

Charles Lee - Strategic Director for Region 10 - CPMT Board of Governors



Charles Lee is currently a Principal of Materials Science and Technology Integration at Infineon Technologies Asia Pacific Pte Ltd, Singapore. He received the M.App.Sc degree in Materials Science and Engineering from the University of New South Wales, Australia in 1993.

Charles Lee began his professional career with Siemens Components Pte Ltd, Singapore (now Infineon Technologies Asia Pacific Pte Ltd) in 1993 as a Package Development Engineer. In Siemens/Infineon, he held several functions, spanning from spearheading research development to technology management. He supported package developments in materials characterization and qualification, deflashing and solder plating process. He has made numerous contributions on low temperature wire bonding, copper oxidation, popcorn improvement and surface cleaning issues of surface mount packages. In 1997, he was awarded the Regional Siemens 150 Years Innovation Award. Charles Lee is highly recognized within his organization for pioneering the adhesion technology of a novel inorganic adhesion system and its successful implementation in automotive and lead-free applications. In 2000, he was appointed by the Institute of Microelectronics, Singapore to lead an industrial Electronic Package Research Consortium project to develop a high performance System-in-Package.

In 2001, Charles Lee was promoted to the position of Principal, Materials Science and Technology Integration, at Infineon where he currently heads the Technology and Services Group in Asia Pacific. He is responsible for technology development of wafer dicing/thinning and flip chip programs, and providing modeling/simulation and analytical services for Infineon's Communications Business Group. To date, he has more than 10 patents on assembly packaging technologies and has contributed more than 40 publications in major IEEE conferences and journals.

Charles Lee is currently an elected member of the IEEE/CPMT Society Board-of-Governors (2004-2006) and was a recipient of the 2001 IEEE/CPMT Society Outstanding Young Engineer Award. He is also an executive committee member of the IEEE REL/CPMT/ED Singapore Chapter since 2000. He has been actively involved in the organizing committee of the Electronics Packaging Technology Conference (EPTC) from 1997 and has served as the International Advisory Board member since 2004, Past General Chairman in 2003, General Chairman in 2002 and Technical Chairman in 2000. He is also a member of the IEEE/CPMT Technical Committee on Materials and the Interconnect Program Committee of Electronic Components & Technology Conference (ECTC).

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Dr. Ganesh Subbarayan is a Professor of Mechanical Engineering at Purdue University. He was previously at University of Colorado (1994-2002) and at IBM Corporation (1990-1993). He holds a B.Tech degree in Mechanical Engineering (1985) from the Indian Institute of Technology, Madras and M. S. and Ph. D. (1991) degrees in Mechanical Engineering from Cornell University. Dr. Subbarayan's research is in Computational Mechanics with applications to Microelectronics. Dr. Subbarayan is a recipient of the 2005 Outstanding Contributions Award from ASME EPP Division, 2005 University Faculty Scholar Award from Purdue University, NSF CAREER award, the NSF Research Initiation Award, the 2003 Charles E. Ives Outstanding Paper Award from the Journal of Imaging Science and Technology, the 2002 Highly Commended Award from Soldering and Surface Mount Technology journal, the Itherm 2000 Best Paper Award, the 1996 Peter A. Engel Best Paper Award from ASME Journal of Electronic Packaging, and an IBM Invention Achievement Award. He has served on the program committees of several conferences including the ASME/Pacific Rim International Intersociety Conferences on Electronics Packaging (1997 program co-chair, 1999 reliability track chair, 2001 Modeling and Characterization track chair), ASME International Mechanical Engineering Conference and Exhibition (2002 Program Chair, EPP Division) and Intersociety Conference on Thermal and Thermomechanical Phenomenon in Electronic Systems (2002 program co-chair, Mechanics). He currently serves as the Editor-in-Chief of IEEE *Transactions on Advanced Packaging*. He has served as an Associate Editor of IEEE *Transactions on Components, Packaging and Manufacturing Technology*.

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Dr. R. Wayne Johnson is a Professor of Electrical and Computer Engineering at Auburn University and Director of the Laboratory for Electronics Assembly and Packaging (LEAP). During his 19 years at Auburn, he has established teaching and research laboratories for advanced packaging and electronics assembly. Research efforts are focused on materials, processing, and reliability for electronics assembly and for extreme environment electronics. Current research projects span the temperature range for -180°C to +485°C. He has published and presented numerous papers at workshops and conferences and in technical journals. He has also co-edited one IEEE book on MCM technology and written book chapters in the areas of silicon MCM technology, MCM assembly, automotive MCMs (IEEE Press), flip chip assembly and high temperature packaging (IEEE Press). He is the Editor-in-Chief of the IEEE *Transactions on Electronics Packaging Manufacturing* and served as an Associate Editor prior to this appointment. He was

elected a Fellow of IEEE in 2004 for ‘his contributions to electronics that must operate in harsh environments.’”

Dr. Johnson received the B.E. and M.Sc. degrees in 1979 and 1982 from Vanderbilt University, Nashville, TN, and the Ph.D. degree in 1987 from Auburn University, Auburn, AL, all in electrical engineering.

Wayne is also a member of the International Microelectronics and Packaging Society (IMAPS), the Surface Mount Technology Association (SMTA) and IPC. He was the Technical Vice President of IMAPS from 2000-2004.

Editor’s Note: Refer to June, 2006, issue of the Newsletter for profile of other CPMT Transaction editors.

Interview with Dr. Avram Bar-Cohen, CPMT’s Transactions Editor in Chief

By Dr. Vasudeva P. Atluri, Newsletter Editor



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

ABC: I was born in 1946 and lived many of my childhood years in Brooklyn, NY, graduating from a neighborhood elementary school (PS225) and later Abraham Lincoln High School. I then headed to MIT for 3 engineering degrees, completing a PhD in Mech Eng in 1971. After a few years at Raytheon in Bedford, Mass, I joined the faculty at the Ben Gurion University in Israel, spent a sabbatical at MIT in the late 1970’s, and following a second sabbatical, joined the corporate staff of Control Data Corporation in Minneapolis. In 1988 I accepted a faculty position on the Minneapolis campus of the University of Minnesota and spent some 14 years in the Mechanical Engineering Department running a laboratory dedicated to the Thermal Management of Micro and Nano Systems (TherMNs) and later directing the University’s Center for Development of Technological Leadership. In 2002 I joined the Department of Mechanical Engineering at the University of Maryland as Professor and Chair and was named Distinguished University Professor in 2005. My current Laboratory, Thermal Packaging of Photonic and Electronic Systems (TherPES), provides me with the opportunity to keep studying the thermal aspects of these fascinating optical and semiconductor devices.

My wife, Anat, and I recently celebrated 40 years of marriage and now live in Washington DC, where she serves as Director of Programs for the National Breast Cancer Coalition. Our daughter Talia is a professional modern dancer in DC; our son Raanan is Director of on-line services for a major national publisher and lives with his wife and daughter in Brooklyn, NY; and our son Barak is President of a telecom investment company and lives in Princeton, NJ, with his wife and 2 sons.

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

ABC: For as long as I can remember, I wanted to be an engineer and as a kid I was forever dreaming up ways to use technology to cure the world’s ills. My father was a master plumber – and later a technical high school teacher – and the weekends I spent as his “go-fer” (helper) – threading pipes, melting lead with a torch for sealing cast iron waste pipes, trying to “persuade” 20ft segments of steam pipes into align-

ment, and coaxing a furnace back into operation - taught me the love of all things thermal and the joy of seeing a system spring into life, after arduous assembly and fabrication.

My MS Thesis at MIT, under the supervision of Prof. Art Bergles, dealt with direct contact heat exchangers and I had intended to begin my career in applications of solar energy and development of desalination systems. But, my first real job in 1968 was as an R&D Engineer at Raytheon, working on military electronics and radar systems, dealing – of course – with thermal management issues. I quickly became fascinated with the thermal challenges inherent in these miniaturized solid state logic, memory, and phase shifter devices and in 1969 – with Raytheon’s support - returned to MIT to pursue a PhD in immersion cooling with Art Bergles. Two years later I resumed my career at Raytheon as a Section Manager for Advanced Thermal Management.

When my attention began to encompass the assembly of devices into compact, later miniaturized, systems, a talent for visualization and geometric reasoning helped me transition into the broader domain of packaging. No one could pack a suitcase or the trunk of a car better than my father and in later years – though he didn’t know much about electronic packaging - we would compete on who could get to the higher “packaging density” in these more mundane applications. I rarely won the competition, but the acquired subtle skill in exploiting the 3rd-dimension has served me very well.

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

ABC: It has been my privilege these past few decades to witness and participate in the transformation of electronic packaging from a field dominated by “art” to a field with a growing scientific base. Like a Mangrove or a Banyon tree, and some other domains of engineering, packaging science – the “roots” – have grown from packaging practice – the “branches.” Today there is little tolerance for the “trial and error” approach of the past and products must be “correct by design” on the day they are released to the commercial marketplace. The growing sophistication of packaging science, facilitating the use of fundamental relations for the prediction of performance and failure and helping to identify barriers to greater precision, predictability, and reliability, has allowed the packaging community to keep pace with the Moore’s Law cadence and assure the continued progress in miniaturization, performance, and reliability we now take for granted in electronic systems.

The CPMT Society is today one of the most important depositories for, and guardians of, the packaging knowledgebase, including the collective memory of where we have been, the roadmap of where we are going, and the techniques and tools that will get us there. Through the publications, workshops, conferences, tutorials, and the more diffuse CPMT-centered professional networks, CPMT makes it possible for our members to be part of a “learning community,” applying progressively more sophisticated solutions to emerging packaging problems.

Editor: What are your visions for the society in short and long term? Where do you see the Society (and your area within it) in 5 to 10 years?

ABC: In the short term CPMT must continue to refine its “value proposition,” finding new ways to more efficiently create, showcase, and disseminate packaging knowledge at an affordable price