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Years of Driving Manufacturing Innovations with Local Enterprises

1993 - 2023



About Us



Singapore Institute of Manufacturing Technology

SIMTech

The Singapore Institute of Manufacturing Technology (SIMTech) is a research institute of the Agency for Science, Technology and Research (A*STAR).

Founded in 1993, SIMTech's history began through the merger of GINTIC Institute of Computer Integrated Manufacturing and the Institute of Manufacturing Technology, to form GINTIC Institute of Manufacturing Technology (GIMT) under the National Science & Technology Board (NSTB). In 2002, GIMT was renamed the Singapore Institute of Manufacturing Technology (SIMTech). NSTB was renamed the Agency for Science, Technology and Research (A*STAR).

Today, SIMTech serves as a world-class innovation partner in advanced manufacturing technologies, systems and capabilities. It collaborates with MNCs, local enterprises and SMEs in precision engineering, aerospace, automotive, marine, electronics, semiconductor, MedTech, logistics and other sectors.

The technologies that SIMTech helps develop are in the areas of Advanced Manufacturing Processes, Autonomous Manufacturing, Net Zero Manufacturing, and Resilient Value Chain.

As a technology provider, it is important for SIMTech to showcase, promote and engage the industry on specific technologies and applications. This is achieved through its four Industry Innovation Centres, namely the Precision Engineering Centre of Innovation (PE COI), Manufacturing Productivity Technology Centre (MPTC), Sustainable Manufacturing Centre (SMC) and Innovation Factory (IF).





Years of Driving Manufacturing Innovations with Local Enterprises

1993 - 2023



Scan the QR code to watch our SIMTech 30th Anniversary videos!

vww.a-star.edu.sg/SIMTech/30YA

SIMTech 30th Anniversary Commemorative Visual

The SIMTech 30th Anniversary commemorative visual marks a significant milestone in SIMTech's journey of driving manufacturing innovations with local enterprises.

The infinity symbol represents SIMTech's sustainability role, and its R&D efforts and industry partnerships.

The blending of SIMTech's iconic shutter blue with A*STAR corporate colours illustrates SIMTech's strong identity in advanced manufacturing and as a research institute of A*STAR.

Foreword

by A*STAR Chief Executive Officer, Mr Frederick Chew



My heartiest congratulations to SIMTech on its 30th anniversary. SIMTech has had the privilege of supporting Singapore's Manufacturing Industry intimately over the years.

SIMTech in Singapore's Manufacturing Industry

Singapore's manufacturing industry accounts for about 20% of our national GDP and is an integral component of our economy, making it vital that we future proof this industry in the global 21st century economy.

Advancing R&D and manufacturing technologies is key to keeping Singapore's manufacturing industry globally competitive. Over three decades, SIMTech has grown from strength to strength in serving our SMEs and local enterprises. SIMTech collaborates with a wide range of companies, especially with SMEs, co-translating advanced manufacturing R&D into ready-to-go, efficient and resilient manufacturing solutions.

Precision Engineering Centre of Innovation (PE COI)

The Precision Engineering Centre of Innovation (PE COI) is one of SIMTech's industry innovation centres for industry collaborations. Since PE COI's launch in 2008, it has partnered companies across numerous industry sectors for the co-creation and adoption of advanced precision engineering technologies such as additive manufacturing, to move them up the manufacturing value chain.



Technology Adoption Programme (TAP)

SIMTech's Technology Adoption Programme (TAP), a partnership with Enterprise Singapore since 2016, has also made wide industry impact by supporting collaboration among research institutes, technology providers, IHLs, trade associations and system integrators to identify and translate new technologies into industry-ready solutions. Under TAP, over 1000 companies have adopted technologies to address productivity challenges and sharpen their competitive edge.

Model Factory @ SIMTech

Under the 2017 Future of Manufacturing roadmap, the Model Factory @ SIMTech was launched as an initiative for the advancement of local enterprises in digitalisation and Industry 4.0, serving as a testbed and training centre for industry partners to integrate digitalisation and IIOT solutions into their manufacturing processes. With advances in artificial intelligence, cloud networking and big data analytics, Model Factory continues to help local enterprises become more efficient, resilient and sustainable in the global manufacturing landscape.

Innovation Factory @ SIMTech

The Innovation Factory @ SIMTech is SIMTech's latest partnership with Enterprise Singapore to work with SMEs and start-ups on product innovation, to move them up the manufacturing value chain to become product owners. Since Innovation Factory's pilot launch in 2020, they have grown their member base to over 48 local enterprises and helped member companies launch seven products to market. With SIMTech's move to its new premises at CT2B this year, Innovation Factory has also been scaled up with additional capabilities such as 3D printing for product development, readying it for even greater impact on local enterprises.

Conclusion

SIMTech has been systematically built up by the many strong and sacrificial leaders and staff over the past three decades. On SIMTech's 30th anniversary, I sincerely thank all of them, past and present, for shaping SIMTech into what it is today.

Go SIMTech - onwards and upwards!

30th Anniversary Message by SIMTech Executive Director, Dr David Low

At SIMTech, we are clear that the future of manufacturing will be Smarter, Greener and More Connected.

On SIMTech's 30th anniversary, I would like to thank our partners and collaborators, especially from the industry, trade associations, public agencies, and institutes of higher learning (IHLs), for the long-term collaboration and support over the years. Working together closely enabled the joint development and adoption of advanced manufacturing technologies by the industry, and consequently moving up the manufacturing value chain and staying competitive.

As importantly, I would like to thank the management teams and colleagues at SIMTech, both past and present, for your teamwork, passion and dedication in driving advanced manufacturing technologies with the industry. This key 30th anniversary milestone belongs to you as well - thank you.



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SIMTech @ CleanTech Park - A New Era

2023 coincided with the relocation of the majority of SIMTech's facilities to CleanTech Park. Being in the Jurong Innovation District (JID), an upcoming iconic advanced manufacturing location, it marked a new era in SIMTech's efforts to support Singapore's manufacturing industry Manufacturing 2030 Vision. We are determined to continue forging impactful and efficient partnerships with small and medium enterprises (SMEs) and local-based enterprises.

SIMTech's Four Research Themes

In recent years, the pace of technology trends and needs have been evolving more quickly than ever before. Technology areas that were important pre-COVID-19 are no longer so these days, and in 2023, sustainability, net zero and related "green" topics have taken centre-stage.

At SIMTech, we are clear that the future of manufacturing will be Smarter, Greener and More Connected, and have focused our efforts in four research themes:

> Advanced Manufacturing Processes

SIMTech develops advanced manufacturing processes from "bread & butter" (but advanced) processes such as machining, forming, cutting, welding, coating, joining and surface modification, to 3D printing and MedTech manufacturing, among others.

> Autonomous Manufacturing

A holy grail in complete lights-out manufacturing. It covers areas from smart automation and robotics, digital twinning, connectivity and interoperability, as well as many building blocks to reach autonomous manufacturing.



> Net Zero Manufacturing

As one of the leading teams in life cycle assessment & analytics in the region, SIMTech has conducted multiple major ecosystem life cycle assessments for both public and industry, and developed solutions in energy monitoring and control. Other key areas include industrial symbiosis, circular economy and decarbonisation of manufacturing processes.

> Resilient Value Chain

SIMTech develops technologies to help enterprises manage risk and create stronger supply chains with end-to-end Al-driven logistics optimisation, and to be more resilient to global challenges.

SIMTech's Innovation Centres

The Innovation Centres are customer facing to bridge research solutions and industry needs. Our four centres are: the Precision Engineering Centre of Innovation (PE COI), Manufacturing Productivity Technology Centre (MPTC), Sustainable Manufacturing Centre (SMC) and Innovation Factory (IF), each specialising in precision engineering, digitalisation and automation, sustainability and product innovation respectively.

Talent Development

Talent is one of Singapore's key strengths in maintaining 20% of our GDP in manufacturing. Over the years, SIMTech has trained nearly 10,000 PMETs through more than 100 accredited programmes. Through these programmes, many PMETs have achieved diploma qualifications as well as implemented many industry solutions in their companies. With SIMTech's unique Learn-Practice-Implement[™] (LPI[™]) training model, we constantly challenge the status quo and how to create greater impact in upskilling and reskilling our manufacturing workforce to stay ahead of the game.

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MILESTONES & COLLABORATIONS

SIMTech Through the Years

1990S Economic Miracle

Singapore's transformation from a resource-poor third-world country to one of the world's richest nations within a single generation was the result of Singapore's strategic and rapid industrialisation.

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GINTIC Institute of Computer Integrated Manufacturing and the Institute of Manufacturing Technology merged to form **GINTIC Institute of Manufacturing Technology (GIMT)** under the National Science & Technology Board (NSTB).

GIMT's objective was **R&D for high-value industrial growth**, as part of the national initiative to put Singapore's manufacturing industry at the forefront of advanced technologies. It was modelled after world-class R&D institutes like Germany's Fraunhofer Society and the Netherlands' Organisation for Applied Scientific Research.

Dr Frans Carpay was appointed Managing Director of GIMT.

Industry-Directed Consortia

Between 1990s and early 2000s, GIMT started **12 industry-directed consortia** with the electronics sector to advance PCB assembly and packaging technologies. **156 companies benefitted** from the consortia research and many engineers were trained.

Year	Membership	Consortium
1994	8 companies	Plastic Ball Grid Arrays (BGAs)
1995	10 companies	Flip-Chip-On-Glass (FCOG)
1996	13 companies	PCBA I
1996	17 companies	Ceramic / Tape Micro BGA
1997	13 companies	PCBA II
1998	19 companies	Chip Scale Packaging

Year	Membership	Consortium
1998	12 companies	BGA Consortium for SMEs
1999	8 companies	Wire Bonding
2001	23 companies	Flip-Chip
2001	12 companies	High-Density Substrate
2002	15 companies	Lead-Free Process Qualification and Implementation
2003	6 companies	Advanced Substrate and Integrated Passive (ASIP)

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Inaugural Industry Training

GIMT conducted its inaugural industry training programme (Master of Science in Computer Integrated Manufacturing, and Precision Engineering), which was later recognised through the American Society of Mechanical Engineers LEAD Award.



Technology Achievement

GIMT made technological achievement in world's thinnest magnesium die-cast part of 0.38mm thickness.

1996



Award

GIMT was recognised through the 3rd ASEAN Engineering Achievement Award for CONCERT, a concurrent engineering project for the construction industry.



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Award

GIMT was recognised through the National Technology Award for 3D grinding technology.

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2000S Challenge to Maintain Edge

The new millennium ushered in an era of unprecedented acceleration in technology evolution. Singapore's manufacturing sector was in a highly competitive environment, as Singapore faced rising costs, global competition and technological changes, and had to constantly upgrade its capabilities, and innovate to maintain its edge.



First Patent

GIMT achieved the first patent for a submergible pumping system with thermal-sprayed polymer surfaces.



SIMTech

GIMT was renamed the **Singapore Institute of Manufacturing Technology (SIMTech)** to signal the need for a step change in contributing towards **higher-value manufacturing in Singapore**, with Dr Lim Khiang Wee as its first Executive Director.

NSTB was renamed the Agency for Science, Technology and Research (A*STAR).

SIMTech took the lead in nurturing the technical capabilities of local enterprises and SMEs through extended secondments via GET-Up and T-Up programmes.

SIMTech also set up Joint Labs with universities to undertake upstream research, leading to several patent awards and international scientific journal publications.





Awards

SIMTech was recognised through the National Technology Award for sol-gel technology.

SIMTech was recognised through the Flight International Aerospace Award (Maintenance and Modification Category) for a robotic aircraft wing inspection system.



Technology Achievement

SIMTech made technological achievement in FDA-approved biocompatible polymer bones using 3D printing technique.



Executive Director Appointment

Dr Lim Ser Yong was appointed Executive Director of SIMTech.



Research Programme Launch

SIMTech launched a multi-disciplinary research programme for Microfluidics Manufacturing.



Award

SIMTech was recognised through the Singapore Quality Class Award.



Patent

SIMTech patented liquid forging technology, a very cost-competitive near-net-shape process for complex component fabrication using either cast aluminium or wrought aluminium.



Award

SIMTech was recognised through the National Technology Award for liquid forging technology.



Knowledge Transfer Office

Knowledge Transfer Office (KTO) set up for talent training to support a vibrant, renewing workforce for Singapore's manufacturing industry.

First Batch of WSQ Graduate Diplomas

SIMTech KTO conducted the first batch of Workforce Skills Qualification (WSQ) Graduate Diploma courses as part of industry training programmes.





Precision Engineering Centre of Innovation

SIMTech set up Precision Engineering Centre of Innovation (PE COI) to better address the needs of our local enterprises through patents, licenses, industry collaborations and technology transfers in the area of precision engineering.



Sustainable Manufacturing Centre

SIMTech set up Sustainable Manufacturing Centre (SMC) to better address the needs of our local enterprises through patents, licenses, industry collaborations and technology transfers in the area of sustainable manufacturing.

World's First 3D Wire-Bond Inspection System

The world's first 3D wire-bond inspection system, co-developed by SIMTech and Component Technology Pte Ltd, was launched in Semicon Japan.

2010S Emerging Opportunities

Singapore began positioning her economy for emerging opportunities. SIMTech's focus was aligned with the development of new advanced manufacturing capabilities in sustainable manufacturing and Industry 4.0.

SIMTech deepened and broadened collaborations with SMEs through Joint Labs, platform technologies and collaborative industry projects, to uplift SME global competitiveness.



Inaugural CIP

SIMTech launched the inaugural Collaborative Industry Project for Gun Drilling.



Awards

SIMTech was recognised through the **WSQ Distinguished Partner Award** for outstanding contribution to the development and expansion of the WSQ system.

SIMTech's spin-off company, D-SIMLab, won the **Red Herring Global Top 100 Start-Ups Award** for its process optimisation solution co-developed with SIMTech.



Manufacturing Productivity Technology Centre

SIMTech set up Manufacturing Productivity Technology Centre (MPTC) to better address the needs of our local enterprises through patents, licenses, industry collaborations and technology transfers in the areas of digitalisation and automation.



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Research Joint Labs

From 2011, four Research Joint Labs were established with the National University of Singapore (research areas: Industrial Robotics, Precision Motion Systems, Large Format Machining, Natural Fibre Composites) and four with the Nanyang Technological University (research areas: Reliability, Precision Machining, 3D Additive Manufacturing, Complex Systems).



CIP with SIA Engineering Company

SIMTech launched a Collaborative Industry Project with SIA Engineering Company (SIAEC) to develop local capabilities to produce aircraft cabin parts.



Licensing

2014

SIMTech licensed silver nanowires (AgNWs) process know-how to Quantum Chemical Technologies for production.



Model Factory

Model Factory (MF) set up for companies to experiment and co-create new shopfloor digitalisation and automation technologies.

~2016



Technology Adoption Programme (TAP)

2017

SIMTech launched the Technology Adoption Programme (TAP) in partnership with Enterprise Singapore, benefitting over 1000 SMEs.



Executive Director Appointment

Dr David Low was appointed Executive Director of SIMTech.





Industry Joint Labs

SIMTech established **Joint Lab with SIA and SIA Engineering Company (SIAEC)** to develop advanced manufacturing capabilities and local suppliers for aircraft interior parts.



SIMTech established Joint Labs with Revvity Singapore (formerly known as Perkin Elmer) and Inzign to develop microfluidic device platforms and critical manufacturing processes for the MedTech sector.

2020S Future of Manufacturing

In support of Singapore's vision to remain at the forefront of global advanced manufacturing, SIMTech is forging disruptive technologies to transform the industry and shape the future of manufacturing. These include areas such as Industry 5.0 and MedTech.



Industry Joint Lab



SIMTech established **Joint Lab with Entegris** to develop high-performance functional filtration components with powder-bed additive manufacturing technologies for semiconductor applications.



Industry Joint Labs

SIMTech established **Joint Lab with ST Engineering Aerospace** to develop end-to-end additive manufacturing solutions for applications in aerospace maintenance, repair and overhaul (MRO).



Innovation Factory

Innovation Factory (IF) set up for SME product innovation, to uplift SMEs into product owners to break into new international business markets. SIMTech established **Joint Lab with Philips Electronics** to develop local capabilities and supply chains towards manufacturing engineering excellence.

SIMTech established **Joint Lab with Dou Yee Technologies** to develop advanced powder metallurgy (PM) manufacturing to enhance Dou Yee's technical capabilities and operational efficiencies.



Industry Joint Lab

SIMTech established **Joint Lab with Osteopore** to develop bioactive and bioresorbable scaffolds for oral-maxillofacial bone regeneration.





SIMTech moves to new premises at CleanTech Park. The Model Factory was also upgraded for Industry 5.0 capabilities.



Industry Joint Lab

SIMTech established **Joint Lab with Mencast** to develop customised marine propellers through blade design and optimisation capabilities and additive manufacturing technologies.

SIMTech Achievements In Figures





Looking Ahead

Moving into the fourth decade, SIMTech will continue to serve our manufacturing industry, especially SMEs and local-based enterprises, with the aim of increasing their global competitiveness in terms of advanced manufacturing capabilities, productivity, resilience and product innovation.

- Dr David Low, ED, SIMTech & CEO, ARTC



Recently, we learned a new term – BANI (Brittle, Anxious, Nonlinear and Incomprehensible) World. BANI aptly describes the current landscape on many fronts, taking over VUCA (Volatile, Uncertain, Complex and Ambiguous) which surfaced not too long ago. These global conditions challenge the stability and productivity of our manufacturing enterprises. As such, advanced manufacturing and digital technologies are becoming critical differentiators to help companies become more resilient, productive and innovative in product development.

SIMTech for the Future

"Moving into the fourth decade, SIMTech will continue to serve our manufacturing industry, • especially SMEs and local-based enterprises,

with the aim of increasing their global competitiveness in terms of advanced manufacturing capabilities, productivity, resilience and product innovation." - Dr David Low, ED, SIMTech & CEO, ARTC

In addition, SIMTech will continue to make R&D advances in our four research themes, to help make Singapore's manufacturing industry Smarter, Greener and More Connected. Lastly, but as importantly, SIMTech will continue to work with SkillsFuture Singapore (SSG) and partners to provide differentiated, practical continuing education and training (CET) to upskill and reskill our manufacturing workforce and stay at the leading edge.

As we move forward, amidst an ever-changing global landscape, partner with us on your journey in the Future of Manufacturing – the new SIMTech @ CleanTech Park awaits you.



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