



President's Column



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Greetings

The World Cup

We live in interesting times. Many of you who have stayed up until the wee hours of the morning to watch the 2006 World Cup soccer matches can testify to the dynamism and energy of these exciting games. It is clear that from the sheer skill, teamwork, and physical conditions, that the final eight teams have all played superbly. The differences between these frontrunner teams are razor thin. They have all been expertly trained and meticulously prepared for their chance at World Cup Championship glory. They were exciting games indeed.

A Time of Change

We live in a time of change. The CPMT Society is changing to reflect the global nature of the CPMT professionals in industry and academia. And our value propositions are changing to help members and professionals meet challenges arising from the industry's increasing globalization. What are these challenges? Let me give you my personal view. As technical professionals, we practice our trade with our intellectual capital, i.e., our technical knowledge, learned from formal education in schools, universities and later on, "on the job", whether research, development, or manufacturing. We learn that engineering is a team sport. We learn to think and act in a multi-disciplinary fashion. We regularly build up this intellectual capital when new technologies are introduced, or when we take on new responsibilities.

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The CPMT Society Rolls Out the Red Carpet for its 2006 Award Winners

Lights! Cameras! Action! A Hollywood theme set the stage for this year's CPMT Society Awards luncheon, held during the 56th Electronics Components and Technology Conference (ECTC) in sunny San Diego, California. Almost 800 attendees were on hand to celebrate individuals who personify the goals of the Society as well as the profession itself.

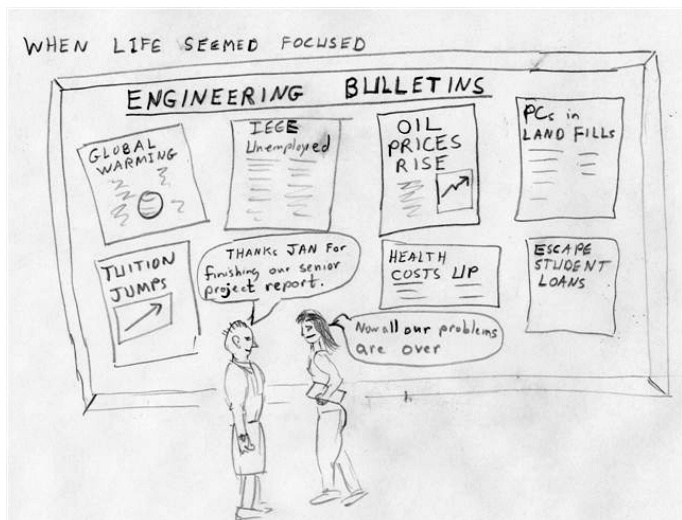
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... Dave Palmer

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2006 Deadlines for Submitting Articles:

September 5th, 2006

December 5th, 2006

March 5th, 2007

Members-only Web (www.cpmt.org/mem/)

UserName:

Password: (Join CPMT, for access!)

President's Column (continued from Page 1)

Two global forces are leading the change: the fast-changing consumer market and the geographically wide-spreading manufacturing facilities across the globe. In addition, IC technology is churning out more advanced dies at each decreasing technology node. Our professionals must understand what technology advancements and new innovations are happening, and how they are being implemented into the product market space. We are challenged to get our intellectual capital in tiptop condition ahead of global changes in the same way that these soccer players have to get their skill and physical condition into tiptop condition ahead of the World Cup competition.

CPMT Technical Conferences & Workshops

How does one learn what is going on technically in our field? I know no better way than to go to a high quality technical conference covering one's particular field of interest. We have just completed two of the most successful conferences: the 56th ECTC Conference and the 29th IThERM Conference co-located in beautiful San Diego from May 26th to June 1st. Without a doubt, ECTC is the best place to understand the latest technology developments in the industry. In addition to the six parallel Paper Sessions, Panel Sessions, Poster Sessions, Professional Education Courses and Technical Exhibits, there were technical committee meetings and special workshops. IThERM is the best specialty conference on Thermal and Thermo-mechanical developments in our industry. From the statistics that I have heard, this was the most successful ECTC ever. From my own observation, it was certainly the most participative. The energy, the vibration, the excitement and the electricity in the air for these four days in San Diego were simply overflowing. Let us thank Patrick Thompson (general chair of ECTC), and Baghat Sammakia (general chair of IThERM) the respective organization committees, as well as the program committees and authors for giving us superb conference experiences in San Diego last month.

Well, what makes a "very good" conference experience become a "superb" conference experience? Is it the quality of the papers? The quality of the professional courses? The panel sessions? Or perhaps all of these combined? I asked a few attendees randomly what they liked about the conferences. Yes, the papers were very important. Yes, they enjoyed the panel sessions. Yes, the professional courses were on target. But, ultimately, it was the "people" factor that created these superb conference experiences. In this internet-driven technical community, meeting people and talking shop face-to-face are becoming so very important to the people-to-people relationship building process. The practice of engineering today requires us to work along and across many layers of supply chain. As we think about the "intellectual capital" that we talked about earlier, the breadth and reach of our network is an integral part of adding a crucial edge to our professional intellectual capital.

Unfortunately, not everyone in our profession was able to go to San Diego for these conferences. This is especially true for those people living outside the United States. However, in our globalization effort, we are sponsoring high quality

technical conferences to benefit people in all regions around the world. Also, there are other technical conferences and workshops in the United States besides ECTC.

Members from the CPMT European chapters have come together to organize the Electronic Systemintegration Technology Conference (ESTC), scheduled to take place in Dresden, Germany during the month of September. The goal is to have a high quality technical conference in Europe to serve the professional community there. The result is a collaborative effort by the CPMT chapters in Europe, and the conference itself has been years in planning. Please check the Web (www.estc-conference.net/) to review the ESTC program and you will agree with me that this is going to be a first class technical conference.

In the coming months there will be technical conferences organized or sponsored by CPMT in the Asia region (www.cpmt.org/conf/).

There is the ICEPT'06 in Shanghai August 26th to 29th sponsored by your CPMT Society. The CPMT Malaysia Chapter is organizing the 31st IEMT in Kuala Lumpur, Malaysia (November 8 – 10). The 8th VLSI Packaging Workshop to be held in Kyoto (December 4-5), is organized by members of our CPMT Chapter in Japan. The IEEE Rel/CPMT/ED Singapore Chapter will again organize the 8th EPTC in Singapore (December 6-8). Finally the 8th EMAP will come back to Hong Kong (December 11-14) under the auspices of Hong Kong CPMT Chapter and HKUST. Each of these conferences is organized by the regional CPMT chapter members for the professional and technical communities of their own regions.

In Phoenix Arizona, a hotbed of professional activity, the IEEE Section, with the CPMT and Wave & Devices Chapters, will present an all-day workshop on Convergence in Communication and Computing on November 17th. This is a great example of a high quality technical event on a really hot topic. As this report is going to press, the Santa Clara Valley Chapter is planning for the next IEMT conference in co-location with the Advanced Materials Workshop in Northern California for the fall of 2007.

CPMT conferences and workshops are organized by our CPMT chapter members. They volunteer countless hours to make the conferences vital, relevant, and enjoyable. They are the heroes behind the many successful conferences. I urge you to consider supporting them through participating in these conferences. It is a great way to brush up your technical knowledge and to expand your personal network systems. Please turn to the next pages of this newsletter to learn about other CPMT sponsored technical conferences and workshops. At the same time there are many Section and Chapter activities not listed in this newsletter. Please check out the CPMT web sites as well as your own local chapter websites for further information. If you cannot find exactly what you would like to see, how about volunteering to organize a technical event -- seminar/workshop -- on a topic that you are passionately interested in?

Access papers from ECTC/IThERM

Visit ieeexplore.ieee.org and download them

Purchase the CD-ROM at

www.cpmt.org/proceedings

Appointment of Two Strategic Directors to CPMT Board of Governors

Marsha S. Tickman

Executive Director, IEEE CPMT Society

The following message is sent on behalf of CPMT President Bill Chen:

I'm pleased to announce two appointments to Strategic Director positions on the CPMT Board of Governors.

Kitty Pearsall (CPMT Member-at-Large 2005-2007) has accepted appointment as Strategic Program Director, Awards. She is taking over this position from Rao Bonda, who was elected Vice President, Technical for 2006-2007. Kitty has an outstanding professional career in IBM. Her great knowledge of the industry and the people make her particularly well-suited to this important responsibility.

Charles Lee (CPMT Member-at-Large 2004-2006) has accepted appointment as Strategic Program Director, Region 10. Charles is succeeding me in this position. In his professional capacity, Charles has developed an extensive global network, particularly in Asia Pacific Region. He has demonstrated great leadership and strong commitment to the CPMT Society in his many contributions in the Singapore CPMT Chapter, as well as in his work as Technical Chair and General Chair at EPTC Conferences.

Please join me in congratulating Kitty and Charles and in supporting their efforts on the Board of Governors.

Regards,

Bill Chen, President, IEEE CPMT Society

Welcome Aboard Kitty Pearsall and Charles Lee!

Kitty Pearsall kittyp@us.ibm.com

Kitty Pearsall received the BS degree in Metallurgical Engineering in May 1971 from the University of Texas at El Paso. She continued at the University in the graduate program until 1972 at which time she joined IBM as a Materials Engineer. In 1976 she left IBM on an educational leave of absence. She received the MS and PhD degree in Mechanical Engineering, Materials Option from the University of Texas at Austin in May 1979 and May 1983 respectively.



Since returning to IBM in 1983, Kitty has served as a technical resource in materials/package engineering in manufacturing, procurement and development environments. Twelve of these years were spent in technical management focusing on the qualification of various commodities.

In April 2005 Kitty was promoted to a Distinguished Engineer. As a DE in the Integrated Supply Chain, her responsibilities include strategic process consultancy to cover definition, introduction and deployment of key supplier quality initiatives for Procurement Engineering in all geographies, with particular emphasis on qualification, assurance and

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supplier quality management for procured commodities. She is a champion for cross-brand, cross-commodity processes across procurement ensuring robust linkage into development, manufacturing engineering and services. Kitty was recognized for her contribution to the IBM technical community by being elected a member of the IBM Academy of Technology in 2005. She has been a licensed Professional Engineer in the State of Texas since 1993; holds 3 US patents and several disclosures that have contributed to the IBM patent portfolio. She has numerous internal publications as well as 17 external publications in IEEE conferences and journals.

Kitty has been a member of IEEE since 1993 and was appointed a Senior IEEE member in 2002. Today, Kitty serves as a Member at Large for IEEE's Component, Packaging and Manufacturing Technology society, a member of the Manufacturing Technology Committee and the Professional Development Community for the ECTC.

(Next issue we will profile Charles Lee)

Meet IEEE CPMT Society Transactions Editors

Avram Bar-Cohen is Distinguished University Professor and Chair of Mechanical Engineering at the University of Maryland. He joined Maryland in 2001 after 15 years in academic and administrative positions at the University of Minnesota. He had earlier held academic positions at the Ben Gurion University (in Israel), the Naval Postgraduate School, and the Massachusetts Institute of Technology. He's also held technical leadership positions at Control Data Corporation (1984-1989) and Raytheon (1968-1972). He holds an SB, SM and the PhD degree in Mechanical Engineering from the Massachusetts Institute of Technology. Bar-Cohen currently serves on the Steering Committee of ASME's Nanotechnology Institute, is the ASME representative for the US on the Assembly for International Heat Transfer Conferences (2002-2006), and is the Editor of the IEEE Transactions on Components and Packaging Technologies. He is the co-author of two books and has co-edited nine books in this field. He has authored and co-authored some 250 Journal papers, Refereed Proceedings papers, and Chapters in books, and has delivered more than 50 Keynote, Plenary, and Invited Lectures at major technical Conferences and Institutions. Nearly all of these have been co-authored with the 49 MS and PhD students that have completed their studies under his direction. Bar-Cohen is a Fellow of ASME and IEEE and has received several national awards from each society.



Dr. Koneru Ramakrishna is the current Editor-in-Chief for Trans. CPT along with Dr. Ricky Lee. Dr. Koneru Ramakrishna [BE (1976), Andhra University, Waltair, India, M. Tech (1978), IIT, Madras, India, MSME (1980), Kansas State University, and Ph. D (1989), University of Pennsylvania] was with IBM Corporation, Endicott, NY from 1988-'94 following the completion of his doctoral degree in heat

transfer and fluid mechanics. His Ph. D thesis dealt with electrical breakdown between a pointed electrode and a plane and the melting of the electrode. At IBM, he worked on assessment of the mechanical reliability of electronic packages and advanced printed wiring boards (PWBs) using simulation and modeling. He conducted an extensive study of the stresses induced in plated through holes in a variety of PWBa during their manufacturing steps. This effort included participation in the development of the first PWB with PTFE as the dielectric and the development of kapton-based TAB packages. Rama is with Freescale Semiconductor, Inc. (formerly Semiconductor Products Sector, Motorola, Inc.) since March 1994. He is currently a Distinguished Member of Technical Staff. Early on at Motorola, Rama conducted experimental and modeling studies to evaluate various thermal enhancements to portable electronic equipment. His work on simulation of thermal performance of an advanced wafer level burn-in system early in its development cycle were instrumental in narrowing down the design options for the system. He contributed thermal solutions in the development of the very first wire-bond PBBA (ball grid array) package used in automotive underhood application for Chrysler. During this project, he developed experimentally verified mechanistic methods linked to package physical design to predict thermal performance of BGA packages. He applied them to ceramic and plastic – flip-chip and wire-bond - for consumer, automotive and wireless applications. Using these methods, he generated an extensive database of the thermal characteristics of these families of packages cover a wide range of parameters of practical interest. He shifted his focus to the development of the state of the art models to predict the effects of Joule heating and limitation they impose on current carrying capability of the copper/low-k interconnects for 130-65 nm nodes in a design environment. These models were later extended to poly resistors. Following this, he worked on the evaluation of intrinsic reliability of copper interconnects with low-k dielectrics for electromigration and stress migration effects in 130 and 90 nm technology nodes. For the past three years, he is working on evaluating the TDDB (time dependent dielectric break down) performance of the on-chip dielectrics for 130 and 90 nm technology nodes using traditional and new methods. He is dividing his time to evaluate the intrinsic reliability of large area MIM decoupling capacitors. At Freescale and Motorola, Rama was actively engaged with mentoring SRC projects in electronic packaging and devices at various universities. He continues to be active in this area.

Prior to the completion of his Ph. D degree, Rama was a Consulting Engineer at the United Engineers and Constructors, a subsidiary of Raytheon Corporation, from 1983-'86. He was involved in evaluating the fluid transients and heat transfer in safety and non-safety systems in nuclear power plants.

Dr. Ramakrishna is a Member of IEEE and a Fellow of ASME. He was the General Chair, ITherm '04, Program Chair, ITherm '02 and Program Co-Chair, ITherm '00. In addition, he co-organized technical sessions on thermo-mechanical and thermal aspects of electronic packages at ITherm '98, InterPack '95 & '97, 2nd ASME/JSME Joint Conference on Electronic Packaging, '93 and at ASME

IMECE conferences. He co-authored more than 50 conference and journal papers and an on-line book chapter on thermal management. Rama is an Associate Editor, IEEE Trans. on Components and Packaging Technologies (since 1998) and ASME Trans. Journal of Electronic Packaging (2003-'06). Rama was the Co-Chair of the Modeling, Simulation and Design TWG, NEMI Roadmap 2000 & 2002. He received 2005 Mehboob Khan Award for outstanding mentoring of the SRC projects and Mentor of the Year (2002) & High Impact Technology (1997) Awards from Motorola, Inc. He co-advised two MSME students on their theses. His current interests are in the areas of on-chip Joule heating effects, intrinsic reliability of Cu/low-k interconnects for future CMOS technology nodes, TDDB behavior of interlayer dielectrics, intrinsic reliability of MIM decoupling capacitors and delamination in Cu/low-k interconnects.



Dr. Shi-Wei Ricky Lee is the current Editor-in-Chief for Trans. CPT along with Dr. Koneru Ramakrishna. Ricky Lee received his PhD degree from Purdue University in 1992. Currently he is Associate Professor of Mechanical Engineering and Director of Electronic Packaging Laboratory (EPACK Lab) at the Hong Kong University of Science & Technology (HKUST). He is also appointed Technology Director of Nano and Advanced Materials Institute (NAMI) Ltd., which is a Hong Kong Government sponsored R&D center. His research activities cover wafer bumping and flip chip assembly, wafer level and chip scale packaging, microvias and high density interconnects, lead-free soldering and solder joint reliability, and mechanics for sensors and actuators. Ricky has substantial publications international journals and conference proceedings. He also owns one US patent and co-authored three books. Ricky is a two-time recipient of JEP Best Paper Award (2000 & 2001) conferred by *ASME Transactions: Journal of Electronic Packaging*. He also won the Best Poster Paper Award of IEEE Electronic Components & Technology Conference (ECTC2004) and the Philips Best Paper Award of International Conference on Electronic Packaging Technologies (ICEPT2005). Furthermore, he serves as Editor-in-Chief for *IEEE Transactions on Components & Packaging Technologies*. He also sits on the Editorial Advisory Board of two other international journals. Ricky is very active in professional societies and international conferences. He is an ASME Fellow, an IoP Fellow, and a Senior Member of IEEE. He was Chair of IEEE CPMT-Hong Kong Chapter (2001-2002), Member-at-large of Board of Governors (2003) and Vice-President of IEEE CPMT Society (2004-2005). In addition, he was General Co-Chair of 2nd International Symposium on Electronic Materials and Packaging (EMAP2000) and 60th Chinese Association for Science & Technology Forum for Young Scientists (FYS2001). Currently Ricky is Chair of ASME-Hong Kong Section and Chair of ASME Electronic & Photonic Packaging Division (EPPD). He will serve as General Chair of 8th International Conference on Electronic Materials and Packaging (EMAP2006).

We will introduce you to our other two Editors-in-Chief in the next issue of the NEWSLETTER.

Interview with Dr. Rao Bonda, CPMT Society Vice President (Technical)

By Dr. Li Li , Associate Newsletter Editor

Editor: Tell us a little about yourself and your family

Rao Bonda: I was born and raised in India. After receiving my BS and MS in Metallurgical Engineering, I came to the US for a Ph.D. I have been married to my lovely wife Sowbha for over 25 years. We have two wonderful daughters; Swathi is in college majoring in business and Sirisha is in middle school.

Editor: Tell us how you got involved in the field of packaging and something about your career.

Rao Bonda: For my Ph.D. (Materials Science and Engineering) at the University of Pennsylvania, I researched the fundamental understanding of high temperature fatigue in nickel-base superalloys. I continued post-doctoral research on the mechanical properties and physical metallurgy of high-temperature alloys until I got an opportunity to apply my expertise in this area to solder fatigue at the IBM T.J. Watson Research Center in Yorktown Heights, NY. This was my first exposure to the exciting field of packaging and the electronics industry. After working on failure mechanisms of Pb/Sn solder alloys and C4 flip chip solder joints, I extended my packaging expertise to the development and qualification of ceramic and plastic packages at IBM Microelectronics Division in Endicott, NY. I joined Freescale Semiconductor (formally known as Motorola's Semiconductor Products Sector) in Tempe, AZ in 1994 as a team leader for the packaging of an optical display module. Since then, I have worked on a wide range of projects involving design, qualification and manufacturing implementation of plastic packages for wireless communication and networking systems applications.

Editor: What do you see as the needs of our members around the world and how is the CPMT Society addressing them?

Rao Bonda: Whether they are experts or just entering the field, career enhancement through technological innovation and interaction with the community in their field of interest are of primary importance to our members. I see an increasing pressure on the electronics packaging community to lower the backend assembly cost, and to achieve this without sacrificing package quality or performance. There is also emphasis on shorter cycle times for development of new packages and processes as well as for production ramp-up. To keep up with this ever changing industry and expectations, our members worldwide feel the need to be technically innovative and know the latest, significant developments in their field of interest. CPMT Society is providing the resources to meet these needs through publications, conferences, workshops, technical committees, education and local chapter activities. The Society ensures accessibility of these programs to all our members by periodic reviews and enhancement of the programs.

Editor: You have taken a new position in the Society as Technical VP starting this year. What are your plans for the Society within your area in short and long term?

Rao Bonda: First, I would like to thank the Society for giving me this important position to serve our members. As the Technical VP, I am responsible for providing the necessary support to our Technical Committees (TCs) so that our members get the highest benefit through TC activities. We currently have 18 Technical Committees that cover various CPMT fields of interest. The role of the TCs is to promote, review and report major developments in their areas. They organize symposia, workshops, and seminars, and arrange special sessions at CPMT-sponsored conferences. They develop tutorial courses in their technical fields and support editors of IEEE Transactions in publishing papers on the latest technologies.

In the short term, I want to make sure that the TCs have the resources they need to make their activities visible to our members. I also plan to form TCs in new and emerging technologies, such as, 3D Packaging and SiP/SoP. In the long term, I continue supporting the TCs for increased participation in conferences, publications and local CPMT chapter activities worldwide.

Editor: What would be your advice to engineers who are in or entering this field for career growth?

Rao Bonda: The fields encompassed by the CPMT Society are highly interdisciplinary and present tremendous opportunities to interact with engineers from different backgrounds. Whatever their formal education is in, engineers in this field invariably will have to deal with various aspects of packaging and work on diverse projects simultaneously. Therefore, adaptability and teamwork are extremely important. Often, the team includes customers and suppliers, as well as their colleagues, so personal skills are also essential. All these aspects make working in this field very interesting and challenging. It offers great prospects for career growth, but requires one to be very agile.

Editor: Where could the Society and you use help from members?

Rao Bonda: Members can help the Society by actively participating in its programs and utilizing that learning for their professional growth. This is essential to the growth of local chapters, conferences, Technical Committees, membership, and other programs, and to the growth of the Society as a whole. With respect to the Technical Committees, we need volunteers to join the TCs and support them actively. I also need input or ideas from members concerning the TCs.

Editor: What do you like to do in your spare time?

Rao Bonda: I like to spend my spare time with my family, exercising at a health club and watching Telugu (my native language) and Hindi movies. I also spend my spare time on other volunteer work for the CPMT Phoenix Chapter, IEEE Phoenix Section, ECTC and other professional and non-profit organizations in Phoenix area.

Editor: Thank you, Rao.



Dr. Rao Bonda and his family with Minnie Mouse at 2005 ECTC Gala Reception in Orlando, Florida

Interview with Rolf Aschenbrenner, CPMT Society Vice President (Conferences)

By Debendra Mallik, Associate Newsletter Editor



Editor: Tell us a little about yourself and your family.

Rolf Aschenbrenner: I grew up in Southern Germany and I moved to Berlin in 1993. Berlin is a very special city and a rapidly-developing metropolis and I really enjoy living in such an interesting place that has gone through so many big changes, such as the separation into East and

West and the reunification after the fall of the Berlin Wall. I have been married since 1995 and I have two daughters at the age of 13 and 15 years which also appreciate to live in such a great place like Berlin.

Editor: Tell us how you got involved in the field of packaging and something about your career.

Rolf Aschenbrenner: I studied at the University of Applied Science in Gießen, Germany, and I received the B.S. degree in mechanical engineering in 1986 and the M.S. degree in physics from the University of Gießen in 1991. From 1991 to 1992 I worked at the University of Gießen in the area of new materials and was engaged in a project where I worked as a physicist preparing experiments for the German Space Lab Mission D2.

I got involved into packaging by chance. When I moved to Berlin I found a job at the Research Center for Micro-peripheric Technologies at the Technical University of Berlin where I got in contact with microelectronic packaging for the first time, working together with Prof. Reichl. In the beginning I worked in the area of electroless metal deposition. Since March 1994 I have been employed at the Fraunhofer Institute for Reliability and Microintegration Berlin (IZM) where I built up a team in the area of flip chip interconnects with adhesives. In 1997 I became head of the department of Chip Interconnection Technologies, which has

more than 30 employees and is one of the biggest departments of the institute. In the meantime I also served as Deputy Director of the Fraunhofer Institute IZM and for this reason I was involved in various activities in Germany, on the level of the European Union as well as worldwide ones.

Editor: What do you see as the needs of our members around the world – what are the most important issues the CPMT Society can address?

Rolf Aschenbrenner: In my opinion one of the most important issues of the Society is networking. It is great to work together in a community of excellent experts and these contacts are very helpful to get to know other people worldwide. The exchange of knowledge and creative ideas also result to be very valuable and I would always encourage people to form part of this community.

Editor: What are your visions for the society in short and long term?

Rolf Aschenbrenner: I am supporter of the globalization and my main aim is to unite and enhance the activity of scientific and industrial colleagues that are working in the field of electronic packaging and manufacturing technology not only in Europe but also worldwide. In my opinion it is very important that the packaging community of Europe, Asia and America grows together.

Editor: What are your plans for the Society within Conferences and Workshops?

Rolf Aschenbrenner: My main goal as Vice President Conferences is to make the conferences sponsored by IEEE CPMT more attractive to the participants. In my opinion the existing conferences should be qualitatively improved – if necessary. Conferences with similar topics should be combined and it should be avoided that the number of conferences increases if there is no qualitative benefit from it. Another objective is to establish the ESTC as an important European conference. Furthermore I am working on pushing ahead the collaboration with IMAPS in Europe.

Editor: What would be your advice to engineers who are in or entering this field for career growth?

Rolf Aschenbrenner: I think the field of packaging is a very fascinating one, especially because of interdisciplinarity. Many different sectors are involved such as mechanical/chemical and electrical engineering. The fact that interdisciplinary collaboration breaks the limiting factors of the specialist fields facilitates and stimulates the development of creative ideas. But it also makes the ability to work in a team a necessary prerequisite for the professional career.

I would advise you professionals of this field to join the IEEE CPMT Society and use its very helpful networking potentials.

Editor: What's a good book you have read recently?

Rolf Aschenbrenner: The last book I have read is called "Der Schwarm" (an English translation would be "The Swarm") by a German author named Frank Schätzing. In his book Frank Schätzing stages the worldwide rebellion of nature against mankind. He sketches a global catastrophe scenario between Norway, Canada, Japan and Germany. The novel is full of psychological and political dramas and it is extremely exciting until the very last page. The book is a balancing act between popular scientific rep-

resentation and science fiction similar to Dan Brown's "Da Vinci Code".

Editor: What do you like to do in your spare time?

Rolf Aschenbrenner: In my job I have to travel a lot (to conferences, project meetings, road map meetings etc.). Since I really enjoy travelling all these trips around the globe do not cause stress to me. I would only wish that I had more time to see more of the interesting sights of the countries I visit.

When I am at home during the weekends I enjoy cooking for my family and friends. For me cooking is a challenge and when I travel I get a lot of ideas that I try to put in practice when I am at home. My favourite cuisines are the Asian and the Italian ones.

Editor: Thank you, Rolf.

Interview with Dr. David W. Palmer, CPMT Society Fellow

By Vasudeva P. Atluri, Newsletter Editor



Editor: Tell us a little about yourself and your family.

Dave Palmer: I have worked for a National Laboratory for more than 3 decades. Most of my contribution has been in building and packaging electronic components for harsh environments (low and high temperatures, shock, radiation). During this period I also lived in the same house with the same spouse raising 3 children who were strongly and strangely influenced by commercial electronics.

Editor: Tell us how you got involved in the field of packaging and something about your career.

Dave Palmer: In grad school while experimenting with low temperature electronics, the importance of designing packages for thermal management, high frequency transmission, and miniaturization became very clear. The fact that packaging was not at that time considered interesting in academia also made it appear as the forbidden fruit. Sandia Labs hired me immediately upon graduation to help their team design and build hybrid microcircuits rather than printed wiring boards. Being able to operate a wire bonder, do photolithography, and build thin film vacuum deposition chambers were not common student skills in the early 70s and were admired by hardware-delivering employers more than your grade in quantum mechanics.

Editor: What do you see as the needs of our members around the world – what are the most important issues the CPMT Society can address?

Dave Palmer: Basic member needs are fixed but the way CPMT and the world address these needs are changing. The first need is to gather information that will help our members complete their projects. The library stack search of my youth has given way to the Internet search of the IEEE data

base. After learning from publications, our members next need to bounce their ideas/designs off of colleagues. CPMT activities give many opportunities to meet experts outside of your own company who can give candid feedback. This natural networking by volunteering in CPMT is often not understood by those that have not been active. A third need is for continued "formal" education. The Tin whisker Workshop, the Professional Development 4 - 8 hour classes, and the panel discussions at ECTC have been enormously helpful for many of the projects in my career. CPMT could expand their offering over the Internet of both technology tutorials and keynote addresses on the state of our industry. In fact, having a picture-filled dictionary of terms and abbreviations used in the packaging business would be great. At least once a month I run across a term that is not clear and have to scramble through many books and web sites to nail it down.

Editor: What are your visions for the society in 5 to 10 years?

Dave Palmer: The CPMT society has been re-defining itself continually for the 25 years I have volunteered. As newsletter editor for 22 years I saw the power of electronic delivery of edited meeting reviews, society volunteer news, and upcoming meeting announcements. It is very motivating to a hard-working conference volunteer to get their picture and written acknowledgment in a newsletter that goes to 4000 fellow members. The power of quick delivery in a colorful format make me expect that all our Society news will come exclusively over the Internet within 5 years. (I made the same prediction 5 years ago).

The CPMT Society has definitely tried to be more visible to the component and packaging community in the last 5 years. The Society has also grown more global during this period. The number of sponsored meetings and pages of publications have probably doubled in the last 10 years. It is probably impossible for one person to make all the CPMT-sponsored meetings around the world (why one would want to go to that many meetings is another mystery), or read all the published pages. We will probably develop the ability to provide members with streaming video of keynote and technical presentations at any of our meetings. A member may not be able to make the Hong Kong meeting but can still watch two of the presentations on a home computer. Even our biggest meeting (ECTC) only has about 20% of our members in attendance so "partial" attendance would be a nice step forward. We will also probably develop "condensation" experts. These experts will distill the many presentations and publications in quickly evolving areas so that a member can get up to speed in 10 minutes of study. Right now there is little professional recognition or career benefit for this specialty but the savings of time for our members will demand such a service.

Editor: What are your plans for the Society?

Dave Palmer: I intend to continue providing small input to each newsletter (cartoons, book reviews) and helping our annual quest to find Fellow Candidates. I have considered developing some electronic tutorials on component subjects and placing these on the Members-only web pages. However, I decided to let the next generation of engineers take over my traditional roles. As a rule of thumb, volunteer positions should not be assumed for more than 5 years. Many volunteers in each generation should have opportunities to perform the many Society tasks.

Editor: What would be your advice to engineers who are in or entering this field for career growth?

Dave Palmer: The best advice I received was from a past president of CPMT, Skip Porter. He called me up one day when I still was struggling finding a place at Sandia. He said there were many ways to help the Society. He gave me a list of openings and asked me to pick 2. I was most comfortable with newsletter editing and with Rules of Order. So I became editor and keeper of the Constitution. So find a list and pick at least one.

Once you are a real volunteer and not just an attendee, the opportunities to continue education and to publish will be obvious.

I'm afraid I am beyond help from our Society members. I am getting ready to retire and everyone in the Society, especially those that have retired from several employers, do not seem to know how to retire. In contrast, it is good to see that former president Rao Tummala has played some golf in many parts of the world after decades of packaging technology concentration. Most packaging and component engineers appear to successfully follow their main expertise forever. However, there are so many exciting paths to follow, as rewarding as CPMT has been for me, it is time to head off in other directions.

Editor: What's a good book you have read recently?

Dave Palmer: I love books, often haunting libraries and book stores. Recently I was amazed by a book about the artist Hieronymus Bosch. I am currently savoring "War with the Newts" by Karel Capek, the man the coined the term "robots".

Editor: What do you like to do in your spare time?

Dave Palmer: In the hundreds of hours I have saved by not editing the last few issues of the CPMT newsletter, I have had enough spare time to put a new roof on the family home. Civil engineering is hard work but has a very tangible final reward. Vegetable gardening is another hobby, one with very edible rewards.

Editor: Thank you, Dave.

The 56th ECTC May 30th – June 2nd, 2006

The 56th Electronic Components and Technology Conference (ECTC) was held May 30 through June 2, 2006 at the Sheraton San Diego Hotel and Marina in San Diego, California. This premier international conference brings together the best in packaging, components, and microelectronic systems science, technology, and education. The ECTC is jointly sponsored by the IEEE Components, Packaging and Manufacturing Technology Society (CPMT) and the Electronic Components, Assemblies, and Materials Association (ECA), the electronic components sector of the Electronic Industries Alliance (EIA). IThERM and ECTC are co-located in even-numbered years to provide attendees with even more opportunities for technical exchange and professional interaction.

The Executive and Program Committees of the 56th ECTC would like extend sincerest thanks to all the authors, presenters, instructors, session co-chairs, program committee members, exhibitors, and our conference and corporate sponsors for making the 56th ECTC so successful.

ECTC consists of three major parts: the technical program, the professional development courses, and the technical exhibit corner. Contributions from more than 20 countries made ECTC a truly global conference. Authors from companies, research institutes, and universities located around the world presented 314 papers at thirty-six oral sessions and two poster sessions to about 1,150 conference participants. Participants caught up with new technology developments and broadened their technical knowledge base in the sixteen professional development courses offered by world-class experts in their fields. The papers and courses covered a wide spectrum of topics, including electronic components, materials, processing, assembly, advanced packaging, system packaging, manufacturing, optoelectronics, interconnections, quality, reliability, modeling and simulation. Emerging technologies topics sessions addressed exciting new developments and applications in biotechnology and nanotechnology. The Technology Corner managed by Bill Moody helped seventy-four leading companies, primarily in the electronics components, materials, and packaging field, showcase their products and services to the engineers attending both ECTC and IThERM conferences.

The technical program was complemented by three special evening sessions. William Chen, IEEE-CPMT Society President, chaired the panel discussion featuring industry leaders on "3D Packaging and Novel Interconnects." Torsten Wipiejewski, the ECTC Program Chair, chaired the plenary session entitled "Look into the Crystal Ball: Arising New Applications, Technologies and Challenges," which showcased leaders from the semiconductor industry presenting their views on the opportunities and challenges of today's global manufacturing environment." Yoshitaka Fukuoka from Weisti chaired a CPMT technical committee seminar highlighted leading edge developments in high density interconnect technology, "Advanced Substrate Technologies for SiP/SOP."



ECTC 3D Packaging and Novel Interconnects Panel Speakers

JOIN the IEEE CPMT Society

Relevant Information can be obtained at
www.cpmt.org



ECTC Look into the Crystal Ball: Arising New Applications, Technologies and Challenges Plenary Session Speakers

Co-chairs Ron Gedney of iNEMI and M. E. Williams of NIST and moderator H. Leidecker of NASA organized the pre-conference Tin Whiskers Workshop, that provided experimental updates, introduced new analytical tools, and offered insights into tin whisker formation and growth mechanisms. The International CPMT Academic Conference was again held in conjunction with ECTC. This one-day program chaired by Rao Tummala addressed new directions of education in the packaging field.

The ECTC General Chair, Patrick Thompson, hosted the ECTC luncheon. The keynote speaker, Todd Bayer, Chief Engineer of the Mars Reconnaissance Orbiter, spoke about the technology being used in the next phases of Mars exploration.



ECTC Lunch Speaker Todd Bayer

The Vice General Chair, Eric Perfecto, awarded the 2005 Best Paper Awards for the previous year's conference:

- The Best Paper was awarded to M. Kaysar Rahim, Jeffrey C. Suhling, Richard C. Jaeger, and Pradeep Lall from Auburn University for "Fundamentals of Delamination Initiation and Growth in Flip Chip Assemblies."
- Outstanding Paper was awarded to B. E. Lemoff, M. E. Ali, G. Panotopoulos, E. de Groot, G. M. Flower, G. H. Rankin, A. J. Schmit, K. D. Djordjev, M. R.T. Tan, A. Tandon, W. Gong, R. P. Tella, B. Law, and D. W. Dolfi from Agilent Technologies for "500-Gbps Parallel-WDM Optical Interconnect."



ECTC Vice General Chair, Eric Perfecto, Presenting Best Paper Award

- The Best Poster Paper was awarded to I. Ndip, W. John, and H. Reichl from Fraunhofer Institute for "Effects of Discontinuities and Technological Fluctuations on the RF Performance of BGA Packages."
- The Outstanding Poster Paper was awarded to G. Carchon, A. Jourdain, and H. A.C. Tilmans from IMEC; O. Vendier from Alcatel; and J. Schoebel from R. Bosch for "Integration of 0/1-Level Packaged RF-MEMS Devices on MCM-D at Millimeter-Wave Frequencies."

The CPMT society hosted Thursday's luncheon, where awards were presented to several ECTC committee members. C.P. Wong was awarded the IEEE Technical Field Award, John Segelken and Connie Swager received the David Feldman Outstanding Contribution Award, and IEEE Fellows were awarded to William Chen, Michael Leiby, Johan Liu, Michael McShane, and Madhavan Swaminathan.



Dr. William T. Chen, IEEE CPMT Society President, presiding over the CPMT Society Luncheon.

Torsten Wipiejewski, moderated the Friday Program Chair's luncheon. The Motorola Packaging Fellowship, a three-year fellowship grant of \$21,100 to the student's university, was presented by Andrew Skipor. The winning student was **Arindam Goswami**, University of Maryland for his paper "On Ultra-Fine Leak Detection of Hermitic Wafer Level Packages."

The Intel Best Student Paper Award, a \$2500 cash prize given to the best student presentation in the area on modeling or advance

packaging, was presented by Debendra Mallik. The winning student was Lingbo Zhu of Georgia Institute of Technology for “*In-situ Opening Aligned Carbon Nanotube Films/Arrays for Multichannel Ballistic Transport in Electrical Interconnects.*”



Torsten Wipiejewski, ECTC 2006 Program Chair, Presiding over ECTC Program Chair Luncheon



Andrew Skipor of Motorola Inc. presenting Motorola Packaging Fellowship to Arindam Goswami, Univ of Maryland.



Debendra Mallik of Intel Corporation presenting Intel Best Student Paper Award to Lingbo Zhu of Georgia Institute of Technology

The 57th ECTC will be held from May 29 to June 1, 2007 at John Ascuaga’s Nugget in Reno, Nevada. Abstract and course proposal submissions are due by October 15, 2006 and can be submitted on line at www.ectc.net starting in mid-August. For additional information, contact the 2007 Program Chair, Rao Bonda, Freescale Semiconductor, Inc., +1-480-413-4511, rao.bonda@freescale.com.

The CPMT Society 2006 Award Winners (continued from Page 1)

Lights! Camera! Action! A Hollywood theme set the stage for this year’s CPMT Society Awards luncheon, held during the 56th Electronics Components and Technology Conference (ECTC) in sunny San Diego, California. Almost 800 attendees were on hand to celebrate individuals who personify the goals of the Society as well as the profession itself.

The guests were seated around tables that included “walk of fame” stars highlighting individuals who have made or continue make significant contributions to the electronics and packaging industry. The names of historical pioneers such as Jack Kilby and Gordon Moore were intermingled with today’s “stars” such as Yutaka Tsukada and Rao Tummala, demonstrating just how important people are to the profession and to the Society.

William T. Chen, President of the CPMT Society, opened the ceremony with a few words. “The collective work of our industry has contributed to a world driven by transistors and electronics. We have seen great improvements in transportation, medical applications, communications, and other life-affecting industries. These are very good things.” said Chen. “And we all stand on the shoulders of brilliant engineers and scientists who came before us, building on their discoveries to make our own research and breakthroughs possible,” he added.

Here is a recap of this year’s award winners:

The 2006 IEEE Technical Field Award

The *IEEE Components, Packaging and Manufacturing Technology Award* was presented to **C.P. Wong** (Georgia Institute of Technology, USA) for his contributions in advanced polymeric



materials science and processes for highly reliable electronic packages. IEEE-USA President (and former CPMT Society president) **Ralph W. Wyndrum, Jr.** presented the award. Wong’s extensive list of accomplishments includes 40 U.S. patents, over 450 published technical papers and numerous other CPMT Society awards. Wong thanked his personal mentors, including **Rao R. Tummala** (also a former CPMT Society president) who brought him to Georgia Tech, and his colleagues and students, whose support and collaboration were essential to his achievements. Always humble, Wong suggested that there were many in attendance equally deserving of the honor. Wong received a certificate, a bronze medal and an honorarium.

The 2006 CPMT Society Awards

Chen and **N. Rao Bonda**, CPMT Society Awards chair, presented the awards to academics and industry leaders alike.



- **Ning-Cheng Lee** (Indium Corporation of America, USA) received the *Exceptional Technical Achievement Award* for his contributions to surface mount technology and electronic packaging assembly. Lee is the Vice President of Technology for the Indium Corporation of America. His pro-

found contributions to the electronics industry, particularly the SMT industry, span over two decades and his work has enabled the establishment of scientific reflow profiling optimized manufacturing performance. Lee's findings have received critical peer recognition, and his papers have become the seminal text for the SMT industry.

- **Jorma Kivilahti** (Helsinki University of Technology, Finland) was awarded the *Outstanding Sustained Technical Contribution Award* for his contributions to the devel-



opment of novel electronic and optical integration techniques and the reliability of electronic products. Kivilahti heads the laboratory of electronics production technology as well as the National Graduate School of Electronics Manufacturing, both in the Department of Electrical and

Communications Engineering at the Helsinki University of Technology. He has also made several distinguished technological and scientific contributions to increasing the understanding and control of the failure mechanisms behind the reliability of electronics. He has received the Order of the White Rose of Finland (Knight). Unable to attend the event, Kivilahti's award was accepted on his behalf by a former student, **Kari Kuloj-rvi**, Director, Mechanics and Miniaturization, Technology Platforms, Nokia, Finland.

- **Nasser Grayeli** (Intel Corporation, USA) received the *Electronics Manufacturing Technology Award* for his con-



tributions to electronic packaging and assembly technologies through his leadership in Intel Corporation and the International Electronic Manufacturing Initiative (iNEMI). Grayeli is Intel's Vice President, Technology Manufacturing Group Director, Assembly Technology Development. His contributions include establishing a technically

competent organization at Intel to develop electronic packaging and assembly technologies for use in the high volume manufacturing of microprocessor, chipset, wireless and communication products. He also contributed to the development of an electronic packaging certification and degree program and research center at Arizona State University



- **Connie Swager** and **John Segelken** (Consultants, USA) were awarded the *David Feldman Outstanding Contribution Award* for their exceptional and sustained leadership in the CPMT Society and the Electronic Components and Technology Conference (ECTC) in numerous roles. Swager worked at IBM for almost

20 years spanning semiconductor packaging engineering, procurement and supply chain management, marketing and e-business consulting. Segelken completed a 30-year career with Bell Labs spanning research, design and development, and supply chain management of electronic components. Both Swager and Segelken held several leadership positions in the CPMT Society and were elected Board of Governors. They are also both former General Chairs of ECTC.



Many up-and-coming engineers were nominated for the *Outstanding Young Engineer Award*, but two exceptional candidates stood above the rest. So the Society honored them both.

- **Ravi Prasher** (Intel, USA) was honored for his contributions to thermal design and management of electronic packages, in-



cluding microchannel based cooling, nanofluidics, and thermal interface materials, and for supporting CPMT Society activities and journals. His nanotechnology work has resulted in a well-respected program at Intel. He holds 11 U.S. patents with an additional 21 pending. In addition to his work at Intel, he is an adjunct professor at Arizona State University where he co-developed a graduate level nanoscale thermal transport course.

- **Tek-Joo Goh** (Intel Asia-Pacific, China) was honored for his contributions to microelectronic packaging research and devel-



opment, and for supporting CPMT Society activities and journals. Goh is the operations/technical manager for Intel's Asia-Pacific research and development organization. He has led thermal and mechanical engineering teams in the Assembly Technology Development Group of Intel to enhance thermal/mechanical design, model-

ing, characterization and validation.

The *IEEE Transactions on Components and Packaging Technologies Best Paper Award* honors the most outstanding paper published in 2005. This year's winning paper, "Increasing the Accuracy of Structure Function Based Thermal Material Parameter Measurements" was published in the March 2005 issue. **Márta Rencz** accepted the award from **Paul Wesling**, CPMT's Vice President of Publications. The paper was authored by **Márta Rencz** and **András Poppe** (both with MicReD, Ltd., Budapest, Hungary) as well as **Ernő Kollár**, **Sándor Röss** and **Valdimir Székely** (all with the Department of Electron Devices, Budapest University of Technology and Economics, Budapest, Hungary).



Student chapters offer a sense of professional community at the university level. One student chapter put in many hours to coordinate campus meetings and activities that allow students to enhance their knowledge and hone their leadership skills.

The *Student Chapter of the Year Award* went to the **Chalmers University of Technology** (Gothenburg, Sweden). Chapter advisor **Johan Liu** and chapter treasurer, **Dimitar Kolev**, accepted the award. Additional chapter officers include **Yue Qu**, President, **Mohammad Kamruz-zaman Chowdhury**, Interim President, **Mohammad Najmzadeh**, Vice Chairman and **Björn Carlberg**, Secretary.



Finally, the Society took this opportunity to honor its 2005 IEEE Fellows who were in attendance at ECTC. **Ralph Wyndrum** presented certificates to:

- **William T. Chen** (ASE Group, USA) for contributions to packaging and assembly technology.
- **Paul Franzone** (North Carolina University, USA) for contributions to chip-package codesign.
- **Johan Liu** (Chalmers University of Technology, Sweden) for contributions to environmentally compatible electronic materials and processes.
- **Gary May** (Georgia Institute of Technology) for contributions to semiconductor manufacturing and engineering education.
- **Michael McShane** (Freescale Semiconductor, Inc., USA) for contributions to the advancement of semiconductor packaging.
- **Qi-jun Zhang** (Carleton University, Canada) for contributions to linear and nonlinear microwave modeling and circuit optimization.

If you know a colleague who deserves recognition, please visit www.cpmt.org/awards for more information and awards criteria.

CALL FOR CANDIDATES

The CPMT Society is governed by a Board of Governors composed of officers, 18 elected members-at-large, and various committee chairs and representatives (see inside cover of this Newsletter for details.) Annually, Society members are asked to elect six members-at-large for a three-year term of office. Candidates for member-at-large are selected in two ways -- either by the Society Nominating Committee, or by petition. This year's election is the second in which members-at-large will be elected to achieve totals proportionate to the geographic distribution of CPMT members. This translates as follows:

Regions 1-6, 7 and 9 (US, Canada, South and Central America): elect 3 (for total of 12)

Region 8 (Europe, Africa, Middle East): elect 1 (for total of 3)

Region 10 (Asia/Pacific): elect 2 (for total of 3)

Voting members will elect members-at-large from within their Region only (that is, members in Region 8 will vote for members-at-large from Region 8, etc.)

If you are an IEEE and CPMT Society member in good standing and are interested in serving on the Board of Governors, you can become a candidate via petition by following the procedures below. Members of the Board of Governors must be willing to attend two annual Board meetings and participate actively in areas of their interest (publications, conferences, membership development, chapter development, etc.) The term of office for this election is 1 January 2007 through 31 December 2009.

- Prepare a petition that contains your name, member number, and statement of your qualifications for office.
- Provide lines for signatories. Each line should include space for a printed name, member number, and signature.
- Have the petition signed by a MINIMUM of 25 CPMT Society members in good standing (Student grade members are not eligible to sign.)

Membership status of all signatories will be validated. It is suggested that you gather more than 25 signatures in order to assure

meeting the minimum required number of valid signatures. Submit your petition by no later than Friday, 21 July 2006

to:

CPMT Society Nominations Committee
c/o Marsha Tickman
IEEE CPMT Society Executive Office
445 Hoes Lane, PO Box 1331
Piscataway, NJ 08855-1331 USA
or FAX to 732-981-1769.

If you have questions or need additional information, contact Marsha Tickman at the above address, by phone at 732-562-5529, or by e-mail at m.tickman@ieee.org.

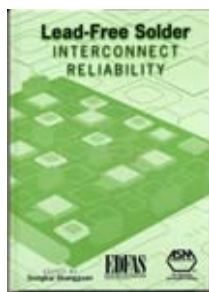
Book Reviews

The Summer the World went Lead-Free

We are reviewing two comprehensive books that are references to the large scale conversion of our industry from its 63% Sn 37% Pb roots to more legislative acceptable alternative solders. This transformation first surfaced in the late 70s in Europe and studies have slowly convinced engineers company-by-company that change is possible without dropping the high performance of their products. There are only a few blessed materials in electronics: crystal silicon, copper wire, and eutectic Sn/Pb. There is one less now.

I suspect that only old engineers remember the magic at their father's or teacher's workbench in discovering a hot iron with the smell of rosin could take a stick of metal and induce smooth silver flow onto copper wire. Frank Howland of AT&T was fond of lamenting that at first we only asked solder to protect our twisted wire from the ravages of gas diffusion caused corrosion but now we ask it to often solely perform mechanical, thermal, and electrical functions. "Never has so much been asked of so little." Although these books can not provide the same eye-opening solder magic to a new generation of "electronikers", they do reassure the experienced engineer that there is lots of support in their continual struggle to produce high quality assemblies. We applaud all the writers for their major effort in supporting this transformation.

This switch in baseline solder is massive for each individual company as well as for our industry. The characteristics of which solder is used effect the components, the mother boards, the flame retardants acceptable in encapsulates, and every detail of the manufacturing processes. These books provide the common wisdom but also alert the engineer of the danger signs to look for even when keeping on the safe path.

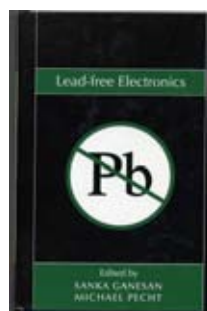


Lead-Free Solder: Interconnect Reliability -- Dongkai Shangquan, editor. ASM International 292 pages, \$195 (US).

As editor, Dongkai Shangquan provides an introductory perspective and a summary of points for continued concentration. This book is excellent for a researcher trying to decide who/what

has been done in the area and what still needs to be attacked. This book does not directly address aiding a production engineer to switch over a process line. However, the owner of a line in trouble would find plenty of aid in root cause determination in this book. This book is also excellent for a weekend study by a manager not on the production floor but faced with helping decide the transformation of production.

Highlights include the clear pictures and graphs on fatigue and creep by P. Vianco. The clear comparisons between lead and lead-free in joint reliability by J. Clech which discusses the practical considerations of assemblies with both solders. A good discussion on flux residue and its often 5 dB effect on pagers and cellular phone assemblies is included in a chapter by L. Turbini. A good tutorial on accelerated testing (and shortcomings) is cast by G. Grossmann toward Pb-free assemblies. R. Ghaffarian gives great aid to the beleaguered failure analysis engineers pitted against the new solders.



Lead-Free Electronics -- Sanka Ganesan and Michael Pecht, editors. Wiley-IEEE, 766 pages, \$100 (US), 2006 edition.

This book is excellent for the manufacturing practitioner and their MBA support. At first the size of the book evokes fear of a CALCE shovel job but, in fact, the pages are needed for the extensive review of the many alloy options and the many reliability studies. There is a slight legacy of the original edition in that all possibilities are still discussed with only moderate emphasis on the alloy path currently being taken by most of industry. This may prove the best long range approach to presenting the material since only one major long term failure mode will have many in industry and academia scurrying to back-up alloys.

Highlights include the extensive alloy review by Y. Fukuda and S. Ganesan; the in-depth treatment of surface mount process options for both reflow and wave soldering by S. Rao, J. Bath, and H. Ladhar; a complete review of reliability research by S. Ganesan; a great tutorial on Separable contacts and connectors by J. Wu and M. Pecht (Sn-Ag-Cu is worse at aging but more resistant to fretting); the tangled IP web we have woven by P. Casey and M. Pecht; and the Guidelines for production change presented as answers to frequently asked questions by V. Evely and a gang of co-authors.

For the low price, everyone with electronics assembly responsibilities should have access to this book.

Workshop Reports

EMAP 2005

Mami Yamashita, Secretary

Dear Participants of EMAP 2005,

Thank you for joining the Conference once again. I have uploaded some of the pictures taken during the conference and the tour. Please take a look at the album and if you have any additions, please feel free to send me. I will be happy to work with them.

www.sms.titech.ac.jp/emap2005/album/album.html

The pictures of the general sessions are not in the order of the session program. I am sorry but I was just incapable of doing that! Please look for and find yourself.

Season's greetings and best wishes for a prosperous New Year!!

With best regards,

Mami Yamashita, Secretary
EMAP 2005 Secretariat

(See the Call for Papers for EMAP'06 in Hong Kong,
December 11-14, 2006, [later in this Newsletter](#))

Chapter News

Region 10 Chapter Activity Round-up

By **Dr. P.B. Parikh**, Region 10 News Coordinator

Malaysia Chapter:

Dr. Ch Chew –Chairman of CPMT Chapter, Malaysia has reported having planned a number of Technical activities for this Chapter including IEMT 2006 which scheduled at Kuala Lumpur from 8th -10th November 2006. This event will feature 4 Distinguished Lecture Programs, 3 parallel technical sessions (paper presentation), and exhibition. A number of distinguished members of IEEE and Leading experts in the IC packaging have confirmed short courses and keynotes talks as under:

- **Bernie Siegal** - Short Course on “Thermal Test Methods for Integrated Circuits”.
- **Dr. Rolf Aschenbrenner** - Short Course on “Emerging Technology In IC Packaging”.
- **Dr. Annette Teng Cheung** - Short Course on “Wafer Dicing Technology”.
- **Dr. John H. Lau** - Short Course on “Design, Material, Process and Reliability of Pb Free Packaging and Assembly”.
- **Carlo Cognetti** – Keynote talk on “Packaging and Manufacturing Evolution”.
- **Dr. Dongkai Shangguan** - Keynote talk on “Packaging and Board Assembly Technology Trend and Impact on the Supply Chain”.
- **Charles Vath** – Keynote talk on “Interconnect Technology”.
- **Kin Gan** - Keynote talk on “Assembly Technology and Challenges”.
- **Yee Eh Horng** - Keynote talk on “Test Challenges and Trends”.

The new Committee of the Chapter has launched a special membership drive inviting membership to leading industries in IC packaging including material suppliers and government bodies. The Chapter is targeting to increase the total membership by 30 % by year end.

The Chapter also aims to provide good coverage and knowledge sharing on technological developments in all areas of electronics packaging and manufacturing technology.

The chapter has announced that one of their Chapter CPMT members, **Dr. Teck Joo Goh** has been awarded the “Outstanding Young Engineer” for 2006 for his significant con-

tributions to the growth of Malaysia IEEE CPMT Chapter and semiconductor packaging community. The CPMT Chapter was also awarded as one of the most active IEEE Malaysia Chapters during 2005 IEEE Malaysia Section dinner.

The Chapter Officers and the Committee members for 2006 have been announced as under:

Chair: **Dr. CH Chew**, ON Semiconductor

Vice Chair: **Dr. Ishak Abdul Azid**, University Science Malaysia

Treasurer: **Azhar Aripin**

Committee Members: **Dr. Chee Choong Kooi**, Intel

Wee Teck Lim, ON Semiconductor

Fuaida Harun, Infineon

Shutesh Krishnan, ON Semiconductor

L.C. Tan, Freescale

Taipei Chapter:

Prof. Lih-Shan Chen- Chairman of Taipei Chapter had reported that the Chapter will co-organize with IMAPS Taiwan Chapter for the “2006 International Symposium on Advanced Packaging and Green Packaging Technology”, as 4 day event to be held from June 28th to July 1st, 2006 at the Taipei World Trade Center, Taipei, Taiwan. More than 100 papers are likely to be presented in the Technical Sessions and a combined Ferro Technical Session. Topics will cover the latest developments on advanced packaging and green packaging technology.

Invited keynote speakers are:

- a) **Dr. C. Robert Kao** - Institute of Materials Science & Engineering, National Central University, Taiwan.
- b) **Dr. Kyung W. Paik** - Korea Advanced Institute of Science and Technology, Korea.

Besides, a short course entitled “Accelerated Testing; Ways to Understand Reliability Quickly and Accurately” will be given by **Dr. Michael Pecht** (Director of the CALCE Electronic Products and Systems Center at the University of Maryland).

China Chapter:

CPMT Shanghai, China

Dr. Wen-Yan Yin of CPMT Shanghai China has reported that the Chapter has planned an International work shop on EDAPS 2006 on December 17th and 18th with an objective to enhance the technical awareness in the area of packaging and on-chip system electrical design concepts. The event will focus on issues and challenges ahead for next generation electronic products.

The following topics are proposed to be covered-

- Computer-Aided Design Issues for SoC and SiP/SoP Modeling and Design;
- EM and Thermal Modeling for SoC and SiP/SoP, Electrical Design and Modeling, with Experimental Verification;
- Field-Circuit Interactions and Simulations;
- Interconnect Modeling, Design, and Testing for System-on-Chip (SoC Mixed Technology Modules Nanotube and Nanowire);
- Interconnects Optical Approaches to Packaging;
- On-Chip High-Power and Ultra-Wideband EMC and EMI;
- Power Delivery and Low Power Consumption;

- Package Reliability;
- System-in-Packaging (SIP) Testing Strategies and Techniques;
- RF, Microwave, Millimeter-Wave and Light Wave Circuit Packages;
- Signal Integrity;
- Specific Implementation of Thermal Management to Advanced High-Power Packages;
- Wireless Interconnects.

Delegates are requested to contact:

Prof. Jun-Fa Mao Tel: +86+ 13916314802 Email: jfmao@sjtu.edu.cn

Prof. Wen-Yan Yin Tel: +86+ 21+34201339 Email: wyyin@sjtu.edu.cn

Singapore REL/CPMT/ED Chapter by Wilson TAN, Chair:

A. Short Courses

- 21 April 2006, Failure Mechanisms and Reliability in Integrated Circuits, Dr MK Radhakrishnan, *CTO of NanoRel – Technical Consultants*

This short course attracted 29 participants, 22 from the industry and 7 from academia.

B. Workshop on Silicon-based Technologies

Jointly organized by Pall Filtration Private Limited & Microelectronics Center, School of EEE, Nanyang Technological University (NTU) and the Chapter, a workshop on “Technology of Silicon-based Nanodevices” was successfully held on 24 Feb 2006 in NTU. Pall Filtration Private Limited had financially funded the workshop. Four overseas speakers and six local speakers presented talks on topics ranging from new filtration technologies on defectivity reduction to advanced sub-30nm transistor technologies. The details of the talks are as follows:

- Effectiveness of New Filtration Technologies on Defectivity Reduction in Advanced Microlithographic Processes, Dr Barry Gotlinsky, *Pall Corp Scientific and Laboratory Services, USA*
- Sub-30 nm Transistors: Material and Device Structure Innovations for Enhanced Performance, Dr Y.C. Yeo, *National University of Singapore*
- Towards Nano Purification with Selective Ion Removal Technology in Wet Chemistry, Dr Fumitomo Kunimoto, *Nihon Pall, Japan*
- Challenges, Issues and Solutions to low-k Implementation in Future Technology Nodes, Dr Sanjeev Jain, *Applied Materials, USA*
- Reliability Issues and Challenges in Cu/low-k Interconnects, Mr Y.K. Lim, *Chartered Semiconductor Manufacturing*
- Cu-based Nano Interconnects, Dr C.M. Tan, *Nanyang Technological University*
- Three-dimensional Interconnects, Mr N. Ranganathan, *Institute of Microelectronics*

- Silicon Based 3-D Multi-layer CMOS Integrated Circuits, Dr Mansun Chan, *Hong Kong University of Science & Technology, Hong Kong*
- Negative-bias Temperature Instability of p-MOSFETs: The Role of Nitrogen, Dr D.S. Ang, *Nanyang Technological University*
- Si Technology for Nano and Bioelectronics, Dr Patrick Lo, *Institute of Microelectronics*
- Silicon Front-End Junction Formation - Physics and Advanced Technology, Dr Benjamin Colombeau, *Chartered Semiconductor Manufacturing*

The workshop attracted more than 180 participants from the industry, research institutions and universities. The Chapter plans to organize similar workshop annually.



Left to right: Dr Patrick Lo, Dr Mansun Chan, Dr K Prasad, Dr KL Pey, Dr DS Ang, Dr Sanjeev Jain, Mr N. Ranganathan, Dr Benjamin Colombeau, Mr Y.K. Lim, Dr CM Tan, Dr Barry Gotlinsky, Dr Fumitomo Kunimoto

C. Conferences

IPFA2006

Preparations are well underway for the 13th IPFA which will be held from 3 to 7 July in the Meritus Mandarin Hotel, in the heart of Singapore's central business district. The technical sessions will be:

- FEOL (gate dielectrics, NBTI, hot carriers, etc.)
- BEOL (Cu and Al interconnects, low-k and ultra-low-k, stress migration and electromigration, etc.)
- Packaging (flip chip, system-on-chip, SIP, etc.)
- Novel device architectures, design, processes, and characterization (SGOI, FinFET, nanowires, CNT, etc.)
- Advanced instrumentation or methodology for Failure Analysis
- Advances in reliability evaluation and approaches including methodology for novel new devices, design-in/build-in reliability, wafer level reliability, etc.

Of the approximately 100 hundred abstracts submitted, 44 papers have been accepted for oral presentation and 25 for the poster session. As well as the submitted papers, we have 5 invited papers and exchange papers from ISTFA and ESREF. This year we are particularly fortunate and honoured to have two keynote papers given by very prominent experts in their fields, Professor Hiroshi Iwai of Frontier Collaborative Research Center, Tokyo and Dr. Chih-Yuan Lu, Senior Vice-President of Microelectronics & Memory Solution Group, Macronix in Taiwan.

The following invited talks are scheduled for IPFA 2006:

A Review of New Characterization Methodologies of Gate Dielectric Breakdown and Negative Bias Temperature Instability - Prof. Muhammad Alam (Purdue University, USA)

The Scanning Confocal Electron Microscope: A New Tool for Defect Studies in Semiconductor Devices - Dr. Nestor J. Zaluzec (Argonne National Labs, USA)

Technology Reliability Qualification of a 65nm COMS Copper/Low-k BEOL Interconnect - Dr Fen Chen (IBM, USA)

Advanced Test Methodology/Roadmap and Strategies for Semiconductor - Dr. Burnell West (Credence, USA)

Design for Reliability - Dr. Tim Turner (Chiron Technology)

Carbon Nanotube Interconnects in Electronic and Biological Systems - Prof. Cary Yang (Santa Clara University, USA)

In a paper exchange arrangement, the best papers from ESREF 2005 and ISTFA 2005 will be presented at IPFA 2006, while the best papers in reliability and failure analysis from IPFA 2006 will be presented at the corresponding ESREF & ISTFA conferences.

In conjunction with the three day technical symposium, two days of tutorials will be held on the 3 and 4 July 2006:

- Transmission Electron Microscopy for Failure Analysis: S. Subramaniam (Freescale Semiconductor, USA)
- Atomic Force Microscopy Principles and Role in Failure Analysis: Terence Kane (IBM, USA)
- Reliability of Lead-Free Solder Joints for Semiconductor Packaging: John Lau (Agilent, USA)

- Copper Interconnect and Low-k Reliability: Eckhard Langer (AMD, USA)
- Fundamentals of Integrated Circuit Test for Physical Failure Analysis: Burnell West (Credence, USA)
- Ultra High Resolution in Scanning Electron Microscopy: Nestor Zaluzec (Argonne National Labs, USA)

The exhibition will be held in parallel with the symposium between 5 and 7 July and is expected to draw just under 30 companies.

EPTC 2006:

The 8th Electronics Packaging Technology Conference (EPTC 2006) will be held from 6th to 8th Dec 2006 at the Pan Pacific Hotel, Singapore. The 1st call for papers has been announced recently.

EPTC 2006 is an International event organized by the IEEE Reliability/CPMT/ED Singapore Chapter, sponsored by IEEE CPMT Society with technical sponsorship from IMAPS.

EPTC 2006 will feature technical sessions, short courses and exhibition. It aims to provide a good coverage of technological developments in all areas of electronic packaging from design to manufacturing and operation. It is a major forum for the exchange of knowledge and provides opportunities to network and meet leading experts in the field.

Since its inauguration in 1997, EPTC has developed into a highly reputed electronics packaging conference in Asia and is well attended by experts in all aspects related to packaging technology from all over the world.

The conference program includes full-day short courses which will be conducted by leading experts in the field. Details will be updated in the conference website and available in subsequent mailings.

A tabletop exhibition featuring suppliers of materials, equipment, components, software and service providers of the microelectronics and electronic assembly industries will be held during the conference.

The Conference topics include:

- Interconnection Technologies;
- Emerging Packaging Technologies;
- Manufacturing Technologies; Materials & Processes;
- MEMS Packaging;
- Electrical Modeling & Signal Integrity;
- Thermal Characterization & Cooling Solutions;
- Mechanical Modeling & Structural Integrity;
- Optoelectronics;
- Quality & Reliability.

D. Others

Book Prize Awards

The Chapter donated a book prize of S\$2,500 to the School of Materials Science & Engineering, Nanyang Technological University. This book prize entitled "IEEE Singapore Reliability/CPMT/ED Chapter Book Prize" is awarded to the student who has distinguished himself/herself in the Microelectronics related subjects, offered in the third and final year of the Engineering (Materials Science & Engineering) course of next 5 years, commencing in 2006.

The Chapter also donated a Subject Prize of S\$1,500 to the Temasek Polytechnic Engineering School. This award is entitled the "Subject Prize" for the student who graduates with a Diploma with Merit in the Diploma in Microelectronics course of next 5 academic years, commencing in 2006.

IPFA 20th Year:

The IPFA Board met on 21 April 2006 to discuss over the hosting of the "20th Year of IPFA" celebration since its first inception in 1987 in Singapore. A task force committee has been setup to plan for this celebration in conjunction with the 13th IPFA Conference to be held from 3 to 7 July 2006 at the Meritus Mandarin Hotel, Singapore.

Watch for the December, 2006, Newsletter Issue

- Interviews with CPMT Officers
- Reviews of new Books
- CPMT Society 2006 Award Winner Profiles

**Send Your News Articles to the Editor at
nsltr-input@cpmt.org**



**Institute of Electrical and Electronics Engineers, Inc.
Phoenix Section
Components, Packaging and Manufacturing Technology Society Chapter
&
Waves and Devices Chapter**

PRESENT AN ALL-DAY WORKSHOP ON

Convergence in Communication and Computing

Date: Friday, November 17th, 2006

Time: 7:00 A.M. – 5:00 P.M.

Location: Arizona State University, Tempe, Arizona – ASU Memorial Union (Arizona Room)

TOPICS

Vision – A View of the Future of Convergence

Market – Current Status and Future Trends

Communication Technology Options and Standards

Packaging – Mobile Products and Infrastructure

Device Technology – RF, Microwave, Analog, and Base Band / Graphic Processing

Panel discussion on the Future of Convergence in Communications

Business Model

System and Architecture

Antenna / Propagation

System Integration

Vendor Displays

For Additional Information Access <http://www.ieee.org/phoenix>

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For more details:

www.cpmt.org/trans/

**31st International
Electronics Manufacturing Technology Symposium (IEMT 2006)
8-10 November 2006 Petaling Jaya, Kuala Lumpur, MALAYSIA**

The 31st IEMT is an international event organized by the IEEE CPMT Malaysia Chapter with co-sponsorship from the CPMT Society of IEEE and the Santa Clara Valley CPMT Chapter, featuring short courses, 3 parallel tracks of technical sessions, and exhibitions. It provides good coverage of technological developments in all areas of electronics packaging, from design to manufacturing and operation.

Professional Development Courses:

• Emerging Technology In IC Packaging • Thermal Test Methods for Integrated Circuits • Wafer Dicing Technology • Design, Materials, Process and Reliability of Pb-Free Packaging and Assembly

Tabletop Exhibits space still available!
Contact Mr. Eric Ng, eric.ng@st.com

Keynote Speakers and Instructors

• Dr Rolf Aschenbrenner • Dr Carlo Cognetti
• Dr Annette Teng Cheung • Bernie Siegal • Charles Vath • Kin Gan • Dr John Lau
• Yee Eh Horng • Dr. Dongkai Shangguan

IEEE Member fee: RM720 (approx US\$200)
Early Registration Rate through October 9

Visit our website for more information:

www.ieee.org.my/iemt2006



CALL FOR PAPERS



IEEE COMPONENTS, PACKAGING AND
MANUFACTURING TECHNOLOGY SOCIETY

**Technical Conference, Short Courses and Exhibition
International Electronics & Manufacturing Technology (IEMT 2007)
November 2007, San Jose, California, USA**

I. Introduction

The International Electronics Manufacturing Technology (IEMT) Conference is the premier Technical Conference devoted to the manufacture (mainly the assembly/packaging aspects) of electronic, opto-electronic and MEMS devices and systems. IEMT is an established International Conference of long standing organized by the Components Packaging and Manufacturing Technology (CPMT) Society of IEEE. IEMT 2007 is being co-organized by the Society and the Santa Clara Valley Chapter of CPMT.

In addition to approximately 70 technical papers over 2.5 days, IEMT '07 will also feature several Short Courses and Vendor Displays. The dates and venue for IEMT '07 will be finalized and announced by October '06.

II. Conference Topics

Paper abstracts are sought from fabless companies, manufacturers (integrated, contract manufacturing service providers) and their Suppliers on their proven capabilities and case studies for package assembly/manufacturing of electronic, solar, opto-electronic, MEMS, bio-medical devices and systems including but not limited to, the following topics :

- Design for Manufacturability: performance modeling of tolerances for cost reduction, reliability standards,..
- Tools & Automation: innovations in bonders, fiber alignment, batch vs continuous (e.g. roll to roll) production
- Manufacturing Systems: metrologies, incoming & WIP monitoring, statistical tools & software (design & process) for QC, predictive models for excursion detection & yield
- User perspective on Outsourcing: impact on cost, logistics, product development ,quality, schedule, supplier selection, on-site and remote monitoring of quality, strategies to create unique products using generic process platforms, IP, licensing, technology gaps
- Outsource Supplier Showcase: turnkey products and services, monitoring systems, in-house development activities, roadmaps for key technologies

Abstracts must be received by **March 31, 2007**. Selected Authors will be informed by **May 15, 2007**.

Selected papers will be due by **August 15, 2007** and should be 5 to 7 pages in length (incl. text and graphics).

For further details visit

www.cpmt.org/iemt/

15th Topical Meeting on Electrical Performance of Electronic Packaging



IEEE COMPONENTS, PACKAGING AND
MANUFACTURING TECHNOLOGY SOCIETY

EPEP 2006

October 23-25, 2006
Scottsdale, Arizona



Sponsors

**The IEEE Components, Packaging and
Manufacturing Technology Society**

**IEEE Microwave
Theory and Techniques Society**

The **general subject of the meeting** is the electrical modeling, design, analysis, and characterization of electronic interconnections and packaging structures. We invite your attendance.

Future Directions in IC and Package Design (FDIP'06) – One-day Workshop

Chip Multithreading Keeps the Datacenter Cool –
David Greenhil, SUN Microsystems

**Carbon Nanotubes: An Emerging Alternative for On-
Chip VLSI Interconnects –** Kaustav Banerjee, Univer-
sity California Santa Barbara

**Characterizing and Managing Variability in Micro-
processor Chips –** Manjul Bhushan, IBM Corporation

**Power Delivery System Design, Modeling and Analy-
sis Challenges for Complex Digital System-in-
Package –** Zhen Mu, Cadence Design Systems

**Future Directions in Computational Electromagnet-
ics for Digital Applications –** Thomas Weiland, Univer-
sity of Darmstadt

**Electromagnetic and Circuit Co-Simulation and the
Future of IC and Package Design –** Zoltan Cendes,
Ansoft Corporation

Choose from Three Short Courses:

**Fast Electromagnetic Solvers for Interconnect and
Package Modeling**

**Power Delivery Networks for Semiconductor Sys-
tems: Design, Modeling and Simulation Methods**

**High-Speed I/O Circuit Design Issues and Tech-
niques**

EPEP Sessions:

• Systems • Measurement and Validation • TL and
Macromodeling • Noise Containment • EM • Power
Distribution • Chip Issues • Modeling

**KEYNOTE TALK: “The Role of System Integration
and Packaging in Future Computing Systems,”** Mark
Papermaster, IBM

Earlybird registration deadline – Sept. 30th

Conference Web Page: www.epep.org

IEEE-CPMT • iNEMI • Georgia Tech Packaging Research Center (PRC) Sponsor the

Second International Workshop on SOP • SIP • SOC (3S) Electronics Technologies

September 28 & 29, 2006

This workshop will review the latest design, R & D and manufacturing status as well as applications of each of the three electronic packaging technologies currently being used around the world. It will also compare and contrast SOC, 3D stacking, SIP, SOP and MCM as related to distinct application sectors.

The preliminary program is now available on the website. Download it today!

For further information and registration, see:

www.prc.gatech.edu/3s

7th International Conference on Electronics Packaging Technology

Shanghai, CHINA
August 26 - 30, 2006

ABOUT ICEPT

Since 1994, ICEPT has been held in Beijing, Shanghai, and Shenzhen, China, every two years respectively. As the only international electronics packaging technology conference organized and supported by the Chinese government and relevant authorities, leading industries and academia, ICEPT has attracted many participants from the whole world, covering all the relevant fields of electronic packaging, such as equipment, ICs, packaging, interconnect, Sensor/actuator/MEMS/NEMS, Optoelectronics, LEDs, LCDs, substrates, systems, PCBs and assembly.

Sponsored By The IEEE Components, Packaging, and Manufacturing Technology Society, China Electronics Packaging Society, Chinese Institute of Electronics

For registration information and full program, visit:

www.ICEPT.org

IEEE/CPMT 8th International Conference on Electronics Materials and Packaging

Hong Kong Univ of Science and Technology (HKUST), Hong Kong, December 11-14, 2006

The EMAP conference includes all fundamental and applied science and technology related to the fields of electronic materials, devices, and packaging. Its purpose is to promote awareness of new advances in materials, design and simulations, fabrication, reliability, and thermal management of microsystem/MEMS packages. Also, the technical program will include invited and contributed presentations on theoretical, numerical, and experimental work of electronic materials and packaging. Technical workshops and industrial visit will also be arranged.

Short Courses: **Lead-Free Soldering – Materials, Processes, Troubleshooting, and Reliability**, Ning Cheng Lee; and **3D Integration Technologies – An Overview**, Rajen Chanchani

Keynote Lectures: **Electromigration in Flip Chip Solder Joints**, King Ning Tu; and **Enabling Electronic Prognostics**, Michael Pecht

Papers are solicited in the following Topical Areas:

- Materials and Processing
- Passive and Active Components
- Optoelectronics / Photonics
- Sensor, Actuator, and Transducer Technologies
- Advanced Packaging
- Emerging Packaging Technologies
- Interconnection Technologies
- System-in-Package (SiP) and 3D Stacked Die Packaging
- Electrical Modeling, Characterization, and Signal Integrity
- Thermal-Mechanical Modeling and Characterization
- Packaging Technologies for High Brightness LEDs
- Quality and Reliability

Abstracts Submission

Deadline: August 21, 2006

For more details, and the full call for papers, visit our website:

www.ust.hk/emap2006

Coordinate international travel plans to attend one or two other CPMT Society events: **EPTC'06**, 6-8 December, 2006, in Singapore; and **VLSI Chip Packaging Workshop**, Dec. 4 - 5, 2006, Kyoto, Japan.

Call for Papers

TWENTY-THIRD ANNUAL Semiconductor Thermal Measurement, Modeling and Management Symposium

March 20–22, 2007 San Jose, California

In its 23rd year, SEMI-THERM will include Topic Sessions, Invited Speakers, an Evening Tutorial, and a Short Course program to address key issues highlighted by attendees at the last symposium. SEMI-THERM actively solicits student papers and awards travel stipends and reduced conference fees. Technical workshops, tutorials and vendor exhibits—for which SEMI-THERM is well known—will enhance the technical program.

The Program Committee is soliciting papers on current thermal management and practical application issues, modeling and measurement of electronic components and systems in the following areas:

- Practical Thermal Solutions for Low-Cost, High-Volume Systems Design
- Package Thermal Design and Components for High-Volume Semiconductor Packages
- Thermal Solutions for Low-Noise Environments
- System-Level and Board-Level Thermal Design
- Solutions for Harsh Environments in Commercial, Defense, and Aerospace Systems
- Characterization and Standardization of Material Property Measurements
- Thermal Integration in the Product Design Process, Characterization and Modeling of Thermo-Mechanical Stress
- Characterization and Modeling of Components, Boards and Systems
- Temperature and Thermal Property Measurement Techniques
- Transient Thermal Control Methodologies
- Compact Modeling, Model Reduction and Validation
- Roadmaps, Specifications and Traditional Cooling

Abstracts are now solicited. The abstract should provide a complete summary of the proposed paper comprising work or result not previously presented or published. The abstract should be between 2 and 5 pages of single-spaced text giving the key results, findings and conclusions, supported by additional pages of figures tables and references as appropriate. Abstracts must demonstrate that proposed papers are appropriate for **SEMI-THERM** and of high technical quality.

Abstracts must be submitted in RTF, DOC or PDF formats via the **SEMI-THERM** web site. Check the web site periodically for updated information.

Abstract Deadline: Sept. 15, 2006

Visit the SEMI-THERM website for the full Call for Papers and additional information:

www.semi-therm.org

For further information please contact the Program Chair via email: Ross Wilcox, Rockwell Collins
PHONE: +1-319-295-7139 FAX: +1-319-295-3751
EMAIL: rkwilcox@rockwellcollins.com

IEEE/CPMT ASTR 2006

Workshop on Accelerated Stress Testing & Reliability

San Francisco, CA Fisherman's Wharf October 4 - 6, 2006

Accelerated Stress Testing (AST) has been embraced by an ever widening array of worldwide companies seeking to reconcile the need for the highest quality product with the necessary push for early time-to-market. The AST Workshop shares ideas on better ways of accelerating and detecting hidden defects, flaws, and weaknesses in electronic and electro-mechanical hardware that would result in failures during usage. These techniques are focused on testing electronic hardware to destruction limits and root cause investigation to determine the physics-of-failure. The goal of AST is to produce mature products at market introduction and, in making it robust, the product can be screened for manufacturing defects with high combined stresses (beyond end-use specifications) for shorter lengths of time.

Tutorials – Technical Sessions – Exhibitors

For the full program and registration information, please visit our website:

www.ewh.ieee.org/soc/cpmt/tc7/ast2006

CALL FOR PAPERS

IEEE Polytronic 2007 Conference on Polymers and Adhesives in Microelectronics and Photonics

Miraikan - Odaiba, Tokyo, Japan

January 16-18, 2007

Polytronic 2007 will be held at the Miraikan Hall of the 'National Museum of Emerging Science and Innovation', in Odaiba-Tokyo, Japan. The conference provides experts from polymer developers and electronics manufacturers with a unique opportunity for presenting the latest findings, sharing ideas, and learning the fundamentals for R&D of polymer and adhesive materials, and polymer electronic packaging.

During the conference, Japan's largest exhibition "INTERNEPCON JAPAN" is also held from Jan. 17-19 at the same place, featuring materials, equipment and technology for electronics manufacturing, SMT, and packaging, and hopefully may interest you to visit during the conference.

Submission of abstracts: **Sept. 15th, 2006**

Visit the website for the full CFP:

www.polytronic.jp

Papers are solicited in the following areas:

Polymer and Adhesive Materials: Thermosetting, thermo-plastic, isotropic/anisotropic/thermal conductive adhesives; underfills, high temperature materials; PCB materials

Processing and Manufacturing: lamination; printing; dispensing; spraying; transfer techniques; underfilling; potting; curing; equipment; SPC; economic analyses.

Low temperature processes: laminates, bonding, process for non-silicon MEMS.

Reliability and Testing: Degradation mechanisms; adhesion; hermeticity; accelerated testing; humidity and environmental sensitivities; nondestructive testing methods

Functional Polymers for Microelectronics: Conductivity of polymers; electronic transport; polymeric materials for molecular electronics; polymer-inorganic materials interface.

Applications: Polymer electronic devices; polymer optical fibers; polymer wave guides; organic displays; polymer batteries; e-paper; substrates, displays.

Environmental Issues: Ecology and toxicology; life cycle analyses.

2nd Call for Papers

ThETA Conference –

Cairo – Egypt – Jan 3-6 - 2007

Θ_1

International Conference on Thermal Issues in Emerging Technologies – Theory and Applications

Objectives: Emerging Technologies in various domains, including Microelectronics, Nanotechnology, Smart Materials, Micro-Electro-Mechanical Systems, Biomedical engineering as well as New Energies, all raise many issues related to thermal effects. The importance of such effects is continuously increasing to a point where they become a dominant factor in determining the performance of such technologies. This is the first event in a series of conferences dedicated to these issues, gathering scientific and industrial communities to exchange experiences, orient research and create cooperation opportunities.

Send a ~1000 words abstract, in any of the following formats: .txt, .pdf, .doc, .sxw to:

thetacnf@gmail.com visit www.thetacnf.org/

Topics:

- Thermal modeling of electronic systems
- Temperature aware computer systems design
- Cooling of electronic systems and data centers
- Micro and nano-scale heat transfer
- Modeling of multiple scale heat transfer problems
- Compact thermal models
- Thermo-mechanical analysis in electronic systems
- MEMS – multi-physics problems
- Computational methods in heat transfer
- Energy conservation
- Fuel cells
- Solid state energy generation / cooling
- Multiphase flow with heat transfer
- Thermal issues in biomedical engineering
- Thermal issues in micro-fabrication technology
- Thermal issues in new materials
- New experimental methods in heat transfer

Call For Papers

57th Electronic Components and Technology Conference

Reno, Nevada, USA May 29 - June 1, 2007

The Electronic Components and Technology Conference 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. The ECTC is jointly sponsored by the Components, Packaging and Manufacturing Technology Society of the IEEE and the Electronic Components, Assemblies and Materials Association of the EIA. You are invited to submit abstracts that provide non-commercial information on new developments, technology and knowledge in the following areas:

Advanced Packaging: New packaging technologies, systems packaging, density and cooling for single chip, multichip, wafer-level, MEMS and power packages. Special emphasis on flip-chip, fine pitch and high lead count packaging in CSP, BGA, CGA, LGA and SMT packages for both Pb-based and Pb-free bumps and package assembly.

Components & RF: New passive or active component technologies, integrated/embedded components, RF and wireless component applications, modules with subsystem functionality, component performance and reliability.

Interconnections: First-level electronic interconnection technologies including: flip-chip, lead-free interconnect, novel interconnection structures and processes, wirebonding, conductive polymers for interconnect, wafer level interconnect, interconnections for 3D stacking (SIP/SOP), interconnection for new Silicon technologies (e.g. low-k), electromigration of bumped interconnects.

Manufacturing Technology: Advanced process development and equipment improvement for wafer thinning, bumping, stacking; low-k chip and sensor packaging; high-density interconnect and embedded component substrates; testing and burn-in. Cost, yield, performance and environmental improvements, process characterization, design for flexible manufacturing

Materials & Processing: Processes for IC Packaging that enhance performance (mechanical, thermal and electrical) and cost effectiveness, including new technologies, development and application of adhesives, encapsulants, chip underfills, solders and alloys, thermal interface materials, dielectrics, thin films, nano materials to bonding, plating and other assembly processes.

Modeling & Simulation: Electrical, thermal, optical, mechanical modeling, simulation, characterization and packaging solutions including system-level applications.

Optoelectronics: Packaging for fiber-optic modules, optical devices and components including optical amplifiers, lasers, detectors, OEICs, and passive components, nonhermetic and plastic optical packages, optoelectronic package manufacturing and materials, solid state lighting (LED's and display arrays), optical data interconnects, WDMs, and optical back-planes.

Quality & Reliability: Reliability testing and data analysis; failure analysis of field and test failures; reliability modeling of accelerated testing; reliability issues in emerging technologies; interconnect reliability physics, testing and predictive simulation.

You are invited to submit a 750-word abstract that describes the scope, content, and key points of your proposed paper via the website.

Abstracts must be received by 15 October, 2006.

www.ectc.net

For information, contact Rao Bonda, Freescale Semiconductor,
Phone: +1-480-413-6121 Email: rao.bonda@freescale.com