

MANUFACTURING MATTERS

July 2014 | Issue 1

A publication of the Singapore Institute of Manufacturing Technology

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Getting the 'GREEN' light

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NOTE FROM...



Dear Friends and Industry Partners,

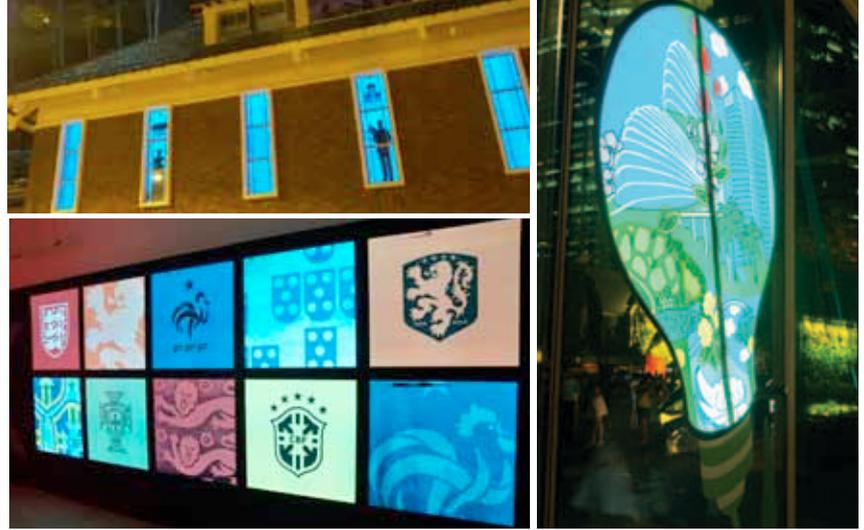
I hope you find this inaugural issue of **MANUFACTURING MATTERS**, a renewal of the SIMTech newsletter Cutting Edge, useful. It encompasses information and stories from the four centres hosted @ SIMTech, namely Manufacturing Productivity Technology Centre (MPTC), Precision Engineering Centre of Innovation (PE COI), Sustainable Manufacturing Centre (SMC) and Emerging Applications Centre (EAC).

As the Singapore manufacturing industry evolves into high-value activities, the quarterly **MANUFACTURING MATTERS** aligns with new industry trends developments to provide relevant technologies, innovations, and solutions developed by SIMTech to meet these needs. Should you require any assistance in any of these areas, please contact ido@SIMTech.a-star.edu.sg or call Devi at 6793 8388.

As we are constantly improving the newsletter for an easy read and to include topics that are of interest to the industry, we welcome your feedback at ido@SIMTech.a-star.edu.sg.

Dr Lim Ser Yong

Executive Director, SIMTech



PRINTED LIGHTING – GETTING THE ‘GREEN’ LIGHT

Printed Lighting technology was applied on the Marina Bay City Gallery Glass Façade Décor for the iLight Marina Bay 2014 festival in partnership between SIMTech and Exploit Technologies Pte Ltd, A*STAR’s technology transfer arm, with the Urban Redevelopment Authority.

Printed Lighting is a demonstration of SIMTech’s roll-to-roll Large Area Processing (LAP) technology where electrically-functional materials, or optical inks, are deposited on rolls of flexible substrates such as PET (polyethylene terephthalate), PC (polycarbonate), paper, and fabrics. Extremely versatile, the ultra-thin (<1mm) and lightweight panels can be printed on a large (up to 0.9m width and unlimited length) scale as well as moulded into 3D features. The panels can be easily adjusted to fit precise shapes and are easily installed and maintained. With a diffused and uniform light source, the effect is a non-glaring and elegant lighting. The innovative panels can be overlaid with high resolution graphics and customised for large surface area applications.

Generating negligible heat, the reusable Printed Lighting technology is both environmentally friendly and commercially attractive. In September 2013, at the Singapore Armed Forces Non-Commissioned Officers Club at Beach Road, Printed Lighting panels were installed on signature windows that featured 12 unique silhouettes across the window panels.

The technology was also used in the Nike Foot Ball Revolution in May 2014. The 10-day exhibition at the Singapore Arts Science Museum, Marina Bay Sands, demonstrated its sustainability by reusing the inverters to showcase signature Nike sports gear and apparel on an interactive mock football pitch.

Given its versatility, sustainability, ease of use, and economics, the technology can be applied to art installations, advertising, architectural, furnishing, packaging, and automobiles.

For more information, please contact **Mr Rick Yeo**, Acting Director, Emerging Applications Centre (EAC) at 6793 8227 or email to rickyeyo@SIMTech.a-star.edu.sg.



Scan for more information on Large Area Processing Programme

From Left: Dr John Gan and
Dr Lee Eng Wah from SIMTech

RFID-BASED PERSONNEL TRACKING SYSTEM BOOSTS PRODUCTIVITY & SAFETY

SIMTech project won the Most Innovative Solution at the Land Transport Authority Awards 2014.

SIMTech developed the Radio Frequency Identification (RFID)-based Personnel Tracking System (PTS) which can be used to ensure the safety and track movement of workers in confined spaces, such as underground tunnels.

The system was implemented by a consortium of nine contractors working on Stages 2 and 3 of the MRT Downtown line. This enabled contractors to track, in real-time, the number of workers on site, their identity, location of their entry and exit activities, as well as their movements through the dark and confined tunnel environment.

Using computers to receive and process data from the entry and exit points of the work site, the system boosted productivity by reducing the personnel tracking time by 99% - from 5 minutes per worker to a few milliseconds.

“ The system boosts productivity by reducing the time taken for personnel tracking by 99% - from 5 minutes per worker to a few milliseconds. ”



The RFID Personnel Tracking System in use at a construction site



Close-up view of RFID Personnel Tracking System at the site gantry



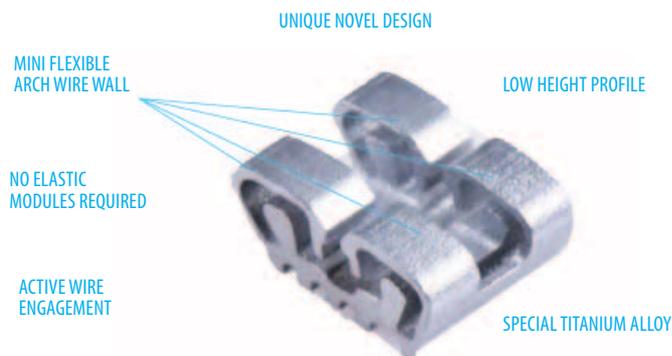
RFID Tag attached non-disruptively onto the safety helmet

In recognition of this innovative system, SIMTech was awarded the Most Innovative Solution at the Land Transport Authority Awards 2014 on 17 April. The biennial Land Transport Excellence Awards recognises industry partners and individuals who have played pivotal roles in developing an efficient, sustainable, and people-centric land transport system in Singapore.

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6793 8389 or email to
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Scan for more
information on National
RFID Centre





REVOLUTIONARY ORTHODONTICS FOR SME

Innobrace Orthodontics Pte Ltd, a local orthodontic supply company with capabilities in design development, manufacturing and marketing, partnered with SIMTech to introduce a revolutionary new orthodontic device - the Epsilon non-ligating bracket (NLB) series.

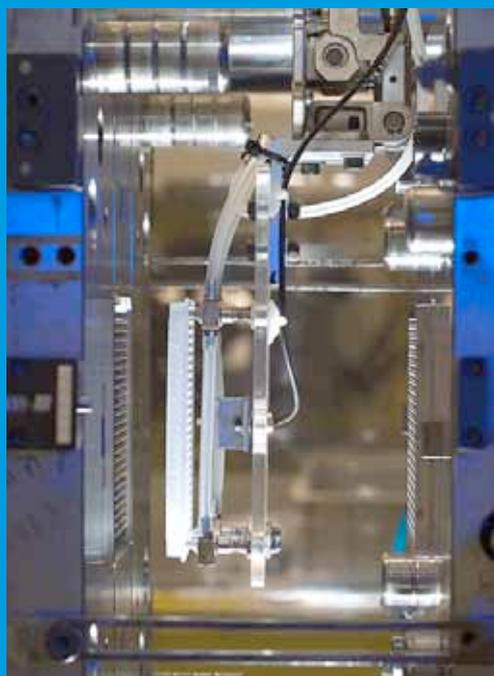
In a project supported by SRING Singapore, a SIMTech researcher was seconded to the company under the A*STAR GET-UP Programme to provide technical know-how. In developing the Epsilon NLB, a special titanium alloy with good elasticity and mechanical properties ideal for the dental bracket's flexible engagement system, was introduced. With the simulation data generated from

computer-aided engineering design software, Innobrace Orthodontics was able to modify and further improve the product design. Clinical trials showed that the Epsilon NLB system was able to reduce patient chair time by up to 50% and lessen completion time by up to 33%, compared to normal braces.

On completion of the project, SIMTech assisted the company in establishing the manufacturing processes and transfer of technical know-how for commercialisation.

For more information, please contact **Mr Yap Wai Teng** at 6793 8519 or email to wtyap@SIMTech.a-star.edu.sg.

PARTNERSHIP WITH SIMTech YIELDS RESULTS



Arising from its participation in SIMTech's Gun Drilling Collaborative Industry Project, Meiban Energy Services Pte Ltd set up a S\$10 million deep-hole drilling production facility [see page 5 for more information on Collaborative Industry Project (CIP)]. The company employs a team of 35 highly-skilled engineers, machinists, and operators. The company installed a 30m-long deep-hole drilling machine (currently reputed to be the longest in Southeast Asia) to produce higher value, higher performance, and greater corrosion-resistant oilfield equipment. SIMTech provided the Meiban Group with the justification and market

projections, machine specifications, on-site supplier evaluations, product configurations, and other material needed for the setup.

To cope with the rapid growth and the HPHT (High Pressure and High Temperature) harsh environment, Meiban Energy Services secured another factory and new investments to provide more holistic services, including large-format deep hole drilling and 5-axis turn mill operations.

For more information, please contact **Dr Lim Beng Siong** at 6793 8370 or email to bslim@SIMTech.a-star.edu.sg.

COLLABORATIVE CAPABILITIES TO VENTURE INTO THE OIL & GAS SECTOR

Local enterprises leverage on Collaborative Industry Project (CIP) to develop High-Value Gun Drilling expertise.



SIMTech has pioneered an evaluation, comparison, and validation method to produce deep, straight holes in a variety of materials for downhole drill pipes to enable Oil & Gas exploration venture into greater depths and harsher environments. With assistance from SPRING Singapore, SIMTech launched an initiative under its CIP scheme to equip companies in the Oil & Gas sector with effective tooling, preparation methods, and drilling parameters.

Gun drilling is a method to achieve reliable production of small diameters and a range of depths in downhole drill pipes with straightness and precision. Currently, holes of depths less than 600 to 800mm are fabricated by less than five local PE companies and multinational corporations. For holes with diameters of 8mm or smaller and depths beyond 800mm, particularly those fabricated on hard materials, the technology is usually imported.



“ Many local enterprises also lack the integrated expertise in choosing the most appropriate tooling, materials, process parameters, tool changeover, alignment, regrindings and measurements in deep hole drilling. ”

The CIP aims to fill this gap. It will enable companies in the PE industry, in partnership with SIMTech and other tooling, coolant and material suppliers to acquire the required know-how that allows high precision holes to be accurately produced. It will also leverage on the strengths and expertise of partners in the supply chain and on the scientific methods provided by SIMTech for optimum solutions that further reduce the cost and time of development.

Through the CIP, participating companies can maximise the usage of existing resources including machines, workforce, facilities, and space, to produce surface, subsea, and downhole components using other corrosion-resistant metals. The CIP is also expected to increase throughput, productivity and yield by 45 to 60 percent through reduced rejects, rework and remake.

Dr Lim Ser Yong, Executive Director of SIMTech said, “The CIP is significant

in raising the capabilities of local enterprises in high-value gun drilling operations to strengthen Singapore’s position as a hub for the Oil & Gas equipment manufacturing industry. Through the collaborative partnership, SIMTech will develop the key technologies and know-how for high precision gun drilling operations for local companies to gain access to the capital-intensive and highly complex manufacturing of large Oil & Gas exploration tools.”

SIMTech will provide a structured methodology that enables participating members to evaluate the compatibility of their products in relation to other critical resources in deep hole drilling. Participating companies will be trained and equipped with appropriate capabilities in tool engineering and process design, execution, analysis, and inspection through a combination of classroom, laboratory, and case-study based training. Leveraging on SIMTech’s capabilities, the performance of the tools and the effectiveness of the chosen drilling conditions and parameters will be objectively evaluated.

For more information, please contact **Dr Lim Beng Siong** at 6793 8370 or email to bslim@SIMTech.a-star.edu.sg.

Scan for more information on Precision Engineering Centre of Innovation





MANUFACTURING PRODUCTIVITY TECHNOLOGY CENTRE (MPTC)

Enhancing Manufacturing Productivity

MPTC is the first of its kind in Singapore. It promotes the use of technology to enhance manufacturing productivity by improving efficiency and effectiveness. It also strives to create increased value with the innovation and development of high-value products and services. Overall, MPTC actively engages local companies to harness A*STAR's technologies, tools, and capabilities in automation, processes, and systems in order to gain "step-change" improvements in manufacturing productivity.

MISSION

MPTC endeavours to spur manufacturing industries towards using technologies and techniques to improve their productivity, economic growth, and sustainability. The centre, which showcases technologies for productivity, works closely with industry partners to carry out R&D in productivity enabling technologies, undertakes knowledge transfers, trains productivity champions, and generates awareness on productivity.

INITIATIVES

Some of the initiatives that address the

needs of different industry sectors are:

High-Mix Low-Volume Manufacturing (HMLV) Initiative

This helps companies to improve their operational efficiency and service level through production planning, scheduling, and shop floor tracking.

Lean Manufacturing Initiative

This initiative applies lean tools, techniques, and concepts to identify and eliminate wastes (extra transport, excess inventory, unnecessary motion, waiting, over production, over processing, defects, and un-utilised manpower through continuous improvement.

Operations Management and Innovation (OMNI) Initiative

OMNI, a unique training programme developed by SIMTech, incorporates classroom and practical sessions to systematically teach industry participants identify productivity issues and generate productivity gains.

RFID for Resource Tracking Initiative

This initiative provides real-time visibility of personnel movements in

access points at confined spaces in underground construction sites.

RFID for Supply Chain Track and Trace Initiative

This initiative provides track and trace for companies' operations and supply chain to increase visibility and productivity.

Overall Equipment Effectiveness (OEE) Initiative

This initiative aims to help industries in improving machine performance, machine utilisation and quality of parts.

Industrial Automation Initiative

This initiative aims at robotic welding for enhancing productivity through the intuitive robotic path teaching software toolkit for the welding industry.

For enquiries, please contact

Dr Lee Eng Wah, Director,
Manufacturing Productivity
Technology Centre

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Scan for more information on
Manufacturing Productivity
Technology Centre



PRECISION ENGINEERING CENTRE OF INNOVATION (PE COI)

Sustaining and Advancing PE Industry

Precision Engineering (PE) is the building block of manufacturing. From nanometric semiconductor chips to the most cutting-edge medical devices and the giant-sized drill bits used in oil exploration, the PE sector is of crucial importance to the electronics, aerospace, automotive, marine, Oil & Gas, and MedTech industries. The PE industry employs a quarter of the local manufacturing workforce.

Against this backdrop, the PE COI is a national initiative launched by SPRING Singapore to help PE SMEs leverage state-of-the-art technology for innovation and growth.

Hosted at SIMTech and supported by A*STAR research institutes as well as other institutes of higher learning, the PE COI offers a broad spectrum of technologies, manpower training, consultancy, and comprehensive facilities targeted to meet the manufacturing needs of local PE companies.

MISSION

PE COI aims to help PE manufacturing companies leverage technologies for innovations to sustain and advance their business.

INITIATIVES

To help the local PE companies venture into high growth industries, initiatives are launched. Some of these are:

Aerospace Initiative

To support the Aerospace OEMs to localise the contents of their products by forming collaborative industry projects with the local supply chain in Singapore.

MedTech Initiative

To support and build the capabilities of the local PE companies supporting the MedTech industry.

Oil & Gas Initiative

To develop indigenous deep-hole gun drilling, boring, trepanning and Fibre-laser cladding capabilities on exotic materials to attract a new range of high performance and corrosion resistant oilfield equipment manufacturers to Singapore.

Complex Equipment Initiative

To support local SMEs in the manufacturing of high-value components, electromechanical modules and complex equipment through capability development projects and courses.

PE Metal Industry Initiative

To enhance the capabilities of the metal industry to serve the growing Oil & Gas, Aerospace, Complex Equipment, and MedTech industries.

PE Polymer Industry Initiative

To enhance capabilities of the polymer industry by adopting new processes and polymeric materials such as composites and metal replacement plastic.

Engineering Design, Prototyping and Simulation Initiative

To assist PE supporting industry to move up the manufacturing value chain, from the building of parts based on print drawing to offering complete system integration of components and assemblies through early-stage project involvement and definition of product design specifications.

For enquiries, please contact
Dr John Yong, Director,
 Precision Engineering Centre of Innovation
 Email: mxyong@SIMTech.a-star.edu.sg
 Web: www.SIMTech.a-star.edu.sg/PECOI

Scan for more information
 on Precision Engineering
 Centre of Innovation





SUSTAINABLE MANUFACTURING CENTRE (SMC)

Embracing Sustainable Manufacturing

The Sustainable Manufacturing Centre (SMC) is spearheaded by SIMTech and supported by a host of key government agencies and industry-related associations.

Since its inception in 2009, the SMC has actively engaged the local manufacturing industry to push boundaries in the development and implementation of technologies for eco-performance improvements in products and manufacturing processes. Much effort has been made to create awareness of its technologies and promote successful partnerships.

MISSION

The SMC aims to showcase and promote the concept of sustainability in manufacturing and create a platform to bring together relevant government agencies, industry associations, research communities, and the industry to develop and implement sustainable manufacturing technologies.

INITIATIVES

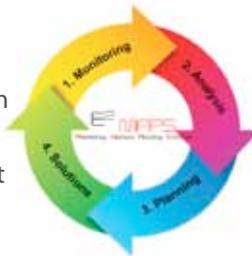
Initiatives have been established to assist companies measure their eco-performance baseline,

improve energy and resource efficiency, innovate technologies to manufacture green products and packaging, and recycle/remanufacture waste to strengthen the global competitiveness of Singapore's manufacturing industry. These are:

Energy Efficiency

The Energy Efficiency Programme is specially tailored to assist the manufacturing companies in Singapore to achieve energy efficiency improvement

- Real Time Monitoring
- Power Pattern Analysis
- Improvement Planning
- Solutions



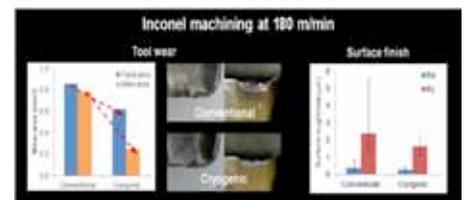
Carbon Management

This initiative aims to train company in-house experts in carbon footprint quantification and communication.



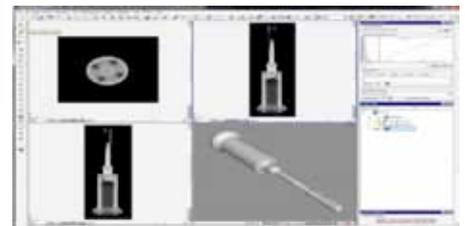
Green Manufacturing

This initiative aims to develop and implement green manufacturing solutions. The focus areas are cryogenic machining and development of natural fibre applications.



Remanufacturing

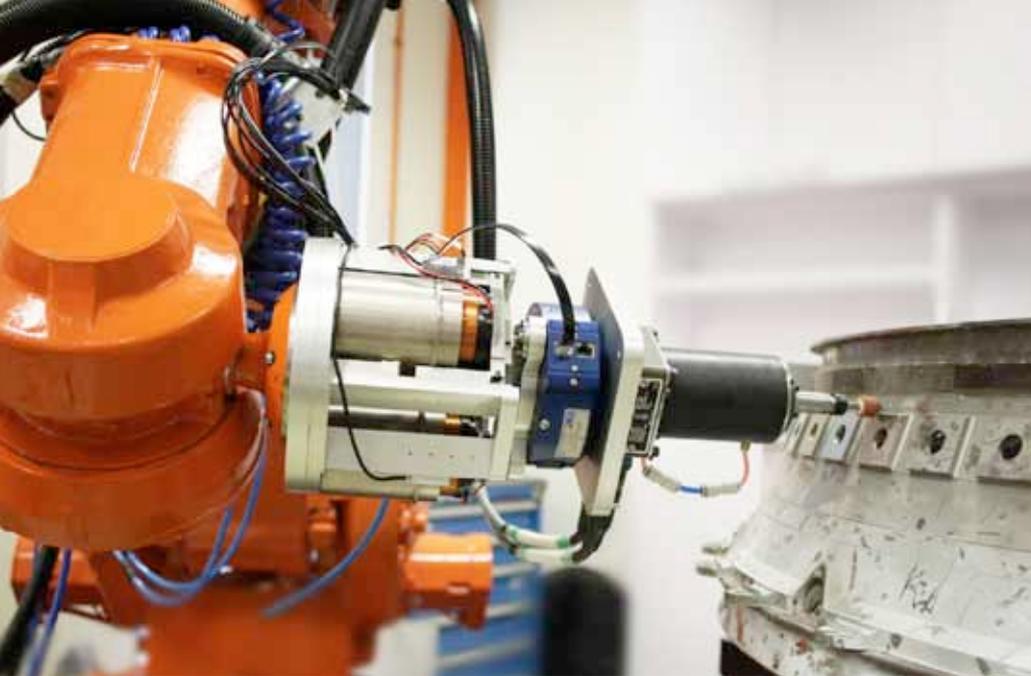
This initiative provides a platform for collaborative research and development in remanufacturing technologies to enable the manufacturing industry acquire sustainable capabilities and overcome implementation barriers.



For enquiries, please contact
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 Email: wchen@SIMTech.a-star.edu.sg
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Scan for more information on
 Sustainable Manufacturing
 Centre



GEARING UP FOR HIGH-VALUE MANUFACTURING THROUGH JOINT LABS

The SIMTech Joint Labs with NTU and NUS serve as platforms to nurture R&D manpower for industry and transform them into centres of excellence.

A total of eight Joint Labs have been set up by SIMTech with the Nanyang Technological University (NTU) and National University of Singapore (NUS) to boost manufacturing productivity and R&D to gear up for high-value manufacturing in the MedTech, aerospace, marine, Oil & Gas and PE clusters.

These joint labs are:

- Joint Labs in **Precision Motion Systems** and **Industrial Robotics**
- Joint Labs in **Natural Fibre Composites** and **Large Format Machining**

In the area of **Precision Motion Systems**, technologies for high-speed and high-precision linear motion stages, wide-format roll-to-roll machines, and multi-axis nanopositioning systems will be developed. These will help local companies build high-end machines and complex equipment for high-value manufacturing.

For the aerospace industry that is characterised by large work pieces, high precision, and better surface finishing, the **Industrial Robotics Joint Lab** aims to develop a reconfigurable robot work cell for flexible redeployment. The marine and Oil & Gas industries can benefit from more than 50 percent productivity improvements in robotic welding and weld-inspection systems.

The **Natural Fibre Composites Joint Lab** can contribute to manufacturing R&D and meet the demands of the natural fibre market as it is expected to grow at a Cumulative Annual Growth Rate of 11 percent over the next five years due to the need for light-weight, cost-effective and sustainable products.

The **Large Format Machining Joint Lab** will tackle industry challenges such as distortion, inaccuracy, high aspect ratio, and harsh working environments that can cause tool failures in the

machining of large and complex components, mainly on difficult-to-machine alloys for various marine, Oil & Gas, and aerospace applications.

This addresses the growing demand for machining from the aerospace, Oil & Gas and medical devices industry. The Global Machine Tools and Cutting Tools Market report in 2013 by Frost & Sullivan forecasts a Compound Annual Growth Rate of 6.2 percent over the next five years.

SIMTech collaborates with NTU in:

- Joint Lab in **Complex Systems**
- Joint Labs in **Precision Machining, Reliability** and **3D Additive Manufacturing** to benefit industries ranging from Oil & Gas to bio-medical engineering.

“ The Joint Labs are long-term collaborations to conduct systematic fundamental research on specific research themes to develop advanced manufacturing technology. ”

Reliability assessment technologies evaluate the remanufacturability of parts to assure their warranty. Precision machining technologies enable refurbishing of parts by high-precision forming, texturing, and processing complex surface and subsurface features. 3D additive and precision engineering paves the way for new frontiers in manufacturing capabilities by providing solutions to creating complex structures with high accuracy and low costs.

For more information, please contact **Dr Zhang Ying**, Director, Research Liaison Office at 6793 8281 or email to yzhang@SIMTech.a-star.edu.sg.

A number of events were organised in 2014 to engage the MedTech, moulding, metal machining, and engineering design simulation sectors.



Seminar on Updates on US and European Regulatory Requirements for the MedTech Industry, 11 March

The seminar offered a platform for participants to share and learn about the latest developments in MedTech regulatory compliances, including clinical evaluation and market surveillance.

Over 90 participants attended the seminar. The MedTech industry was well represented by over 27 companies.

Seminar on Achieving Better Product Design through Simulation, 29 April

The seminar presented an overview of how computer-aided engineering simulations can benefit systems level engineering design work and how it has helped companies make their products compliant with regulatory standards. It was attended by 61 participants from 27 companies in the precision engineering, electrical/electronics, water treatment, Oil & Gas, MedTech, aerospace, and infrastructure sectors.



Precision Engineering Centre of Innovation (PE COI) Annual Conference 2014, 21 May



The 6th PE COI Annual Conference 2014 was attended by more than 260 participants from 103 companies. The conference provided an invaluable opportunity particularly for local SMEs to explore business partnerships in increasing localisation activities with leading manufacturers in the Oil & Gas, aerospace, MedTech, and complex equipment sectors.

Local companies also gained a deeper insight to the trends, gaps, and strategies involved in making CIPs more cost-effective. At the conference, Mr Tan Hui Khim, Director, Supplier Development from the Economic Development Board (EDB) shared the opportunities available to local PE companies and its support for suppliers to diversify into the growing aerospace, complex equipment, MedTech, marine, and Oil & Gas sectors. He also shared the various supplier development support programmes provided by A*STAR, EDB, IE Singapore, and SPRING Singapore.



Collaborative Industry Projects (CIPs) are cost-effective R&D platforms where groups of companies facing similar issues work jointly with SIMTech to develop manpower and technology.

Lean Implementation Programme CIP

15 August 2014 | SIMTech Training Room

This aims to enhance the competitiveness of manufacturing companies by adopting lean techniques to reduce waste and improve productivity. The programme will focus on basic lean tools comprising 2 components which focuses on training in lean fundamentals and identifying wastes and implementing lean techniques.

For enquiries, please contact **Ms Xu Xiao Xia Laura** at: Tel: 6793 8395 | Email: xxxu@SIMTech.a-star.edu.sg



CIP for Productivity Improvement in Machining

19 August 2014 | SIMTech Training Room

With high manufacturing costs and low productivity, the existing machining sector in Singapore is in need of sustainable R&D solutions. SIMTech's DynaCut technology is one such proven technology solution that optimises machining cutting parameters, such as the depth of cut and speed, by offering characterisation and analyses of a machine's vibration dynamics.

For enquiries, please contact **Dr Mehrdad Zarinejad** at: Tel: 6793 8513 | Email: mehrdad@SIMTech.a-star.edu.sg



CIP for Dental Lab Innovation

20 August 2014 | SIMTech Training Room

This CIP is set to address manufacturing/technology gaps in the dental industry. With approximately 1,500 dentists, 800 dental clinics, and 60 dental labs in Singapore, dental restorations and other procedures generate more than \$200m revenue for the sector.

For enquiries, please contact **Mr John Lim Kee Yong** at: Tel: 6793 8248 | Email: kylim@SIMTech.a-star.edu.sg



High-Mix Low-Volume (HMLV) Lite Programme CIP

8 October 2014 | SIMTech Training Room

This CIP trains production planners and production supervisors in key planning concepts and shop floor tracking concepts respectively.

For enquiries, please contact **Mr Chua Tay Jin** at: Tel: 6793 8513 | Email: tjchua@SIMTech.a-star.edu.sg



CIP for Advanced Metal Forming

November 2014 | SIMTech Training Room

This CIP develops combined sheet and bulk forming processes for the cost-effective forming of high-precision and high value-added metal components for the local precision engineering industry. Participants in this CIP will benefit from SIMTech expertise in combined sheet and bulk forming technologies, including processing, simulation, and tooling design to achieve near-net shape with minimum material wastage and maximum productivity improvement.

For enquiries, please contact **Dr Mehrdad Zarinejad** at: Tel: 6793 8513 | Email: mehrdad@SIMTech.a-star.edu.sg

Seminar on Aesthetic Coating Technologies for Metals

19 August 2014 | SIMTech Tower Block

The half-day event will showcase advanced coating technologies that combine the functional properties of the coatings used on metal surfaces with their aesthetic and decorative features for adoption by the local industry.

Green Construction Seminar

27 August 2014 | 9.00am - 1.30pm | SIMTech, Tower Block

This half-day seminar highlights the importance of Eco-labels in the construction industry and how technology can help companies move to green product and production.

Manufacturing Solutions Expo 2014

8 - 10 October 2014 | Suntec City Convention Centre

SIMTech is a supporting organisation of the Manufacturing Solutions Expo (MSE), the first and only exhibition in Singapore targeted at manufacturing professionals, policy makers and business decision makers. MSE aims to showcase the industry's best ideas, innovative technologies and cost effective manufacturing solutions to meet the growing needs of manufacturing companies.

MPTC Annual Conference 2014

9 October 2014 | SIMTech Auditorium, Tower Block

MPTC Annual Conference and Technology Exhibition 2014 revolves around the theme 'Productivity through Innovation'. The annual event aims to generate awareness of productivity improvements by local enterprises through the use of manufacturing technology. Complementing the conference will be an exhibition to showcase the technologies, products, and expertise available at SIMTech to assist local enterprises in their productivity improvement journey.

Scan for more events

**PE WSQ Graduate Diploma in Manufacturing Operations Management****Module 5: Inventory Management**

4 August 2014 | 6.30pm - 9.30pm, SIMTech, Tower Block

PE WSQ in Improve Productivity through RFID-enabled Workflows Innovation Framework

4 August 2014 | 6.30pm - 9.30pm, SIMTech, Tower Block

PE WSQ Programme in Carbon Management

4 August 2014 | 6.30pm - 9.30pm, SIMTech, Tower Block

LEAN Implementation Programme – A Way for Productivity Improvement

11 August 2014 | 9.00pm - 11.00am, SIMTech, Tower Block

PE WSQ Implement OEE for Productivity Improvement

12 August 2014 | 6.30pm - 9.30pm, SIMTech, Tower Block

CEO Breakfast Talk - Strategies for Productivity Improvement to Achieve Operational Excellence

13 August 2014 | 8.30am - 11.00am

Devan Nair Institute for Employment and Employability
80 Jurong East St 21, Level 1, Event Hall 3

PE WSQ Graduate Diploma in Advanced Welding Technologies**Module 2: Implement Laser Beam Welding**

21 August 2014 | 6.30pm - 9.30pm, SIMTech, Tower Block

Scan for more courses

**Editorial Committee**

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Ms Lee Swee Heng	Member
Dr Goh Kiah Mok	Member
Mr Peter Shi	Member
Mr Cedric Yon	Member
Ms Prashad Nandini	Member
Mr Kelvin Goh	Designer

MCI (P) 167/05/2014

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 electronics, semiconductor, precision engineering, medtech, aerospace, automotive, marine, oil & gas, 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 with a three-pronged approach to develop the human, intellectual, and industrial capital in Singapore. We achieve this by:

- Boosting the human capital base in Singapore, through manpower development initiatives such as industry research collaborations and training programmes for industry.
- Generating, applying, and commercialising manufacturing technology through R&D and create intellectual capital to enhance the competitiveness of local industries.
- Enriching the industrial capital base with the outcomes of R&D collaborations with industry and the transfer of research results through technology training.