IEEE Electronics Packaging Society (EPS) Malaysia Chapter
Newsletter H1-2018

Greeting from Chapter Chair:

Shaw Fong WONG
IEEE EPS M'sia
Chapter Chair 2018
Intel Technology

Greetings to all EPS M'sia members for Y2018! How time flies, we are almost approaching mid Y2018.

As mentioned by our EPS Chapter President Dr. Avram Bar-Cohen, the electronics industry is once again experiencing tremendous expansion and revolutionary changes for Y2018. We are in the right path to reposition electronic packaging as a value generator and product differentiator for broad domains of the semiconductor industry. The continuous growth in "Internet of Things" (Iota) and 5G communications mean an extension of business development for every one of us in this semiconductor and electronic packaging ecosystem. It again provides another great opportunity for our respective industry groups to collaborate and expand our prospects, even as our society renames and reinvents itself as "Electronic Packaging Society (EPS) in Q3 of Y2017.

For Y2018, our main focus is to ensure a prestigious and regionally recognized conference setup, for the upcoming International Electronics Manufacturing Technology (IEMT2018) conference, which will be held at Malacca in September 2018. I can assure you that this EPS M'sia flagship conference offers good technical exchange avenues for all the semiconductor packaging and manufacturing engineers and specialists to meet and share their latest industry development. I am expecting this conference to be a prodigious one. Stay tuned for more info from here!

As per previous years, the committee have planned and aligned some exciting activities to be hosted by the M'sia Chapter. We will continue the "Best Engineering Student Award" program, where we reward our final year engineering student's project with a prestigious recognition! This is to encourage our new fledging engineers to tread where no one has tread before. Moreover, we will ensure we roll out our long-waited membership reward program, which is targeted to have its infrastructure completed by the end of 1H 2018. Furthermore, we will continue our reach-out opportunities with our regional EPS chapters (Singapore, Japan, Taiwan, Korea and China) to exchange knowledge and ideas, which we commenced a few years back. There are many more exciting programs that are being worked out by our tireless and committed executive team. Stay tune for our awesome announcements!

Lastly, I wish you all a fantastic 2018 and encourage you to participate passionately in all our exciting programs coming up! See you in the upcoming events!

Minutes of IEEE Electronics Packaging Society (EPS) Chapter AGM 2018

(Meeting Minutes by Dr. Yew Hoong WONG)

A. Chapter AGM (Annual General Meeting) – 27th January, 2018 at The Everly Hotel, Putrajaya)

- **Attendees:** Lim Wee Teck; Bernard Lim; CH Chew; Zain Asraf; Dr. Kim; Wong Shaw Fong; Chew Guat Li; Dr. Chee Choong Kooi; Dr. Shutesh; Dr. Wong Yew Hoong; Prof. Cheong Kuan Yew; Tan Kai Chat; CW Chai; Dr. YY Tan

B. Meeting Minutes:

No	Discussion Items	Owner
1	**Minutes of IEEE EPS Chapter AGM 2017-18** Dr. Wong YH as secretary of the chapter for 2017-18 agreed to be the AGM minutes taker.	Shaw Fong / Wong Yew Hoong

2	**IEEE EPS Chapter Annual Report for the IEEE Malaysia Section**.
	• Welcoming speech by Shaw Fong, followed by thank you and appreciation note for attending the AGM and Exco 2017-18.
	• Brief explanation on the events that had been held throughout 2017. Many good feedbacks gathered on the planned events. Shaw Fong reiterated that the chapter has been renamed as Electronics Packaging Society (EPS) from the former name of Components, Packaging and Manufacturing Technology (CPMT) in Q3 last year.
	• The treasurer is mandated to inform the Bank and undertake the necessary steps to update this change of chapter name in their database.
	• Highlighted items captured from the events held in Y2017 as a good reference for Y2018:
	  • The main event was 2017 Advanced Packaging Workshop, which was a Bi-Annual 1-Day Technical Workshop covering the current state of art technical discussion related to Wafer Level Chip Scale Packaging (WLCSP) and automotive devices packaging.
	  • Other events are educational talks at various local institutions, forums with CREST and CPMT Malaysia Best Engineering Student Award (BESA) for Undergraduate with University of Nottingham Malaysia Campus, University of Malaya (UM), Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM) and Universiti Teknologi Malaysia (UTM).
	  • Our CPMT Exco were also active in giving talks in national and international IEEE events as well as outreach to other universities.
	  • MOU with IEEE & IEEE/EPS on IEMT2018 Conference had been approved by Shaw Fong, Dr. Faisal, and Denise.
	  • Shaw Fong encouraged those who are eligible to apply for senior membership of IEEE to do so.
	  • Membership reward program: will be carried out this year in 2018.
	Prof Cheong proposed and seconded by Dr. Kim for report to be accepted.
		Yew Hoong & Shaw Fong

No	Discussion Items	Owner
3	**Treasurer Report** • Treasurers' report shared by Wee Teck since Azhar was unable to attend in person (personal medical attention). • Wee Teck explained line-by-line of the financial report. • SF and YY pointed out on 20/12/17 is sponsorship from Infineon but intended for other IEEE chapter. This amount (RM5000) needs to return to Infineon once details are confirmed. • Shutesh pointed out 10/7/17 related payment is for advanced packaging workshop. • SF proposed the chapter may support starting up EPS in ASEAN countries such as Vietnam, Laos, etc through seed money from current chapter funds. This proposal was supported by CH Chew with brief introduction on Vietnam industrial scenario. • SF also mentioned Treasurer 2018-19 could engage to get Netsuite finance reporting from IEEE Malaysia Section (By April). • The new Treasurers will also taking up the responsibility to engage with IEMT2018. Zain Asraf proposed and seconded by Dr. YH Wong for report to be accepted.	Azhar, Shutesh & WT Lim
4	Shaw Fong proposed to dissolve committee for 2017-18 and seconded by Wee Teck. Election started after the dissolution of committee for 2017-18. **Congratulation to New Committee for 2018-2019:** 1) Junior Past Chair: Dr. Siow Kim Shyong 2) Chairman: Wong Shaw Fong 3) Vice-Chairman 1: Dr. YY Tan 4) Vice-Chairman 2: Prof. Mohd Nasir Tamin 5) Secretary: Dr. Wong Yew Hoong 6) Treasurer: Dr. Shutesh 7) Vice Treasurer: Tan Kai Chat 8) Exco (Webmaster & Newsletter): Zain Azhraf Abdul Malek 9) Exco (Webmaster & Newsletter): Dr. Banu Poobalan 10) Exco – Industry (Industry Liaison): Choong Kooi Chee 11) Exco – Industry (Industry Liaison): CH Chew 12) Exco – Academia (Academia Liaison): Prof Cheong Kuan Yew 13) Exco – Membership Development: Chew Guat Li 14) Exco – Membership Development: Bernard Lim 15) Exco - Education & Technical Talk: Leow Eng Hoo 16) Exco - Education & Technical Talk: Dr. Eu Poh Leng 17) Exco - Industry (Auditor): Lim Wee Teck	
5	**Others** • A small token of door gift was handed to those attended the AGM F2F. • Shaw Fong also shared EPS Malaysia plan for 2018 and four key focus areas as the 1st Exco kicks off & introduction meeting. • The meeting adjourned at 10:40am. • The next exco meeting will be held post CNY.	Shaw Fong/Yew Hoong

Planned Chapter Activities in 2018

(Compiled by Shaw Fong WONG)

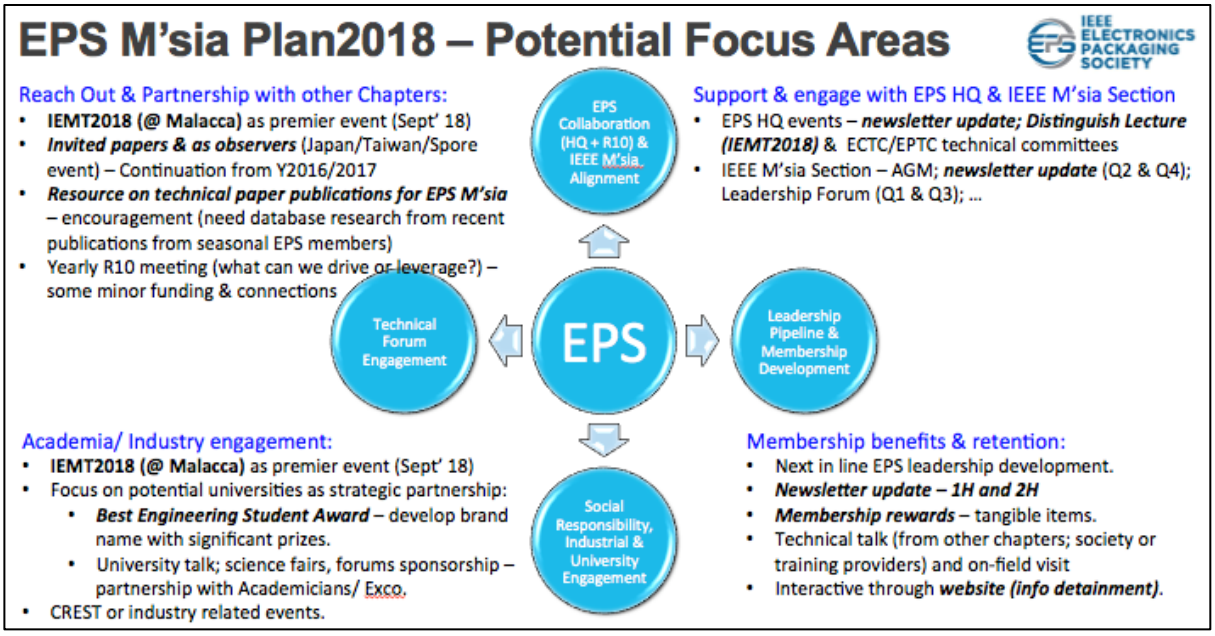

Figure 1: EPS Malaysia Plan 2018 Focus Areas presented during the AGM

Opportunities for Engagement:

A. Promote local EPS members for more paper publications to EPS recognized conferences.
B. Engage EPS exco for potential involvement in these conferences for chapter as well as personal networking development
C. Appoint EPS Exco for strategic involvement in EPS recognized conferences as invited speakers or for keynote sharing

Additional focus for 2018:

A. Engage with ICEPT
B. Engage with EMAP
C. Engage with IMPACT
D. Engage with EPTC (R10 Meeting)

38th IEMT 2018: Packaging for the SMART World

(Updated by Dr. Yik Yee TAN)

The 38th International Electronics Manufacturing Technology (IEMT) 2018 is an International Leading Conference organized by the IEEE EPS Malaysia Chapter with co-sponsorship from EPS society of IEEE Santa Clara Valley Chapter. "***Packing for the SMART World***" is the theme for this year. This is a major forum providing opportunities to network and meet leading experts, in addition to exchanging of current knowledge in the field. It will feature short courses, keynotes, invited speakers, parallel technical sessions, poster sessions and tabletop exhibitions. The aim is to provide extensive coverage of technological development in all areas of electronics packaging, from design to manufacturing and operations.

This year IEMT 2018 will be held at Ramada Plaza Hotel, Malacca Malaysia on the 4th-6th of September 2018.. You can refer to the official website of the IEMT2018 for more details. **https://ieee-epsmalaysia.org/iemt/** Grab this great opportunity to participate!!! See you there in Historical Malacca!!

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Kuan Yew CHEONG
USM, Malaysia
FA of Engineering Materials for Application in IoT

Ning-Cheng Lee
Indium Corporation, USA
Electromigration – The Hurdle for Miniaturization and High Power Devices

Theuss HORST
Infineon, Germany
PDC- Packaging for MEMS and Sensors

Srinivasa YEDURU
Infineon, Malaysia
Chip to Package Interaction: Trends, Developments and Integration Challenges

Mark Luke FARRUGIA
NXP, The Netherlands
Cu WB for Automotive Grade Semiconductor Products Packaging

Nelson Wong
K&S, Malaysia
WB Advancement: Smart Equipment for Smart Manufacturing

LF Chan
LF Training, Malaysia
Breakthrough in Semiconductor Packaging Problem Solving Through Quality Functions and Statistical Methodologies

Best Engineering Student Award (BESA) Program

(Compiled by Dr. Kim Shyong SIOW)

IEEE Electronic Packaging Society (EPS) funded the 2017 BESA program, which is implemented as a Final Year Project Competition to motivate mastery. The competition serves as the information-sharing platform among researchers, students and lecturers. Every small discovery contributes to both innovation and technological advances; it allows the next generation to spur the furtherance of knowledge by standing on the shoulders of giants. Being granted the award and bestowed the noteworthy recognition is the aspiration of every final year Engineering student. The monetary reward helps to emphasize the value of the recognition.

The Best IEEE EPS Undergraduate Final Year Project (FYP) Award at Universiti Teknologi Malaysia for 2017

The Best IEEE EPS Undergraduate Final Year Project (FYP) Award at Universiti Teknologi Malaysia for 2017 was awarded to Mr. Tay Kian Yoon, a Mechanical Engineering student. The title of his project was "Thermal and Moisture Analysis in a Solid Desiccant Wheel (SDW)". The project focused on the temperature and moisture distribution in a desiccant wheel, where adsorption and desorption processes took place due to differences in vapor pressures. Different wheel thickness and desiccant materials available in markets have been set as the research controlling variables.

The temperature distribution of different thickness and different desiccant properties of SDW was being determined by using Multiphysics simulation porous medium modeling and Finite Element Method (FEM) software. Thermal-wetness analogy was then applied to predict and to determine the moisture content along the SDW thickness. By having precise and accurate information on the temperature and moisture distribution, engineers could enhance the performance of solid desiccant air dehumidifier.

Last but not least, the student would like to express his appreciation for the mentorship of his supervisors, Assoc. Prof. Dr. Haslinda Mohamed Kamar and Assoc. Prof. Dr. Nazri Kamsah. Their guidance had been monumental in this achievement. The winner received RM3000 and a certificate. The cheque was presented by the FYP Committee Chairperson of the Mechanical Engineering Faculty; Associate Professor Dr. Haslinda Mohamed Kamar.

Figure 2: Dr. Haslinda Mohamed Kamar presenting the award cheque and BESA certificate to Tay Kian Yoon. EPS BESA Certificate displayed.

The Best IEEE EPS Undergraduate Final Year Project (FYP) Award – Universiti Sains Malaysia 2017

Best Engineering Student Award for Undergraduate Final Year Project at Universiti Sains Malaysia for 2017 was awarded to Mr Soo Kuan Lim, from Materials Engineering, School of Materials and Mineral Resources Engineering. The title of the project was "Characterization of Lithium Vanadium Oxide Anode with Agar Binder in Aqueous Rechargeable Lithium Ion Batteries". In this research work, the effect of the different ratio of agar binder on electrochemical properties and performance of the aqueous Li ions batteries was examined. From the study, it was found that the binders used in lithium ion batteries have the ability to improve electrochemical properties of Li ion batteries.

The morphology of the working electrode was characterized by Scanning Electron Microscopy method to determine the resilience and delamination of the surface as added with agar binder. Subsequently, the electrochemical performance were determined by using cyclic voltammetry findings, cyclic performance and charging-discharging capacity. An anode with high excellent cyclic performance and high specific discharge capacity were determined; and indeed agar binder was very suitable as a potential binder.

With the hard work and determination plus consistent guidance from his supervisor, Assoc Prof Dr Ahmad Azmin Mohamad, Mr Soo was grateful that the long journey had borne fruit in his young career in research and development with the receiving of this prestigious BESA award. The award ceremony was flanked by IEEE Malaysia representative and in-house lecturers; Prof Dr Ir Cheong Kuan Yew, and Assoc Prof Dr Nurulakmal Mohd Sharif (Programme Chairman, Materials Engineering programme). The award certificate and cash prize of RM 3000 were presented by the Deputy Dean of School of Materials and Mineral Resources Engineering, Prof Dr. Ir. Mariatti Jaafar, to Soo Kuan Lim.

Figure 3: Prof Dr. Ir. Mariatti Jaafar presenting the BESA certificate to Soo Kuan Lim (USM).

The Best IEEE EPS Undergraduate Final Year Project (FYP) Award – Universiti of Malaya 2017

The best IEEE EPS Undergraduate Final Year Project (FYP) Award 2017 at the University of Malaya was awarded to Ms. Lee Ee Lynn, a Materials Engineering student. The title of her project was "Intermetallic Compound Growth between Solid Cobalt and Molten Tin". The project focused on the interfacial reaction of binary Co-Sn system in terms of intermetallic compound (IMC) growth morphology and kinetics. The nano-hardness and modulus of Co-Sn IMC formed was investigated to determine suitability of $CoSn_2$ in transient liquid phase (TLP)

bonding. A dipping method where solid cobalt was immersed into molten tin statically was carried out at various temperature and duration. Field-emission scanning electron microscope (FESEM) coupled with energy-dispersive X-ray Spectroscopy (EDX) was used to characterize morphology and composition of IMC. The results showed that phase formed during liquid-solid Sn-Co interfacial reactions at 250°C, 275°C and 300°C for all durations were found to be $CoSn_2$. The $CoSn_2$ IMC thickness increases as dipping temperature and duration increase. The results had revealed that $CoSn_2$ is the most stable phase under test conditions in terms of thermodynamics and reaction kinetics aspects.

Last but not least, Ms. Lee would like to express her appreciation for the mentorship of her supervisor, Prof. Dr. A.S.M.A. Haseeb. His guidance had been monumental in this achievement. The winner received RM3,000 cash prize and a certificate. The cheque was presented by the Chairman of Centre of Advanced Materials; Assoc. Prof. Dr. Henk Metselaar.

Figure 4: Associate Prof. Dr Henk Metselaar presenting the award cheque and BESA certificate to Lee Ee Lynn. EPS BESA Certificate displayed.

The Best IEEE EPS Undergraduate Final Year Project (FYP) Award – Universiti Kebangsaan Malaysia 2017

The best IEEE EPS Undergraduate Final Year Project (FYP) Award 2017 at the University Kebangsaan Malaysia was awarded to Mr. Ravinder Singh Sidhu, a Materials Engineering student from Faculty of Engineering and Built Environment, UKM. His research was on fabricating a lab-on-chip biofilm sensor that can detect the presence of Leptospira bacteria in a wet medium. The elements used were Nickel, Ferum and polyaniline. The thesis also included the effects of different radiation strengths on the detectability of Leptospira. Ravinder received RM3,000 cash prize and a certificate.

Figure 5: Ravinder Singh Sidhu with his BESA certificate

Section Leadership Event

(Written by Dr. Shutesh KRISHNAN)

IEEE Malaysia held its Leadership Camp and Strategy Meeting from 10-11 March 2018 at Nilai Spring Resorts Hotel. The event started with an ice breaking competition where participants had a chance to mingle with their counterparts from various chapters under IEEE Malaysia whom they hardly meet. This is followed by speeches by the Chair, Vice Chair, Secretary and Treasurer. During the opening speech, the Chairman touched on various activities undertaken by the section throughout 2017 and IEEE Malaysia current membership status. As this leadership camp is meant to give insights on IEEE management aspects to new office bearers, the roles of secretary and treasurer were also explained in detail. The speakers answered numerous questions from the floor, mostly from the new office bearers. The participants were treated with a scrumptious lunch before the strategy meeting/workshop in the afternoon. In the afternoon each chapter presented their planned activities for 2018 and shared their financial status. The workshop continued on the second day entitled "Membership Benefits and Membership Growth", members from both academia and industry across various chapters shared their ideas on how to improve IEEE membership enrolment. The leadership camp and workshop event was a success. The participants departed with high spirits and equipped with sufficient knowledge to execute their duties in the coming years.

Figure 6: 2018 IEEE Malaysia Section Leadership Camp and Strategic Meeting Retreat Group Photo

IEEE EPS Website Development

(Updated by Dr. Kim Shyong SIOW)

IEEE EPS Malaysia Web site is under construction with major revamps from the previous CPMT content and graphical menu changes to make it more user friendly and relevant to this new technological age. Watch this space in H2 Newsletter for link and major features.

Membership Rewards Program

(Updated by Dr. Yew Hoong WONG)

IEEE-EPS (formerly known as IEEE-CPMT) Malaysia Chapter has recently launched Membership Reward Program to its loyal members. This program was designed to retain existing members. It is also a gesture to appreciate and acknowledge members who have provided support and displayed committed engagement to the chapter, and to encourage growth of the IEEE-EPS Malaysia Chapter's membership base. In order to obtain the latest particulars from the members, a Google Form has been created and disseminated. A special IEEE-EPS souvenir as membership reward will be delivered.

There are a total of 27 respondents todate who qualify under the membership rewards program for various reasons. The retaining of existing pool of members are critical for experience sharing with the younger newer members, and to propagate knowledge and aid technological advancement via tribal knowledge methods. There are currently 3 categories of membership rewards as listed below:

Category	Rewards
0 – 4 years	Special Electronic Device + IEEE EPS T-shirt
5 – 9 years	Fitness Device + IEEE EPS T-shirt
> 10 years	Cash Voucher / Book + IEEE EPS T-shirt

Table 1: Membership Reward Categories and the associated reward gifts

The Membership Program will be executed per the schedule below. Members are to watch out for their souvenirs in Jul'18, which will be shipped to their listed physical address. Any individuals who believe his/her address is not current will need to request for an update in the system accordingly so that the correct address is reflected prior to the reward gift being posted. Alternatively, he/she can update it in the Google form provided

Timeline	To do
May 2018	Supplier selection and token design reviews for reward gift finalisation.
June 2018	Fabrication of Reward Tokens
July 2018	Distribution of Reward Gifts to Identified Individuals

Table 2: Membership Reward Targeted timelines for distribution of gifts

REGIONAL EVENTS:

IEEE R10 Chapter Chair Meeting at EPTC Singapore (December, 2017)

(Updated by Shaw Fong WONG)

The typical yearly regional IEEE/EPS Chapter Chair R10 meeting was held again in Singapore in conjunction with the 19th Electronics Packaging Conference (EPTC 2017). The Malaysian Chapter was represented at the meeting by Wong Shaw Fong, the chair of the chapter. The meeting was chaired by Singapore Chapter Lead, Prof Andrew Tay and attended by the newly-elected President of IEEE/EPS Chapter, Prof Avi from USA. Besides, there are some BoG members and executive directors, including Prof Bailey, Dr. Kitty Pearsall and Denise Manning, who also attended to update some of the latest progress of the EPS societies' latest strategic planning. Various regional chairs, included representatives from Singapore, Beijing, Japan and Hong Kong also presented their chapter development status in this meeting with some good information exchange. The team agreed to bring up the unique value chain of each regional conference and also increase more technical exchange among R10 region. Prof Avi furthermore proposed a long-term plan to have a larger scale conference to be held in R10 with a possible all-week event to reduce some probable conference duplication. At the end of the meeting, a group photo was taken and Shaw Fong continued with several quick follow up face to face meeting with Prof Avi to introduce the EPS Malaysia team and also to elaborate the key upcoming event such as IEMT2018 conference to rally for more engagement from the new BoG team. In short, the R10 meeting was a fruitful meeting event.

Figure 7: Participants of 2017 Chapter Chair R10 meeting at EPTC Singapore.

Initiative of Epitaxial Technology in Malaysia - Towards a Brighter Future! (CREST and UCSB Collaborative Effort)

(Compiled by Hoo Kooi Lim from CREST team)

The story began with the word **LED,** which stands for Light emitting diodes. LED was one of the very first few emerging industries during the Penang's industrial revolution in the seventies. Companies like Hewlett Packard (HP) and Siemens Electronics (currently known as Osram) pioneered LED manufacturing, building their plants on the island touted as the *Silicon Valley of the East.* This in turn, created a domino effect, attracting many small and medium enterprises (SMEs) to immerse into LED associated business such as LED design, materials and packaging, spillover effect caused by the presence of these large LED companies. 2008 marks the year where Osram ventured into LED wafer fabrication in Penang. However they fell short of upstream development activities such as epitaxial technology. Epitaxial technology refers to the growing of a thin layer on the surface of a crystal (also known as the substrate) so that the overlayer has the same structure as the underlying layer

The journey towards enabling Malaysia to initiate Epitaxy Research in Malaysia began in 2013, when Malaysian Investment Development Authority (MIDA) invited Shuji Nakamura from University of California Santa Barbara (UCSB) to be a speaker at one of its conferences. After his presentation at the conference, MIDA invited Nakamura to meet the LED companies in Malaysia. During the conversation with the LED companies, it was suggested to Nakamura that the LED companies in Malaysia and UCSB could mutually benefit from collaborating with each other on epitaxial growth. Nakamura agreed that it was an excellent idea as Malaysia can gain from the front-end research at UCSB while he can gain from the in-depth experience of the back-end through the collaboration with Malaysia. On his return to UCSB, Nakamura developed a proposal for a collaboration that enabled Malaysian companies and Universities to send researchers to Nakamura's frontend research team at UCSB to MIDA. On receiving the proposal, MIDA assigned Collaborative Research in Engineering, Science & Technology (CREST) to help materialize the collaborative initiative. As CREST had already been mulling over on how to move up the value chain for LED community of companies, the project seemed to come along at just the right time.

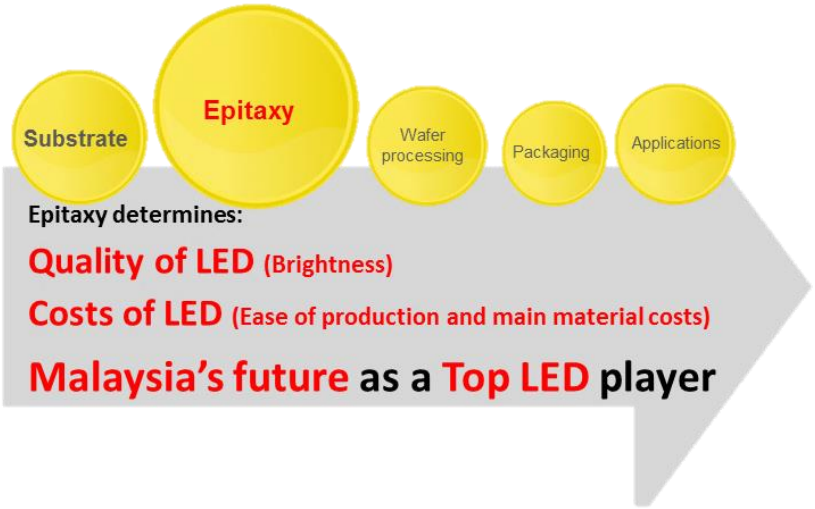

Figure 8: Graphical illustration of Epitaxy in the simplified wafer fabrication value stream

As part of the assessment of the proposal, CREST organized a trip to visit Nakamura at UCSB together with several representatives from Malaysia LED companies, MIDA and Northern Corridor Implementation Authority (NCIA). The purpose of the trip was to make the proposal compelling for Malaysia. CREST counter-proposed to UCSB by asking Nakamura's team to consider replicating Nakamura's lab in Malaysia and send UCSB researchers to Malaysia, not just for a few weeks, but for month long durations to take specific knowledge of the lab and replicate it in the Malaysian labs, similar to the current's product technology transfer in the industry. The next crucial step would be to innovate around that foundation thus setting up the nation on an exploration of a new frontier, viz. the next generation LED. Both Universiti Sains Malaysia (USM) and University of Malaya (UM) also joined the research representing the nation's academia.

In 2014, in the midst of our discussion with UCSB on the joint collaboration with a consortium of Malaysian-based LED companies and universities, Profession Shuji Nakamura was awarded a Nobel Prize in Physics for his contribution towards the invention of the Blue LED.

It takes an enormous effort to start up a technology in any country. Initially, Malaysia government agreed to pay RM80 million for everything, including the equipment, research and material costs and sending researchers from four local universities to UCSB. But for CREST, it was not just about getting money from the government. The industry and universities would have to commit something to the program as well. CREST developed a proposal that detailed the collaborative research program between industry and academia. The industry would have to commit their research officers to the project, donate equipment, lab time and some know-how that was not proprietary to them while universities would send their researchers, allocate lab space and provide lab equipment. At the end, the total cost estimate came to RM120 million, collectively coming from government, industry and academia over a five-year period.

This collaborative program, called Gallium Nitride on Gallium Nitride (GaN-on-GaN) officially kicked off in August 2015. During that time, UM already had its own Metal-Organic Chemical Vapor Deposition (MOCVD) machine, which allowed the program to commence to grow the epitaxy layer. In December 2015, Nakamura visited UM which is among the cogs of the collaboration to buildup epitaxial capability in Malaysia. He conducted an inspection of the equipment, verified the configuration of the gas system, checked the gas purity and pointed out the critical parameters to the UM team. UCSB also did their part by sending over their post-doctoral researchers to UM to help replicate Nakamura's laboratory environment and to develop the right recipe to light up the first Malaysia growth epitaxy in January 2016.

Figure 9: Professor Shuji Nakamura inspecting the UM epitaxial growth equipment (Metal Organic Chemical Vapor Disposition) in December 2015

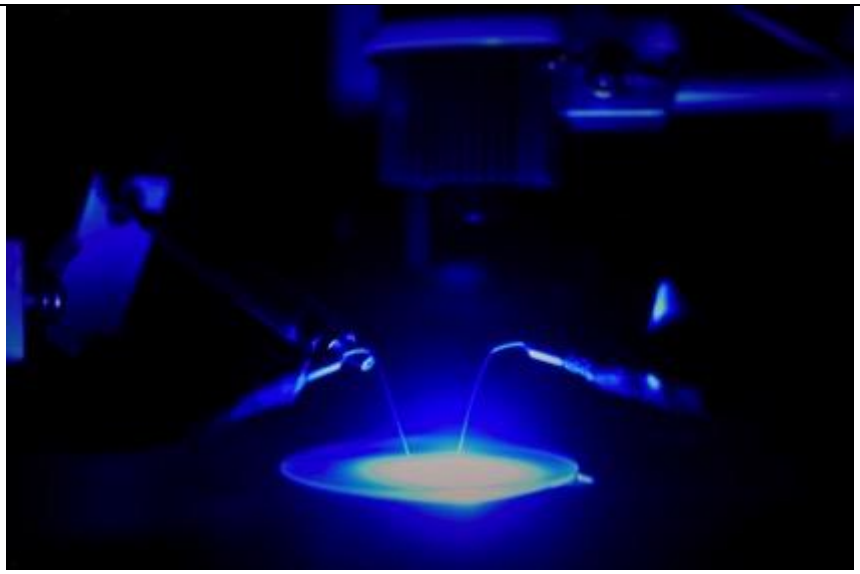

Figure 10: Our first Malaysia grown epitaxy lighted up in January 2016

As the story continues to unfold, the program funded a MOCVD reactor located in USM used for epitaxial growth of 4" wafer size and operated at high temperatures up to 1400˚C. The reactor was delivered to USM in October 2017 and was fully commissioned by March 2018. Apart from the epitaxy process, the subsequent fabrication process is also crucial in impacting the LED performance. With that, UM team completed the commissioning of LED fabrication equipment, which was also funded by the GaN-on-GaN program in Dec 2017. As of now, the UM lab is fully equipped with the LED front-end processes and is all geared up to produce Malaysian own in-house produced LED.

It would be amiss to note that all of this would not have been made possible without the contributions of each individual whom played their parts superbly. In term of researchers, there are 26 GaN experts (Malaysian) carrying out their research in UM, USM, Monash University Malaysia and Universiti Malaysia Perlis under the GaN-on-GaN program. On top of that, 3 PhD students from Malaysia are put under the program to pursue their studies in UCSB under the supervision of principle investigators from UCSB. Currently, they are in their second year of their PhD studies and they will be back to form Malaysia's GaN team after graduation. In addition to that, the program has also been seeing an exchange of visiting researchers from Malaysia to UCSB as part of the knowledge transfer activities for 6 months' assignments (4 researchers per year). The visiting researchers would be trained for GaN growth, MOCVD operation, LED fabrication, packaging as well as MOCVD lab operation & safety during the assignment period. So far, 7 visiting researchers have completed the training and have been relocated back to Malaysia to continue the research as well as to guide the local team. The program is expected to produce 50 GaN experts in Malaysia by 2020.

In retrospect, the program has been well on track for its five years' journey. Currently, the team has stepped into Year 3 of the program to enhance the performance, brimming with brilliant ideas to further innovate in Year 4 and Year 5. This program has also paved the way in terms of setting up a platform for the next phase of researches in gallium nitride power devices, LiFi communication and ultraviolet (UV) LED thus creating an exciting future ahead!

UTM-EPS Colloquium on Electronics Packaging

(Compiled by Prof. Nasir TAMIN)

The Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM) hosted the UTM-EPS Colloquium on Microelectronics Packaging, on 10 October 2017. The half-day seminar was held at the UTM main campus in Johor Bahru. Two technical presentations were shared with the audiences. Prof. Dr. Mohd Nasir Tamin, from UTM, discussed the topic on *Reliability of Solder Joints in Microelectronic Packages – FE Simulation Methodology*; whilst Dr. Shutesh Krishnan from ON Semiconductor deliberated on *Novel Interconnections: Towards Nano-dimensional Packaging*. The Colloquium was attended by the graduate students and academic staff and chaired by Dr. Wong King Jye from the Faculty of Mechanical Engineering, UTM.

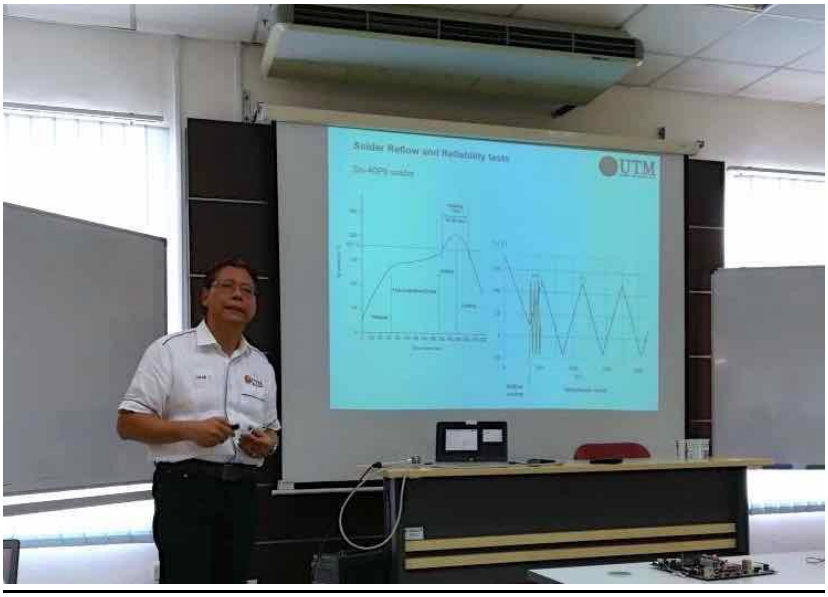

Figure 11: Prof. Dr. Mohd Nasir Tamin's technical presentation on Reliability of Solder Joints in Microelectronic Packages – FE Simulation Methodology

Figure 12: Dr. Shutesh Krishnan's technical presentation on Novel Interconnections: Towards Nano-dimensional Packaging

IMPACT 2017 Conference

(Updated by Prof. Nasir TAMIN)

International Microsystems, Packaging, Assembly and Circuits Technology (IMPACT 2017) conference was held in Taipei Nangang Exhibition Center, Taipei, from 25-27 October, 2017. The 3-day conference showcased 4 plenary talks, about 115 papers and 18 invited papers, spread over 4 parallel technical sessions each day. In addition, of particular interest, is the forum on IEEE EPS Heterogeneous and Integration Roadmap, chaired by William Chen (ASE). Shen-Li Fu. IEEE EPS Taipei Chapter facilitated the discussion and Rolf Aschenbrenner (Fraunhofer IZM) discussed the future of SiP. I was the only presenter from Malaysia and I presented a paper titled "Methodology for Thermal-mechanical Modeling of Damage and Failure Processes in Through-Silicon-Vias" in the session on 3D Integration and SIP. A total of 22 posters on packaging and 15 on PCB were also on display.

I also served as the IAB member for the IMPACT2017 conference and represented IEEE EPS Malaysia chapter during the IMPACT IAAC meeting held on 26 Oct. 2017 at the conference venue.

The conference venue is excellent, easily accessible, food is good and the committee members are very helpful throughout the conference. The Conference dinner at Howard Plaza Hotel is informal and wonderful. Cheong Chiang Ng from NXP Malaysia was invited to receive his award for the IMPACT-IAAC 2016 Best Paper Award during the dinner event.

Up Coming EPS Conferences & Meetings:

Networking and constant knowledge advancement opportunities are always an important part of any conference. EPS chapters have lined up an outstanding program with top tier speakers and timely topics for 2018. Below is a sample of what's in store for us. Mark the dates!!

EPS CONFERENCES IN 2018:

2018 34th Thermal Measurement, Modeling & Management Symposium (SEMI-THERM)
CA, USA Mar 19, 2018 – Mar 23, 2018

2018 29th Annual SEMI Advanced Semiconductor Manufacturing Conference (ASMC)
Saratoga Springs, NY USA Apr 30, 2018 – May 3 2018

2018 41st International Spring Seminar on Electronics Technology (ISSE)
Zlatibor, Serbia May 16, 2018 – May 20, 2018

2018 IEEE 22nd Workshop on Signal and Power Integrity (SPI)
Brest, France May 22, 2018 – May 25, 2018

2018 Symposium on Design, Test, Integration & Packaging of MEMS and MOEMS (DTIP)
Roma, Italy May 22, 2018 – May 25, 2018

2018 IEEE 68th Electronic Components and Technology Conference (ECTC)
San Diego, CA USA May 29, 2018 – Jun 1, 2018

IEEE TENSYMP 2018: Impact of the Internet of Things
Sydney, Australia Jul 4, 2018 – Jul 6, 2018

2018 19th International Conference on Electronic Packaging Technology (ICEPT)
Shanghai, China Aug 8, 2018 – Aug 11, 2018

2018 IEEE 38th International Electronics Manufacturing Technology Conference (IEMT)
Malacca, Malaysia Sep 4, 2018 – Sep 6, 2018

2018 13th International Congress Molded Interconnect Devices (MID)
Würzburg, Germany Sep 25, 2018 – Sep 26, 2018

2018 24rd International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)
Stockholm, Sweden Sep 26, 2018 – Sep 28, 2018

2018 IEEE 27th Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS)
San Jose, CA USA Oct 14, 2018 – Oct 17, 2018

2018 IEEE CPMT Symposium Japan (ICSJ)
Kyoto, Japan Nov 19, 2018 – Nov 21, 2018

2018 20th International Conference on Electronic Materials and Packaging (EMAP)
Hong Kong Dec 17, 2018 – Dec 20, 2018

Some Important References:

- Official IEEE website: http://www.ieee.org
- Official IEEE/EPS website (HQ): https://eps.ieee.org/

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The 24th THERMINIC Workshop will be held in Stockholm, the capital of Sweden. THERMINIC is the major European Workshop related to thermal issues in electronic components and systems. For academics and industrialists involved in both micro and power electronics this annual event promises to be a very special occasion with a high quality technical programme and exciting social events. We invite delegates to consider submitting abstracts that are related to, but not limited to, the following topics:

Thermal Phenomena, Simulation and Experiment
- Thermal management of electronic component and systems
- Classical and modern thermometry and thermography
- Multi-physics simulation and field coupling
- Thermal interface materials
- Thermal modelling and investigation of packages
- Power electronics
- High Temperature electronics
- Solid state lighting / LED's
- Thermal characterisation of micro and nano domains
- CFD modelling and benchmarking
- Advanced thermal materials
- Heat transfer on the nano-scale
- Thermal performance of interconnects
- Temperature mapping
- Electro-thermal interactions
- Nanotechnology applications
- Flow visualisation

Electronics Cooling Concepts
- Thermo-electric cooling
- Novel and advanced cooling technologies
- Sub-ambient cooling
- Heat pipe assisted cooling
- 3D integration and cooling concepts
- Cooling concepts: air, liquid, etc.
- Ultra low form factor air cooling
- Novel manufacturing methods

Thermo-Mechanical Reliability
- Thermo-mechanical reliability
- Prognostics and health monitoring
- Lifetime modelling and prediction
- Damage and fracture mechanics

Technical Programme will include oral talks, poster presentations, special sessions and invited talks given by prominent speakers.

Authors are invited to submit an abstract describing recent work. Abstracts must detail the objectives of the work presented and demonstrate new results. All abstracts will be double-blind reviewed. Please, refer to the www.therminic.eu web page for information on past THERMINIC workshops. This site will also guide you to the website of THERMINIC 2018. Accepted contributions will be published in the Workshop proceedings, and archived in IEEE Xplore (provided they comply with specifications). THERMINIC papers can be searched through IEEE, Google scholar and other search engines. Vendors and Book Exhibitors are invited to offer products in the scope of the Workshop. Exhibitor space is available – please contact local committee for further details. Editors are invited to exhibit books.

Deadline abstract submission:	11th April 2018
Notification of acceptance:	14th June 2018
Submission of paper for workshop proceedings:	10th August 2018

Please check the Workshop website for details on hotel bookings and travel arrangements.

Venue	Contact
Scandic Victoria Tower, Stockholm	Local Conference Committee Email: therminic@mcc-pr.de

38TH INTERNATIONAL ELECTRONICS MANUFACTURING TECHNOLOGY CONFERENCE

RAMADA PLAZA, MELAKA, MALAYSIA — 4 - 6 SEPTEMBER 2018

1ST CALL FOR PAPERS

The 38th IEMT 2018 conference will be held in Melaka, Malaysia, a UNESCO heritage site. It is an international event organized by the IEEE-EPS, Malaysia Chapter, with co-sponsorship from Electronic Packaging Society (EPS) of IEEE, Santa Clara Valley Chapter. The IEMT 2018 will feature short courses, parallel technical sessions, poster sessions and table top exhibitions. It aims to provide extensive coverage of technological developments in all areas of electronics packaging, from design to manufacturing and operation. The conference is a major forum to meet and network with leading experts, share scientific experience and exchange up-to-date knowledge in the field. Since 1990's, IEMT has gained a reputation as a premier electronic materials and manufacturing technology conference, and well attended by experts from all over the globe. Visit us at https://ieee-epsmalaysia.org/iemt/

IMPORTANT DATES

Abstract Submission (Extended)	Abstract Acceptance Notification	Full Paper Submission
15th March 2018	15th April 2018	15th June 2018

SCOPE OF PAPERS SOLICITED

Extended abstracts are being sought from, but not limited to, the following areas:

- Advanced Packaging
  - 2.5D/ 3D
  - Wafer level packaging
- Assembly & Manufacturing Technology
- Thermal/Mechanical/Electrical Design, Simulation & Characterization
- Materials & Processing
- LED, MEMS & Sensor Packaging
- Emerging Packaging & Interconnection Technologies
  - Opto-electronics packaging
  - Medical electronics packaging
  - Nano technology, materials and packaging
  - Wearable electronics
- Advanced Semiconductor Fabrication Technologies
  - Thin film materials and processing
  - Frontend process characterization
  - Yield enhancement
- IC Testing Technology
- Surface Mount Technology
- Quality, Reliability & Failure Analysis

PAPER AWARDS

The conference will present the "Best Paper Award" to papers in various categories:

- Overall best paper
- Bill Chen Award
- Best interactive paper

The paper awardees will be announced and honored at the conference.

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IEMT Malaysia IEMT 2018

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IMPACT 2018

A global platform with integral outstanding expertise in packaging and PCB professionals

Call for Papers, Register **TODAY**!

2018 the 13th IMPACT Conference will be held in conjunction with TPCA SHOW 2018 on Oct. 24th-26that Taipei Nangang Exhibition Center. IMPACT 2018 as the largest gathering of packaging and PCB professionals in Taiwan, aims at becoming a yearly meeting place for presenting and discussing new packaging and PCB ideas, best practices and case studies on innovative technology-based learning strategies, institutional policies. The symposium highlights the theme "IMPACT on Artificial Intelligence - Our Future" toward intelligent innovations, which fall into several areas: automobile electronics, smart application, robot, drones, autonomous vehicles, artificial intelligence, Micro LED, 5G and IoT devices. IMPACT seeks papers reporting research work, academic or business case-studies, on topics indicated below in the section "Conference Areas". Papers describing advanced prototypes, systems, tools and techniques and general survey papers indicating future directions are also encouraged. Both technological and social-oriented papers are accepted. All papers must describe original work, not previously published or submitted to another conference. Accepted papers, presented at the conference by one of the authors, will be published in the Proceedings of IMPACT under an ISBN, and will be indexed by major indexes. Acceptance will be based on quality, relevance and originality. Both full research reports (regular papers) and work-in-progress reports (position papers) are welcome. There will be both oral and poster sessions. Special sessions, dedicated to case-studies and commercial presentations, as well as tutorials dedicated to technical/scientific topics are also envisaged: researchers interested in holding a tutorial, workshop or special session are invited to contact the conference secretariat or visit the conference website.

CONFERENCE INFORMATION

【Date】Oct 24th (Wed) to Oct. 26th (Fri), 2018
【Venue】Taipei Nangang Exhibition Center
【Theme】IMPACT on Artificial Intelligence - Our Future

【On-line Registration】 register@impact.org.tw

【Abstract Submission Deadline】 June 15th , 2018
【Notification of Acceptance】 July 15th , 2018
【Advanced Program Online】 August 15th , 2018
【Full Paper Submission Deadline】 August 25th , 2018

CONFERENCE AREAS

Each of these topic areas is expanded below but the sub-topics list is not exhaustive. Papers may address one or more of the listed sub-topics, although authors should not feel limited by them. Unlisted but related sub-topics are also acceptable, provided they fit in one of the following main topic areas:

Packaging

P1. Advanced Packaging Technologies
P2. Power Electronics Packaging
P3. 3D Integration and SiP
P4. Wearable Technologies
P5. Interconnections & Nanotechnology
P6. Modeling, Simulation & Design
P7. Thermal Management
P8. Advanced Sensor & Microsystems Technology(MST)
P9. Advanced Materials, Automatic Process & Assembly
P10. Emerging Systems Packaging Technologies

PCB

B1. Advanced and Green Materials
B2. Test, Quality, AOI, Inspection and Reliability
B3. HDI and Embedded Technology
B4. Electro Deposition and Electrochemical Processing Technology
B5. Mechatronics and Automation
B6. Advanced and Emerging PCB & PCBA Technology

PAPER SUBMISSION

Authors should submit a paper in English, carefully checked for correct grammar and spelling, addressing one or several of the conference areas or topics. Each paper should clearly indicate the nature of its technical/scientific contribution, and the problems, domains or environments to which it is applicable. Only original papers should be submitted.

PAPER SUBMISSION

Abstract format (Authors should submit their ABSTRACT (400-500 words) electronically by Jun 15)
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