

Components, Packaging, and Manufacturing Technology Society



Newsletter

The Global Society for Microelectronics Systems Packaging



Vol. 25, No. 2, June, 2002 (ISSN 1077-2999)

www.cpmt.org

www.evh.ieee.org/soc/cpmt/newsletter

Another Success

By Rao Tummala, CPMT President

The IEEE-ECTC Conference Was Highly Successful Most conferences around the world are having low to poor attendance, but not ECTC - - IEEE-CPMT's premier conference which was held in San Diego, May 28-31, 2002. This year's conference was attended by over 1000 scientists, engineers, managers, faculty and students from 30 countries. The attendance marked a 9% increase over last year. In addition, the conference offered 290 technical papers, 14 short courses on topics ranging from today's IC and systems packaging to emerging SIP, SOP and wafer level packaging technologies. The technology booths have increased to 67 and about 45% of the papers came from outside the U.S. For the first time, there were more attendees from the academic community than from industry. The panel discussion arranged by the local San Diego CPMT chapter, as well as the plenary session, were highly successful. These are fantastic statistics for this economy. My sincere thanks to **Mike McShane**, the General Chair of ECTC, and his organizing committee.

Congratulations on Six New Fellows

Six new Fellows were elected from the CPMT membership this year, some received the honor at ECTC. As we all know, IEEE Fellow is the highest honor one can receive for technology or leadership contributions and only a small fraction, typically 0.1% of IEEE members, receive such a distinction.

Cristina H. Amon (*Carnegie Mellon University, USA*) – *For contributions to thermal management techniques for wearable computers and portable electronics*

Paul Siu-Chung Ho (*University of Texas at Austin, USA*) – *For contributions to metalization of, and metrology for, multilevel interconnects and electronic packages. (continued on page 3)*

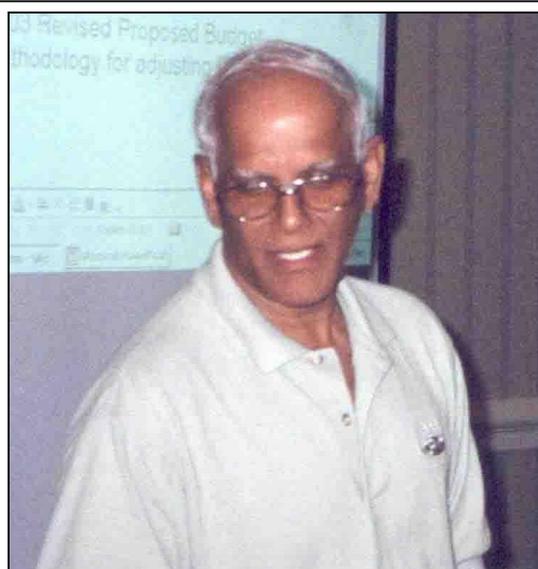
IN THIS NEWSLETTER

Reviews: ECTC sessions, photo spreads.

Awards: Fellows, Society, Special Presidential

Society: Board meeting, TC-5, TC=16

Upcoming Meeting Announcements



Rao Tummala, CPMT President

OFFICERS & BOARD OF GOVERNORS

President-- Rao Tummala, 1 404 894 9097
 Tech VP—Phil Garrou, 1 919 248 9261
 Admin VP--H. Anthony Chan, 1 408 924 3656
 Treasurer--L. Merrill Palmer, 1 619 675 2889
 VP Publication--Paul B. Wesling, 1 408 285 9555
 VP Conferences--James Morris, 1 607 777 4774
 VP Education--Albert Puttlitz, FAX 802 879 0466
 S. Past Pres.-- Ralph Wyndrum, 1 732 219 0005
 Jr. Past President—John Stafford, 1 602 413 5509
 Secretary--Ron Gedney, 1 703 834 2084
 Executive Director-- Marsha Tickman,
 1 732 562 5529
 Division I Junior past Director--Ralph Wyndrum,
 1 732 219 0005

Elected Members at Large

2004	2002
Rolf Aschenbrenner	Alina Deutsch
N. Rao Bonda	Koji Nihei
Rajen Chanchani	James Steele Jr.
Corey Koehler	Ephraim Suhir
Connie Swager	Walt Trybula
Naoaki Yamanaka	E. Jan Vardaman
2003	
William D. Brown	Craig Gaw
Johan Liu	Ralph Russell
John M. Segelken	C. P. Wong

Standing Committee Chairpeople

Student Chapter Development--William D. Brown
 Educational Activities--
 Distinguished Speakers-- A. F. Puttlitz
 Fellows Search--Rao Tummala
 Fellows--George G. Harman, C. P. Wong
 Constitution & Bylaws—Tony Mak
 Finance--Ralph Wyndrum, Jr.
 Long Range Planning--Dennis Olsen
 Standards Chair - "Jack" Balde. 908 788 5190
 IEEE books & C and D magazine Editor—
 Joe Brewer, 904 445 8971
 Membership--Ralph Russell, email:
 cpmt-membership@ieee.org
 Chapter Development--R. W. Russell, II,
 cpmt-membership@ieee.org
 Nominations--John Segelken, 1 540 633 5781

**Next News Deadline:
 September 5, 2002**

CPMT SOCIETY NEWSLETTER

EDITOR	PUBLICATIONS VP	TRANSACTION EDITORS:
David W Palmer Org 1716, MS0874 Sandia National Lab P.O. Box 5800 Albuquerque, NM 87185 505 844 2138 FAX 844 7011 d.palmer@ieee.org	Paul B. Wesling Compaq Computers 10435 N. Tantau Ave CAC07-38 Cupertino, CA 95014 408 285 9555 p.wesling@ieee.org	Avram Bar-Cohen, editor Part A University. of Minnesota 111 Church St SE, ME Dept Minneapolis, MN 55455 612 626 7244, Fax 612 624 1398 G. Subbarayan, editor Part B ME Department, Univ. of Colorado . 303 492 1726, ganesh@colorado.edu Walter Trybula, editor Part C 512 356 3306, w.trybula@ieee.org

Composition and Layout: Alina Deutsch Proofreading: S. Puccetti

International Relations-- Leo Feinstein, 508 870 0051; Europe:Ephraim
 Suhir, 908 582 5301; Far East: W. T. Chen, 65 874 8110
 Joint Committee on Semiconductor Manufacturing--G. C. Cheek

Technical Committee Chairpeople

TC-1 Electrical Contacts, Connectors and Cables--
 Gerald Witter, 1 708 244 6025
 TC-2 Discrete and Integral Passive Components—
 Leonard Schaper, Univ. of Arkansas, 1 501 575 8408
 TC-3 IC and Package Assembly – Michele Berry, michele.j.berry@intel.com
 TC-4 Manufacturing Design & Process—Walt Trybula, 1 512 356 3306
 TC-5 Materials--Rajen Chanchani, 1 505 844 3482
 TC-6 High Density packaging -- Yoshitaka Fukuoka,
 weisti.fukuoka@rose.zero.ad.jp
 TC-7 Environmental Stress & Reliability Test--Kirk Gray, k.a.gray@ieee.org
 TC-8 Semiconductor Processing & Manufacturing--John Reekstin,
 714 762 5077: Court Skinner, 1 408 453 9460
 TC-9 Thermal Management & Thermomechanical Design--
 Tony Mak, 1 972 371 4364
 TC-10 Fiber Optics & Photonics—Frank Shi, email: FGSHI@uci.edu
 TC-11 Electrical Test -- Bruce Kim, Bruce.Kim@asu.edu, 1 480 965 3749
 TC-12 Electrical Design, Modeling and Simulation--
 Madhavan Swaminathan, 404 894 3340
 TC-13 Power Electronics Packaging--Doug Hopkins, 607 729 9949
 TC-14 Systems Packaging—Lisa Pallotti, HP, 1 972 497 4127
 TC-16 RF and Wireless-- Craig Gaw, 480 413 5920
 TC-17 MEMS and Sensor Packaging—Eric Jung, email: erju@izm.fhg.de
 TC-18 Wafer Level Packaging—Michael Topper, toepfer@izm.fhg.de
 TC-19 Education--Rao Tummala, 404 894 9097
 TC-21 Green Electronics Manufacturing and Packaging, Hansjoerg Griese.
 Email: griese@izm.fhg.de

Representatives

ABET Ad Hoc Visitors--W. Arthur Porter
 ECTC Coordinating Committee--C. P. Wong, 404 894 8391
 IEEE Press Liaison--Joe Brewer, 904 445 8971
 Intersociety Liaison--W. T. Chen, 65 874 8110
 IMAPS--Phil Garrou, 919 248 9261
 ASME--Ephraim Suhir, 908 582 5301, suhir@hogpa.att.com
 AVS--James Morris, 1 607 777 4774
 Solid State Circuits Council--Leslie J. Palkuti
 U. S. A. Pace Coordinator-- R. W. Wyndrum, Jr.

*****IEEE Components, Packaging, and Manufacturing Technology Society Newsletter is published quarterly by the Components, Packaging, and Manufacturing Technology Society of the Institute of Electrical and Electronics Engineers, Inc. Headquarters: 3 Park Avenue, 17th Floor, New York, NY 10016-5997. \$1.00 per member per year (included in Society fee) for each member of the Components, Packaging, and Manufacturing Technology Society. Printed in U.S.A. periodicals postage paid at New York, NY, and at additional mailing offices. Postmaster: Send address changes to IEEE CPMT Newsletter, IEEE 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved, copyright (c) 2002 by the CPMT Society of IEEE. Authors and Artists given full permission for further use of their contributions. This Newsletter was printed in the U.S. of America. For circulation information call IEEE customer Service 908 981 1393, or FAX 9667.

- **Osami Ishida** (Mitsubishi Electric Corporation, Japan) – For leadership in research and development of microwave devices for mobile communications.
- **George Alexander Katopis** (IBM, USA) – For contributions to the advancement of switching noise estimation and containment in first-level packaging structures and architecting of design approaches.
- **Ravindhar K. Kaw** (Agilent Technologies, USA) – For contributions to the development of parametrics, tools and methodologies for the electrical design of electronic packaging.
- **Tseung-Yuen Tseng** (National Chiao Tung University, Taiwan) – For contributions to ceramic capacitor and sensor technology.

Congratulations to Society Winners

As in the past, the Society has recognized its major contributors in technology, in service and in Education (*see March Newsletter*).

- **The David Feldman Outstanding Contribution Award**
Herbert Reichl (Fraunhofer IZM, Germany) – For his technical leadership and outstanding contributions to the microelectronics packaging industry.
- **Outstanding Sustained Technical Contribution Award**
Avram Bar-Cohen (University of Maryland, USA) – For his contributions to thermal design, modeling and analysis and for original research on ebullient and liquid-phase cooling.
- **Exceptional Technical Achievement Award**
C.P. Wong (Georgia Institute of Technology, USA) – For his pioneering work in polymeric materials for electronics packaging applications and for the introduction and development of silicon gels to achieve reliability without hermeticity in plastic integrated circuits (IC) packaging.
- **Outstanding Young Engineer Award – Co-winner**
Li Li (Motorola, Inc., USA) – For her contributions to flip chip interconnect bumping materials and process development and embedded passive design and implementation in radio frequency (RF) modules.

- **Outstanding Young Engineer Award – Co-winner**
Christine Kallmayer (Fraunhofer IZM, Germany) – For her contributions to various packaging technologies including Gold-Tin (Au-Sn) solder interconnections and flex-based packages, and for her active participation in CPMT Society-sponsored technical conferences.

Special Presidential award to Bob Galvin, Chairman – Emeritus of Motorola

The CPMT Society was pleased to honor **Bob Galvin**, formerly of Motorola, for his sustained support of CPMT and ECTC by establishing the “Motorola Graduate Fellowship for Research and Education in Microelectronic Packaging.”

Society Continues on its Strategic Initiatives

Our Society continues to make progress on all its strategic initiatives, and the marketing of our Society is in full swing. We have met with several magazine editors to convey our message: *Advanced Packaging*, *Spectrum*, and *EE times*. We have also begun to focus on Leadership Development in Europe and Asia. The Asian development workshop is slated for December and the European for next year. Rolf Aschenbrenner of IZM, Berlin has been named the Strategic Director for CPMT European Operations and Bill Chen of ASE, Taiwan for Asian Operations.

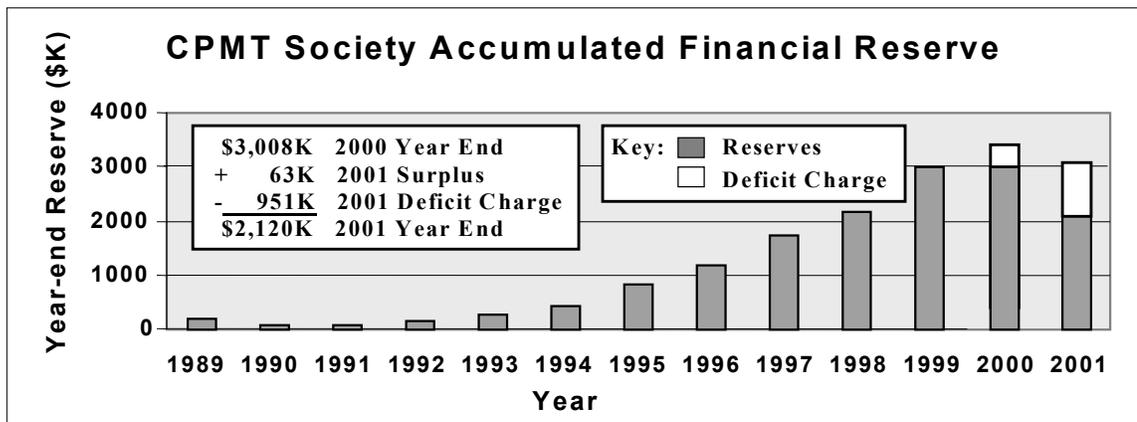
CPMT Welcomes Three New TC Chairs

- **Michael Topper** of IZM, TC –18, wafer level Packaging
- **Yoshitaka Fukuoka**, Japan, TC-6. High Density Packaging
- **Michelle Berry** of Intel, TC-3, IC assembly



3

Volunteers in action: (from front) Kimberly Newman (U. of Denver), Hansjoerg Griese (Fraunhofer Institute), Rolf Aschenbrenner (Fraunhofer Institute).



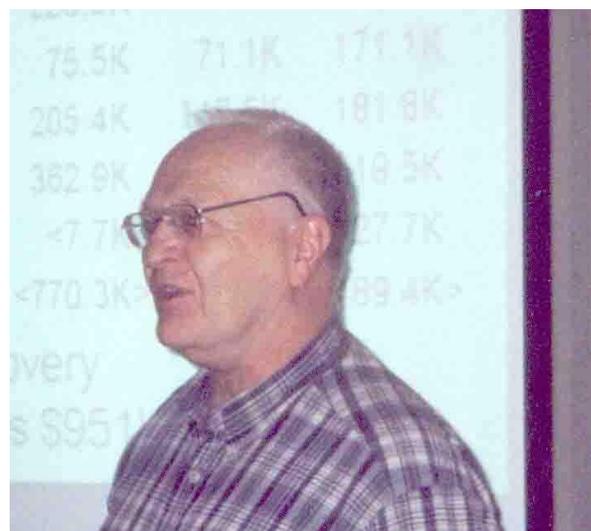
Your CPMT Society dragged itself from near bankruptcy in 1990 by working hard so most meetings and publications gave a small surplus that went into our reserves (left). Now IEEE Headquarters is near bankruptcy and uses surpluses from all Societies to pay their bills. The budgets are very linked so a cure must involve all incomes and expenses.

Treasury Report

CPMT financial reserves continue to be depleted to help cover IEEE Institute-Level operating deficits. For many years investment returns were high and these came to be relied upon to fund operations as well as initiatives. Then investment return were not high but the spending level was. Institute-level reserves quickly depleted and the only available source of deficit recovery was those IEEE entities that had financial reserves, including Technical Societies like CPMT.

As shown by the figure above, 2001 charges to CPMT for IEEE Infrastructure charges and Institute-level deficit were \$951K. That is \$263 per CPMT member! A number of policy changes, cost reductions, and budgeting guidelines have been put in place to address the problem. Progress is being made. But there is still expected to be a significant Institute-level deficit for some years to come. Transfers from CPMT reserves for Institute deficit recovery is projected to be almost \$500K in 2002 and \$300K in 2003. This is of major concern to your CPMT officers.

We try to be judicious and prudent in the fiscal stewardship with which we have been entrusted. We would hope that all IEEE officers and staff feel similarly responsible. In the upcoming elections for IEEE officers we encourage CPMT members to know the position and plans of the candidates with respect to IEEE fiscal management and to consider this in your vote(s).
--Merrill Palmer, CPMT Treasurer



Merrill Palmer, CPMT Treasurer

Nano Packaging Georgia Tech & Singapore

Rao Tummala, Pettit Chair Professor and Director of the Georgia Tech Packaging Research Center and President of the IEEE CPMT Society, will lead an international collaboration between Georgia Tech, The National University of Singapore and The Institute of Microelectronics of Singapore in a 3-year \$3M program to explore and develop Nano wafer level packaging technologies through a substantial research and education initiative. The program was awarded through Singapore's distinguished Temasek Professorship and provides the funding to develop the extensive research and education program in Nano technologies. The program's central objective will be to explore and demonstrate cost-effective ultra-fine pitch Nano wafer level packaging interconnections to meet the needs of Nano chips, which are expected to be in production within two years. Professor Tummala will lead a team of 20 faculty and researchers and 30 graduate students at Georgia Tech and in Singapore.

Editor's Turn

I want to thank all the volunteers who prepared material for this issue, particularly those who covered the many aspects of the busy ECTC: Ellen Leeper, Marsha Tickman, Rao Tummala, Rao Bonda, Bill Moody, Ralph Russell, Paul Wesling, Merrill Palmer, Bill Brown, Jim Morris, Anthony Chan, C. P. Wong, Kristine Martin, Rajen Chanchani, Connie Swager, Koji Nihei, Alina Deutsch, Craig Gaw, and Chase Palmer.

The San Diego ECTC attracted about 20% of our members. But the other 80% can still buy a CD-ROM with all the papers. I have already used my CD to spark some breakthroughs in my office. So even if your boss was too mean to let you come to ECTC, you can have the ECTC papers come to you.

Your Board Ships to San Diego

After an exciting but tiring week at ECTC, 32 of your Society Volunteers met for an all day Board of Governors meeting on Saturday, June 1. There were many issues to discuss given the pressure on our budget by the cash strapped IEEE Headquarters. The month of May was a blizzard of emails on the many issues and during breaks at the conference much debate took place.

President Rao Tummala opened the meeting with his "State of the Society" remarks. He mentioned the many changes in IEEE, member companies, and member interests that must be considered as volunteers steer the Society. "The improved liaison between CPMT and the ECTC board (Bob Willis) is working well." IEEE will take another large bite of our reserves to balance the whole Institute budget, but there is steady shrinking of the deficit spending. In the education department, there are now 10 Internet style courses that have been developed partly with CPMT support that should soon be available to our members. Rao would not be surprised if continuing education became the main financial support for the society in contrast with today's Transactions and Conference revenue generation. The announcement of new fellows included 6 from our Society bringing the total to about 120 or about 2% of members.



Rao Tummala talking to Ellen Leeper of PCG Inc

Rao announced that the ground-work was accomplished for a major IEEE award in our Society's field starting in 2004. He also mentioned that our global chapter structure was active and growing (36 regular chapters) and we had a few student chapters initiated (after a lot of work). CPMT has remained in the 3rd spot in growth rate among the 32 IEEE societies. He mentioned that the feedback from the 1000 that attended the CPMT luncheon was positive, with many liking the spectacular way the member awards remained the focus.

Rao judged the first year of strategic marketing, given the work of the Potomac Communication Group, has had a big impact and has been an important learning experience for all of our technology-oriented members. He reminded everyone that we continue to share ownership of the "IEEE nano-technology publication" which will grow in importance to our members.

He congratulated everyone on how far we had globalized the Society but indicated the journey had just started and it was time

to shift gears. To that end he introduced Rolf Aschenbrenner to discuss plans to increase CPMT focus in Europe.

5



Elected Board member **Rolf Aschenbrenner discussed several goals** which would provide the focus needed. First he suggested the establishment of a major European CPMT conference that has the stature and drawing power of the ECTC held in the USA or the ICEP in Japan. A related step would be to establish a CPMT Board in Europe which could better generate ideas and make tradeoffs for the region 8 members. Such a Board of Governors could coordinate the many European Chapter activities, workshops, conferences, short courses, publication and awards. The strategic goal is more active members in Europe...better service for our members. Of course if there was a major meeting in Europe it would be easier for Asian and North American members to justify the time needed to attend.

A step to begin this work would be holding the first of an intended annual leadership meeting. This would allow leaders with CPMT interests to self-identify and coordinate their activities. Rolf is considering such a meeting in central Europe (Germany) in the spring of 2003. Given the geography and structure of IEEE this effort is open to all of Region 8 which includes Europe, the Middle East, and Africa.



Director of Marketing, **Connie Swager**, reviewed this first year of

CPMT strategic marketing. In June 2001 a contract was formed with Potomac Communications Group (PCG) to bring professional wisdom and experience into our efforts. The original challenge as defined by detailed interviews with CPMT volunteers were:

- Competition for our natural members attention by other societies, publications, and meetings.
- We remained somewhat USA focused despite the global nature of the industry and member base.
- Our members only vaguely felt the benefits and value of belonging.
- Non-members benefited by what we did without knowing who we were.
- When our technologies created news the media seldom found our society.
- Our past advertising of meetings and membership were hit and miss.

This is not to say that CPMT was inactive. We had just finished our 50 year Anniversary celebration in Las Vegas. Each member had received an archival brochure about the history of our technologies. Also active volunteers earned CPMT labeled coffee mugs and tote bags. The Society and this newsletter had expanded with a rich web presence with growing readership. The number of Chapters were growing and being visited by many CPMT leaders (with jet lag). We also had professionalized our promotion booth at ECTC/ IEMT and had doubled the number of meetings we were actively engaged in. This was a lot of progress but it also taught many volunteers that they were in water often over their heads.

Much has been accomplished including the training of 12 of our volunteer leaders as ambassadors to the media. They are now able to interact at press conferences when our members technology developments are newsworthy. There have been 4 formal press releases (you may have seen a few). There have been about 9 interviews of our members by technical editors of trade publications. A Press Room has been added to our web presence so that journalists do not have to struggle to obtain background information and find contact information. To date the focus of conference coverage has been the ECTC and the IEMT/Semicon West.

Examples of specific accomplishments spearheaded by PCG include:

- Expanding our mailing list of interested "non-members"
- Establishing a quarterly reader ("Outlook") which updates a wide audience to CPMT activities and people
- Choreographed the best CPMT luncheon program at ECTC ever
- Established an expanded/branded web presence
- Unified an events calendar for our members planning purposes
- Designed an exhibit for the IEMT/Semicon West

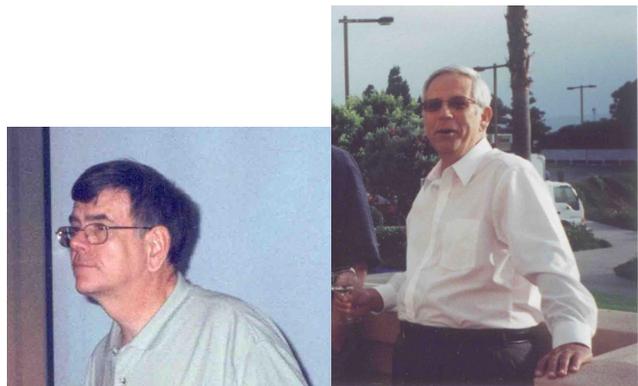
In addition to continuing these efforts, next year will see more concentration on media engagement. Marketing efforts will now focus on the Education program and the Distinguished Lecturers. Marketing thrust aimed at IEEE headquarters and other members are also in the plan.



C.P. Wong discussed how the CPMT Society gained recognition across the globe by guest seminars and talks given by Dr. K. Nihei, Prof. Ricky Lee, Prof. Ma, Prof. T.Y. Tseng, John Liu, and C. P. himself. These meetings took place in Osaka, Hong Kong, Beijing, Taiwan, Hungary, Tokyo, and Shanghai. He remarked that the Hong Kong chapter grew 40% in a one year period, and that there was an apparent need for an Osaka Chapter in addition to the all encompassing Tokyo.

C. P. also discussed the need to begin thinking of good candidates for Fellow nominations. To be nominated you must be a Senior Member already and have significant combination of technical, product, and IEEE Society accomplishments. Often the hardest step is to find the 5-8 existing Fellows that are knowledgeable in the nominees area of expertise and can write a strong recommendation. The list of Fellows in CPMT were published last year in this newsletter (see web back issues or look on at your stack of "things to read"). The complete list of IEEE Fellows are on the IEEE web site. Don't let this step stop you even though it can be hard in some spots of the world, ask a CPMT Board member for help. Historically our Society as submitted between 6 - 10 nominees and received 3-5 Fellow acceptances. In addition to those nominees CPMT submits there are typically an equal number of our members that are submitted by other societies in which they are also active. It is highly recommended that if you can make a strong case of contribution for a colleague or yourself, go ahead with the process and don't be concerned about possible quotas. Two steps that we can all do is to promote as many CPMT members as possible to "Senior Member," and survey all the volunteer members we work with to find Fellow quality and then start the process.

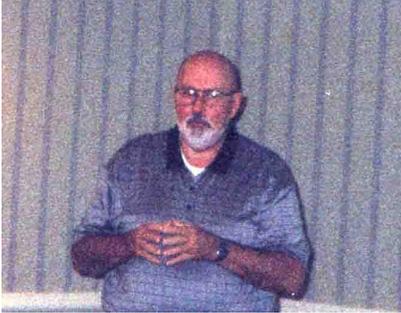
Ralph Russell discussed having email motions follow the normal Rules of Order that motions at the Board meetings have: seconds, discussion, call to vote. This was agreed and will be implemented by our Executive Director, Marsha Tickman.



Ralph Russell

John Segelken

John Segelken mentioned that it is time for nominations for the 6 Members-at-Large for the Board who will start their 3 year term next January. The rules for nomination are elsewhere in this newsletter or on the Society web pages.



John Stafford reported on the survey he performed as our Industry Liaison. He was trying to determine the general opinion of industry in supporting their engineers' attendance at technical conferences and short courses. Although most in upper management agreed in general on the benefit to both the engineer and the company they also said that in the last few years they have had very limited funding. However, some felt that "if an engineer wants to be employed then they are responsible for maintaining their skills and remaining current." And one VP even said curtly "Engineers are a commodity."

Our Society does not have the industry affiliation of our members since many use home addresses on their membership applications. A careful investigation of 20% of our members showed 95 different affiliations with no dominant ones. Twenty five years ago perhaps 20% of our members were from IBM and the Bell System; both were heavily represented at ECTC. This year the academic community provided a larger showing than industry. One meets many at ECTC that have taken vacation time to come because they know the importance of this meeting for their long term career.

For these reasons it is important that we develop compelling reasons for business leaders (who are often in survival mode thinking) to support their engineers membership and participation in CPMT. If we can gather a book of case histories where CPMT participation helped the bottom line this would encourage thinking beyond the next monthly reporting period. In addition, we must expand our effort to supply "low schedule impact" ways to train and upgrade our members. Examples include the ten web course that CPMT is developing. In addition, the possibility of making available the audio with viewgraphs of all presentation of all CPMT meeting on the Internet would greatly help our many members that can make one meeting a year at most but see much of interest at many meetings.

One step to support industrial members is to develop a world-wide list of companies and their respective CPMT-like decision makers that we can mutually benefit. Then we must develop the literature to make the case for supporting CPMT membership and participation. In addition, we must continue to develop training methods, meeting formats, and publication content that meet industrial needs.

So pretend you are the CEO of your company and develop a compelling set of reasons for supporting employee CPMT membership and attendance at key conferences. Forward your ideas to John Stafford.

Paul Wesling, VP of Publications, mentioned that the Transactions are up for their 5 year review. In general all 3 of our main publications are in good shape. Two have occasionally been a few months late on some issues. A more general issue is that the income from traditional publications is going down. For example, the long-time dependable surplus of \$600K from the Transactions is now \$400K. We must build a new revenue stream: Internet sales of specific articles, conference presentations, or virtual classroom seats. For these new member services we need new volunteers with multimedia skills.



Paul Wesling (left) mingling at coffee break

Paul reported on the IEEE Press. William Brown's "Advanced Electronics Packaging" is coming out with another edition. Richard K. Ulrich is developing a book on "Integrated Passives." Another book on Lead Free Soldering will be out early next year. Income from the "Book Brokers" program is growing. This income comes from the sale of old Proceedings that have been warehoused and a growing sale of electronic download from the IEEE archives.



Naoaki Yamanaka, NTT Network Innovation Laboratories, discussed

the resolution of the loss of articles from Japanese Conferences to the Transactions. A procedure is now in place and is to be monitored closely by the Board publication committee. The goal is to publish all papers by January 2003. Even some papers from 1997 are in limbo. In one case an author's address was lost and in three cases the authors did not respond with suggested corrections and the dialog stopped. The record was better in 1998 where 4 papers made it to the transactions but 3 were referred to the Component and Packaging Transactions and apparently were not tracked through the process.

Ralph Russell discussed the year to year drop of 2.9% due to an increase in non-renewals. In the same period the IEEE membership dropped by 1.6%. Since this is the time of the year that those forgetting to renew are taken off the books and a variable percentage rejoin over the summer, it is hard to draw any conclusions from this decrease. The drop in meeting attendance (which correlates to the economic difficulty of electronics industry) affects the finances of our Society much more than the membership count. None the less Ralph mentioned that he is updating the membership web site, making new membership welcome kits, and providing more ways to have one's membership recognized.

Ralph also mentioned that the India Council Chapter had won "Chapter of the Year." This was announced at the ECTC where a Chapter Reception was held. Mentors for each of the CPMT Chapters have been found within the Board of Governors. Ralph mentioned that over 40% of our members are global excluding North America.



Koji Nihei of Waseda University gave a report for the CPMT activities in Japan. Koji reminded everyone of the upcoming 6th VLSI Packaging workshop of Japan on November 12-14 in Kyoto Research Park. The big annual IEEE Chapter meeting was held on March 14-16 at the NTT facilities. A lecture was given by Dr. Hajime Sasaki, the Chairman of NEC, on "The Challenge of 100nm Wall for the Next Generation in Semiconductor Technology." Koji pointed out that 173 of the 11,000 Tokyo Chapter members identify themselves as CPMT members. Society membership has dropped because engineers in the hot areas of materials, RF, and devices are not joining.

Koji mentioned the success of the Systems Packaging Japan Workshop on February 4-6 at the NTT Musashino R&D Center (a very beautiful complex). There were 120 people listening to 30 papers. Ten countries were represented. On April 17-19 the International Conference on Electronics packaging (ICEP) was

held in Tokyo. There were 360 attendees from 16 countries learning from 87 papers. The parallel MicroElectronics Show had 4500 attendees.



Steve Adamson talks with Ron Gedney

Steve Adamson is the chair of the 60 member San Diego CPMT Chapter. San Diego county is large and it is hard for all to get to each meeting so they are trying to rotate where they meet to make it easy for everyone to make some of the meetings. The chapter almost folded in 1999 but they formed a joint chapter with IMAPS and ACS groups. RF has been one of their popular topics based on the local industries. They are working towards 1 day seminars. They need electronic projectors rather than viewgraph machines.

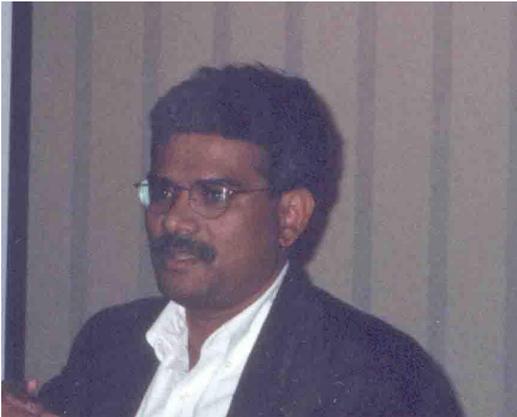


Package Education Session: Patrick McCluskey (U of Maryland), Paul Wesling (Compaq) and Jim Morris (Portland State U.)

Conference Vice President **Jim Morris** updated everyone on the status of our meetings. We are having trouble keeping the 15% reserve margin, a lot of our meetings have not been closed out yet. The cooperation of our TC-chairs with their ECTC counter-parts was excellent this year and can only get better. There has been continual growth in International conferences including the possibility of the "International IEEE Conference on the Business of Electronic Products Reliability and Liability." Jim is working with Paul Wesling to see if an on-line conference is possible.

Current effort is going into working the budget and getting more visibility to our IEMT Symposium (International Electronics Manufacturing Technology). Paul Wesling introduced a resolution that the Conference Committee should be charged with the goal of negotiating with all international

conferences that CPMT touches. As these meetings repeat their success the goal should be to implement the 15% surplus in their budget that has been responsible for society success since 1991.



Rao Bonda discussed the success of the ECTC presentation of some of the annual award. A lot of individual and CPMT recognition was gained by the way it was done this year. Now it is time for everyone to read the descriptions of the awards and nominate. These descriptions are on the CPMT web page and will be published in the September newsletter. This year a special Presidential Recognition Award was given at the CPMT Luncheon to Robert Galvin, Chairman Emeritus of Motorola. The citation read "The sustained support to CPMT Society and ECTC Conference and for establishing Motorola Graduate Fellowship for Research on Electronic Packaging and promoting graduate-level education."

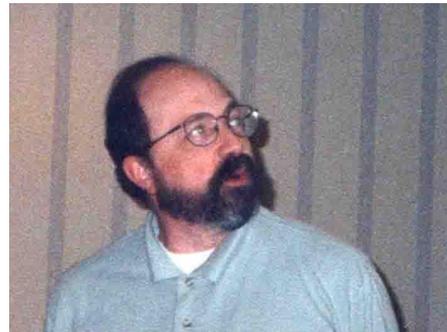


Al Puttlitz reported on the ECTC Short Courses. There were 14 classes this year with about 340 students. This was a strong showing for having the courses on the day before a very long meeting. Al led a discussion on our CPMT Distinguished Lecturer program. There are 18 listed as Lecturers but only 8 have actually given talks to CPMT Chapters in the last 2 years. Al discussed ways of encouraging use of Lecturers to help bolster our Society. He proposed two new Distinguished Lecturers:

Paul Franzon, is currently a professor at North Carolina State University. He earned his PhD from the University of Adelaide Australia in 1988. He has also worked at AT&T Bell Laboratories, DSTO Australia,

Australia Telecom, Communica Ltd, and LightSpin Pty. Ltd. The latter two companies he cofounded. His current interests center on the technology and design of complex systems incorporating VLSI, MEMS, advanced packaging, optoelectronics, and nanotechnology. In 1993 he received an NSF Young Investigators Award and in 2001 was elected to the NCSU Academy of Outstanding Teachers.

Luc Martens received the M.Sc degree in electrical engineering from the Ghent University (Belgium) in 1986. Through 1990 he was a research assistant at the Department of Information Technology of the same university. Obtaining his Ph. D from Ghent he became a member of the permanent staff of the Inter-university MicroElectronics Center (IMEC) and is responsible for the research on characterization of packaging technologies with respect to high-frequency and EMC behavior. He is now a Professor at Ghent. In 1998 he published a book on high-frequency characterization of electronic packaging (Kluwer Academic Publishers, ISMN 0-7923-8307-0)



Phil Garrou, Vice President of Technology, announced some changes in the Technical Committee Leadership.

- Bruce Kim of Arizona State University Chairs TC-11, Electrical Test
- Erik Jung of FhG-IZM in Berlin Chairs TC-17, MEMS and Sensor Packaging
- Michael Toepper of Fraunhofer IZM in Berlin Chairs TC-18 Wafer Level Packaging
- Yoshitaka Fukuoka of Weisti in Tokyo Chairs TC-6 High Density Packaging
- Michele Berry of Intel Chairs TC-3 IC and Package Assembly
- Len Schaper of University of Arkansas Chairs TC-2 Discrete and Integral Passives
- Frank Shi of University of California-Irvine Chairs TC-10 Fiber Optics and Photonics

Phil reported on the success of the evening plenary session including presentations by

- Raj Master of AMD, "Laminate Packaging for the Athlon Microprocessor."
- William Olson of Motorola, "The Future of Personal Area Networks."
- Christopher Erben of Lucent Technologies, "Polymers in Opto-electronics."



Professor **Bill Brown** updated the Board on the Student Chapter thrust. There are now active chapters at Georgia Tech, Romania, and Hong Kong. Arrangements are being finalized at IEEE for the University of Arkansas and in Sweden.

There are other interested locations for Student Chapters that are being investigated:

- Indian Institute of Technology - Bombay
- Indian Institute of Science - Bangalore
- University of Toronto
- Shanghai University

Other points of contact came from the "Dresden Packaging Education Conference"

- Budapest University of Technology and Economics
- Dresden University of Technology
- Wroclaw University of Technology

Bill Brown is looking for a person to run the Student Chapter Website...do you feel lucky?

Georgia Tech has the longest standing Student Chapter with seminars, tours, and scholarships. They have aimed at the

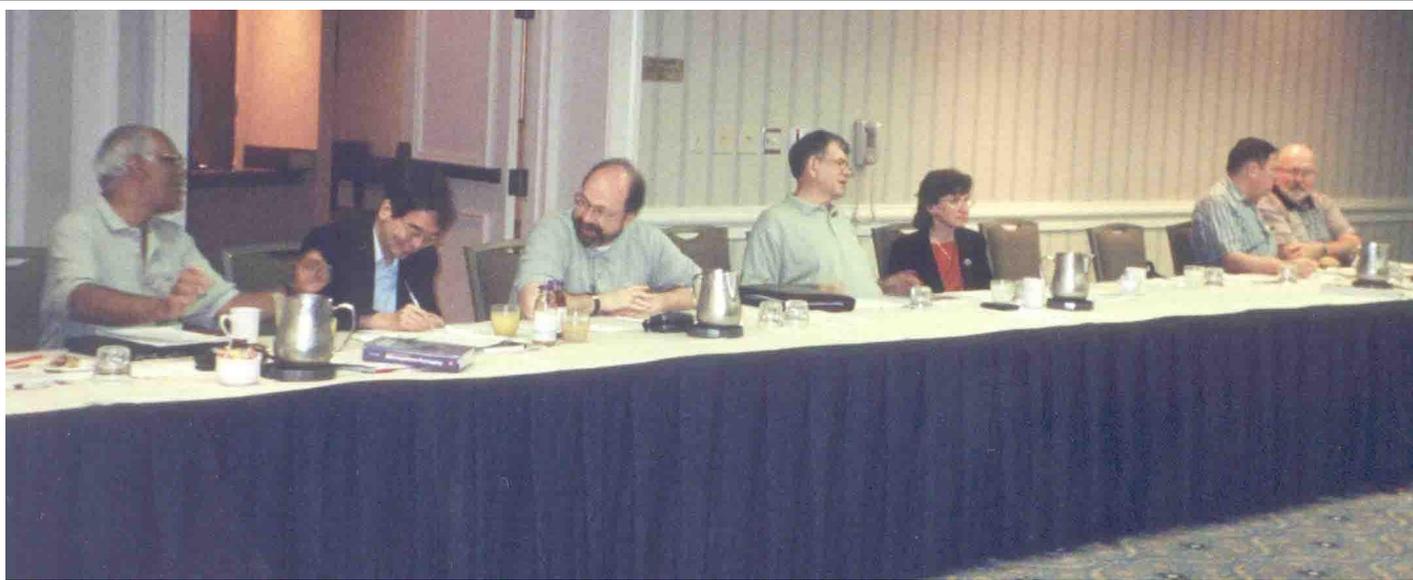
following benefits for the students:

- Following benefits for students:
- exposure to the many facets of microsystem packaging
- Group leadership opportunities
- Interaction with faculty outside classroom
- Inter-discipline interaction (ME, MSE, ChE)
- Scholarship award possibility
- Cutting edge seminars
- Access to CPMT transactions
- International perspective



Wayne Howell, IBM, reported on the results of the just completed ECTC. There were more than 1000 paid attendees at the talk and technology show. This is a 9% increase over the last year's Orlando event. Members from 30 countries attended and gave more than 290 papers. The execution of the months of planning was a lot cleaner because all communications were done through the website. There was no need for lots of email and phone calls and surface mail. As participants realize the benefits of this type of interface, future meetings should be even more efficient.

Wayne mentioned that feedback on the Panel discussion of local businesses in the CPMT fields indicated it was highly successful and should be repeated a future meetings. Both the attendees and the press derived a lot of value. Again the Plenary session proved to be a key area of the conference. The ECTC committees found the CPMT marketing work great and requested further coordination so that the conference light could be spread as far as possible.



Upcoming Conferences

****POLYTRONIC 2002** (2nd International IEEE Conference on Polymers & Adhesives in Microelectronics and Photonics), Zalaegerszeg, Hungary, June 23-26, 2002 ---

polytroni2002@ett.bme.hu, fax: +36-1-463-4118

****4th International Symposium of High Density Packaging & component Failure Analysis** (HDP-02), Shanghai, China, Galaxy Hotel, June 30 - July3, 2002, johan.liu@pe.chalmers.se or xmxie@itsvr.sim.ac.cn

****International Electronics Manufacturing Technology Symposium (IEMT)** with Semicon, San Jose CA, 17-18 July 2002, Glorie Lou at glou@semi.org, fax 1 408 943 7913.

****9th Annual International KGD Packaging and Test workshop**, September 8 - 11, 2002, Mapa California, www.dieproduct.com

****2002 Workshop on Accelerated Stress Testing (AST 2002)**, Montreal, Canada, 2 - 4 October, 2002, Kirk Gray, k.a.gray@ieee.org.

****2002 IEEE Holm Conference on Electrical Contacts**, Orlando FL, October 21 - 23, 2002, Jeanette Lopez, j.m.lopez@ieee.org, fax 1 732 981 1203

****Future Directions in IC & Package Design Workshop (FDIP)**, Monterey CA, 19 October 2002, www.epep.org, fax 1 520 621 1443

****11th Topical Meeting on Electrical Performance & Packaging (EPEP 2002)**, Monterey CA, 21 - 23 October 2002, www.epep.org, fax 1 520 621 1443

****6th VLSI Packaging Workshop of Japan**, Kyoto, Japan, November 12 - 14, 2002, nakamura-atsushi4@sic.hitachi.co.jp, fax +81 42 327 8631

****4th International Conference on Electronics Materials & Applications**, Germany, November 18 - 20, 2002, elke.zakel@ieee.org

****4th International Conference on Electronics Materials & Packaging (EMAP)**, Kiaohsiung, Taiwan, December 4 - 6, 2002, Shen-Li Fu, szyi@isu.edu.tw, fax 886 7 6577051

****Electrical Design of Advanced Packaging Systems (EDAPS)**, Singapore, 9 December 2002, Karen Chin, karen@ime.org.sg, fax 65 6774 5747

****4th Electronics Packaging Technology Conference (EPTC'2002)**, Singapore, December 11 - 13, 2002, Charles.Lee@infineon.com, eptc_ieee@pacific.net.sg

2003

****Commercialization of Military and Space Electronics**, Feb 10--13, 2003, Los Angeles CA, dal@cti-us.com

****9th International Symposium on Advanced Packaging Materials**, March 19-21, 2003, Atlanta, Georgia

****53rd Electronic Component and Electronics Technology**, May 27 = 30, 2003, New Orleans, Louisiana.

Alina Deutsch of IBM is a main organizer for the FDIP and EPEP conferences.



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.

If you are an IEEE and CPMT Society member in good standing and are interested in serving on the Board of Governors, you can automatically become a candidate via petition by following the procedures below. The term of office for this election is 1 January 2003 through 31 December 2005.

- 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, July 26, 2002 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.

IEEE Virtual Museum

Thomas Edison didn't invent the light bulb, so why does everyone think he did? What was the first computer? How did the patterns in a Utah cornfield lead to the development of TV? What is the "X" in an X-ray? Why are Alvin and the Chipmunks part of a museum about technology?

The answers to these questions and more are found in the new IEEE Virtual Museum launched at <http://www.ieee.org/museum>. Designed for educators, pre-college students, and the general public, the virtual museum debuted with two exhibits containing audio and video clips, and interactive

features: Socket to Me! How Electricity Came to Be and The Beat Goes On: How Sounds are Recorded and Played.

Three more exhibits are in production and are scheduled for release by third quarter 2002. These will explore the different applications of microwaves, the works of Thomas Edison, and contributions women have made to electrical and information technologies.

The IEEE Virtual Museum explores the global social impact of electrical and information sciences and technologies and demonstrates the relevance of engineering and engineers to society.



Ralph W. Wyndrum Jr., Eng.Sc.D.
Engineering Consultant
35 Cooney Terrace
Fair Haven, NJ 07704

Statement in Support of Candidacy for IEEE Technical Vice President

Before 2000, I served AT&T Labs as Technology VP, and later Program Planning/Management VP. More recently, I have served as a consultant in technology planning, and in a Silicon Valley startup for R&D enterprise decision support systems .

The IEEE exists to provide unique, affordable products and services to our members, academia, industry and government ; it must be a leader in electronic publications/services. World class technical leadership and business practices are essential ingredients. The TAB VP must lead TAB, but also be a key player on the IEEE management team with the Board of Directors.

Basic industry redirections are underway, including shifts *from internal R&D*. Venture-funded R&D and contract development/manufacture are business models being used today. These models *seriously affect IEEE members and programs*. My Board experience as Director for both Divisions I (Circuits and Systems, 2000-01) and III (Communications, earlier) as well as a Society President help me understand the IEEE infrastructure/cost issues. Costs need to be streamlined for the environment. I understand and appreciate the problems facing our large Societies as well as our small ones

I have wide international experience. Further, as IEEE-USA VP-Technology Policy I am working with the Societies to strengthen our programs informing Congress and the Regulatory Agencies on vital current issues. Many Societies need to be more supportive of regional programs globally, programs vital to members in start-ups, larger companies, academia and government.

I will deal with the technical challenges and infrastructure cost issues promptly. For years I have run organizations with

\$100M+ budgets- always balanced and properly weighted. I am familiar with valuable practices (e.g. activity based costing) which can benefit the IEEE. I will work closely with our colleague Board members to lead technical strategy, planning and operations to a healthy future as Technical VP.

(editor's note -- as IEEE members we are all worried about the financial crisis of the Institute. Ralph rescued the CPMT Society from a similar crisis in the early 90s as both a Board member and the President. He has also helped the Institute by his wisdom in his just completed term as Director of Division I. Please think about this and vote in the election.)

TC-16 Meets at ECTC

TC-16, RF and Wireless, was called for a breakfast meeting on Friday during the ECTC week in San Diego. Chair Craig Gaw of Motorola called the meeting to order with about 10 eager members. TC-16 typically gathers papers for one session at ECTC and puts on one short course. The fact that the MTT Society has their big meeting the week following ECTC limits the ECTC support available from RF companies. To contrast with the MTT Society, the CPMT TC-16 must stress RF packaging, manufacturing, and components.

One theme discussed was integration and packaging of RF embedded function including GPS, Wireless LAN, Bluetooth, SAW, VCO, RF power modules, flexible RF circuitry, and integrated passives. Another focus of discussion was how CPMT technologies were being used in the RF identification tag market.

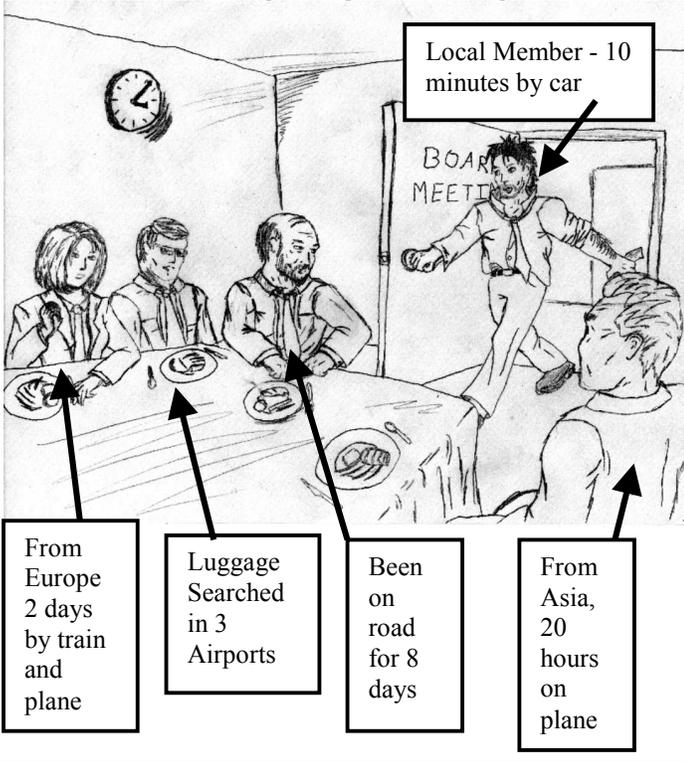
Frank Bachner of TechSearch and Goran Matijasevic of U of California-Irvine agreed to pursue these paths to find a critical mass of interest to support a panel discussion or a session of papers.

It was also agreed to build up a mailing list of those RF developers that had CPMT tendencies so we can communicate quickly to RF peers. To this end, Craig Gaw will draft a letter requesting ideas for presentations, panel discussions, and articles. Dave Palmer agreed to place a call for papers of the sessions developed in the September CPMT Newsletter and negotiate a place in the MTT newsletter as well as other trade publications.



Koji Nihei (Waseda University), Rao Bonda (Motorola), Lih Tyng Hwang (Motorola), Goran Matjasevic (U of California). Not shown are Craig Gaw (Motorola), Shankar Mmadathil (DeMortfort University), Len Schaper (Univ of Arkansas), Frank Bachner (TechSearch), Manos Tentzeris (Georgia Tech), Dave Palmer (Sandia Labs).

International Meeting: Travel Delays, yet only 1 Late.



TC-5 Materials

Chair Rajen Chanchani called together TC-5 at a morning meeting on Thursday May 30, 2002 during the ECTC in San Diego. Also trying to wake up were C. C. Lee the Vice-Chair from U. C. Irvine, Sridhar Canumalla the Web Master from Sonoscan, Richard Benson of Johns Hopkin, Eric Perfecto from IBM, Charles Lee from Infineon-Singapore, Kyung W. Paik of KAIST, Jim Morris from Prtland State, Vaidyanathan Kripesh of IME-Singapore, and John Pang from Nanyang Technical University-Singapore.

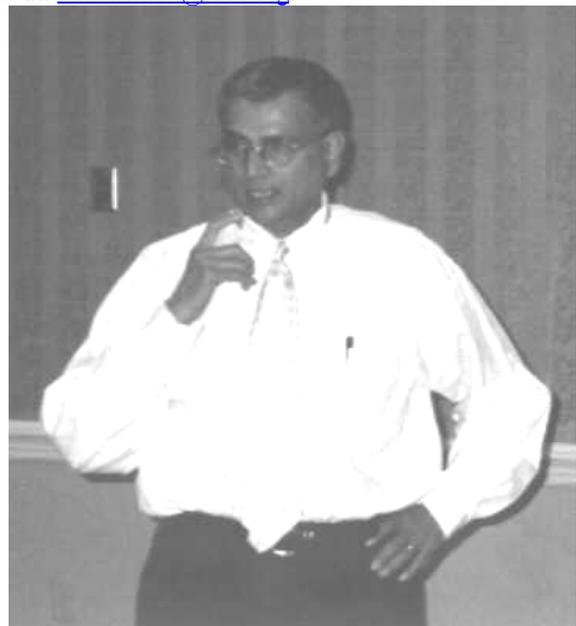
Old Activities Status

- TC-5 sponsored the recent Packaging Materials Symposium held near Atlanta. The conference is now sponsored jointly by IEEE-CPMT (TC-5) and Georgia Tech Packaging Research Center (PRC).
- Rajen announced that C. C. Lee is the Vice-Chair and Sridhar Canumalla is the TC-5 Web Master. Send all your updates to Sridhar.

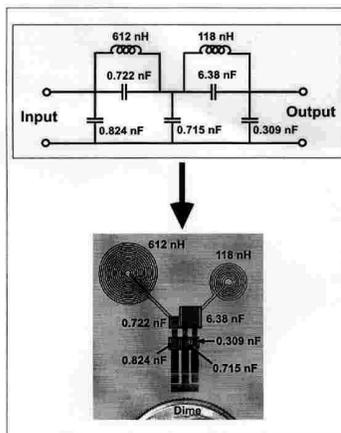
There was a discussion on sponsorship of conferences. TC-5 sponsors directly four conferences: Atlanta Packaging Materials Conference, Polytronic Conference in Europe, Component Failure Analysis (HDP) in Shanghai, and Electronic Materials and Packaging (EMAP) moving in Asia. The EPTC Conference to be held in Singapore this year in December is a general meeting and will be jointly sponsored by all TCs. There are several business issues relating to conference sponsorship which the Board of Governors must address, but the TC job is to present the best technical program possible.

Eric Perfecto proposed that TC-5 sponsor an ongoing "Polymer in Electronics" conference held every year in upstate NY. This conference is currently sponsored by the local chapter of the Society of Plastic Engineers. Eric will provide detailed information in the coming months so that we can bring up the issue to the Board of CPMT during the November meeting.

Become a volunteer if you have material interests. Contact Rajen at: r.chanchani@ieee.org.



Integrated Passive Component Technology



by
Rick Ulrich
Len Schaper

University of Arkansas
Fayetteville AR 72701
(479) 575-5645

rulrich@uark.edu
schaper@uark.edu



Sheraton San Diego Hosted ECTC

ECTC Technology Flows

The 36 presentation sessions plus lots of poster papers kept everyone writing notes and asking questions. For the 80% of CPMT members that were not able to make the meeting the CD-ROM or paper proceedings are still available.

There was calm, confident mood at this year's conference. Most engineers from industry looked worn out but saw orders picking up and so were positive about the future. Most of the professors saw their states running out of money and cutting back on financial support for universities...particularly salaries. Most of the students were very glad when their work was taken seriously and they cautiously engaged in scoping out employment opportunities.

Session 26: Advanced Packaging Technologies Chaired by Joseph W. Soucy (Draper Labs) and Sudipta Ray (IBM)

Muhannad Bakir of Georgia Tech spoke of the "Sea of Leads". This technology allows compliant contacts of up to 12,000/cm². Under each solder bump is an air "bubble" that gives up to 30 microns of compliance.

William Dritzler of Lockheed Martin (San Diego) mentioned that the packaging of RF components is 72% of the cost of shipboard antenna. To this end he reported on a long term project using plastic backed chips on flex circuits.

Seong-A Kim of KAIST discussed wafer level MEMS vacuum packaging. He methodically compared the different methods of bonding wafers together: direct bonding--anodic and fusion, as well as indirect with eutectic AuSn, glass frit, and B-stage epoxy. They perfected solder with leak rates x100 of minimum mil spec. However, for very small MEMS package volumes even this leak rate many be too high.

Silke Spiesshoefer of University of Arkansas presented a new Z-axis connector for 3D packaging techniques that has advantages over solder balls, fuzz buttons, and wires embedded in elastomer. The approach involved multiple gold wire bond stubs plated with a spring retentive material with gold frosting. These stubs are amazingly uniform and form good pressure contacts over a range of deformation.

Erik Jung of University of Berlin discussed thinning wafers to 15 microns and embedding the chips within the board (chip in polymer)

D. Pinjala of the Institute of Microelectronics characterized a Thermal Interface Material designed to minimize the need for tight tolerances in assembly.

Session 36: Web-Based Packaging Education: Demonstrations chaired by Paul Wesling (Compaq) and Al Puttlitz (consultant).

The CPMT Society and other funding sources

have been funding the development of web based courses that would help with continuing education of CPMT members. This session let web authors show their stuff.

James Morris of Portland State University discussed an Internet Course for conductive Adhesives used in Packaging. During the question period it was mentioned that a core library of java script for common packaging screen displays might be shared to help authors be more productive.

Patrick McCloskey of the University of Maryland discussed a Web-Based Graduate Course on Design-for-reliability of Electronic System. It seemed a systematic way of reviewing the most common failure modes and how to avoid them.

Rutgers University demonstrated their electronics packaging course. Since packaging is 47% of the cost of high performance ICs this is an important part of their curriculum. They had built in controls that allowed slowing down the presentation, repeating sections, and random access to different sections. (might be perfect for students getting tired of lectures).

A hands-on course was discussed by professors at Georgia Tech intended for the many engineers world-wide who are involved in complex board assembly and test. It takes \$40K to design and fab a complex board. Thus it makes sense to have a virtual lab to make and test boards for education.

The most attended course came from Budapest University of Technology and Economics as presented by Zsolt Illyefalvi-Vitez. He reported 400 students a year take their very basic electronics knowledge computer based course (on a CD-ROM). It looked very interesting but the version completely translated to English will take a bit longer (any volunteers.)

Session 24: RF and RF MEMS chaired by Lih-Tyng Hwang (Motorola) and P. Agrawal (Propulsion Networks)

Alan M. Lyons of Lucent Technologies discussed a detailed study of matching a 40 Gb/s connector to transmission lines on a high speed board. The study was needed to insure testability of the final design, ease of assembly and repair, and supply a standard interface for many different component vendors. The design/simulation of the connector to circuit launch geometry in detail was needed.

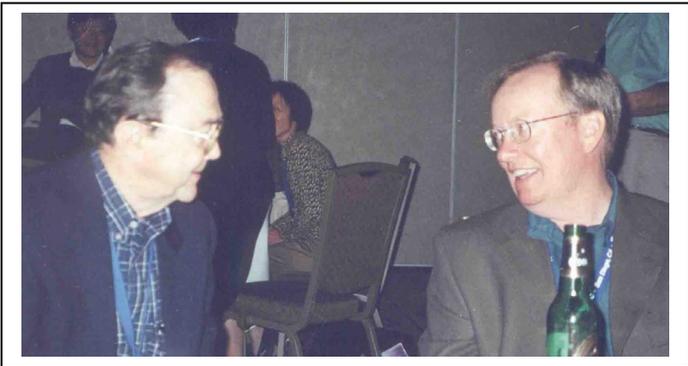
Hector J. De Los Santos of Coventor discussed the boundary conditions that determine the best MEMS inductors that you can make.

Lih-Tyng Hwang of Motorola used tools such as Ansoft HFSS to find the best package for MEMS RF switch packaging from several "commercial" variations.

CPMT Award Winners: Ravindhar Kaw, Herbert Reichl, Christine Kallmayer, Rao Tummala, Li Li, Avram Bar-Cohen, Skipor for Robert Galvin, and C. P. Wong



Networking at ECTC



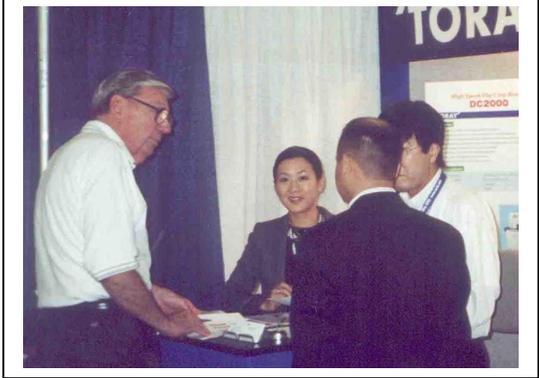
George Harman (NIST) with Darwin Edwards (TI)



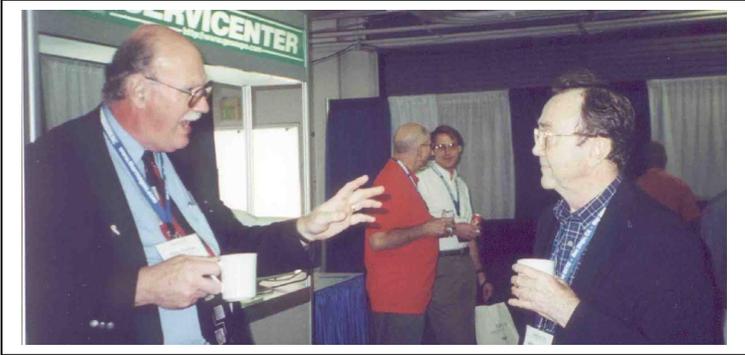
Rajen Chanchani (Sandia) with Alan Lyons (Lucent)



Harry Charles (Applied Physics Lab) and George Harman (NIST)



Co-Chairs: Joseph Soucy (Draper Labs), Sudipta Ray (IBM)



Harry Charles (Applied Physics Lab) and George Harman (NIST)



Co-Chairs: Joseph Soucy (Draper Labs), Sudipta Ray (IBM)



Phil Garrou at the Dow Chemical booth



Board members: Koji Nihei, Ralph Russell, Craig Gaw, Ron Gedney, and Alina Deutsch.



ECTC Executive Committee members: Donna Noctor (Agere), Steve Bezuk (Kyocera), Wayne Howell (IBM), and Mike McShane (Motorola)

Zhuqing Zhang of Georgia Tech getting Outstanding Paper award from Wayne Howell



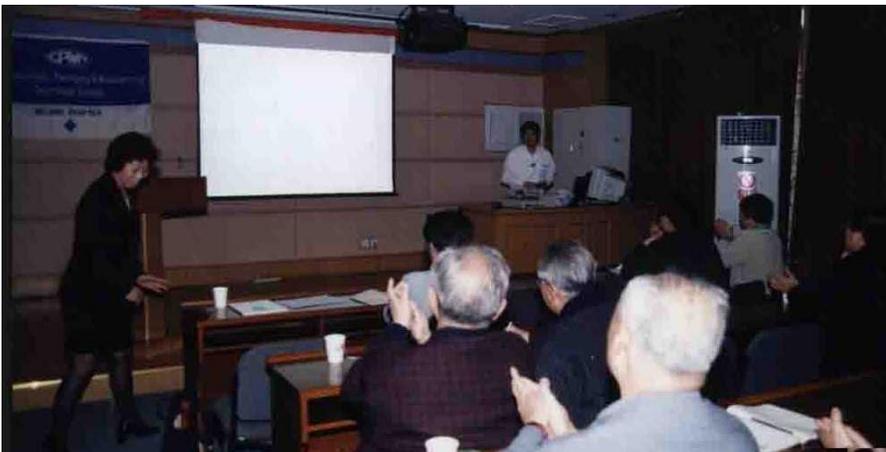
ECTC Program Committee already planning for New Orleans 2003

Pictures thanks to Bill Moody



Bill McClean, president of IC Insights, presenting his talk, "2002--A Healing Year for the IC Industry" at the ECTC luncheon

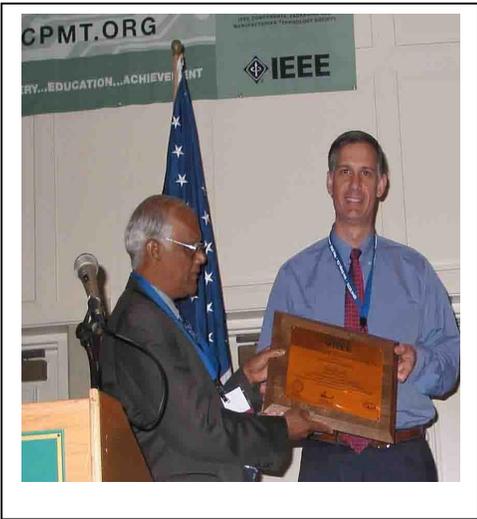
Beijing CPMT Chapter Professor Ma and C. P. Wong



A CPMT seminar was held by the Beijing CPMT Chapter on April 29, 2002. Prof. C. P. Wong of Georgia Institute and of Technology and Prof Ma of Beijing were the seminar speakers.



CPMT AWARD LUNCHEON AT ECTC



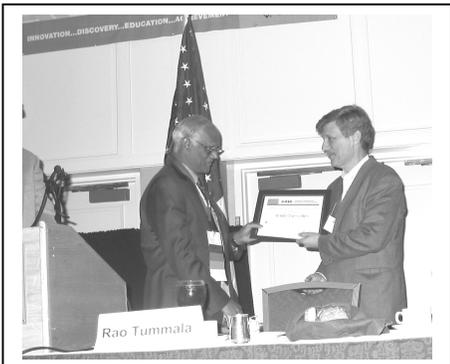
On May 30th the annual CPMT Luncheon was held during the ECTC conference. About 900 engineers attended. This occasion was used to give volunteers some well-deserved awards and recognition.

In the picture to the left, President Rao Tummala is giving Mr. Skipor **The Special Presidential Recognition Plaque** awarded to Robert W. Galvan “for sustained support to the CPMT Society and the Electronic Components and Technology Conference, for establishing the Motorola/IEEE CPMT Society Graduate Fellowship for Research on Electronic Packaging, and for promoting graduate-level education.”

Vice President Paul Wesling is giving Suresh Sitaraman of Georgia Tech the **Best paper Award** (right) for the Transactions paper “Interfacial Fracture Toughness for Delamination Growth Prediction in a Novel Peripheral Array Package.”



Outstanding Sustained Technical Contribution Award was earned by Prof. Avram Bar-Cohen of University of Maryland. (left) His contributions to thermal design, modeling and analysis including ebullient and liquid-phase cooling.



Li Li of Motorola (right) won the **Outstanding Young Engineer Award** for her contributions to flip chip interconnect bumping materials and process development and embedded passive design and implementation in radio frequency modules.



Prof. C. P. Wong (left) of Georgia Tech deserved the **Exceptional Technical Achievement Award** for his pioneering work in polymeric materials for electronics packaging applications and for his introduction and development of silicon gels to achieve reliability without hermeticity.



The **David Feldman Outstanding Contribution Award** was given in recognition of the technical leadership and outstanding contributions to the microelectronics packaging industry by Professor Herbert Reichl (left).



Everyone was rewarded by an excellent meal.

