MANUFACTURING MATTERS

July 2017 | Issue 3

FEATURE

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RESEARCH SPOTLIGHT
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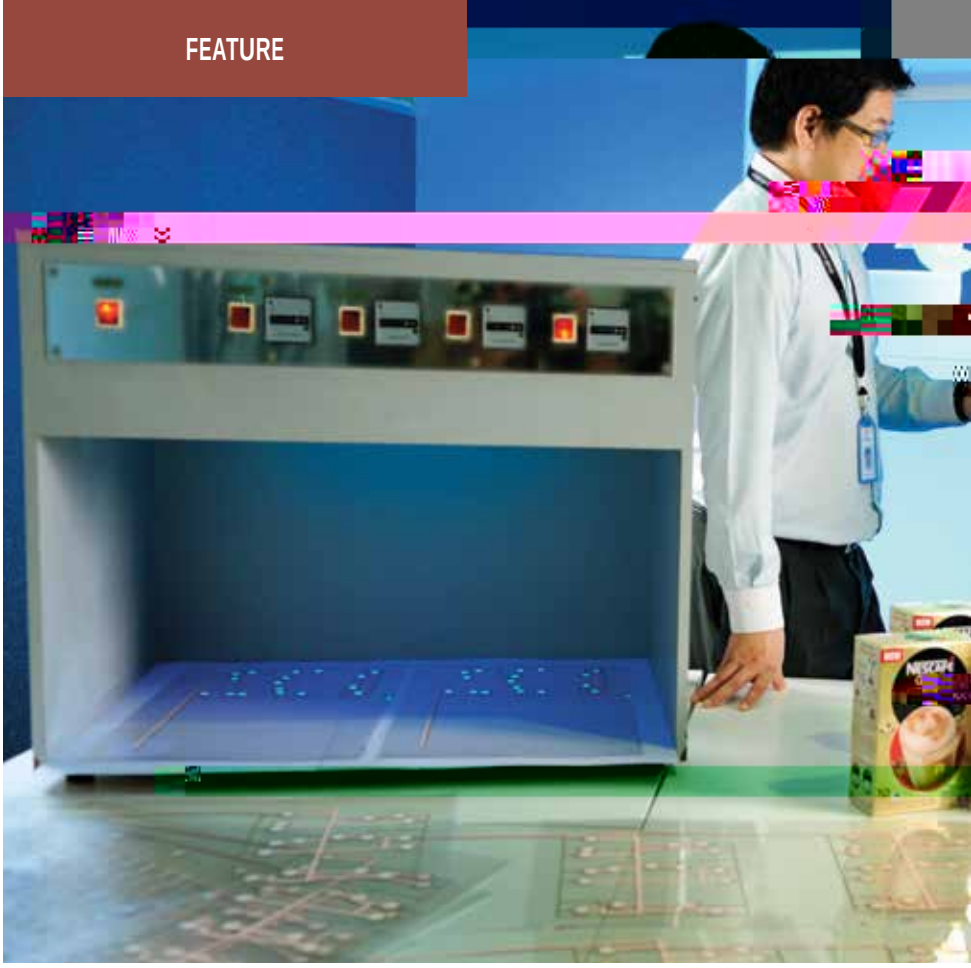

TECHNOLOGY FOR SMART PACKAGING

SME used printed lighting and Flexible Hybrid Electronics in smart packaging for food giant

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Despite the vast market potential of smart packaging, not many local enterprises create sustainable smart packaging products. Not having su□cient knowledge in printed electronics is one challenge. Smart packaging design that works for customers is another major constraint. The lack of experienced integrators that can provide total solution in smart packaging and insu□cient industry expertise to combine e□ective marketing strategy to maximise the impact of smart packaging are real issues.

To address these, SIMTech launched several Collaborative Industry Projects (CIPs) on Printed Electronics and Smart Packaging since 2014 for the packaging and printing industries, industry associations, system or software solution providers and integrators to build

An Enhanced OTR (Operations Roadmapping) conducted by SIMTech facilitators for Feinmetall Singapore Pte Ltd in early 2016 developed a strategic plan for the company to be one of the few in Southeast Asia capable of designing and manufacturing customised solution for wafer probe cards. In this roadmapping, market research was also conducted by SIMTech's partner, HIS, to provide information on market size and segmentation, market share and growth for the company. On establishing from market intelligence that the Flip Chip market Compound Annual Growth Rate was more than 8 per cent, Feinmetall moved ahead in developing capabilities in this field.

Feinmetall launched five new initiatives focusing mainly on Master Class Training, skills upgrading and continuous training

THUMBS UP FOR A*STAR COLLABORATIVE COMMERCE MARKETPLACE

Portal lists veri□ed SMEs' capabilities and MNCs' requirements, A*STAR research institutes and universities to help companies grow business and bridge technology gaps

In less than a year since its launch last May, more than 350 companies and Singapore Precision Engineering and Technology Association and Singapore Manufacturing Association are members of the A*STAR Collaborative Commerce Marketplace (ACCM). About 80 per cent of these are Small and Medium Enterprises (SMEs). The rest are Large Local Enterprises and Multinational Corporations (MNCs).

The ACCM highlights local SMEs' capabilities for MNCs to source easily for prospective suppliers in Singapore. SMEs can also gain insights on MNCs' needs. Through this network, ACCM facilitates greater business opportunities and partnerships across di□erent sectors. It encourages companies to collaborate amongst themselves and with A*STAR RIs, and form interest groups. ACCM is open to all government agencies, suppliers and industry partners. It is a central data portal for Singapore government agencies to help the local manufacturing sector.

ACCM MNC member, Endress + Hauser (S.E.A.) Pte Ltd, a Swiss instrumentation company for the automation, chemical, food & beverage, oil and gas, marine, life science and environment industry, learnt about ACCM through a Trade Association presentation in mid-March 2017. It wasted no time to be an ACCM MNC member the following week.

SIGENIC, an engineering solutions SME which provides real-time monitoring of machines' health using sensors, is another ACCM bene□ciary. SIGENIC came upon ACCM on the Internet last December and contacted SIMTech to become a member.

ACCM is clearly something Singapore's Manufacturing Industry has been waiting for

Ms Sabine Kempe, Marketing Director, In Mind Cloud Pte Ltd, a specialised Customer Relations Management Sales and Con□gure Price Quote software provider

ACCM is a great platform for SMEs to tap into the global markets

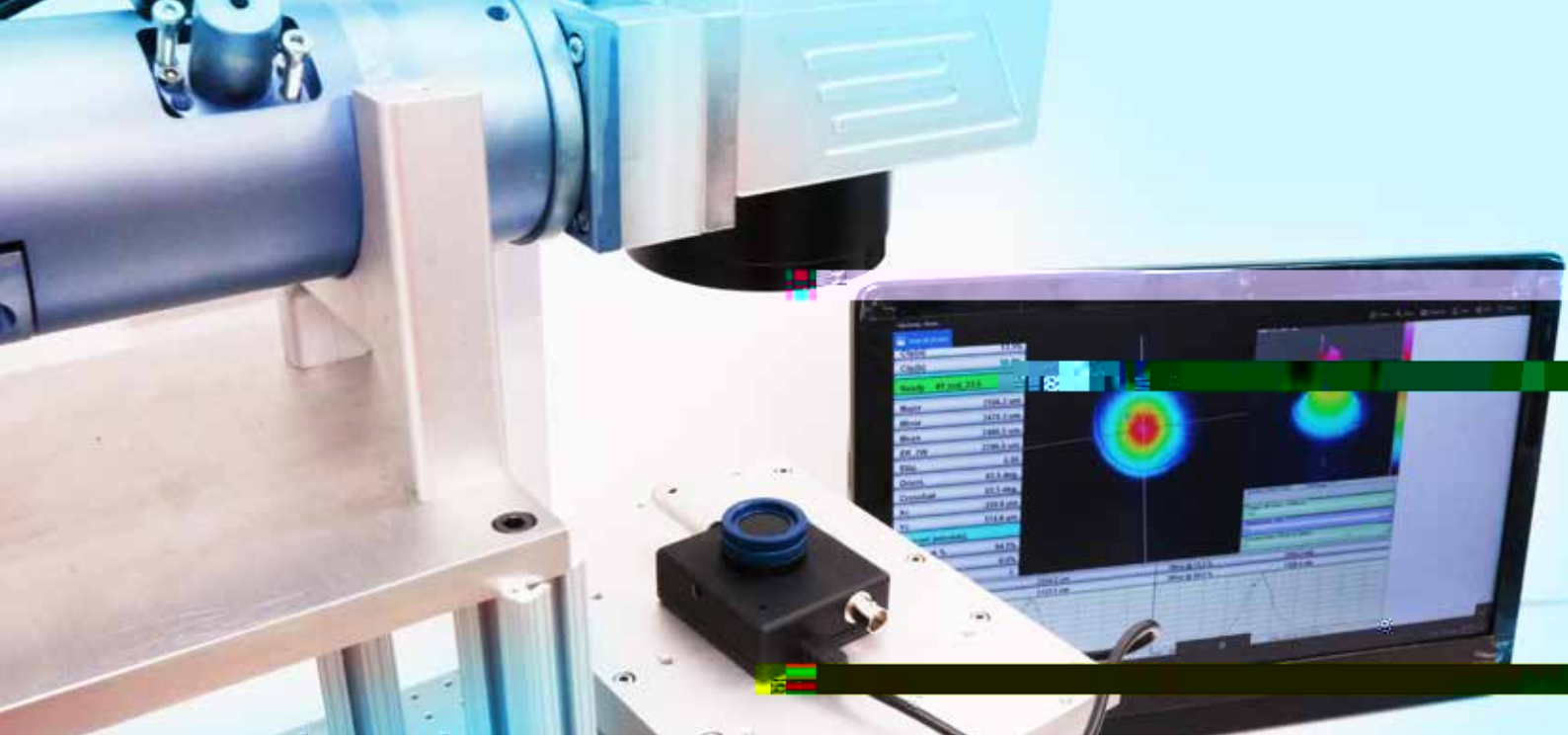
Mr Ooi Chee Kong, Senior Operations Manager, Jason Electronics Pte Ltd, a leading SME provider of integrated solutions in designing, supplying, installing, integrating, testing and commissioning solutions ,b91 (or)the

"ACCM is a good platform for Endress + Hauser to be part of the ecosystem which is vital for our sustainable long-term growth. We can now connect with complementary partners among local SMEs and diversify our clientele. The portal can help us to form consortia bidding for overseas projects. As other manufacturing sector companies will be included in ACCM, this will greatly bene□t us"

Mr Lim Khay Guan, Managing Director, Endress + Hauser (S.E.A.) Pte Ltd

"Through ACCM, SMEs are visible to MNCs. As companies listed on the ACCM are veri□ed through a rigorous system, our chances of being successfully connected to MNCs as suppliers increase. With MNCs' needs speci□ed, SIGENIC can expand our product o□erings in a more targeted way. ACCM allows us to forge alliance with like-minded companies. The portal gives us access to a pool of valuable resources that greatly leveraged our position"

Mr Koh Min Zhuan, Director, SIGENIC Pte Ltd



The laser processing market is estimated to grow from US$6.40 Billions in 2015 to US$9.75 Billions by 2022, at a Compound Annual Growth Rate of 6.13% from 2016 to 2022. With the rise in adoption of laser processing systems in precision engineering, microelectronics, medical, and automotive sectors, solid, gas, and liquid lasers are expected to play a key role in propelling the growth of the laser processing market in the next five years (Source MarketsandMarkets March 2016).

Laser beam shaping is a technique to redistribute the light energy by changing the light beam profile for a uniform intensity spot. This technique is useful to optimise laser-material processing to upgrade surface quality, control laser beam depth, enhance laser edge profile, and improve throughput.

competencies in design, engineering, and characterisation of customised laser beams.

In learning sessions of the CIP, the participants will be provided with customised software kits including online laser measurement and beam shaper design to understand laser and beam shaping principles and critical parameters. In practice sessions, one-to-one feasibility or case study will be conducted on a specific laser beam shaping problem statement provided by a company.

The CIP is expected to benefit the participating companies by building up their new competences in manufacturing of high-value added optical modules and adopting new laser manufacturing processes for product innovation. The CIP is supported by SPRING through the CDG scheme.

SOLUTION BOOSTS PRODUCTIVITY

United Graphic Pte Ltd, a colour separation house, found a magic solution in SIMTech's Mobile Work□ow (wfMOBILE™). wfMOBILE™ □lls its digitalisation gap by enabling the SME to track their operations and job status on-the-go.

Since commencement of operations 30 years ago, United Graphic adopted a series of non-satisfactory manual solutions, ranging from using a hard cover exercise book to record the 100-200 incoming jobs at any one time, managed by 6 Sales Representatives, to relying solely on Supervisors' memory. An improvement 10 years ago used spreadsheet to record all the more than 100 jobs daily during peak periods. However, updating on spreadsheets was still tedious. In 2015, United Graphic further improved its job monitoring by listing all current jobs on a large white board. Although much better than previous methods, it required all Sales Representatives to list the job titles on the board. Whenever there is a change in

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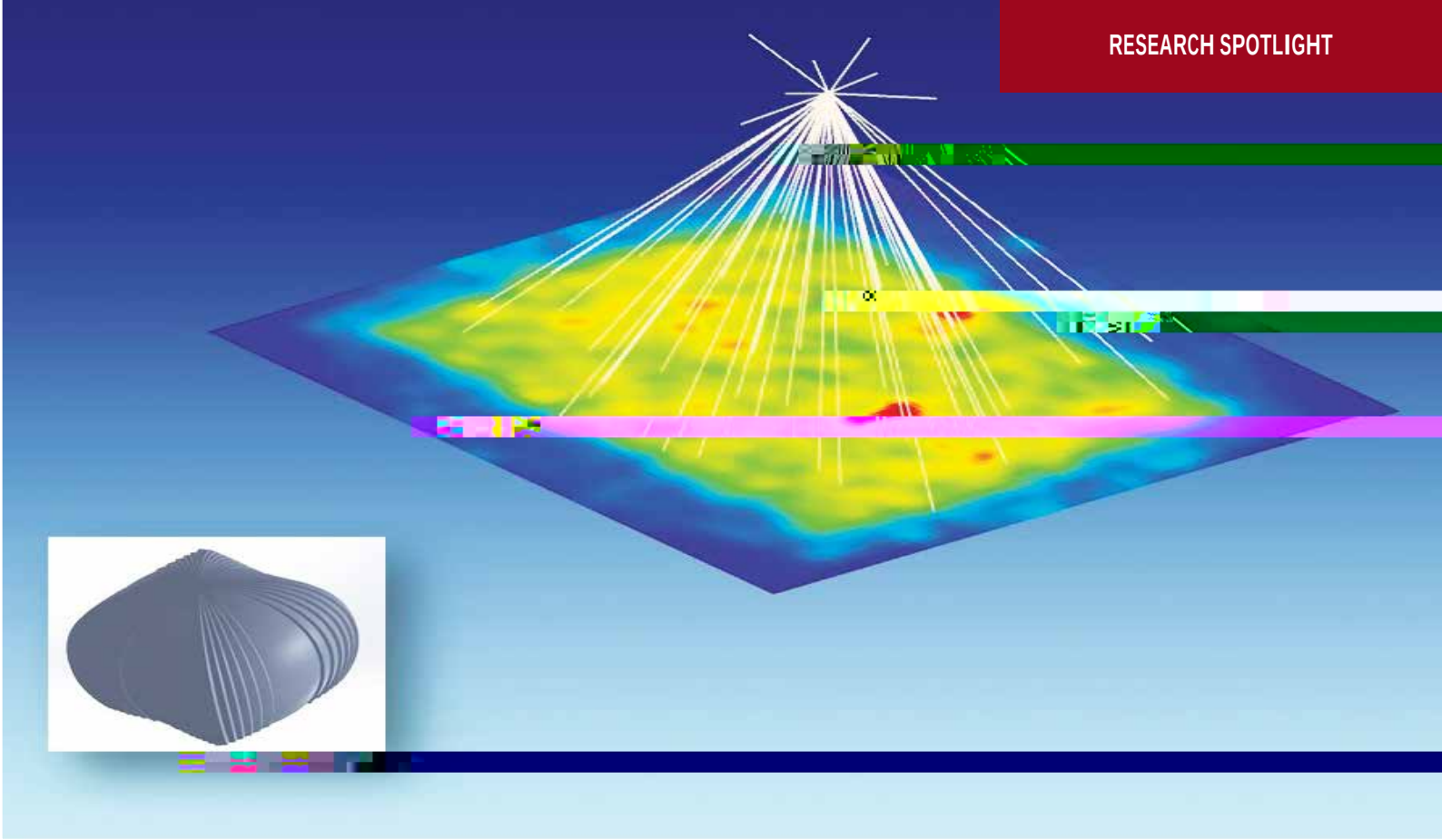

FREEFORM OPTICS DESIGN

Freeform optics surfaces revolutionise high-tech applications

Traditionally, optical lenses are in the form of spherical surfaces and are called spherical lenses. Although these lenses are widely used in cameras, microscopes, telescopes or inspection systems, spherical lenses are usually bulky, limiting their applications in compact optical devices and systems. The advent of optics with freeform optics surfaces enable many compact optical systems such as Augmented Reality /Virtual Reality glasses, wearable biometric recorders which were previously available in sci-□ movies.

Freeform lenses can have arbitrary surfaces and do not need to be rotational symmetrical. The major challenge with freeform lenses is the lack of a systematic approach to design surfaces that can deliver the desired optical functions. It was only in 2012 with the invention of the nodal □eld theory that many other methods are available to design freeform lens for both imaging and non-imaging optics.

The SIMTech team developed a design methodology to design freeform lenses that are capable of generating uniform illumination in various shapes. In the title picture, the light distribution from a 1mm LED source is being altered by a freeform lens into a rectangle shaped illumination over an area of 10 meters by 8 meters. The CAD model of a rotational symmetrical freeform lens is shown at the bottom left of the photo.

Another example is shown in the above picture, where a near parallel beam with a spread angle of 2 degrees and a □at top are being designed with a 1mm LED source. The □at top is visible throughout the light propagation and seen at each imageive25 m (e)12 (, wh4(l1omTg

Major corporate events were organised to engage industry and forge partnerships.

Senior Minister of State for Trade & Industry, Dr Koh Poh Koon's Visit to SIMTech, 23 March

SIMTech welcomed Dr Koh Poh Koon for an update of the Model Factory@SIMTech. In addition, Dr Koh was briefed on SIMTech overview and industry engagement models. During the lab tours on advanced manufacturing technologies- Manufacturing Control Tower™(MCT™), Large Area Processing, 3D Additive Manufacturing and X-ray technologies - industry partners from CKE Manufacturing, Worldbizz Engineering, 3D Metalforge and Centiforce Instruments shared the benefits arising from the collaboration with SIMTech.

PE COI Annual Conference 2017, 4 April

This event, in collaboration with the Singapore Precision Engineering and Precision Engineering Cluster (PECC) and Singapore Manufacturing Technology Association (SIMTech) (Di(r)10

Collaborative Industry Projects (CIPs) are cost-e□ective platforms, where companies facing similar issues work jointly with SIMTech, to develop capabilities and technology. In addition, there are some ready-to-go technologies which are ready for adoption.

Joining Technology Development for Lightweight Materials

Launch date: July 2017

This CIP aims to help companies develop and demonstrate various advanced joining techniques for lightweight materials, such as Al alloys, Mg alloys, Ti alloys, metal to polymer composites and hybrid structures. This CIP also lays the foundations for companies to adopt advanced joining capabilities and capture business opportunities in the area of lightweight materials manufacturing.

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Corrosion Assessment of Materials Systems in Industrial Application

Launch date: July 2017

This CIP aims to help the companies tackle their corrosion problems through evaluation of their materials/corrosion system.

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3D Marking and Surface Engraving for Medical Devices

Launch date: August 2017

This CIP aims to demonstrate 3D laser marking and surface feature engraving on complex surfaces with various base materials for medical devices.

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Customised Tool Grinding, Edge Finishing & In-Situ Measurement

Launch date: August 2017

This CIP aims to enhance the e□ectiveness of local companies in interrupted cutting and high aspect boring of corrosion resistant alloys with innovative integrated grinding, polishing and in-situ measurement of high performance carbide tooling, drills and inserts.

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bslim@ l .a-star.edu.sg

Collection Delivery Management System (CDMS)

Ready for Adoption

This CIP aims to use a mobile NFC/barcode-based solution to ensure right items are collected and delivered to the right customer and on time.

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Manufacturing Operations Management (MOM)

Ready for Adoption

This CIP aims to implement the MOM solution that manages the entire manufacturing operation from production planning, raw material management, mobile shop □oor tracking, and delivery order generation. Through this programme, companies can better manage and improve their manufacturing operations.

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Electronic Data Logging for Job Tracking & Report Generation

Ready for Adoption

This CIP aims to train and equip companies with electronic data logging capabilities for job tracking and report generation, through technology and Android apps.

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Mobile Work□ow (wfMOBILE™)

Ready for Adoption

This CIP aims to provide a platform for mobile workforce to perform user-con□gurable business/operational transactions using mobile devices.

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EVENTS

SIMTech Annual Manufacturing Forum 2017 (AMF'17)

27 July 2017 I 8.30am - 5.00pm I Grand Copthorne Waterfront Hotel Singapore, Grand Ballroom, Level 4

Join us to be inspired and connected by the array of innovations and business opportunities to be presented at AMF'17. With the theme, ***I F H E (FHE)***, SIMTech AMF'17, in its 12th edition, brings together technology leaders and experts in FHE to share the global industry trends and developments that are driving the industry.

For enquiries, please contact **M N C** at sekarn@SIMTech.a-star.edu.sg

Emerging Applications Centre Annual Conference 2017

19 September 2017 I 8.30am - 5.00pm I Matrix, Breakthrough, Discovery and Creation Theatres, Level 4, Biopolis Singapore

Scan for more events

COURSES

PE WSQ Graduate Diploma in Manufacturing Operation Management (MOM)

M 4: A

21 August 2017 | 6.30pm - 9.30pm, Fusionopolis Two

PE WSQ Improve Manufacturing Productivity through Energy Usage Pattern Monitoring and Analysis

4 September 2017 | 6.30pm - 9.30pm, Institution of Engineers Singapore

PE WSQ Graduate Diploma in MedTech Manufacturing

M 4: M M C M

4 September 2017 | 8.30am - 12.30pm, Fusionopolis Two

PE WSQ Graduate Diploma in Mechatronics

M 4: A I A

4 September 2017 | 8.30am - 12.30pm, Fusionopolis Two

PE WSQ Graduate Diploma in Precision Measurement Characterisation (PMC)

M 1: G D

5 September 2017 | 6.30pm - 9.30pm, Fusionopolis Two

PE WSQ Graduate Diploma in Precision Measurement Characterisation (PMC)

M 2: E O & O M

7 September 2017 | 6.30pm - 9.30pm, NTU Valley Block

PE WSQ Graduate Diploma in Advanced Welding Technologies

M 2: I L B

12 September 2017 | 6.30pm - 9.30pm, Fusionopolis Two

PE WSQ Operations Management Innovation Programme - Public Batch

15 September 2017 | 6.30pm - 9.30pm, Fusionopolis Two

PE WSQ Apply Electro-chemical Processes and Coatings for Wear and Corrosion Protection

19 September 2017 | 6.30pm - 9.30pm, Fusionopolis Two

Master Class in Emerging Manufacturing Technologies - Composite Repair, Non-Destructive Testing & Training

26 - 27 September 2017 | 9.00am - 6.00pm, Fusionopolis Two

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Scan for more courses

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About SIMTech

The Singapore Institute of Manufacturing Technology (SIMTech) develops high-value manufacturing technology and human capital to enhance the competitiveness of Singapore's manufacturing industry. It collaborates with multinational and local companies in the precision engineering, medtech, aerospace, automotive, marine, oil & gas, electronics, semiconductor, logistics, and other sectors.

SIMTech is a research institute of the Agency for Science, Technology and Research (A*STAR). With a pool of more than 400 researchers, we are committed to serving the manufacturing industry to develop the human, intellectual, and industrial capital in Singapore.

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