Components, Packaging, and Manufacturing Technology Society Newsletter

IEEE CPMT

The Global Society for Microelectronics Systems Packaging

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President's Column

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Greetings

This is my first message to you as President of CPMT. I am excited to assume this office. CPMT is the foremost technical society of my profession, and I believe that there is no better place to serve our profession than to serve in CPMT. At the same time, there is a strong sense of humility in following in the footsteps of my predecessors, who have done so much for CPMT and for our profession. I wish to acknowledge Phil Garrou for his leadership and dedicated service as President of CPMT for the term 2004-2005. Under his leadership, the Society has continued to make great progress in the goal of a truly global technical professional society serving the global membership of our profession.

On behalf of CPMT, I wish to acknowledge the retiring Board of Governors (BoG) officers and members at large for many years of dedicated and enthusiastic service to the CPMT Society.

H. Anthony Chan:	VP of Administration
John Segelken:	VP of Finance
Connie Swager:	Strategic Program Director, Marketing
Timothy Adams:	Chair Web Development
Merrill Palmer:	Member at Large
David Whalley:	Member at Large
Walter Trybula:	Member at Large
Jan Vardaman:	Member at Large

We extend our very sincere thanks to you. This is not a goodbye. We are looking forward to seeing you at the society activities. And we would welcome you to visit at the BoG meetings. *(Continued on Page 3)*

IEEE Fellow Nomination Process

Dr. David Palmer
IEEE CPMT Fellow Search Committee

March 1st was the deadline for submitting nominations for the next group of IEEE Fellows of the Institute which will be announce at the end of 2006. Thus, it is a good time to remember what the quest for Fellow is about and to get ready to start the process for the next year. To quote from the IEEE web site*:* *(Continued on Page 7)*

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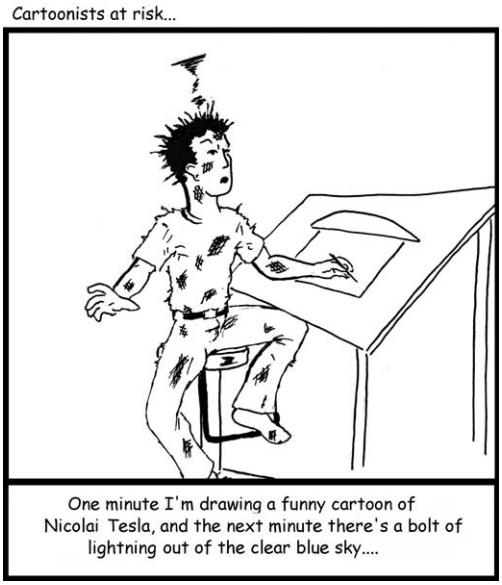

President's Column (continued from Page 1)

CPMT:

First I'd like to say a few words about CPMT.

What is CPMT? The Components Packaging and Manufacturing Technology Society (CPMT, in short) is a world-wide network of engineers and scientists with a shared interest in the engineering and sciences related to the packaging and manufacturing of electronic/photonic components, or microelectronic systems packaging and manufacturing. CPMT is one of 42 Technical Societies of IEEE. IEEE, at 350,000 members, is one of the largest technical organizations in the world. As members of CPMT, we are a part of the larger community of IEEE technical professionals working towards the betterment of our profession and of the society in general.

While CPMT is a Technical Society of IEEE, many of us are not trained as Electrical Engineers. Our members come from all walks of the engineering science and technology disciplines. We are a truly multidisciplinary profession.

What makes me say that CPMT is the foremost society of our profession? The three CPMT Transactions are the most authoritative and widely read archival journals in Microelectronics Packaging. The CPMT-sponsored conferences and workshops, including our three "flagships of ECTC, EPTC, and ESTC, are the most respected technical conferences of our profession, where the industry regularly searches for the latest and greatest in knowledge and innovations, and educational courses. Our technical committees lead technical activities riding at the edge of the technology envelope. CPMT chapters around the globe are sponsoring conferences and workshops actively working towards enhancing the knowledge base and technical agility of our membership. We are a volunteer organization. The reach and strength of the society demonstrates the enthusiasm and dedication of the very many volunteers who spend countless hours in the different facets of CPMT's activities. They are the leaders of our profession. It is these volunteers who have made CPMT into the foremost society of our profession.

Our Profession:

What is CPMT? A simple answer is that it is a "packaging" society. When my children were young, they asked me what my job was, so that they could explain their father's profession at show-and-tell in school. I told them that I worked in "packaging" in IBM. Then, to impress the grave responsibility of what I did in their young minds, I said that I worked in packaging of large, heavy, and expensive computers. Somehow they never did ask me why I went to work everyday in suit, tie, and white shirt. And I did not ask them how their classmates questioned them in show-and tell.

Today, we would not have much trouble to explain what we do. Electronics is pervasive in the society. Many people are carrying millions of transistors in their pockets, on their desks, and in their automobiles, toys and games. If the question were asked of me today, I would say that I worked in the packaging of transistors, and I would add the aside that they have become nano-sized through Moore's Law. Consumers today show that they care about how those transistors are packaged through their buying power. They are an important driving force for our industry, and the implications are far reaching.

The technology landscape, the industry ecosystems and the market have been changing, and the pace is accelerating. With the fast-paced changing landscape, CPMT's value propositions are more important than ever in helping our members to be technologically savvy and intellectually agile to survive, grow, and prosper. What are those value propositions?

Value Propositions: Knowledge Resources and Journal Publications

Whether one is a seasoned engineer or a new graduate entering the profession, to have the relevant knowledge resources to keep up with what is going on or to know other facets of the technology is a significant challenge. The CPMT Society publishes three peer-reviewed archival Journals – *Transactions on Components and Packaging Technologies; Transactions on Advanced Packaging; Transactions on Electronics Packaging Manufacturing.* They are the authoritative source of technical information. They are also the best place for our professionals to publish their best original papers. Survey has shown that IEEE journal articles are in the high range for citation, and CPMT Transactions contribute to these survey statistics. Members are encouraged to make use of IEEE's XPLORE search engine which can be accessed at ieeexplore.ieee.org to do online search for information in the full IEEE database which includes CPMT papers dating back to 1954. CPMT also co-sponsors other journals with other societies because we share common interest with these societies: *Trans on Semiconductor Manufacturing; Trans on Nanotechnology; Trans on Applied Superconductivity; Journal of Display Technology;* and *Sensors Journal.*

Publications are major value propositions for our society. Behind each journal issue are countless hours of toil for the authors, reviewers, and the editors. Paul Wesling, VP for publications, and his merry band of editors, are constantly working towards improvements in the content, quality, and timeliness of the publications. You will hear from him, and they would love to hear from you.

Conferences and Workshops:

CPMT has a track record of sponsoring high quality conferences and workshops spanning the many diverse fields associated with our professional interest. ECTC will be in its 56th year this May in San Diego USA, and we shall initiate the first Electronic Systemintegration Technology Conference (ESTC) in Dresden, Germany in September. In this Newsletter, and on the CPMT Web Page (www.cpmt.org), one can find a complete listing of information on conferences and workshops covering a wide spectrum of technical areas across the globe. The BoG has recognized that to serve the global membership, it is important to develop and nurture flagship conferences across the geographical locations. Behind each and every conference and workshop will be local and international organizers, paper committees, authors, presenters, and the attendees. The conference proceedings are valuable sources of information. And they also represent a great supply chain of papers for the Transactions. Rolf Aschenbrenner has assumed the position of VP for Conferences this term. He would

dearly welcome suggestions, ideas, as well as volunteers for conferences and workshops.

Education:

Packaging is not traditionally in a university degree curriculum. Our membership learn their "trade" – their knowledge and expertise – on the job. The Society organizes topical seminars, packaging technology courses during international and regional conferences, and section/chapter workshops, to help our members gain knowledge and skill in their jobs. There is a Distinguished Lecturer Program that makes speakers available to chapters to complement their technical programs. At another level, CPMT has sponsored academic conferences to bring the academics community together for curricula, courses, textbooks, and programs with the vision that future engineers and scientists in our profession will not have their first training in packaging technology on the job. Al Puttlitz, an industry veteran, is our VP of education. Please contact him for your input on educational needs or ideas for a course.

Technical Committees:

With the fast paced changing landscape of our profession, it is vitally important to have our membership on the pulse of technology development when it is happening and to understand its direction. This is the responsibility of the CPMT Technical Committees. There are altogether 21 Technical Committees on various topics of interest to our membership, see Web Page, www.cpmt.org/tc. The role of the technical committee is to regularly review, debate, and report significant developments and trends in their field of interest. Out of such intellectual ferment come ideas for sessions in conferences, workshops, and educational programs, or perhaps white papers. Taken together, the Technical Committees play the important role of keeping the Society activities fresh and relevant for the members at the leading edge. Rao Bonda assumed the position of Technical VP starting this term. I am sure that he would welcome technical inputs and volunteers to join the committees.

Membership and Chapters:

The Society exists to serve the membership and many of our members belong to local chapters of CPMT. I have been fortunate that I have personally benefited from really good programs and projects from at least four CPMT chapters in different regions around the world. The learning, the networking, the camaraderie, and the give and take from chapter meetings and personal contacts add a significant new dimension to one's personal knowledge growth and currency. Membership and Chapter Development are at the core of the Society's vitality and growth. Ralph Russell has the dual role as Strategic Program Director for Membership and Chapter Development. Please contact him with any ideas for your chapter and membership.

IEEE:

Last month I attended my first IEEE Technical Activities Board (TAB) meeting. It served as an introduction to the operations of the IEEE infrastructure and how the CPMT Society operates within this infrastructure. I came away from the meeting with two strong impressions. First of all, in meeting with the presidents of the other IEEE Societies and Councils, there is a good sense that we are a part of the greater community of IEEE professionals and our members share with their members many common professional interests. Secondly, there is a well organized and established IEEE infrastructure within which CPMT Society operates. I am very happy that Marsha Tickman, CPMT Executive Director, is well-versed and very knowledgeable (I think "savvy" is the word that I am looking for) for keeping us going along the way. Tom Reynolds, our new VP for Finance, is attending similar sessions this month. I have great respect for Tom in his knowledge and perspective. I have no doubt that he will be a tower of strength in this key role for the society.

CPMT – We need your help:

Our industry is globally distributed. With the internet, our reach is also global. In the industry, collaborative engineering and research are being accomplished across time zones and geographical distances. For our membership, it is vitally important that CPMT help us to broaden the global outlook in ourselves, in our work, in our research and in our teaching. We will nurture membership and start chapters where our industries are expanding, and build linkages and networks to existing chapters and membership. We will move ahead of the tide of changes to help our members with advancing technologies. We will continue to make the CPMT value propositions relevant and crucial for our membership. We will make outreach to where our potential members are and will be. To achieve this, all of us must work together with our collective effort and expertise.

We have a great team of volunteers on the BoG. While we come from different backgrounds and geographical locations, we are united in our interest to work for the betterment of our membership and CPMT. We are looking forward to working for you and with you towards these goals.

Interview with Dr. William T. Chen,

CPMT Society President …..

By Dr. Li Li , Associate Newsletter Editor

Editor: Welcome, Bill, can you please tell us a little bit about your background, and your family?

Bill Chen: My formal education was in mechanical engineering. I went to University of London, UK, and graduate schools at Brown and Cornell. Throughout my studies, my interest lay in the areas of materials and mechanics. I started at IBM in the sixties, where I was in their advanced technology group in New York, which included packaging R&D. I have been very fortunate to have grown up with the industry. Initially, my work was in packaging for mainframe computers but with the changing landscape of the industry, I have been working more in areas related to high-volume packaging, such as in the PC and consumer arena. While working at IBM, I learned the importance of understanding how technology is moving, and the importance of working with professional technical societies and universities.

In regard to my family, I have been married to a wonderful lady for over 40 years, and we have two daughters. I have been extremely lucky that my wife understands and has always been extremely supportive of my volunteer activities at the society level,

as well as university level. Remarkably, neither of my daughters has pursued careers in the world of physical sciences and engineering!

Editor: What have you been doing lately?
Bill Chen: I am working for ASE, which is a global company in the area of Assembly, Packaging, Material and Test services. I hold the position of Senior Technical Advisor. While I am based in the ASE US offices, I travel frequently on international business. Prior to joining ASE, I was Director and Principal Research Fellow at the Institute of Materials Research and Engineering in Singapore. I have been in this industry for many years and along the way, I have written papers, book chapters, and presented at technical conferences. One of my other main industry interests is the ITRS Assembly & Packaging ITWG, where I currently serve as co-chair. Earlier in my career, I was active in ASME, particularly in the early days of the Electrical and Electronics Packaging Division of ASME. I am a Fellow of ASME, as well as of IEEE.

Editor: How did you get into the field of electronic packaging, and can you tell us something about things you did along the way?

Bill Chen: Upon completing my PhD research at Cornell University, I joined IBM in Endicott New York. My interest back then was in the physical modeling and reliability simulation of miniature electromechanical components. And this work naturally led to modeling and reliability studies of microelectronic packaging components. In order to understand the motivation behind these modeling and simulation studies, I decided that I must learn about the business of design, materials, processes, and manufacturing. That is how I got into the field of electronic packaging. Fortunately for me, there were many good people at IBM who were willing to share with me what they knew and what they did not know. Of course, the most important part in engineering is to understand what one does not know. I had many great teachers who shepherded my entry into the field. I learned finite element methods, which, at the time, were new tools for the aerospace industry. We initiated a couple of internal workshops and taught ourselves on how to apply finite element methods to microelectronic components, including IC devices. Today, that is history.

As I mentioned previously, I have grown up together with the advancement of technologies. One thing that I have learnt is that the fundamentals of science and technology do not change. What are constantly changing are the applications and ground rules for these applications. For example, when I started in IC Packaging at IBM, I worked on solder fatigue for flip chip. Now, despite the time that has elapsed, it is still a very important subject, although there is now growing interest in lead-free solders, WLCSP, and BGA, in addition to flip chip. In the late 70's, I wrote a paper on the stress distribution between an IC device and a flexible substrate with a layer of adhesive in between arising from their different thermal expansion characteristics. This topic is still of interest today but with different materials and geometric dimensions.

Editor: The CPMT has been around for many years, with focus on the advancement of electronic components, packaging, and manufacturing technology. What is your vision for the society?

Bill Chen: Elsewhere in the Newsletter, I have talked about my vision for CPMT. Here, perhaps, I would like to speak more at a personal level. We are a professional Society. I joined CPMT because at CPMT conferences and CPMT chapter meetings, people speak the same technical language, and worry about the same technical issues, and read the same technical journals. We share common interests and have a common bond between us. We are of the same professional community. In the same way, IEEE is a larger community of which CPMT is a subset.

We put great emphasis on globalization because this natural base for CPMT is expanding globally throughout North America, Asia, and Europe. We put the same great emphasis on conferences, publications, education, and technical committees, as well as the membership developments for our members in whatever parts of the world they happen to be in. We all need to sharpen up our own professional portfolio for the fast changing technology and industry landscapes, and CPMT is here to help us.

Editor: What do you think of the CPMT "brand"?

Bill Chen: IEEE is very well known. The goal is for CPMT to build its brand presence in the industry. This will help our members receive professional recognition, as well as provide linkage to top executives in the industry in order to help them realize the importance of our profession and professionalism for their companies.

Editor: CPMT is truly an international organization. What advice can you give our members in this era of globalization?

Bill Chen: I consider globalization to be a key consideration for CPMT. Our industry is always changing, and while we are a global industry, over the last few years the globe has become very small and in many respects, the term "global village" could be applied to us. Despite our differing specialties and geographical locations, we have one thing in common – our profession and our technology. And it is up to us to take ownership to navigate the streets of our global village.

Previously, our member's network was confined within the company or within a city, but now it needs to be truly global. Through the power of the internet, global networking is increasing by leaps and bounds. Broad availability and use of the CPMT resources is an important goal for us.

Editor: As we are all aware, the packaging industry is extremely volatile so how would you advise an engineer considering a career in this area?

Bill Chen: Earlier in my career, I recognized the importance and became a strong proponent of the development of university education and research in microelectronic packaging related disciplines. The global student community of today contains tomorrow's pioneers. Therefore, it is paramount that they are provided with the best resources to help them develop their careers. There are always challenges and rewards with any given profession. The packaging industry is at the base of many other industries such as automotive, communications, medical, consumer, and others. Being in the packaging profession, sometimes volatility is an advantage. There are many possible paths for a career in this area, but it is very important that first one has to learn to fully

adapt for change. CPMT is changing as well, to help our membership in this respect.

Editor: What book are you currently reading?

Bill Chen: Actually, I am currently reading two books. The first is "The World Is Flat: A Brief History of the Twenty-first Century" by Tom Friedman. I think this is a New York Times Best seller. The second is "Seeing What's Next: Using Theories of Innovation to Predict Industry Change" by Clayton M. Christensen, Erik A. Roth, and Scott D. Anthony. I like to read books during airplane travel so I particularly like those books where one can read a chapter or two then put them down, and come back to them later. I also like to read mystery books. Unfortunately, a compelling storyline often means that one must read the entire book in one sitting. I really dislike having to jump to the last page but sometimes I can't help it!

Interview with Paul Wesling, CPMT Society Vice President of Publications…..

By Debendra Mallik, Associate Newsletter Editor

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

Paul Wesling: I grew up in California, and started my high school education when Sputnik was launched – this event led to major improvements and a strong focus on science and technology in our educational system in the USA. My whole career has been in the San Francisco Bay Area, where I always felt there were hundreds of companies at which I could work, so long as I kept myself current and useful. This proved to be true. One of our sons is a civil engineer in Bishop, CA, and the other is a construction manager for large buildings and hotels in Los Angeles. Between them, we now have 6 grandkids. Some of my hobbies are backpacking in the Sierra Mountains, fly-fishing, sailing, playing my guitar, and ham radio (KM6LH and K6BSA).

Editor: How did you get involved in our field, and what has your career been like?

Paul Wesling: As is likely true for most engineers involved in packaging and assembly, I was first trained in non-packaging fields, with a BS in Electrical Engineering and an MS in Materials Science, both from Stanford. This turned out to be a good combination, and my interest in "how things work" and how to improve them led me into R&D, reliability, and then manufacturing engineering and system integrity, and I ended up on a multi-chip module project at Tandem Computers. My service there went for 17 years, and I retired a few years ago from Hewlett-Packard (which had acquired Tandem). I like remaining active in the profession, so Gail and I are at several conferences each year. Behind the scenes I enjoy being CPMT's webmaster and guiding the volunteers who make our publications so successful.

Editor: What do you see as the needs of our members around the world, and in what direction are you taking CPMT in the short and long term?

Paul Wesling: Short-term I'd like to find better ways to communicate to not only our members but to all practitioners in design, materials, reliability and modeling of packaging, and in assembly and manufacturing. It's difficult for today's engineer to keep current. Our conferences and professional-development courses provide a chance to meet with peers, learn new approaches and developments, and stretch our knowledge base. For those who can't attend, we often have summary or profile articles in the CPMT NEWSLETTER, and all the papers are available in the XPLORE on-line database, for download. With today's search engines, it should be easier to find pertinent information. I also want to begin profiling some of the best journal papers for our members, for their awareness. These papers often cover subjects that will be hitting researchers and practitioners over the next few years, and we need to be aware of these solutions and directions.

Paul and Gail Wesling on a hike in the German Alps while at the SPI Workshop in 2005. Paul represents the CPMT Society and hold Editors' Meetings at several events each year.

Longer-term, I'd like the CPMT Society to direct its primary focus to all practitioners in our fields of interest – not only those who choose to join. Many engineers and academicians have full access to all of our conference and journal papers without joining the Society, and they (and their companies) are happy to pay non-member rates at conferences or for Proceedings. We need to expand our services to these people, so that everyone in the profession can share directions and results. The challenge is finding out how to do this. My hope is that we can get most of them onto our ListServ email list and make the PDF version of this NEWSLETTER available to them each quarter. Perhaps we can count on members to encourage co-workers to get on our DList!

Editor: Where could you use help from members?

Paul Wesling: I could use lots of help. For example, if someone has capabilities in software and creating multimedia, I'd like a person or team to help authors convert Conference presentations into streaming audio with GIFs of slides, so that many more engineers can view the conference talks later over the internet (from our CPMT website) and hear what the authors want to tell us. This can get to thousands more people than were able to attend that session at the conference. Perhaps we could convert the introductions of these talks into a series of Pod Casts or RSS feeds, for our technologists.

I want someone to focus on helping us adopt "groupware" that CPMT could use to bring together small communities of practitioners (such as our Technical Committees), on an asynchronous and virtual basis, for counsel and sharing. I'm also looking for knowledgeable specialists who can find and summarize the "most important papers" in their particular specialty over the past 20 or 30 years, and then write a review article profiling them for our journals; this can be a great help to grad students starting project research, to engineers wondering "where to start" with a problem

or project, and for authors wanting to add the correct references to their papers. This is the internet equivalent of the "compendium" books of compiled papers that we used to publish occasionally.

I know that it's hard these days to find extra time to help develop the profession. But we all take advantage of what we develop in common, and I think it's part of each engineer's professional responsibility to help in some way – maybe at the local Chapter level, or with a conference, and perhaps by helping me with our Society's web presence and services, or with our journals.

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

Paul Wesling: Ours is a particularly challenging field, since it is so interdisciplinary. An electrical engineer new to our fields needs quick updates in materials, failure modes, thermal modeling, and processing. A mechanical engineer must develop background in signal integrity and interconnects, time-of-flight issues, and assembly. The materials engineer has similar "blank spots" that need to be filled. And we all need to understand the chemistry and properties of nano-level materials, the impact of MEMS/NEMS, and the integration of photonics, biotechnology and bio-compatible devices. These will be markers for careers in the future.

So the secret to being successful in the CPMT fields is good teamwork. The engineer must develop relationships with those in complementary specialties – this peer networking is critical. Some of this can happen within a university or company, but much can be done through local CPMT Chapters and by participating on Conference program committees. Companies have a hard time understanding that their engineers need to spend a little of their time working with others across the profession in order to stay fresh and keep contributing at a high level.

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

Paul Wesling: Ah, that's a good question! I'm reading Making Silicon Valley, by Christopher Lecuyer. It has an intriguing hypothesis – that the key development that led to Silicon Valley's success was when a bunch of Hams (amateur radio operators) weren't satisfied with available transmitting tubes (back in the '30's) so they developed new manufacturing processes to get around RCA's patents. This advanced vacuum equipment, processing techniques, and infrastructure allowed Shockley and others to establish the first semiconductor companies here, rather than on the East Coast of the USA, which is what should have happened. Of particular interest to CPMT'ers: our focus on manufacturing technology is more important than we might think. Look for a book review in the near future …

Editor: Thank you, Paul.

IEEE Fellow Nomination Process (Continued from Page 1)

"The grade of Fellow recognizes unusual distinction in the profession and shall be conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE-designated fields, and who has made important individual contributions to one or more of these fields."

The total number selected in any one year does not exceed one-tenth percent of the total voting Institute membership. For the last few years about 250 new Fellows have been appointed out of about 600 nominations. CPMT averages about 5 new Fellows a year. We have more than 100 Fellows in our current Society membership of 3000.

In addition to professional distinction, the qualifications an IEEE member needs before being nominated are:

Must be a senior member at time of nomination
Must be current in dues (yes, even distinguished engineers forget to renew)
Must be a member for 5 years (Affiliate member does not count)
Nominator must get all forms to IEEE web site by March 1st

Through this year one could download the forms, fill them out, and mail them to IEEE headquarters. For the coming year the system will be completely electronic, working from the IEEE web site. The new web site is not yet activated for new nominations but in a few months perform a search on "Fellow nomination" from the new www.ieee.org page and you will get the complete process instructions.

If you know someone who qualifies for the Fellow level you can be a nominator. You do not need anyone's permission. If you need more guidance than is on the IEEE web site you can contact anyone on the CPMT board of Governors or talk to Rao Tummala or Dave Palmer on the Fellow Search committee (see contact information on page 2).

The best steps to success are:

1. Have the Fellow candidate write an extensive resume and list all publications and presentations they have made. With this information you complete the IEEE Fellow nomination form on the web (but make a copy that you can send to potential references). It is usually important to focus on the several technical and organizational contributions that distinguish the candidate in their field. This is typically better than to list only a thousand small contributions that total a lot but did not make an obvious big difference in any technology or organization.
2. Line up between 5 and 8 Fellows in related fields that know of the candidates work or can quickly appreciate it. For example, if the candidate contributed in thermal management, there are a number of Fellows in CPMT that would be ideal for reviewing the nomination.
3. Push everyone to submit everything in February at the latest. About half the nominations miss the deadline and must wait for the next cycle. As the nominator you will have access to the IEEE Fellows Application database and be able to see which references have yet to be submitted.
4. Let C. P. Wong on the CPMT Fellows Review Committee know that you are working on a nomination so he lines up enough society reviewers.

Once a nominator has done their job, the work load passes on to C. P. Wong's committee. They review all the nominations submitted in the name of the CPMT Society. All nominations must go through a Society or Council. At this point it is important to