President's Column (Continued from Page 1)

of great innovation and invention driven as much by the market as by the technology. At the same time the industry continues to be under pressure to produce more for less.

I explained to the interviewer our CPMT Society's globalization initiative to bring greater global participation in CPMT activities in conferences, publications, technical committees, recognition, education, chapters and membership. Virtually all of the CPMT activities come from volunteer efforts from engineers and scientists from around the world, many of whom are CPMT members. They form the core of CPMT constituency.

I told her that an important element in our strategy to reach out to our constituents worldwide is through technical conferences and workshops. Since conferences are the places where fellow professionals meet and talk face to face, they are where we feature and promote CPMT society value propositions. Our goals at each conference are to hold publication workshops and technical committee meetings, set up recognition events, professional development courses, chapter chair meetings and membership recruitment drives. In short, we pack full the conference agenda. At the ECTC conference this year and last year we have had some committee meetings and a publication workshop starting at 7:00 am. While ECTC is an international conference with half of its papers and participants from outside North America, it is important to have high-quality flagship conferences in other parts of the world. In Europe the CPMT UK and RI chapters sponsored the 2nd ESTC conference in Greenwich UK in September. The conference adopted the basic ideas described previously for ECTC and applied them in their own way. We will replicate similar initiatives at EPTC in Singapore, another major conference being held in Asia. CPMT organizes and sponsors many technical conferences around the world. The crucial point is that for each of the technical conferences, there is a group of committed volunteers – the regional CPMT chapter members -- passionate and committed to make their events successful. In addition to conferences there are CPMT workshops and seminars around the world. At all of these events one would find authors, reviewers and readers for our technical journals, and lecturers and students for educational programs. They are the stakeholders of the CPMT society value propositions. It is their passion, enthusiasm and dedication that we want to nurture, support and recognize. I told the interviewer that while I have spoken with much enthusiasm about technical conferences and workshops, I would be just as enthusiastic on the topics on CPMT publications, educational programs, recognitions, membership and chapters. While I think we are making headway in building the base for CPMT constituents, we are still behind in recruitment into IEEE membership.

The interviewer asked me for my thoughts, moving forward, on how to reverse the trend in declining membership in IEEE and CPMT. My response is that the reasons for many people to join and participate in the CPMT Society and IEEE are networking with the leaders in their specific fields, keeping up with advancing technology, and access to the broad knowledge base of packaging technology and science. Equally important is the belief in CPMT as the trusted forum and source of knowledge for our dynamic profession. While I cannot quantify the importance of the IEEE fee structures and benefits in membership decisions in IEEE and the CPMT society, it is important for IEEE and for CPMT to address this issue in a positive way. The interview lasted about an hour and I expressed my good interest to read her study report.

What are your thoughts on this topic? I would very much welcome your thoughts and comments. Write to me at:

wt-chen@ieee.org

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CPMT Society News:

Republishing Conference Papers

R. Wayne Johnson
Vice President of Publications

The republishing of selected and peer reviewed conference papers in our Transactions was an issue raised by the IEEE Technical Activities Board review of CPMT publications this past year. Under the heading "RESPONSIBILITIES OF MANUSCRIPT AUTHORS" the IEEE Publication Services and Products Board Operations Manual states:

"*Except as indicated in IEEE Policy 6.4 (Multiple Publication of Original Technical Material in IEEE Periodicals), authors should only submit original work that has neither appeared elsewhere for publication, nor which is under review for another publication. If authors have used their own previously published work(s) as a basis for a new submission, they are required to cite the previous work(s) and very briefly indicate how the new submission offers substantive novel contributions beyond those of the previously published work(s).*"

The referenced IEEE Policy 6.4 states:

"*IEEE's technical publications shall include original material which appears only once in the archival literature. Unusual circumstances may allow for exceptions to this policy. The appropriate procedures to be followed shall be specified in the PSPB Operations Manual.*

The publication of a conference paper or papers in an IEEE periodical is permitted at the discretion of the Editor provided that all the papers have undergone the standard peer review for the specific periodical in question."

In the past, we have republished selected conference papers in Special Sections of our Transactions. We have also published conference papers independently submitted by the author. These previously published manuscripts have gone through the standard peer review process all manuscripts submitted to CPMT Transactions go through. The level of revision required has ranged from 'Publish as Written' to "Major Revisions Required' and occasionally a selected/submitted conference manuscript has been ultimately rejected. The value in republishing conference papers was collecting related papers into a single Transactions volume and the peer review process.

While we can debate with IEEE over our interpretation of the IEEE Policies, we need to look at the bigger question: is there still value in republishing? IEEE Explorer and web access have changed the value of republishing manuscripts in transactions

after peer review. Using a key word search, all IEEE conference and transactions papers related to that key word are listed. It no longer matters if the papers are in a single transaction or published in multiple transactions and conference proceedings. There is still the value of peer review. If an Explorer search finds a paper with the same title and authors listed both in a conference proceedings and a transactions, the searcher knows the transactions manuscript was peer reviewed. However, they would have to examine both versions of the paper to determine the extent of the revisions required in the peer review process.

The CPMT Publications Committee has been debating how to address republishing conference papers going forward. The ideas have run the spectrum from continue the current practice to completely stop republishing manuscripts. After much discussion a policy has been developed. It states:

1. A manuscript that has been previously published must be substantially modified before submission to a CPMT Transactions.
2. The modifications should be substantial enough to result in a title change for the manuscript.
3. The original publication must be cited in the modified manuscript's list of references.
4. The author must indicate the manuscript is a modified version of a previously published manuscript when submitting the manuscript to a CPMT Transactions.
5. The author must detail the modifications made to the manuscript and why he/she believes the changes are significant.
6. The Associate Editors and Reviewers will consider the modifications discussed by the author as part of the peer review process.

One challenge noted by the Committee with this policy is to define 'substantial'. I agree and we will have to work through this with the assistance of the authors, the editors and the reviewers. Examples of modifications that could be considered include:

1. New data is included in the modified manuscript. We **do not** want to encourage people to hold back data from the conference paper, but quite often additional data is taken and presented that is not included in the original paper because of the deadline.
2. The authors may provide a more detailed discussion of the relevant literature and how their models/experiments will differ or add to the previous work. This would be in the Introduction. In the Discussion section, the authors would then compare and contrast their results with the literature. This type of in-depth analysis is not common for a conference paper, but is important for an archival Transactions paper.
3. A re-write of sections based on questions and comments received during the presentation.

As a Society, we must operate within the rules of IEEE. It is my belief that the policy adopted above will keep us within the rules and is a practical realization that IEEE Explorer and web based searches has fundamentally changed the value of republishing conference papers. I welcome any feedback or suggestions from the CPMT membership. Thank you for your support of OUR publications.

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Call for Nominations for the 2009 CPMT Society Awards

(Nominations Due by January 31, 2009 – Download form at www.cpmt.org/awards)

Kitty Pearsall
CPMT Strategic Director for Awards

This is a Call for Action!!!! Once again it is that time of the year for you to put your thinking caps on and consider those individuals that should be recognized for their contribution to our society. I am sure that you know those individuals that have gone above and beyond in their contribution to their technical community and to the CPMT Society. Don't hesitate to put their names forth. The Awards committee is currently accepting nominations for the 2009 CPMT Awards. All nomination packages are **due by January 31, 2009.** Winners will be notified by 28 March 2008 and the awards will be presented at the 59th Electronic Components and Technology Conference, May 26th - May 29th, 2009, in San Diego, California, USA. I look forward to receiving many nominations in all the categories listed below:

CPMT Society offers the following 5 awards for the purpose of recognizing outstanding service and contributions to furthering the professional purposes of the CPMT Society.

1) David Feldman Outstanding Contribution Award: This award recognizes outstanding contributions to the fields encompassed by the CPMT Society through executive or managerial directions.

> **Prize**: $2,500 and Certificate
> **Basis for Judging**: Contributions to the organization or enterprises connected with the field, to CPMT Chapter, Section or Board of Governors activities, and to the fields encompassed by the CPMT Society.
> **Eligibility:** Recipient must have been a member of IEEE and CPMT for the past five (5) years, including 2008.

2) Outstanding Sustained Technical Contributions Award: To recognize outstanding sustained and continuing contributions to the technology in fields encompassed by the CPMT Society.

> **Prize:** $2,500 and Certificate
> **Basis for Judging**: Technical contributions must be sustained and continuing over a period of at least five (5) and preferably 10 years. One major contribution will not qualify. Contributions must be documented by open literature publications such as papers, patents, books and reports (available to the public).
> **Eligibility**: Must have been a member of the IEEE and CPMT Society for the past three (3) years, including 2008.

3) Electronics Manufacturing Technology Award: To recognize major contributions to Electronic Manufacturing Technology in fields encompassed by the CPMT Society.

> **Prize**: $2,500 and Certificate
> **Basis for Judging**: Contributions may include technical development of, or management (directing) of major new electronic manufacturing processes; significantly increasing yield and/or reliability of established manufacturing processes, etc. Work in the management of CPMT conferences or its BoG may be contributory but not sufficient to receive the award.

Eligibility: No need to be a member of IEEE and CPMT Society.

4) Exceptional Technical Achievement Award: To recognize an individual, or group of individuals (no more than three), for exceptional technical achievement in the fields encompassed by the CPMT Society.

Prize: $2,500 and a Certificate.
Basis for Judging: Technical contributions of the nominee(s) must be such that they are considered to be exceptional, not achieved by most members. A single major contribution will qualify for this award. The contribution could be a significant invention, introduction of a significantly new and important technology or product (in which case, the nominee may be a team leader), or significant work that advances the state-of-the-art in CPMT's field of interest. The technical contributions must be documented by open literature publications such as papers, patents, books, and reports (available to the public). Technical recognition and awards from the organization employing the individual as well as awards from other IEEE and non-IEEE technical societies may also be contributory.
Eligibility: Recipient(s) must have been a member of IEEE and CPMT for the past three (3) years, including 2008. There are no requirements for service to the IEEE or CPMT Society.

5) Outstanding Young Engineer Award: To recognize outstanding contributions to the fields encompassed by the CPMT Society through invention, technical development, publications, or new product implementation.

Prize: $1,500 and Certificate plus one year free membership in CPMT with all CPMT Transactions.
Basis for Judging: Technical contributions through patent invention, contributions to technology or product development within the CPMT Field of Interest. May encompass management (directing) of significant new product introduction or implementation of major new electronic manufacturing processes; significantly increasing yield and/or reliability of established manufacturing processes. Contributions to the Society, through the BoG, Conferences, Chapters, etc., will also be considered. Proof of contributions may consist of open literature publications (preferred) such as papers, patents, books, and reports (available to the public). At least three (3) letters from peers and management at the nominee's place of employment attesting to the accomplishment(s) can be accepted in lieu of publications.
Eligibility: Must have been a member of the IEEE and CPMT (member grade or above) for the past three (3) years, including 2008, and must be 35 years of age, or younger, on December 31st, 2008. Please provide Date of Birth (Month/Year) to ensure eligibility.

Guidelines for Nominators:

- Minimum **three** reference letters must be submitted in support of all nominations. Reference letters can be provided by IEEE/CPMT members and non-members.
- Past recipients of an award are not eligible to receive that same award. For list of past awardees, see the CPMT Society Home page (http://www.cpmt.org/awards).
- An individual may submit only one nomination per award but may submit nominations for more than one award.
- It is the responsibility of the nominator to provide quality documentation to assist the Awards Committee in evaluating the candidate.
- Please send nominations to CPMT Society Awards Committee Chair by e-mail, fax or mail:

Kitty Pearsall, Ph.D.
IBM, Bldg 045/2C-40
11400 Burnet Road
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IEEE Components, Packaging and Manufacturing Technology Award – 2009

Leonard Schaper, IEEE CPMT Awards Chair

The CPMT Award committee is changing as current committee members Rajendra Singh, Patrick Thompson, and Dennis R. Olsen retire and new members join. Many thanks to these gentlemen for their service. New members include Bob Pfahl (NEMI), Kanji Otsuka (Meisei University), and Luu Nguyen (National Semiconductor). Continuing members include Chair - Leonard Schaper, John Stafford, Yutaka Tsukada, and Erich Klink. The committee encourages new nominations for the CPMT Award each year. Information for potential nominators can be found on the IEEE website. The deadline for nominations is January 31, 2009.

With that said, I am delighted to report that the recipient of the 2009 IEEE CPMT Award has been approved by the IEEE Board of Directors. He is: **GEORGE G. HARMAN** (LF'IEEE) - NIST Scientist Emeritus (Retired NIST Fellow), Consultant, Gaithersburg, MD, USA, "**for achievements in wire bonding technologies**."

George Harman was hired at NBS/NIST in 1950 as an Electronic Scientist. In 1955, he filed for a patent on an electroluminescent microwave detector (# 2,928,937). He then studied the high frequency properties of various electroluminescent materials and discovered a new class of ferroelectric electroluminescent materials. His first 15 papers were generally in the area of applied physics and were published in the J. Appl. Physics, and similar journals. He studied contacts and surface states of several new unstudied (at that time) semiconductors (SiC, BC, etc.) and in the process obtained several US semiconductor device patents.

In 1968, a Navy strategic missile under development (Poseidon) had major reliability problems in its wire bonded interconnections. The urgency resulted in Harman being assigned to help solve that problem. This led to an extensive laboratory investigation designed to understand ultrasonic bonding and its evaluation. He developed a 25 µm diameter constricted, floating-cone capacitor microphone to plot the ultrasonic vibration modes of tools at

60 kHz, and applied those measurement methods to understanding and solving other problems in ultrasonic bonding machines and processes. Later, he used a laser interferometer to refine those earlier measurements. In 1971 he started the ASTM F-01.07 committee to standardize wire bond testing methods, which included pull test, nondestructive test, and ball bond shear test. Also, standards for bonding wire inspection methods, etc., were developed during that period. Harman, who currently chairs ASTM Committee F-01.07 (Wire Bonding, Flip Chip, and Tape Automated Bonding), updated and re-balloted the original wire bonding standards in 2005-06. Note that Harman's IEEE fellow citation (in 1982) was "for development of process control and screening procedures for microelectronic welding and bonding". He continues to contribute to the wire bonding area. Recently, an extension of his laboratory work and publications on wire bonding to soft substrates led to applying those principles to wire bonding on Cu-LoK chips. Other recent publications discussed projected metallurgical wire bond problems in NASA extreme temperature planetary exploration probes.

During the 1970's, Harman contributed to the military standards for testing wire bonds (at that time these were the only semiconductor/packaging standards publicly available and in general use), attended JEDEC meetings, and contributed data to be incorporated in their standards. He wrote the bond pull test method for MIL-S-19500 which was subsequently added to MIL-STD-750C, and supplied data and curves for the most used wire bond pull test in MIL-STD-883. He wrote the first version of the nondestructive bond pull test in MIL-STD-883 and has defended its use numerous times, and his paper on that subject in the IEEE IRPS stands alone for the statistical and metallurgical understanding of that test method. Currently, that test is required for most critical parts flown by NASA.

In his NIST Fellow position, George Harman has served as a national and international consultant in the field of wire bonding, advising and solving problems in chip-package interconnections for numerous organizations each year. He has taught most US and many foreign engineers both metallurgical and practical aspects of wire bonding in the 8-hour short-courses sponsored by UAZ, IMAPS, HKUST, and many others organizations for 20 years. He used the well developed and organized content of such lectures, in 1989, and published the first edition, and in 1997 the second edition of the only book(s) on that subject. It is frequently referred to as "the wire bond bible" and has been used by thousands of engineers (over 5000 copies of second edition have been sold by McGraw Hill). Two wire bond manufacturers have given a copy with each major machine purchased ("to educate and save us time and service calls to our customers"). These books have been a major world-wide contribution to the field by Harman.

Most of George Harman's career has been engaged in understanding, standardizing, implementing improvements into the industry's tooling, and disseminating wire-bond technology. He is the individual most responsible for transforming a labor-intensive manual bonding technology whose results depended upon an operator's skill, with attendant poor reliability, to a well-understood, highly automated (>8 bonds per second) method with an outstanding reliability record. As a result of Mr. Harman's work, wire bonding has become the industry standard. It accounts for more than 95 percent of the interconnections made between chips and the next level of assembly in electronic products manufactured worldwide. Approximately 7x10(+12) wire bonds are created each year. George Harman's work has had a profound impact on the industry, and likely benefited anyone utilizing an electronic product.
George's award will be presented at the 2009 ECTC.

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Book Reviews:

Introduction to System-On-Packaging (SOP), Miniaturization of the Entire System

By Rao R. Tummala and Madhavan Swaminathan
MacGraw-Hill, 2008, pp. 785

This is a complete introduction to the on-going research and development of SOP. The authors have co-authored several chapters and edited the rest written by leaders in the field. The basic theme is that there is plenty of room for further miniaturization even after the IC digital evolution call Moore's Law. There is no question that the many components and boards of a system are undergoing continual miniaturization using techniques other than those from the CMOS juggernaut. However, the transistor count has gone up 9 orders of magnitude and the transistor miniaturization improved by 6 orders, whereas the SOP miniaturization appears limited to 2 orders (may just be the reviewers conservative view). None the less, all this technology will be needed to win in the marketplace over the next decade.

This book describes where SOP technology is being expanded and directions technology may take, but does not really address any economic destiny. Remember CMOS is slowing for economic not technical reasons. The SOP is not an irresistible BORG spaceship assimilating all technology in its integration effort, but one future direction proved plausible by the many great developments discussed in this book. Many university and industrial advances are presented in detail within this book.

Before discussing the details, it is important to note that each section of this book presented new exciting facts and new technology interconnections to any reader except those with many years developing integrated packaging. The large number of "AHAs" is a mark of a great tech book.

The integration of unusual single MEMs or photonic element into a highly integrated system is quite a challenge. The MEMs and Optoelectonics chapters in this book give several options to accomplishing this level of integration in addition to discussing economic packaging of single MEMS and photonic devices. Other chapters address many integration aspects of Biosensor, electrical module testing, thermal management, wirering, RF, mixed signal, and stacked ICs.

The RF chapter uses LTCC and LCP integrated packaging as the basis for SOP creation. Particularly informative discussions occur on how to miniaturize and add gain to module antennas. Discus-