CULTIVATING FUTURE LEADERS:
TRANSFORMING CURIOSITY INTO CAREER SUCCESS

Powering Innovation:
Empowering Talent to Drive Innovation and Excellence Across the Semiconductor Value Chain

Semiconductor Women's Forum: 12 March 2025
Accelerating Action, Enabling Women

Leadership in Engineering: 6 to 8 May 2025
Returning by Overwhelming Demand! Developing Leaders Through Cross-Pollination and Meaningful Connections
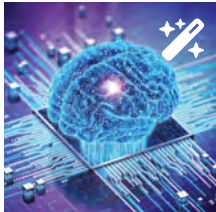
SSIA IS YOUR GATEWAY

Blending unparalleled network access and strategic growth opportunities into a single membership

Network Expansion:
Dive into a vast industry network through exclusive business networking and supplier development sessions, designed to forge valuable connections and partnerships.
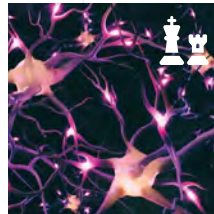
Branding and Marketing Leverage:
Broaden your outreach and enhance your visibility through diverse marketing opportunities - such as in our top industry VOICE publication - and a complimentary listing on the SSIA website.

Insight and Influence:
Gain access to the latest developments and government policies affecting the sector, while also having a platform to voice your feedback directly to key industry and government leaders.

Exclusive Training Opportunities:
Enjoy priority enrolment in specialized semiconductor-focused training and courses, keeping your team at the forefront of industry advancements.

Advocacy and Growth:
Benefit from SSIA's proactive advocacy efforts, ensuring your business's interests are represented, while also contributing to the vibrancy and growth of Singapore's semiconductor ecosystem.

Why be an SSIA member?

For both SMEs and MNCs in the semiconductor sector, SSIA membership offers a dynamic platform for growth, influence, and strategic connections, accelerating your business's success in Singapore and beyond by fostering key industry partnerships, providing insights into policy and development, and enhancing visibility within the global semiconductor ecosystem.

SSIA WELCOMES NEW MEMBERS

ANALOGUESMITH

Curve

siliconeXus

FOREWORD

BY THE EXECUTIVE DIRECTOR

As we step into 2025, I am filled with immense pride reflecting on the achievements of 2024. Together, we have navigated challenges and capitalized on opportunities, demonstrating the resilience and ingenuity that define our industry. It has been a year of meaningful collaborations, groundbreaking innovations, and impactful growth, made possible by the collective strength of our semiconductor community.

At SSIA, we are committed to building on this momentum and paving the way for a year of transformative initiatives. Our secretariat is focused on three key priorities that will drive our shared progress and position Singapore as a global leader in the semiconductor ecosystem.

Workforce Development

Talent remains the cornerstone of our industry. In 2025, we are doubling down on cultivating a mentoring culture within the semiconductor ecosystem. Mentoring not only empowers individuals with knowledge and guidance but also strengthens organizational loyalty and engagement. By fostering meaningful mentorship, we aim to create an environment that not only attracts top talent but also retains and develops them to drive the long-term success of our industry.

SSIA will also continue to organize some of the industry's largest student outreach platforms – the Electronics Industry Day and Semiconductor Awareness Day. These events have proven to be vital in inspiring and connecting students with the exciting opportunities in our sector. To companies that have not yet signed on to participate, we urge you to join this collective effort by reaching out to the SSIA secretariat. A united approach to outreach strengthens our ecosystem, builds a robust talent pipeline, and ensures that we remain competitive as an industry.

Strengthening and Growing Local Ecosystem

Local companies are vital to our ecosystem's success. This year, SSIA will intensify efforts to help these companies grow regionally and globally. The semiconductor industry thrives on interconnectedness, and supporting businesses in expanding beyond our borders ensures that they remain competitive and integrated into the global value chain. Whether it's through forging partnerships, sharing market insights, or facilitating international collaboration, our goal is to empower local companies to take on the world stage.

Championing Sustainability

Sustainability is no longer a choice but an imperative. SSIA will continue to support companies in their sustainability journey, helping them address challenges in energy and water efficiency, carbon footprint reduction, and responsible waste management. By aligning sustainability with industry goals, we can collectively contribute to a greener future while ensuring long-term viability for our businesses.

SSIA Flagship Events

Beyond industry gatherings, SSIA's flagship events are powerful platforms that unite and energize our ecosystem. This year, we will continue to host the Semiconductor Women's Forum, Semiconductor Business Connect, and our signature SSIA Summit and Semiconductor Dinner. These events are more than just networking opportunities—they represent the heartbeat of our industry. They are where new ideas are born, partnerships are forged, and our collective strength is celebrated.

Your continued participation and support for these events are not just about being present; they are about showing your commitment to SSIA and its mission to sustain and grow the semiconductor ecosystem in Singapore. These platforms are vital for the industry, and they also directly fund SSIA's operations, enabling us to drive initiatives that benefit every member of this community. We encourage companies to reach out to the SSIA secretariat for details on sponsorship, support, and participation. Together, let's make these events even more impactful and meaningful in 2025.

Adding to the excitement, 2025 is shaping up to be a milestone year with a vibrant calendar of major events. Singapore will host prestigious gatherings like the Asia Photonics Exhibition, SEMICON SEA, the International Semiconductor Executive Summit, and the MEMS & Sensors World Summit. These events, alongside our flagship initiatives, will further position Singapore as a hub of innovation and collaboration in the semiconductor industry.

And finally, if you haven't already, make it a priority to sign up for next year's Semiconductor Dinner. As the industry's largest and most anticipated gathering, it is an unparalleled opportunity to connect with peers, celebrate our collective achievements, and exchange insights that propel us forward. This dinner will also serve as the backdrop for a significant announcement tied to an important milestone in SSIA's journey. While I can't reveal too much just yet, I promise it will be a celebration you won't want to miss.

Here's to another remarkable year ahead, filled with opportunities, partnerships, and breakthroughs. Together, let us shape the future of semiconductors and drive the industry to even greater heights.

Ang Wee Seng
Executive Director
Singapore Semiconductor Industry Association (SSIA)

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Goh Jong Aik
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Tomorrow's Leaders: The Future of Young Semiconductor Engineers

UPCOMING EVENTS
Mark Your Calendars

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12 MAR 2025

Semiconductor Women's Forum 2025

The Semiconductor Women's Forum 2025 takes on a powerful mission: To turn aspirations into actions and create a future where every woman in the industry has the tools, support, and opportunities to thrive. Anchored in the theme, "Accelerating Action, Enabling Women", this forum is more than an event – it's a call to action for individuals, organizations, and communities to come together to inspire change, foster mentorship, and champion equality.

https://bit.ly/4fFLA1J

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10 JUL 2025

Semiconductor Business Connect 2025

Semiconductor Business Connect is a conference for MNCs and SMEs to unite as a collaborative powerhouse. Our goal: elevate SMEs through shared knowledge and networks, showcasing their innovations and emphasizing their essential role in driving the sector's global competitiveness and resilience. Together, we forge a path toward a unified and thriving semiconductor future.

https://bit.ly/4gGc6ts

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25 SEPT 2025

SSIA Summit & Semiconductor Dinner 2025

The Summit serves as a platform for sharing insights, discussing current trends, and charting the course for the technological integrations that will shape our future. It's not just another conference; it's the convergence of the brightest minds and most influential industry leaders in the semiconductor sector.

The Semiconductor Dinner offers a relaxed and celebratory atmosphere featuring the who's who of the industry – where participants can network, forge deeper connections, and celebrate the industry's achievements. With growing attendance, sponsorship, and support each year, the SSIA Dinner has solidified its status as a cornerstone of the semiconductor industry in Singapore and the region.

https://bit.ly/3PhrQqy

These event dates are subject to change. Please stay updated by visiting our website or following us on LinkedIn @SSIA for the latest news on these exciting events!

A collaboration between SSIA & EQ Strategist to support the development and evolution of Singapore's semiconductor industry

Leadership in Engineering 2025
6-8 MAY

"High energetic, well prepared contents, excellent coaching from EQ Strategist and SSIA"
- HP Inc Singapore

"If there was a leadership course that you want to attend, **this would be the one.**"
- Vanguard International Semiconductor

"Despite how busy your work schedule is, this leadership programme is **truly mindset-changing, game-changing, life-changing** to future leaders"
- Applied Materials

SOLD OUT LAST 2 RUNS, NEW SLOTS OPEN NOW!

"**The sheer energy of the program is amazing!** It takes a lot to conduct a program with so much energy to drive home the fundamentals of making a good leader, AMAZING!"
- KLA Corporation

3-day course for high-potential semiconductor professionals, providing the mindset, emotional intelligence, and tools to shape future leaders.

Suitable Candidates

- High-potential individuals
- Team leaders
- Supervisors
- Managers

Course Details

- Duration: 3 Days
- Date: 6-8 May 2025, Run #5
- Venue: voco Orchard Singapore
- Certification: Statement of Participation upon completion

Contact SSIA to book now!

✉ secretariat@ssia.org.sg

Program Overview

Pre-Course Work
- Each participant receives a personalised DISC profile report.
- The report serves as a foundation for leadership development and offers insights into behavioural tendencies and communication preferences.

The 3-Day Workshop
- Delivered over three impactful days.
- Integrates contemporary best practices from leadership, neuroscience, and high-performance fields.

Session facilitation
- Lead Coach - Dominic Siow
- Master Facilitator - Andrew Davey
- Semiconductor Industry Experts

Networking Opportunities
- Dedicated networking sessions included in the program.
- Enables participants to connect with industry leaders and facilitators.
- Aims to foster long-term professional relationships and collaboration.

Organized by: SSIA — Singapore Semiconductor Industry Association

Programme Partner: eqstrategist

SSIA COLLABORATES WITH MOE ON ENGINEERING AND TECH PROGRAMME SCHOLARSHIP

SSIA is proud to partner with Singapore's Ministry of Education (MOE) on the **Engineering and Tech Programme Scholarship (ETPS)**, an innovative initiative aimed at nurturing Pre-University students with exceptional aptitude in mathematics and science. This programme offers an unparalleled opportunity for students to immerse themselves in applied, interdisciplinary, and hands-on learning experiences within the semiconductor industry.

During the week-long program, scholars worked alongside experts from **Infineon Technologies Asia Pacific Pte Ltd** and **MediaTek Singapore Pte Ltd**, receiving mentorship and gaining valuable insights into the semiconductor ecosystem. From exploring innovation practices to delving into circuit design and coding, students uncovered various facets of the industry, deepening their knowledge and igniting their passion for engineering and technology.

The programme concluded with a final presentation where scholars displayed their creativity and demonstrated their understanding of the knowledge they had gained, showcasing exceptional talent and dedication. Participating schools included **Anglo-Chinese Junior College, Anglo-Chinese School (Independent), Catholic Junior College, Eunoia Junior College, Hwa Chong Institution, National Junior College, Raffles Institution, River Valley High School, St. Joseph's Institution,** and **Victoria Junior College.**

SSIA extends heartfelt thanks to these remarkable scholars and their dedicated mentors for making this initiative a success. Together, we are cultivating the next generation of innovators and leaders in engineering and technology, ensuring a bright future for Singapore's semiconductor industry.

Learn more about the Engineering and Tech Programme Scholarship at:

www.moe.gov.sg

Singapore Semiconductor Industry Association

SEMICONDUCTOR WOMEN'S FORUM 2025

SSIA
Singapore Semiconductor Industry Association

Accelerating Action, Enabling Women

MARCH

12 | **9AM to 5PM** | **Parkroyal Collection Marina Bay Garden Ballroom, Level 1**

The **Semiconductor Women's Forum 2025** is a rallying call to action, uniting individuals, organizations, and communities under the theme **"Accelerating Action, Enabling Women."** This forum is dedicated to empowering women in the industry, turning aspirations into tangible change by **fostering mentorship, championing equality, and celebrating resilience**. It shines a spotlight on **untold stories of perseverance**—from overcoming systemic barriers to balancing personal and professional demands—while inspiring a collective push for progress.

Key highlights include **heartfelt stories of courage, showcases of inclusive workplace initiatives, and mentorship success stories that break barriers and drive growth**. The forum is more than recognition of challenges—it's about building workplaces where women thrive, supported at every stage of their journey. Together, let's **accelerate action and enable women in the workforce!**

For more information:

HIGHLIGHTS FROM THE SSIA HR ROUNDTABLE

The **SSIA HR Roundtable**, held on 27 November 2024 at **NUSS Kent Ridge**, brought together HR Leaders and Government Agencies for an insightful discussion on the future of talent in the semiconductor industry. The strong turnout and dynamic participation underscored the shared commitment to shaping a workforce equipped to lead and drive innovation in the industry.

Encouraging Signs for Talent in Semiconductor

One of the most inspiring insights shared during the session was the noticeable increase in student interest in Microelectronics and Integrated Circuit Design programmes at both polytechnics and universities. Data

trends from SP, NTU, and SIT highlight this rising enthusiasm, reflecting a growing interest among Singapore's younger generation in pursuing careers within the semiconductor sector - a promising sign for the industry's future.

However, maintaining this momentum requires strategic action. The semiconductor industry must **'strike while the iron is hot'**, leveraging platforms like **Electronics Industry Day** and **Semiconductor Awareness Day** to strengthen student outreach and engagement and attract top talent. These initiatives are instrumental not only for igniting student interest but also for supporting and funding efforts to develop a robust talent pipeline.

Shaping the Future Through Collaboration

Looking ahead, SSIA's Key Priorities:

1. Workforce Development: Preparing talent to take on leadership roles and drive transformation in an ever-evolving industry.

2. Mentoring Culture: Fostering a strong mentoring ecosystem to inspire and guide the next generation of semiconductor professionals.

These themes will remain central to SSIA's mission. Collaboration with industry leaders and partners will be vital in achieving these objectives. Together, we can ensure that Singapore continues to be a global hub for semiconductor innovation and excellence.

Every Effort Counts

For more information or to discuss these priorities further, please feel free to reach out to the SSIA team. Let's build on the momentum from the HR Roundtable and continue attracting and developing the brightest minds for the semiconductor industry. **Together, we can make a meaningful impact on the future of our industry.**

⚙ SSIA
Singapore Semiconductor Industry Association

SSIA WELCOMES THE 2024/26 BOARD MEMBERS AT THE ANNUAL GENERAL MEETING 2024

The 2024 Annual General Meeting (AGM) of the Singapore Semiconductor Industry Association (SSIA) marked a significant milestone with a record attendance of 160 members at voco Orchard, Singapore, on 18 November 2024. This remarkable turnout highlights the collective commitment to advancing Singapore's semiconductor sector.

Highlights of 2024

Key milestones celebrated at the AGM included workforce development initiatives to inspire new talent, strengthening Singapore's position as a global semiconductor hub, championing sustainability efforts, and embracing advancements in cutting-edge technologies like AI and quantum computing. These achievements lay a strong foundation for future growth.

Introducing the 2024/26 SSIA Board

The AGM also unveiled the 2024/26 Board Members, entrusted with steering the association forward:

- **Brian Tan** (Applied Materials) – Chairman
- **Tan Yew Kong** (GlobalFoundries) – Vice Chairman
- **CS Chua** (Infineon Technologies) – Secretary
- **Jennifer Teong** (Silicon Labs) – Treasurer
- **Amy Leong** (AEM) – Board Member
- **Lid Jian Chiou** (STATS ChipPAC) – Board Member
- **Jong Aik Goh** (SOITEC) – Board Member
- **Gary Eves** (NXP) – Co-Opted Board Member
- **Tan Geok Hong** (Micron Technology) – Co-Opted Board Member
- **Terence Gan** (IME) – Co-Opted Board Member

Building the Future Together

The semiconductor industry stands at a pivotal juncture. With the new Board Members at the helm, SSIA is steadfast in its commitment to fostering collaboration, championing innovation, and elevating the industry's global prominence. This new chapter presents an opportunity for all members to actively contribute to shaping the future of Singapore's semiconductor ecosystem.

Together, let's unite to cement Singapore's position as a global hub for semiconductor excellence - inspiring growth, empowering talent, and creating a sustainable future for the industry.

"In unity, we find strength; in collaboration, we discover endless possibilities."

DR. EDWARD ONG'S EXPLORATION OF CO-PACKAGED OPTICS AND HYBRID BONDING

I am **Dr. Edward Ong Yong Xi**, a Scientist at the Institute of Microelectronics (IME) under **A*STAR**. My research focuses on two key areas: Co-Packaged Optics, which facilitates information transfer using optical communication, and hybrid bonding, an advanced method of stacking dies to enable high input/output (IO) density. Alongside these, I serve as a standing member of the Technological Disclosure Review Committee, evaluating innovations for their commercial potential.

Coming from a physics background with no prior experience in semiconductor chip design or cleanroom operations, my entry into the semiconductor industry was a steep learning curve. To bridge the knowledge gap, I immersed myself in semiconductor device and process physics through extensive reading and hands-on experience. Early on, I consulted experts within my institute, shadowing them during tool operations and asking countless questions. Their guidance accelerated my learning process, enabling me to develop integration flows, execute tapeouts, and manage my own lots within months of starting.

The collaborative culture at IME has been a cornerstone of my growth. Here, experts from various disciplines—materials science, mechanical engineering, electrical engineering, and computing—work closely together, fostering a multidisciplinary environment. Being part of A*STAR also allows us to tap into neighboring research institutes, broadening our capabilities. This synergy has enabled me to lead customer interactions and R&D projects, pushing me to rapidly acquire expertise across technical and business domains.

A pivotal lesson I've learned in my role is the importance of knowing when to go slow. The semiconductor industry is inherently fast-paced, but R&D often requires careful design-technology co-optimization to yield meaningful results. Balancing speed with precision is crucial for delivering impactful outcomes.

One of my most rewarding experiences was completing my first tapeout. This milestone introduced me to the intricate interplay of device design, architecture, fabrication, metrology, and testing processes. The knowledge gained during this project has been invaluable, opening up a broader design space for future innovations.

Semiconductors are central to many cutting-edge technologies, from femto- and atto-second lasers to medical imaging, quantum computing, and beyond. As a scientist, the opportunity to contribute to these advancements—and to see my research translated into real-world applications—is incredibly exciting. For instance, Co-Packaged Optics and hybrid bonding have the potential to revolutionize data communication and device integration, driving efficiency and performance in myriad applications.

Looking back, my journey has underscored the importance of integration—both technical and interpersonal. Successful innovation requires expertise across layers of abstraction and the ability to communicate effectively with diverse stakeholders. Through hands-on experience with advanced packaging technologies and close collaboration with peers, I've gained clarity on the challenges and possibilities within the semiconductor ecosystem.

To those aspiring to enter this field, my advice is to actively explore the broader semiconductor landscape. What may initially seem overwhelming can become a goldmine of opportunities with curiosity and persistence. Embrace multidisciplinary collaboration, seek mentorship, and aim to contextualize your work within the industry's larger goals. With the right approach, the possibilities in this ever-evolving field are limitless.

Institute of Microelectronics
IME

BRIDGING RESEARCH AND INDUSTRY IN PHOTONICS AND SEMICONDUCTORS

I am **Dr. Li Nanxi**, a Senior Scientist at the Institute of Microelectronics (IME), part of **A*STAR**. My work focuses on the research and development (R&D) of photonic integrated circuits (PIC) using state-of-the-art microelectronics fabrication technology. This role places me at the intersection of academic research and industrial applications, striving to translate cutting-edge science into commercially viable solutions.

One of the biggest challenges in my field is bridging the gap between fundamental research and industry requirements. While high-performance photonics devices can be demonstrated in a lab, issues like scalability and cost-effective manufacturing using standard CMOS fabrication processes often arise. Overcoming these hurdles requires close collaboration with industrial partners to align technological advancements with market needs. This experience has taught me the importance of balancing innovation with practicality to achieve real-world impact.

At IME, the work culture is both collaborative and multidisciplinary. We act as a bridge between research and industry, working with partners from diverse disciplines, including material science, electrical and mechanical engineering, and computer science. This approach fosters innovation and ensures a holistic understanding of complex projects. Senior researchers and leaders provide mentorship, while various talent development programs nurture the next generation of microelectronics and semiconductor professionals. Such an environment has been invaluable for my growth as a scientist.

One of the most valuable lessons I've learned is to become a 'T'-shaped professional. My mentor emphasized the importance of having broad knowledge to understand the bigger picture (the horizontal line of the 'T') while developing in-depth expertise in a specific area (the vertical line of the 'T').

This approach has guided me in making meaningful contributions to my team and differentiating myself in the field. It's advice I often share with juniors entering the industry.

Mentorship has played a pivotal role in my journey. My supervisors at A*STAR, including Dr. Navab Singh, Dr. Lennon Lee, Dr. Karen Chong, and Dr. Luo Xianshu, have provided guidance on everything from technical research progress to crafting successful funding proposals. They've also facilitated opportunities to network with collaborators in academia, industry, and the global research community. Collaborating with peers from diverse technical backgrounds has broadened my perspective and sparked innovative solutions to complex problems.

The semiconductor and photonics industries are at the forefront of technological advancement, and my work at IME underscores the vital role of R&D in driving innovation. For example, photonic integrated circuits have the potential to replace traditional electronic circuits, enabling high-speed data transmission and reducing power consumption in data centers. This blend of cutting-edge research and the possibility of commercialization excites me about the future of these fields.

Reflecting on my journey, some of my most rewarding moments include winning grant awards, overcoming technical bottlenecks, and publishing research in high-impact journals. These milestones reaffirm the value of perseverance and collaboration in achieving breakthroughs. For aspiring engineers and scientists, my advice is to embrace multidisciplinary collaboration, seek out mentorship, and cultivate the curiosity to bridge the gap between research and real-world applications. With the right mindset and support, this field offers endless opportunities to create meaningful impact.

Institute of Microelectronics
IME
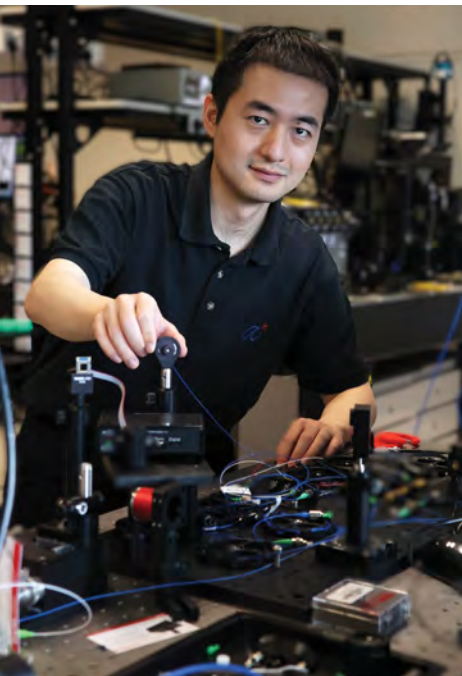
AI IN MANUFACTURING 2025 PREDICTIONS / 2024 REFLECTIONS

By, **Rashmi Misra**,
Chief AI Officer of Analog Devices

2025 Predictions:

Manufacturing + AI = Multiple Changes

In the upcoming year, we expect industrial AI to become even more integral to manufacturing, driving advancements for people in efficiency, innovation, and competitiveness. We should see more focus on seamless integration of AI technologies, ethical considerations, operational excellence, and leveraging AI for product development.

Industrial AI is poised to significantly transform manufacturing and is likely to become more deeply embedded in manufacturing operations, enhancing efficiency and productivity. Applications include predictive maintenance, quality control, and supply chain optimization. For instance, AI-driven predictive maintenance can foresee equipment failures, reducing downtime and maintenance costs. AI-powered quality control systems can detect more defects in real time, ensuring higher product standards.

AI Moves Closer to the Edge:

In the year ahead, we anticipate AI at the edge will further enhance applications and improve efficiency with increasingly specialized edge-AI chips that can enable tasks with lower power consumption. AI techniques like TinyML and model quantization will continue to advance, allowing more sophisticated AI algorithms to run on resource-constrained devices. We expect more real-time speech recognition, computer vision, and predictive maintenance on small edge devices, along with more local data processing. Current edge applications mostly use pre-trained models, but a move toward real-time, on-device training and fine-tuning will become more common. This means edge devices could adapt and learn from local data over time, improving performance and personalization without relying on cloud retraining.

2024 Reflections:

Reflecting on the Robotics Revolution:

Over the last year, I've noticed how integrating AI into robotics has led to more intelligent and adaptable machines capable of performing complex tasks. This advancement is particularly evident as large language models have reinvigorated the robotics world, accelerating robotics frontier models to enable faster, more agile deployments.

ANALOG DEVICES

AHEAD OF WHAT'S POSSIBLE™

EMPOWERING YOUNG ENGINEERING TALENT AT ASM

At ASM, a global leader in semiconductor processing equipment, talent development is a cornerstone of innovation and growth. Recognizing that its workforce drives success in the rapidly evolving semiconductor industry, ASM has implemented a comprehensive suite of initiatives to enhance employee skills, foster leadership, and create an inclusive work environment. These programs empower individual growth while supporting the company's mission of improving lives through technological advancement. Together with Mei San Kua, a New Product Manufacturing Engineer at ASM in Singapore, let's explore how ASM is shaping the future of semiconductor talent.

Manufacturing skills for the future

ASM has transformed its approach to training its manufacturing workforce, particularly in Singapore. Since 2019, the company has established a comprehensive training department with a certification process tailored to specific product groups. ASM has also revolutionized its approach to manufacturing skill upgrading by implementing extended reality (XR) solutions across three pillars:

1. **Immersive Self-Serve Training and Assessment (ISTA):** Ten training modules provide trainees with a 360-degree cleanroom environment experience.
2. **VR training:** Engineers can train on specific modules remotely with full-sized product replicas.
3. **HoloLens 2 as a Service:** This technology allows engineers to connect across borders, sharing the same point of view for troubleshooting and innovation.

In this way, ASM ensures continuous skill development, with a crucial leap forward in adopting next-generation talent development tools. Mei San emphasizes the importance of continuous learning at ASM. "Our team is constantly innovating to optimize precise fabrication and advanced manufacturing capabilities for enabling applications like AI and 5G. It's really rewarding to deliver process optimizations and prototype development that benefit the entire value chain."

Talent for tomorrow's innovations

With over 4,500 talented people across 15 different locations worldwide, ASM unlocks breakthrough technologies that have global impact in fields like AI, EVs, medical devices, and sustainability. That's why the company is committed to supporting and developing its teams, which thrive on diverse perspectives, working together to push the boundaries of innovation.

For example, the company's annual talent review cycle assesses organizational talent and readiness for expanded roles and responsibilities, which in turn informs leadership development curricula. Additionally, engagement survey results spark meaningful team conversations that enhance inclusive practices. ASM in Singapore is also championing the importance of mentoring and internship programs, enabling further growth and innovation for the team as a whole, while giving individual professionals the chance to be their best selves at work.

Mei San highlights the importance of teamwork: "Collaborating across various teams, from design to manufacturing, is crucial for our success. Solving complex product challenges together is incredibly rewarding." This collaborative spirit, combined with ASM's structured development programs, ensures that the company's talent remains at the forefront of semiconductor innovation.

Fostering leadership and diversity

ASM's LEAD Ahead program equips people managers with critical skills to build high-performing teams, covering leadership, finance, and employment law. The company's commitment to diversity is also exemplified by its Women in Leadership initiative, which aims to strengthen female leadership capabilities and drive strategic innovation.

As an aspiring engineer herself, Mei San reflects on these opportunities: "ASM's focus on personal and professional growth aligns perfectly with my career goals. I'm excited to take on more responsibilities and contribute to innovative manufacturing solutions that can drive our company's future."

Long-term growth through continuous development

ASM's commitment to workforce transformation extends beyond immediate needs. The company has expanded its

engagement surveys to cover critical areas like values, cornerstone behaviors, inclusion, excellence, and purpose; launched the BOOST program to support new managers who are embarking on their leadership journey; and introduced Individual Development Plans. These initiatives, combined with the Career Conversion Program (CCP), have helped ASM adapt to rapid growth and introduce diverse talent into its workforce.

Mei San's team exemplifies this forward-thinking approach. "Innovation in manufacturing for us means improving internal processes, particularly for technicians," she explains. "By automating repetitive tasks and implementing systems, we're increasing efficiency and allowing our team to focus on higher-value tasks."

Shaping the future of semiconductor talent

ASM's dynamic teams around the world thrive on diverse perspectives, collaborating globally to redefine the limits of physics. Looking ahead to 2025, the company aims to further upskill its manufacturing workforce's capabilities, extending its training reach to include customer sites. This focus on continuous improvement and technological adoption ensures ASM remains at the forefront of semiconductor innovation, ready to meet future industry challenges. As the semiconductor industry continues to evolve, ASM empowers its people to drive innovations that enable critical technologies like AI, EVs, medical devices, cloud computing, and green energy. That's why working at ASM means being part of what's next.

ASM△

INVESTING IN AI CAPABILITIES TO UNLOCK VALUE

Digital transformation is laying the foundation for fabs of tomorrow.

Singapore is an integral part of the global semiconductor supply chain, thanks to its strategic location, forward-thinking policies, skilled workforce, and push for Artificial Intelligence (AI) and innovation. Key industry players, such as GlobalFoundries (GF), have been at the forefront of embracing technological shifts, driving advancements in semiconductor manufacturing.

The potential of cutting-edge technologies like artificial intelligence (AI) and machine learning (ML) is vast if organizations adopt a strategic integration approach, invest in continuous learning, and foster collaboration. To fully unlock their transformative power, coordinated efforts are required.

GF is building on its foundation to ensure long-term success in the technology-driven landscape. Our unified vision for harnessing technological innovations and advancing digital manufacturing is supported by a dedicated global Digital Manufacturing team that drives digital transformation and accelerates its adoption across our fabs.

Leveraging AI capabilities for enhanced fab performance

At GF, AI capabilities are applied through our enterprise digitalization – ONEGF, standardising material, parts and production planning. We have seen improvements as significant as a 30% reduction in parts inventory.

Our state-of-the-art Factory Control Tower is a virtual fabric that enables our team to monitor key production processes, performance metrics, and tool uptime across all of GF's global manufacturing sites. This allows for 24/7 round-the-clock support across all our sites from our hub offices to remotely address fab production and tool issues in real time.

From Singapore, we have initiated several digital manufacturing initiatives that integrate Generative AI and Industry 4.0 solutions, leveraging AI and machine learning to optimize critical manufacturing processes. For instance, our wafer defect recognition systems accurately classify and detect defects in minutes instead of hours or days, enabling proactive management rather than reactive responses.

Additionally, our deployment of predictive maintenance technologies enhances operational efficiency by continuously monitoring tool parameters, allowing us to schedule maintenance proactively. This not only extends maintenance intervals but also reduces downtime and ensures consistent product quality. These solutions are being scaled and rolled out across other GF manufacturing sites, including those in the US and Germany.

Building-On GF's Digital Manufacturing Ecosystem

With 60% of our global Digital Manufacturing team based in Singapore, we expect even more innovative solutions to be developed and driven from here.

To facilitate global scaling, we have actively engaged a global community of over 400 key stakeholders and engineers from all our fabs over the past year. United by a shared vision, we focus on enhancing fab performance and transforming operations through streamlined processes, improved knowledge management, and the widespread deployment of automation.

GlobalFoundries leverages digitalization and AI capabilities to streamline production processes and performance, reducing machine downtime and ensure consistent product quality.

Further, we are expanding our digital manufacturing ecosystem through collaborations with software solution partners and higher education institutions. These partnerships promote a continuous exchange of best practices and cutting-edge technologies, ensuring we remain at the forefront of innovation.

Moreover, Singapore's latest National AI Strategy 2.0, aimed at strengthening the country's position in supporting industry growth and economic development, presents opportunities for GF Singapore as the Digital Manufacturing CoE (Center of Excellence), to participate in this forward-looking strategy.

Cultivating a Gen-Z talent inclusive workforce

The success of digital manufacturing hinges on as much on people as it does on technology. GF embraces digital transformation to stay competitive, streamline operations, and cultivate a tech-savvy workforce that is Gen-Z talent inclusive. Afterall, digital manufacturing highlights the tech-driven potential of the industry, making it more appealing to young professionals by dispelling the misconceptions of a dated, labour-intensive manufacturing environment.

Given the highly skilled nature of the semiconductor industry, GF is committed to continuous upskilling, reskilling, and cross-skilling. These initiatives empower our engineers to leverage Generative AI, machine learning, and advanced technologies to optimize production, tackle manufacturing challenges, improve quality, and minimize waste for sustainability.

Through GF's on-the-go learning, scholarships, work-study opportunities, and partnership programs, we ensure our workforce is future-trained according to the evolving demands of the business environment.

A new era of smart manufacturing

The future of manufacturing lies in our ability to innovate, integrate, and inspire. The progress we make today in digital transformation is laying the foundation for the fabs of tomorrow—fabs that are more agile, efficient, and adaptable to changing demands, while modernizing job roles to attract young talents into the industry.

Our mission is clear: To shape what's essential and to keep raising the bar for what is possible in the semiconductor industry. Through our commitment to innovation and our focus on building a resilient, future-ready workforce, we are innovating a new era of smart manufacturing.

By **Bo Huang**, Senior Director, Singapore Fabs & Digital Manufacturing, GlobalFoundries

TRAILBLAZERS IN TECHNOLOGY:

HOYA'S FEMALE ENGINEERS SHAPING THE SEMICONDUCTOR INDUSTRY

Adeline *(Top left)*
QA Engineer, 7 Years Experience

Yi Hui *(Top right)*
Process Engineer, Fresh Graduate

Muy Shin *(Bottom left)*
Automation Engineer, 5 Years Experience

Tse Thing *(Bottom right)*
Process Engineer, 6 Years Experience

What's your background?

Adeline: I graduated with a Bachelor's in Materials Engineering from NTU and have been in the semiconductor industry for seven years. I started at GlobalFoundries in Yield Defect Density, analyzing defects and improving line yields. Later, I transitioned to process engineering in CMP and Implant, gaining hands-on experience with process qualification and equipment control. Afterward, I moved into failure analysis at WinTech Nano, where I operated TOF-SIMS, a specialized skill in chemical analysis. Now, I'm a QA Engineer at HOYA Electronics, ensuring product quality.

Yi Hui: I graduated with a Bachelor's in Materials Engineering in NTU and work as a Process Engineer at HOYA Electronics, optimizing manufacturing processes in the semiconductor industry.

Muy Shin: I graduated from University Malaysia Pahang with a degree in Manufacturing Engineering. I began my career as a mechanical design engineer before transitioning to the semiconductor industry. For the past two years, I've been an Automation Engineer at HOYA Electronics, working on projects like automating shipment inspections using vision systems.

Tse Thing: I'm a Deposition Process Engineer at HOYA Electronics Singapore, where I've worked since 2020. I hold a Bachelor's in Materials Science from Universiti Putra Malaysia. My career began at STMicroelectronics as a Process Engineer, where I gained valuable experience in semiconductor processes and statistical process control (SPC).

What inspired you to pursue a career in engineering, specifically within the semiconductor industry?

Adeline: Materials engineering's broad applications intrigued me, but the semiconductor industry's rapid advancements, like 5G and IoT, drew me in. It's exciting to contribute to technologies that impact our daily lives.

Yi Hui: My interest in engineering grew during my final year at NTU, where I specialized in nanoscience technology. I was fascinated by semiconductor processes like thin film deposition, which inspired me to pursue a career in this field after graduation.

Muy Shin: I've always preferred hands-on work, which led me to manufacturing engineering. The semiconductor industry appealed to me because of its rapid growth and high salary potential, and I enjoy the challenge of working in such a fast-paced and evolving field.

Tse Thing: Semiconductors are integral to so many aspects of daily life, from smartphones to healthcare. I saw the industry's long-term growth potential and wanted to be part of a field that offers stability, continuous learning, and innovation.

What challenges have you faced as a woman in the engineering field, and how have you overcome them?

Adeline: The industry remains male-dominated. Emotional resilience and adapting to different communication styles are crucial. While progress has been made, there's still work to empower more women in this field.

Yi Hui: Engineering is often seen as male-dominated, but I've found that opportunities are available when you demonstrate capability. I overcame challenges by focusing on my skills and education, earning a strong GPA and a place on the Dean's List, which helped me stand out during job applications.

Muy Shin: I've found it relatively smooth working in this male-dominated field. While being the only woman on a team can feel like you need to adapt to a masculine environment, building good communication with my male colleagues has helped me integrate well. It hasn't been a disadvantage so far.

Tse Thing: I haven't faced significant challenges as a woman in engineering. Growing awareness of gender equality in the workplace has ensured equal opportunities for me. For women who encounter difficulties, I encourage seeking support from mentors, supervisors, or HR while trusting their capabilities.

Who have been your biggest supporters or mentors in your career, and how have they influenced you?

Adeline: James Huang from Global-Foundries taught me patience and collaboration, emphasizing deep understanding over quick fixes. My team at HOYA has also been incredibly supportive, especially during remote work challenges.

Yi Hui: My FYP mentor was instrumental in guiding me through complex plasma treatment experiments, which closely relate to the semiconductor industry. At HOYA, senior engineers have been incredibly supportive, offering both technical guidance and patience in a high-pressure environment—something I truly value.

Muy Shin: My biggest mentor was a senior during my first job as a mechanical design engineer. He taught me critical technical skills and guided me through the machine design process. His mentorship laid the foundation for my career and made my transition to the semiconductor industry much easier.

Tse Thing: Supervisors and senior colleagues at both STMicroelectronics and HOYA have been pivotal. Their willingness to share knowledge has shaped my approach to problem-solving and process optimization, while also giving me the confidence to take on new challenges.

How important do you think mentorship is for young women entering the semiconductor industry?

Adeline: Mentorship is vital. A good mentor provides guidance and helps navigate the complexities of this fast-paced field. It's important to seek out environments and leaders who value developing new talent.

Yi Hui: Mentorship is vital in such a demanding field. Technical challenges can be overwhelming, and mentors provide guidance and emotional support, helping young engineers like me build confidence. At HOYA, mentorship has accelerated my learning and made me feel comfortable asking questions, which is essential for growth.

Muy Shin: Mentorship is crucial, especially for beginners. Having a mentor who is patient and willing to teach can accelerate your learning and make it easier to navigate this complex field.

Tse Thing: Mentorship is vital. It provides guidance and support, helping young women feel confident and comfortable sharing ideas. A mentor's advice can accelerate learning and foster success in this field.

How do you see the role of women in the semiconductor industry evolving in the future?

Adeline: I'm optimistic. With more diversity initiatives, I believe we'll see greater representation of women in leadership roles, driving innovation and shaping the industry's future.

Yi Hui: I believe more women will step into leadership roles as the industry becomes more inclusive. Strong mentorship programs and growing opportunities will encourage more women to enter and thrive in the semiconductor field.

Muy Shin: I believe we'll see more women in project management and automation roles as the industry becomes more diverse. With more women entering engineering schools, there's a growing talent pool, and the industry is increasingly creating opportunities for women to take on key roles.

Tse Thing: With increasing awareness of the importance of diversity, I believe more women will step into leadership roles and contribute to key projects. The opportunities for women in the semiconductor industry are better today than ever before.

HOYA

SOLVING CHALLENGES AT NANOSCALE:

JUSTIN THEN'S LEADERSHIP JOURNEY IN SEMICONDUCTOR ENGINEERING

I am Justin Then, a Field Service Site Manager at Lam Research. My role centers on managing our Dielectric Etch products for a major memory customer. From overseeing performance to leading installation and conversion projects, I have the privilege of working at the forefront of semiconductor manufacturing. My journey with Lam Research began eight years ago as a fresh graduate in mechanical engineering, starting as a field service engineer. It has been an incredible experience to apply what I've learned to solve real-world problems while contributing to our organization's growth.

Overcoming Challenges and Building Skills

One of the most memorable challenges I faced was stepping into the role of Install Lead during a critical capacity crunch. We had to expedite tool release and process qualification under immense time pressure, with 24/7 support required to address a variety of complex issues. It was a test of our resilience, teamwork, and adaptability. Together, my team and I managed to resolve the challenge in just 2.5 months, showcasing Lam Research's core values: Agility, Teamwork, Ownership, and Accountability.

This experience reinforced the importance of collaboration and taught me the value of staying organized

under pressure. I also gained a deeper appreciation for the expertise and dedication of my peers, who exemplified the best of Lam Research's culture. The tools I've learned to use, from advanced diagnostics to systematic workflows, have enabled me to approach problems more efficiently and with greater confidence.

Collaborative Culture and Growth

At Lam Research, collaboration is at the heart of everything we do. Guided by the principle of "Customer First," we prioritize making our customers successful, knowing that our success follows. This customer-centric approach is supported by a cohesive team culture, where open communication and feedback drive improvement.

Personally, I've grown immensely from working alongside experts who generously share their knowledge. The supportive environment has allowed me to refine my skills and learn directly from those at the forefro nt of semiconductor technology. Regular collaboration across cross-functional units has also enriched my perspective, enhancing my ability to deliver impactful solutions.

Lessons in Leadership and Innovation

A valuable lesson I've learned is the

importance of stepping out of your comfort zone. Stretching your limits reveals your potential and prepares you for greater opportunities. Keeping an open mind and embracing continuous learning are crucial in this fast-paced industry. In the service operations team, where the workload is intense, I've learned to prioritize tasks that bring the greatest value—whether by reducing reoccurring issues, optimizing manpower, or improving product quality.

A memorable highlight of my career was leading the ramp-up of a new product line. Starting with just six chambers for initial wafer development, we scaled to over 400 chambers for high-volume manufacturing while achieving world-class uptime. This milestone was a testament to our team's tireless push for innovation and collaboration with both customers and product groups.

A Thriving Industry

The semiconductor industry is one of constant progress. With the rising demand for AI and memory storage solutions, technological advancements are inevitable. Over the past eight years, I've witnessed the introduction of increasingly sophisticated equipment to support high aspect ratio etching with competitive throughput. It's a source of pride and fulfillment to contribute to solving nanoscale problems that impact industries globally. For anyone who enjoys problem-solving and marvels at the complexity of wafer fabrication, this is the perfect industry to thrive in.

Advice for Future Engineers

Looking back, my experiences at Lam Research have equipped me with the resilience to tackle new challenges and anticipate roadblocks. My advice to future engineers is simple: never stay in your comfort zone too long. Push boundaries, work hard, and seize opportunities when they arise. Prioritize impactful tasks and always strive to learn from those around you. With dedication and a curious mindset, you can unlock incredible opportunities in the semiconductor field.

ENGINEERING EXCELLENCE:

SHAWN LOO'S JOURNEY IN SEMICONDUCTOR INNOVATION

I am Shawn Loo, a Field Service Engineer at Lam Research. My academic foundation in Systems Engineering from SIT-DigiPen prepared me for the multi-disciplinary demands of this role. During my studies, I worked extensively on complex mechanical systems controlled by microprocessors and microcontrollers. These experiences shaped my technical expertise and honed my problem-solving skills, setting the stage for my career in the semiconductor industry.

Currently, I serve as an Install Lead for a new customer Fab, managing the entire process of deposition tool installations. From planning schedules to preparing sites and ensuring operational readiness, I oversee every detail, ensuring smooth execution. My responsibilities also include calibrating systems to meet specifications and troubleshooting issues to meet tight deadlines. This role demands clear communication with multiple stakeholders, aligning goals and expectations to deliver optimal results.

Overcoming Challenges and Building Skills

Managing conflicting customer expectations and prioritizing issues effectively has been one of the most significant challenges in my role. To address these challenges, I focus on clear communication, listening attentively to customer concerns, and providing regular updates to reassure them. Prioritizing tasks requires a structured approach, assessing the urgency and impact of each issue on system performance and customer satisfaction. These strategies have allowed me to delegate resources efficiently and focus on critical tasks.

In this role, I've developed a range of technical and soft skills. Structured problem-solving, effective resource management, and enhanced communication have been pivotal in navigating complex challenges. Additionally, I've learned to maintain a balance between technical precision and customer-centric responsiveness, ensuring all stakeholders remain aligned.

Collaborative Culture and Mentorship

The work culture at Lam Research is collaborative and inclusive, fostering an environment where teamwork thrives. My colleagues and I share a strong sense of camaraderie, stepping in to support each other when needed. This collective responsibility for success has been instrumental in my growth. What stands out most about Lam Research is the company's emphasis on continuous learning and development. Enrichment programs and training opportunities have equipped me with the skills and confidence to excel in my role.

My mentors have been pivotal in my journey, offering practical knowledge and striking a balance between encouragement and accountability. Weekly meetings with them have taught me to anticipate challenges, think critically, and trust my instincts. Their guidance has often been the difference during high-pressure moments, enabling me to approach challenges with confidence and poise.

Memorable Projects and Lessons Learned

A particularly memorable moment was resolving a high-stakes escalation project during my first year at Lam Research. Tasked with identifying the root cause of a persistent issue, I worked closely with cross-functional teams over several intense weeks. The experience was a testament to the power of collaboration and resilience. Presenting our solution to the customer and witnessing their gratitude reaffirmed the impact of our work and strengthened my commitment to this field.

The most valuable lesson I've learned came from my manager: "Don't be afraid to fall; be afraid not to try." This advice has been a guiding principle, encouraging me to embrace challenges and view failures as opportunities for growth. It's a reminder that progress often requires stepping out of your comfort zone and taking calculated risks.

Looking Ahead

My experiences at Lam Research have prepared me for a future of limitless opportunities. This industry demands adaptability, innovation, and resilience—qualities I've developed through hands-on projects, problem-solving, and cross-functional collaboration. Looking ahead, I aim to continue contributing to groundbreaking advancements in semiconductor technology while expanding my leadership capabilities.

To aspiring engineers, my advice is to embrace lifelong learning, balance technical and soft skills, and never fear failure. In the fast-paced world of semiconductors, these attributes will empower you to overcome challenges and create meaningful impact. With curiosity and determination, the possibilities in this field are boundless.

Lam ®
RESEARCH

EMPOWERING GROWTH THROUGH MENTORSHIP AT MARVELL

Marvell, a leader in data infrastructure semiconductor solutions, is renowned for fostering an inclusive and forward-thinking work environment at its Singapore office. By prioritizing mentorship and professional development, the company empowers its employees to deliver cutting-edge solutions and thrive in their careers.

In this feature, we explore the journey of **Siyao Yu**, a former intern turned full-time engineer, and his mentor, **Changfeng Loi**, Senior Director at Marvell. Their collaboration exemplifies how Marvell fosters talent, encourages ownership, and inspires its employees to "Own What's Next."

Q&A: NURTURING TALENT THROUGH MENTORSHIP

What initially attracted you to Marvell, and how would you describe the qualities Marvell seeks in new hires and interns?

Siyao: Marvell has a strong reputation as a leader in the semiconductor industry and its focus on cutting-edge technology made it an obvious choice for my internship. I was eager to work with talented experts in such an innovative environment. The company's competitive benefits, including scholarships for interns, further demonstrated its commitment to valuing and investing in its people from the start.

Changfeng: At Marvell, we look for individuals who have strong fundamentals in analog design, a passion for technology, and a positive, can-do attitude. When we met Siyao, we were impressed by his ability to quickly grasp new concepts and accept feedback constructively. His enthusiasm and curiosity made him a great fit for our team, which I believe are important in the fast-paced and collaborative environment we foster at Marvell.

How has the company's mentorship culture influenced your personal and professional development?

Siyao: Mentorship has been a cornerstone of my journey at Marvell. During my internship, my manager and colleagues were always available to answer questions and share their expertise. This guidance not only helped me build technical skills but also gave me the confidence to present my findings effectively to the team. As a full-time employee, I continue to benefit from one-on-one career discussions, which ensure my interests align with the team's goals and my professional growth.

Changfeng: Mentorship is deeply embedded in Marvell culture. We prioritize creating an environment where knowledge is shared openly, and young engineers feel supported. Weekly team discussions and feedback sessions encourage both interns and employees to develop their technical and professional skills. At its heart, mentorship at Marvell is about empowerment which is helping the next generation to succeed and thrive.

What meaningful projects have you worked on together, and how did these projects contribute to growth and innovation?

Siyao: One of the most exciting projects I worked on was the Marvell® Nova 2, the industry's first 1.6T PAM4 optical DSP. Contributing to innovative designs was incredibly rewarding. These experiences allowed me to gain hands-on expertise, sharpen my problem-solving abilities, and grow more confident in my technical skills.

Changfeng: Siyao made significant contributions to the clock distribution system for high-speed communications. One of his key tasks involved evaluating various architectures to meet strict specifications, a challenging yet crucial aspect of our work. His creativity and technical acumen were evident, and his contributions advanced both his growth and the company's innovations in this space.

How does the culture at Marvell encourage collaboration and open communication?

Siyao: The inclusive and transparent culture at Marvell fosters collaboration at all levels. Regular one-on-one feedback sessions and team-building events create a strong sense of camaraderie, making it easy to ask questions, share ideas, and seek help. Knowing that even senior leaders are approachable builds an environment where innovation can truly thrive.

Changfeng: At Marvell, openness and collaboration are fundamental. We encourage employees to share ideas, take calculated risks, and embrace mistakes as opportunities for learning. Weekly knowledge-sharing sessions and team discussions ensure that everyone can benefit from collective experiences. This culture of openness strengthens team bonds, making even difficult conversations more manageable.

How does Marvell support continuous learning and staying ahead of industry advancements?

Siyao: Marvell provides extensive opportunities for continuous learning, including technical training programs, weekly knowledge-sharing sessions, and industry-focused seminars. I've also benefited from access to advanced CAD tools and online courses, which keep me updated on the latest IC industry trends. This culture of learning ensures I'm always growing and prepared to tackle new challenges.

Changfeng: Staying ahead in a fast-evolving industry like ours demands ongoing learning. At Marvell, we invest heavily in employee development through training programs, conferences, webinars, and workshops. Weekly sessions focus on industry trends, best practices, and technical insights, ensuring that our team remains at the forefront of innovation. Continuous learning isn't just encouraged; it's a core part of who we are.

What does 'Own What's Next' mean to you, and how does it shape your approach to work?

Siyao: To me, 'Own What's Next' is about taking ownership of my growth and seizing opportunities to innovate.

Marvell provides the resources and mentorship I need to excel, and the culture of ownership inspires me to make meaningful contributions to my team. It's about looking ahead and preparing for future challenges and opportunities in the IC industry.

Changfeng: 'Own What's Next' represents ownership and accountability in all we do. At Marvell, we encourage employees to embrace challenges, think critically, and take pride in their work. This philosophy drives both individual and team success, enabling us to deliver world-class innovations and maintain leadership in the industry.

Mentorship That Powers Excellence and Fuels Growth

At Marvell, we strive to foster an environment built on collaboration and diversity. Our people are our greatest resource, and we are committed to empowering every individual at Marvell to reach their fullest potential. The company culture of support drives innovation accelerates professional growth, and fuels success. Siyao and Changfeng's story exemplifies how teamwork and a sense of ownership can ignite impactful careers and groundbreaking solutions.

Feeling inspired? Explore *career opportunities* at Marvell and take the first step toward owning what's next.

MARVELL™

ADVANCING WIRELESS TECHNOLOGY:

HANLIN CHEN'S PATH IN RF IC DESIGN AT MEDIATEK

I am Hanlin Chen, an RF IC Design Engineer at MediaTek. My journey began with a Bachelor's degree in Electrical Engineering from the University of Edinburgh and North China Electric Power University (through a 2+2 program), followed by a Master's in Electronics from NTU. At MediaTek, I design RF and analog integrated circuit (IC) blocks for wireless transceivers, ensuring they meet the performance and reliability standards essential for advanced communication technologies.

Transitioning from academia to the semiconductor industry presented challenges, particularly adapting to industrial IC design methodologies. In university, my research focused on innovation and performance enhancements. However, in the industry, reliability takes precedence, demanding comprehensive consideration of real-world factors like performance degradation and design lifespan. To overcome these hurdles, I immersed myself in previous MediaTek projects, placing myself in the shoes of past designers to understand their decision-making processes. I also sought guidance from experienced engineers and accumulated hands-on experience through debugging and problem-solving.

Through this process, I developed expertise in RF and analog circuit design, learning to balance performance, area, and power consumption. I mastered tools like Cadence for design and verification and gained proficiency in creating IC layouts with careful floor planning. Additionally, I explored testbench construction for real-world applications and behavioral modeling using Verilog and Verilog-AMS. These skills have been crucial in ensuring the robustness and efficiency of the ICs I design.

The work culture at MediaTek fosters collaboration, inclusivity, and innovation while maintaining a healthy work-life balance. What stands out most is the collective effort—everyone understands that every block matters, creating a strong sense of responsibility and belonging. Weekly and monthly meetings encourage idea-sharing, and team members are always willing to help each other. This supportive environment accelerated my growth from a novice to a confident engineer, deepening my understanding of IC design and minimizing mistakes.

One of the most memorable moments in my career was presenting my first design to a room full of talented and experienced engineers. The rigorous review process, filled with questions and challenges, tested my knowledge and confidence. While it wasn't my best presentation, having my design pass the examination was a rewarding milestone, solidifying my determination to excel in RF IC design.

The semiconductor industry's rapid evolution excites me, as it constantly pushes the boundaries of innovation. Working in IC design allows me to contribute directly to groundbreaking technologies, and seeing my designs integrated into popular and advanced devices is deeply fulfilling. This industry demands critical thinking, collaboration, and a commitment to staying updated with emerging trends, making every day an opportunity to learn and grow.

For aspiring engineers, my advice is to cultivate a strong foundation in IC design theory, develop effective communication skills, and embrace mistakes as learning opportunities. Presenting ideas clearly and efficiently is crucial, as IC design often involves regular team discussions. The journey may be challenging, but with curiosity and perseverance, it offers immense rewards and opportunities to make a lasting impact.

DRIVING INNOVATION IN
IC DESIGN:

ZHANG XIN'S JOURNEY AT MEDIATEK

My name is Zhang Xin, and I'm a Staff Engineer at MediaTek, where I specialize in synthesis engineering. After graduating from NTU EEE with a focus on integrated circuit design and in-memory computing design, I embarked on an exciting journey in the semiconductor industry. My primary responsibility is to deliver the best Power, Performance, and Area (PPA) and ensure high-quality netlists for physical designers working on advanced technologies.

One of the most significant challenges I've encountered in my role has been understanding the fundamental logic of designs and their real-world circuit implementations. To overcome this, I've relied on three critical resources: MediaTek's comprehensive knowledge wiki, knowledge-sharing sessions led by senior colleagues, and hands-on projects assigned by my manager. These resources have allowed me to bridge theoretical concepts with practical applications, enhancing both the efficiency and quality of my designs. Along the way, I've developed strong skills in design and verification tools, which have been instrumental in my growth as an engineer.

The work culture at MediaTek stands out for its inclusiveness and constant renewal. Working with cross-functional and cross-cultural teams, I've experienced the value of diverse perspectives. My team's professionalism, kindness, and commitment to continuous improvement inspire me daily. This environment not only fosters collaboration but also provides opportunities for personal and professional growth.

One of the most valuable lessons I've learned is the importance of continuous learning. The rapid evolution of technology and design demands staying up to date with the latest advancements to meet customer requirements. My mentors and peers have been pivotal in this journey, emphasizing the importance of maintaining work observability—a practice that involves identifying, tracing, and documenting issues meticulously. This habit has proven invaluable for resolving challenges and sparking innovative ideas.

A particularly memorable moment in my career was when I independently resolved a challenging issue using knowledge I had acquired and mastered on my own. This achieve-

ment validated my skills and boosted my confidence, reaffirming my passion for tackling complex problems.

My experience at MediaTek has solidified my belief in the critical role of IC design within the semiconductor and electronics industry. The opportunity to see our products reach the market and receive positive feedback from customers is incredibly rewarding. It's a reminder of how our innovations can enhance and enrich lives, driving me to continually improve and innovate.

Looking ahead, I feel well-prepared for future opportunities thanks to the experiences and lessons I've gained. For aspiring engineers, my advice is simple: stay curious, embrace continuous learning, and leverage every opportunity to grow. Whether through company resources, mentorship, or hands-on projects, each experience builds a strong foundation for future success. The journey itself is as important as the destination, and it's filled with opportunities to make a meaningful impact in the dynamic world of semiconductors.

MEDIATEK

SILICON ODYSSEY:

MY LIFE IN IC DESIGN AND THE FUTURE OF SEMICONDUCTORS
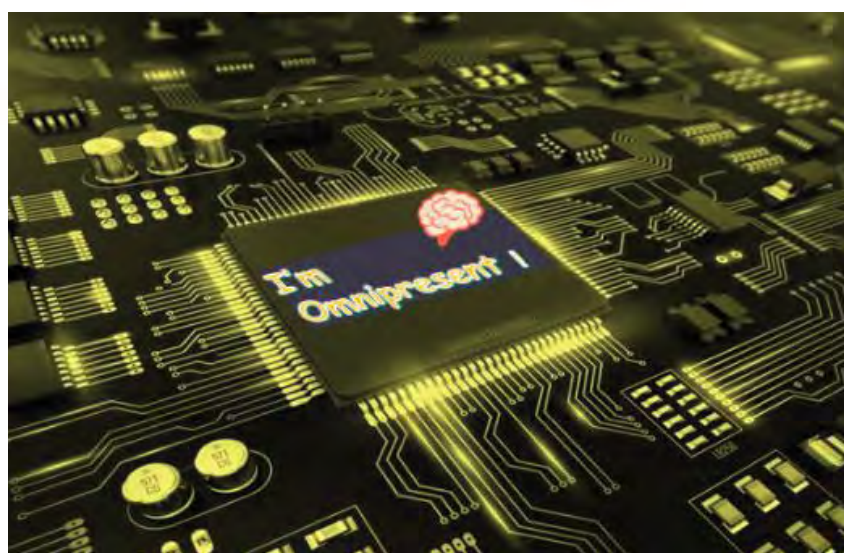
Why IC design?

Sundar Pichai, CEO of Alphabet, recently stated that "AI might be bigger than the internet." Reflecting on this statement, I recall my university days when the internet boom was just beginning. Like many other teenagers, I was focused on finding a job, but due to limited guidance at the time, I believed there were only two career paths: hardware and software. I had no awareness of the VLSI (Very-Large-Scale Integration) industry as fate would have it, I was drawn to an IT firm during campus recruitment, where I was assigned to the VLSI division.

This serendipitous entry into IC design marked the beginning of my journey. Looking back, if given the chance to choose my career path again, I would still opt for this industry as not only is IC design intellectually stimulating, but it also plays a crucial role in shaping the future of humanity. ICs are now ubiquitous, powering everything from smartphones and tablets to IoT devices, automobiles, and data centers. With the ongoing AI revolution, the significance of ICs is more apparent now than ever.

Challenges in Digital IC Design

Digital IC design, which deals exclusively with discrete signals, presents continuous and multifaceted challenges. The primary challenges are encapsulated by the acronym **PPFAS**, which stands for **Performance, Power, Features, Area, and Schedule**.

▪ **Performance vs. Power:** Achieving a high performance often requires higher power consumption. However, industry demands typically require the IC using as low power as possible. Therefore, the inverse relationship between performance and power presents the first challenge. Designing chips that deliver both high performance and low power consumption is a complex task, especially in the context of ASIC (Application-Specific Integrated Circuit) design. For instance, one of MediaTek's clients requested reduced standby power for their application, prompting our design team to innovate and meet this requirement.

▪ **Feature Integration vs. Size:** As applications advance, there is a constant need to integrate new features, such as AI processing, IoT connectivity, and high-speed interfaces. At the same time, there is pressure to minimize the physical size of the chip. Balancing these competing demands—adding new features while reducing the chip's area—can be a daunting challenge.

▪ **Time-to-Market Pressure:** In an industry driven by rapid technological advancements, the pressure to meet shortened product cycles and stay ahead of the competition is immense. Timely product delivery is often critical, creating significant challenges for the design teams in terms of both speed and quality.

The challenges for the design team do not cease once the chip is sent for manufacturing; in fact, they often become more complicated as the transistor manufacturing processes get smaller. This highlights that digital design is not only about technical proficiency but also requires an element of artistry and patience to troubleshoot and resolve complex issues in real-world conditions.

Career growth and opportunities

The semiconductor industry offers a wide range of career opportunities, spanning roles in design, manufacturing, testing, sales, and supply chain management. The variety of pathways within the industry ensures that there are numerous avenues for professional growth. Personally, I feel my journey has been quite rewarding; I started as a trainee engineer and eventually progressed to a senior management position. Some of my peers, working in AI-focused companies, have achieved multimillionaire status or even retired early, dispelling the myth that semiconductor careers are not financially rewarding. It is undoubtedly that they been particularly lucky or shrewd to enter such companies, but that is part of the choices to be made in a

career path too—balancing risk versus reward. Not every AI company has made it. While compensation is influenced by various factors such as company success, market demand, diversity, and company culture, there is significant earning potential in this field. Singapore is a vibrant multicultural hub, and MediaTek exemplifies this diversity as a global employer with offices around the world.

Future of IC Design

The future of the semiconductor industry is still incredibly promising, largely driven by the ongoing AI revolution. As Pichai's statement suggests, AI is poised to become a transformative force, requiring advanced computational power in many applications. This will drive the demand for high-performance CPUs, GPUs, and NPUs, which are at the heart of semiconductor innovation.

The U.S. Chips Act, along with initiatives in China and India, also underscores the geopolitical significance of semiconductor manufacturing. Countries are recognizing that the future is built on semiconductors, and this is leading to substantial investments and policy support for the industry. Moreover, the industry continues to push the boundaries of Moore's Law, with the development of increasingly smaller and more efficient transistors, including innovations that are attempting to reach Angstrom size manufacturing processes, and advanced packing technologies such as chiplets and chip stacking.

As these technological advancements continue, the opportunities for professionals in the semiconductor

industry will only expand. However, with these opportunities come challenges—both technical and geopolitical. Those already in the industry can take pride in the profound impact their work has on global innovation. For those considering their career paths, IC design offers a chance to be part of this exciting revolution and play a role in shaping the future of technology in people's everyday lives.

Conclusion

In conclusion, IC design is not just a career—it is a pivotal part of the technological ecosystem that powers our modern world. Despite the challenges inherent in the industry, the rewards—both in terms of career growth and the opportunity to shape the future—are immense. If you are considering a career in semiconductor design, the industry welcomes you with open arms to be part of this transformative journey.

MEDIATEK

By, **Mr. Jerome Jude Arokiaraj Jacob Selvaraj**, *Senior Technical Manager, Mediatek*

MEDs TECH - MENTORSHIP

INTRODUCTION

At MEDs Technologies, we believe in nurturing talent and empowering individuals at every stage of their professional journey. Whether you are a recent graduate taking your first steps into the industry or a mid-career professional seeking a transformative change, we provide mentorship and growth opportunities. Our commitment goes beyond traditional career paths – we invest in your potential and offering personalized guidance that encourages continuous learning and professional advancement.

We recognize that career growth is a unique and dynamic process. Our mentorship approach is tailored to meet individual aspirations, combining industry expertise and hands-on training to help you unlock your full potential and achieve your professional goals. At MEDs Technologies, we don't just hire employees; we cultivate future leaders and innovators.

MENTORING THE NEXT GENERATION

Our partnership with Singapore Polytechnic exemplifies our dedication to developing young talent. Through our internship collaboration, we provide Jaedon Seng, a third-year computer engineering student with real-world experience, bridging academic knowledge with industry insights and creating pathways for future professionals.

MEDs Technologies - Mentor (Tan Guan Boon)

▪ **What inspired you to take on this mentorship role, and what do you hope to achieve through it?**

The opportunity to mentor intern in the FPGA SoC firmware development for the NTN-IoT gateway application aligns with MEDs Technologies' mission to bridge academia and industry. We recognize the potential in fostering innovation through hands-on learning. By guiding intern, we aim to cultivate future engineers equipped with the technical expertise and professional skills needed in the rapidly evolving tech industry.

▪ **How do you ensure your mentee navigates the challenges of FPGA and IoT gateway applications effectively?**

We adopt a structured mentorship framework that balances theory and practical application. We introduce the Microchip PolarFire SoC FPGA Discovery Kit, Quectel C660D NTN Evaluation Kit, and Alifecom NTN emulator. Comprehensive guidance is provided on configuration, usage, and debugging processes. Regular project reviews, technical workshops, and real-time debugging sessions ensure steady progress. An open feedback culture encourages intern to raise questions and seek guidance whenever needed, fostering collaborative problem-solving and enhanced learning outcomes.

▪ **What are the key skills or experiences you aim to impart during this collaboration?**

Our goal is to impart a comprehensive understanding of FPGA SoC design, including hardware-software co-design, module integration, and debugging. Intern will gain hands-on experience with the Microchip PolarFire SoC, Libero design tools, Quectel C660D NTN-IoT module, and Alifecom NTN emulator. We ensure that intern understands not only the theoretical aspects but also the practical usage of these cutting-edge tools. Additionally, we emphasize soft skills such as project management, problem-solving, and industry-standard development practices.

Singapore Poly - Mentor (Mr Phang Piao Chun):

▪ **What inspired you to take on this mentorship role, and what do you hope to achieve through it?**

I was inspired by the opportunity to give back to the industry that has shaped my career. As an engineering lecturer, I believe bridging the gap between academia and industry is essential in preparing students for real-world challenges. Mentorship allows me to impart both technical skills and professional insights. It is incredibly fulfilling to be part of an intern's journey, watching them develop personally and professionally as they apply their learning in a practical setting.

▪ **How do you ensure your mentee navigates the challenges of FPGA and IoT gateway applications effectively?**

To help my mentee navigate the challenges of FPGA and IoT gateway applications, I focus on building a solid foundation in core concepts like HDL for FPGA design and integration techniques for IoT. I encourage hands-on learning through practical exercises to build their problem-solving abilities. Regular check-ins and milestone reviews help track progress and address any issues promptly.

▪ **What are the key skills or experiences you aim to impart during this collaboration?**

I aim to impart technical expertise in FPGA design and IoT integration during this collaboration, alongside critical problem-solving skills. I also emphasise the importance of effective communication, which is crucial for collaborative projects. Additionally, I encourage adaptability and a growth mindset to help my intern thrive in a fast-paced tech environment.

Singapore Poly - Mentee (Jaedon Seng):

▪ **What have been the most significant lessons from this mentorship experience?**

This mentorship has been transformative, guiding me through the transition from studying for a computer engineering diploma to applying my knowledge as an intern in the semiconductor and satellite communication field. A key lesson has been learning complex hardware and firmware integration, particularly industry-leading programmable FPGA SoC and a satellite NTN-IoT module. I have also developed strong problem-solving skills, learning to break down complex issues involving multi-processor bus and peripheral configurations. Working with advanced FPGA design and embedded firmware tools was challenging. Still, my mentors were instrumental in guiding me throughout the learning process, enhancing my skills in debugging, system design, and end-to-end implementation.

▪ **How has this collaboration helped you grow personally and professionally?**

This collaboration has been invaluable for both personal and professional growth. Personally, it taught me resilience and adaptability as I needed to quickly grasp complex concepts like satellite communication protocols and FPGA SoC architecture. Professionally, the internship honed my technical skills in hardware-software co-design, particularly in debugging serial communication and

working with the AT command set for modem control. I gained a deeper understanding of processor architecture and bus system design. Moreover, the mentorship helped improve my communication and collaboration skills, preparing me to work effectively in multidisciplinary teams.

▪ **How do you envision applying what you have learned in your future career?**

The knowledge and skills I have gained during this internship will provide a solid foundation for my future career, not only in FPGA roles but across a broad range of technology fields. This experience has prepared me for advanced telecommunications, IoT, and remote sensing roles. It has also taught me how to quickly adapt to new technologies and tackle unfamiliar challenges. In the future, I am excited to explore emerging fields like AI accelerators and ASIC design, applying my versatile engineering mindset to develop innovative solutions that bridge hardware and software.

MENTORING CULTURE

A powerful testament to our mentorship philosophy is the journey of Tay Lee Seng, a mid-career professional who found a new career opportunity at MEDs Technologies. After receiving mentorship that supported his career conversion, Lee has now come full circle – mentoring Mahesh Harishankar Pandi Chelvam, a SUSS intern in our Supply Chain Management function. This cycle of support demonstrates how our mentorship approach creates a ripple effect of professional development and knowledge sharing.

At MEDs Technologies, we don't just talk about potential – we actively cultivate it.

DRIVING WIRELESS INNOVATION:

VALENSIA SEBASTIANI'S JOURNEY AT REALTEK SINGAPORE

Valensia with her teammates in SD1

I am Valensia Sebastiani, a Computer Engineering graduate from the National University of Singapore (NUS). After earning my Bachelor's degree in 2020, I joined Realtek Singapore as a Software Engineer specializing in wireless development. Over the years, I pursued my passion for growth by completing a part-time Master's in Computer Engineering at NUS in 2024. Today, I focus on developing and testing new features for Wi-Fi EasyMesh across various Realtek platforms while collaborating with customers to resolve technical challenges.

Overcoming Challenges and Gaining Expertise

One of the biggest challenges I faced was working on emerging technologies like Wi-Fi 7, which often lack extensive documentation or practical examples. Tackling these obstacles required interpreting specifications through collaborative discussions and rigorous testing to ensure interoperability with other vendors. This process deepened my expertise in programming, Linux drivers, and Wi-Fi tools, reinforcing my passion for pioneering innovations in the wireless domain.

Work Culture and Team Collaboration

Realtek's work culture fosters creativity and inclusivity, creating an environment where all ideas are valued. Team members' independence and willingness to share knowledge have been instrumental in my professional development. The balance between autonomy and collaboration has enhanced my ability to tackle complex issues while encouraging continuous learning.

Lessons in Time Management

Balancing full-time work with a rigorous Master's program taught me the importance of effective time management. Attending evening classes while meeting work deadlines required meticulous planning and discipline. Breaking tasks into manageable pieces and setting daily goals helped me stay organized and resilient, sharpening my productivity and focus.

Memorable Milestones

A defining moment in my career was my first business trip to Taiwan, where I resolved critical product issues and achieved Wi-Fi Test Suite certification under tight deadlines. This challenging yet rewarding experience validated my technical capabilities and bolstered my confidence to handle high-pressure situations.

Looking Ahead

The semiconductor industry's dynamic nature excites me, especially its role in advancing technologies like Wi-Fi 7 and Multi-Link Operation (MLO). I'm eager to continue contributing to innovations that shape the future of connectivity. My advice to aspiring engineers is to embrace curiosity and persistence. Seek mentorship, collaborate with your team, and view every challenge as an opportunity to grow. The skills and experiences you gain will pave the way for a fulfilling career in this transformative field.

DESIGNING THE FUTURE:

KELVIN JONG'S JOURNEY IN IC ENGINEERING AT REALTEK SINGAPORE

Kelvin with his teammates during Realtek's 11th Anniversary / Family Day celebration

My name is Kelvin Jong, and I am an IC Design Engineer at Realtek Singapore. A recent graduate from NTU with a degree in Electrical and Electronic Engineering, I specialized in IC design. My current role involves studying automotive product standards and collaborating with team members to design intellectual property (IP) that meets these standards.

Overcoming Challenges and Embracing Learning

Transitioning from university to the semiconductor industry came with its challenges, particularly adapting to the structured and scaled nature of industrial design. University projects often involved small circuits without strict design protocols, while the industry demands adherence to specific RTL (Register Transfer Level) coding styles. To bridge this gap, I focused on mastering Verilog, analyzing past projects to learn best practices for managing complex design hierarchies and optimizing performance.

Work Culture and Collaboration

Realtek's collaborative work culture has been instrumental in my growth. Colleagues are always willing to share knowledge and provide guidance, creating an environment where challenges feel manageable. This camaraderie fosters a collective sense of purpose while encouraging individual development.

Key Lessons and Mentorship

A key lesson I've learned is to tackle complex tasks incrementally. Gradually exploring the vast to-be-known areas can significantly ease the transition. Analyzing existing projects has also been invaluable, offering insights into strategic design decisions. My mentor has consistently pushed me to step out of my comfort zone, accelerating my growth through challenging tasks and constructive feedback.

Shaping the Future of Technology

My experience at Realtek has deepened my appreciation for the semiconductor industry's transformative impact. Semiconductors power everything from vehicle automation to renewable energy systems, driving innovations that improve lives. One of my most rewarding moments was analyzing a previous IoT project and presenting its architecture, which enhanced both my technical and communication skills.

## Advice for Aspiring Engineers

For those pursuing a career in IC design, embrace curiosity and a commitment to learning. Seek mentorship to gain practical insights and understand the broader impact of your work. The field offers immense potential for growth, and seeing your designs come to life in widely used products is a profoundly rewarding experience.

REALTEK

MY JOURNEY AT SILTRONIC
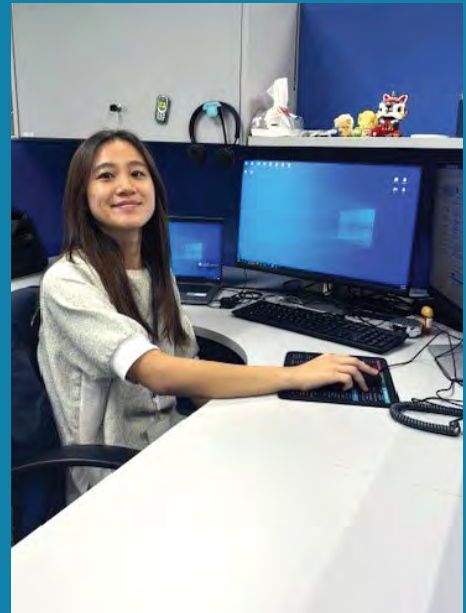
I'm Lin Si Hui Shiho, an IT Engineer at Siltronic and a 2023 graduate of NUS with a Bachelor's degree in Computer Engineering. As an SGIS scholar, I joined Siltronic's IT Production Application team right after graduation. Over the past year, I've been working on various projects and systems, from building web applications to managing key manufacturing systems. It's been a challenging yet rewarding experience transitioning from university to the professional world.

Starting out as a fresh graduate, I faced many unfamiliar processes and standard procedures that took time to understand and implement effectively. However, I reminded myself to stay patient and focus on learning to do things correctly before finding ways to improve efficiency. This mindset allowed me to pick up skills in ASP.NET, SQL languages, and server management. These technical abilities, combined with experience managing production databases, have been invaluable. Beyond the technical, I've also developed soft skills such as active listening, effective communication, and problem-solving—essential traits in any collaborative workplace.

The work culture at Siltronic has been nothing short of supportive. Respect and cooperation are deeply embedded in the company's ethos. As a young employee, I've felt heard and valued, which is something I don't take for granted. My colleagues in the IT department have been incredibly inclusive, always willing to lend a hand and provide guidance. This environment has given me a safe space to grow and hone my skills.

One of the most valuable lessons I've learned is the importance of being systematic when tackling challenges. A structured approach not only clarifies my thought process but also helps me communicate effectively with others. Breaking down complex problems into manageable tasks has been a game-changer in boosting productivity and identifying areas for improvement. Additionally, I've come to appreciate the refined systems and procedures built by experienced colleagues, which serve as a strong foundation for newcomers like me to build upon.

I'm especially grateful for the mentorship I've received. My supervisors consistently make time to check in, offer advice, and help me navigate any issues. Their feedback has been instrumental in shaping me into a more confident and capable engineer. My peers, too, have been a source of support and camaraderie, making every day at work enjoyable and enriching.

Looking back, my most memorable project was creating a web application to track employee attendance during evacuations. As my first project, it came with its fair share of challenges, but seeing it successfully implemented during our first evacuation drill was incredibly rewarding. It marked a significant milestone in my journey and gave me a sense of accomplishment I'll always cherish.

Over the past year, I've grown from a hesitant graduate into a proactive professional. This shift in mindset—realizing that I must take charge of my own path—has prepared me to face future challenges with confidence. To students entering the workforce, my advice is simple: embrace the changes, listen actively, take pride in your work, and don't be afraid to fail. Every experience is an opportunity to learn and grow, and the semiconductor industry offers endless possibilities for those willing to explore.

FROM INTERN TO ENGINEER:

DINO TAN'S CAREER JOURNEY AT SKYWORKS SOLUTIONS

I am Dino Tan, an Equipment Engineer at Skyworks Solutions. My journey here began as a Visual Inspection Intern through my school's Integrated Work Study Programme. Drawn to the precision and complexity of semiconductor manufacturing, I saw the internship as an opportunity to apply my academic knowledge to real-world challenges while learning from experienced engineers and technicians.

During my internship, I worked closely with the equipment team, tackling unique challenges daily. From troubleshooting equipment malfunctions to collaborating with the process team, these experiences sharpened my problem-solving skills and solidified my decision to pursue a career in equipment engineering. The steep learning curve was daunting at first, particularly understanding the technical aspects of machinery. However, by asking questions and dedicating extra time to study technical manuals, I quickly developed a solid foundation.

Transitioning from an intern to a full-time Equipment Engineer brought a significant increase in responsibilities. As an intern, I focused on supporting engineers with equipment maintenance and data collection. In my current role, I oversee equipment performance, troubleshoot issues, and lead improvement projects. Recently, I've been heavily involved in supporting machine relocation—a hands-on experience that's allowed me to work with various departments, meet safety and technical requirements, and collaborate with vendors. This project has not only deepened my technical knowledge but also enhanced my communication and interpersonal skills.

Mentorship has been a key element in my journey at Skyworks. My mentors, Chew Meng Hwee and Moganeshvaran Kalidass, were instrumental during my internship, helping me build technical and

communication skills. The department's collaborative and supportive environment has made it easy to grow and succeed. Skyworks also provides a wealth of resources for professional development, including training programs, technical workshops, and a robust learning management system. These opportunities, combined with cross-functional collaboration, have allowed me to expand my expertise beyond equipment engineering.

Looking ahead, my goal is to deepen my technical expertise in semiconductor equipment automation and predictive maintenance technologies, which I believe are critical for improving manufacturing efficiency and reliability. I also aspire to take on leadership responsibilities within Skyworks, contributing to process optimization and ensuring the sustained performance of the equipment under my management.

The semiconductor industry is evolving rapidly, driven by growing demand for advanced chips, better manufacturing efficiency, and sustainable production methods. To stay ahead, I plan to enhance my knowledge of automation systems, data analysis, and emerging semiconductor technologies.

For new interns or employees at Skyworks, my advice is to stay curious and seize every learning opportunity. Don't hesitate to ask questions, seek feedback, and take ownership of your work. Hands-on experience with equipment will accelerate your growth and build a strong foundation for your career. With curiosity and determination, this field offers endless opportunities for growth and innovation.

SKYWORKS®

GLORIA KWEK'S INTERNSHIP AT SOITEC

My name is Gloria Kwek Li Ya, and I am currently pursuing a degree in Electrical Power Engineering at the Singapore Institute of Technology (SIT). As a Facilities SCADA and Electrical Systems Intern at Soitec, I am responsible for overseeing energy efficiency projects, managing utility budgets, supporting the ISO 50001 certification process, and ensuring the smooth operation of electrical and SCADA (Supervisory Control and Data Acquisition) systems. Additionally, I play a key role as a proxy for the chiller system and contribute to the construction building expansion project. This internship has been an incredible learning journey, exposing me to a range of systems beyond just electrical, including chillers, cooling towers, and ultra-pure water systems.
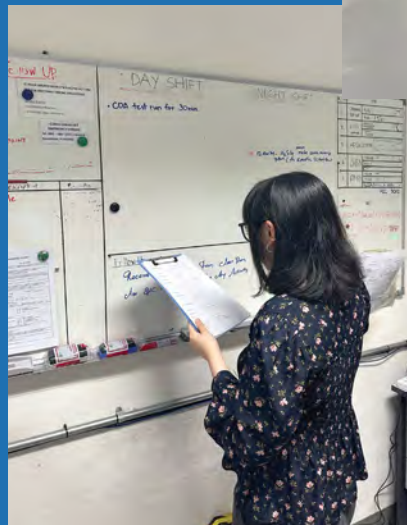
Overcoming Challenges and Developing Skills

One of the biggest challenges I faced was understanding the complexity of the SCADA system. To overcome this, I immersed myself in studying system diagrams and manuals, while also seeking guidance from experienced colleagues. I used system downtime as an opportunity to explore its functions, practising data monitoring and control to gain confidence in troubleshooting. These experiences enhanced my ability to reduce downtime and improve system reliability.

Through this internship, I also developed a structured approach to research and troubleshooting, ensuring that I stayed organised while working on intricate systems. This mindset aligns with SIT's DNA of being a "Thinking Tinkerer," someone who combines a passion for hands-on work with the ability to apply acquired knowledge. This approach has been invaluable in my professional growth, equipping me with practical skills in SCADA systems and beyond.

A Collaborative and Supportive Environment

Soitec's work culture stands out for its emphasis on work-life balance and collaboration. The company fosters an inclusive and friendly environment where colleagues are always willing to share knowledge and support one another. This collaborative spirit has greatly enriched my learning experience. Team-building activities and celebrations have also made the workplace lively and enjoyable, creating strong bonds among colleagues from diverse nationalities and backgrounds. This diversity has broadened my perspective and strengthened my ability to collaborate effectively with people of different expertise.

The guidance from my supervisor has been instrumental in navigating the challenges of this internship. One memorable moment was when I struggled with troubleshooting a complex SCADA issue. My supervisor patiently walked me through the problem, providing insights that helped me solve it efficiently. This not only deepened my understanding of the system but also built my confidence in tackling similar challenges in the future.

Key Lessons and Memorable Moments

A standout moment during my internship was participating in the Factory Acceptance Testing (FAT). I reviewed and identified errors in AutoCAD drawings and inspected components for potential defects. This experience allowed me to bridge the gap between academic theory and practical applications, reinforcing my confidence in my technical abilities. Another highlight was creating a presentation for Minister Baey Yam Keng's visit to Soitec, showcasing the company's sustainability initiatives. It was an honour to join the Minister on a site walk and discuss the future of sustainability in our industry. These experiences not only showcased the real-world impact of my work but also inspired me to continue contributing to meaningful projects.

Looking Ahead

This internship has been pivotal in shaping my career aspirations. Working in facilities and electrical systems has deepened my understanding of the semiconductor industry and its critical role in modern technology. The dynamic nature of the industry, with its constant evolution and innovation, excites me. I am motivated to continue exploring opportunities where I can apply my technical knowledge while contributing to the advancement of cutting-edge technologies.

To students considering a similar path, my advice is to embrace challenges and remain open to learning. Keeping a daily report to summarise your progress can help you stay organised and track your growth. Don't hesitate to ask questions and seek mentorship—the support of experienced professionals can make a significant difference in your journey. The semiconductor industry offers endless possibilities for growth, and with curiosity and determination, you can create a lasting impact.

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LOUISE LIU'S JOURNEY AT SOITEC
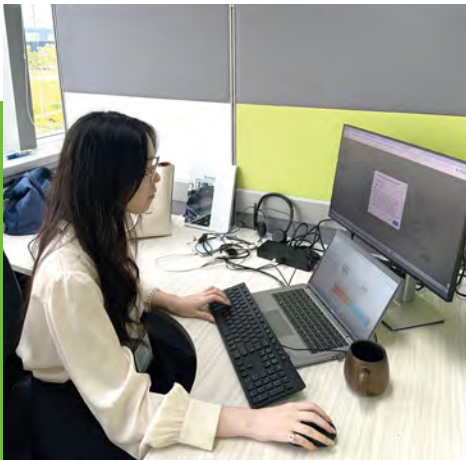
I am Louise Liu, a Corporate Strategy Intern at Soitec, pursuing a Master in Management at ESSEC Business School's Asia-Pacific campus in Singapore. Born and raised in Shanghai, I later moved to Paris, where I earned both a Bachelor's and Master's degree in Engineering, specializing in Big Data and Artificial Intelligence. My professional journey spans data engineering and strategy consulting, culminating in my current role within Soitec's Corporate Strategy & Market Intelligence team. Here, I help define and implement long-term strategies that align with market opportunities and inform Soitec's executive decision-making processes.

In my role, I collaborate closely with the Director of Corporate Strategy, focusing on strengthening Soitec's regional growth strategies across various continents. My work often blends collaboration and discovery—analyzing market trends, conducting deep-dives into industry landscapes, and uncovering insights that drive Soitec's competitive edge. Engaging with colleagues across France, Singapore, and beyond, I contribute to divisions like Mobile Communications, Automotive & Industrial, and Edge & Cloud AI.

Overcoming Challenges and Gaining Expertise

As this is my first foray into the semiconductor industry, one of my biggest challenges was building a solid understanding of the sector—its trends, risks, and opportunities. Immersing myself in industry reports and analyses, I used frameworks like SWOT and Porter's Five Forces to piece together the industry's dynamics and Soitec's positioning. I also conducted interviews with team experts, tapping into their knowledge to gain deeper insights. My engineering background enabled me to grasp technical aspects, which proved crucial for regional expansion studies.

In these studies, I integrated data from public databases, independent research, and industry insights to analyze the interplay of policy, business environments, and semiconductor landscapes across countries. Using data modeling and visualization tools, I synthesized large volumes of information into actionable insights, helping guide strategic decisions. The process of collecting, distilling, and presenting findings honed my analytical and communication skills.

Work Culture and Team Collaboration

The work culture at Soitec is deeply collaborative and supportive. Despite my corporate strategy team being geographically dispersed, our weekly meetings serve as a safe space for sharing updates, seeking support, and even having moments of fun. These sessions exemplify teamwork, with colleagues stepping in to provide advice or share resources whenever needed. I remember struggling to find specific data for a study—bringing it up during a meeting led to several team members offering helpful suggestions and following up with additional sources.

Beyond work, our team bonds through personal stories and cultural exchanges. As the only Gen Z in the group, I enjoy sharing unique perspectives, such as introducing Singapore-exclusive mooncakes during the Mid-Autumn Festival. This inclusive environment has been instrumental in my professional and personal growth.

Lessons Learned and Future Aspirations

One of the most valuable lessons I've learned is the importance of tailoring solutions to meet the needs of your audience. While formalizing regional expansion studies, I noticed that traditional frameworks didn't fully address the

nuances of presenting to a predominantly Western audience. To bridge this gap, I proposed integrating visual aids like maps to highlight semiconductor facility locations, paired with explanatory metrics. This approach not only improved clarity but also made the information more impactful for decision-makers.

For someone entering this field, my advice is to embrace curiosity and never hesitate to ask questions. The more you learn, the sharper your questions become, leading to meaningful conversations and deeper understanding. Effective communication, adaptability, and a willingness to challenge conventions are key to thriving in this dynamic industry.

Shaping a Semiconductor-Driven Future

This internship has reshaped my perspective on the semiconductor industry, revealing its foundational role in enabling advancements like AI, cloud computing, and data-driven innovations. Working in strategy has also given me insight into how geopolitical and macroeconomic factors influence the industry's evolution. I'm particularly inspired by the industry's resilience and adaptability in addressing challenges while preparing for future growth.

A standout moment during my internship was completing my first country analysis. This study supported Soitec's M&A team and was presented to the CEO and executive committee, marking a rare opportunity to contribute to high-level decision-making. Seeing my work drive meaningful impact was incredibly rewarding and reinforced my passion for strategy and innovation.

Looking ahead, I'm excited to continue contributing to this dynamic field. The semiconductor industry holds immense potential to shape a smarter, more sustainable world, and I'm grateful to play a part in this journey. Each project, challenge, and insight has prepared me to embrace future opportunities with confidence and curiosity.

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FINDING MY PLACE IN THE SEMICONDUCTOR INDUSTRY:

GRACE'S JOURNEY

Grace Ding
Process Engineer at STATS ChipPAC

Hi, I'm Grace Ding, a Process Engineer at STATS ChipPAC and a proud graduate of Material Science and Engineering from NUS. My role involves working on semiconductor package fabrication, specializing in Thin Film Sputter, Dry Plasma Etch, and Photoresist Stripping. It's a dynamic and challenging field where I optimize manufacturing processes, analyse data to assess line performance, implement process controls, and integrate new products into our production line. This job is not just a career but a continuous learning journey.

The semiconductor industry constantly pushes us to adapt to new technological advancements and tighter process controls. One of my biggest challenges has been meeting these precise production criteria while ensuring customer satisfaction. To tackle this, I've honed my skills in engineering techniques like Statistical Process Control (SPC) and mastered tools like JMP for data analysis and process experiments. These allow me to detect variations in real-time and make informed, data-driven decisions. But technical skills alone aren't enough—success in this field requires close collaboration with design, equipment, and manufacturing teams. I've learned the importance of strong communication, active listening, and integrating diverse expertise to solve complex problems effectively.

Our work culture at SCS is innovation-driven and collaborative, and this has been pivotal in my growth. Experienced engineers and management have been incredibly supportive, sharing their insights and creating an open environment where new ideas can flourish. As a fresh graduate, I've felt welcomed and encouraged by my team. Their

advice and guidance have helped me transition smoothly from school to the fast-paced semiconductor industry.

One of the most valuable lessons I've learned is to observe and learn from role models, such as my supervisor and HODs. Paying attention during work meetings—even those not directly related to my projects—has been a treasure trove of knowledge. It's taught me how to lead problem-solving discussions, engage customers, and handle challenges with confidence. Active listening has been a game-changer in understanding the nuances of various roles and responsibilities.

I was fortunate to participate in the Mentorship Programme at SCS, where my mentor's tailored advice helped me address my weaknesses, particularly in presentation skills. His encouragement to speak up in meetings and seize public speaking opportunities has significantly boosted my confidence. Today, I'm not only a proactive speaker but also a brand ambassador for my company at career fairs—a role I'm incredibly proud of.

A memorable moment in my career was when I decided to take ownership of a new process area. Initially, I hesitated, fearing mistakes and the unknown. With encouragement from my mentor and supervisor, I took the leap. Balancing this new responsibility with my existing role was tough, but the technical support and regular check-ins from my team made it manageable. Looking back, it was a rewarding experience that expanded my skills and made me a more confident engineer.

If I could offer advice to aspiring engineers, it would be this: Stay open-minded, embrace new knowledge, and build a strong technical foundation during your studies. Internships are invaluable for hands-on experience and a smooth entry into the semiconductor industry. This field is ever evolving, and with the right mindset and preparation, you can thrive in it just as I have.

BREAKING NEW GROUND IN THE
SEMICONDUCTOR INDUSTRY:

JASPER'S JOURNEY

Jasper Tay
R&D Manager, STATS ChipPAC

In an industry often called a "sunset," I've carved out a path of growth, resilience, and innovation. Starting from my roots at Simei ITE and moving to my current role as R&D Manager at STATS ChipPAC, my journey shows that determination and adaptability can lead to meaningful achievements in the semiconductor field.

I began with a foundation in electrical power from Nanyang Polytechnic and SIT. Over the past seven years, I've dived into various facets of the semiconductor industry, starting as a Yield Enhancement Engineer and moving through roles in Process Integration, Metrology, AI Deep Learning, and more. Today, I manage new customer R&D projects, blending technical expertise with a broader strategic outlook.

Challenges are a given in my work, from encountering technical roadblocks to meeting tight deadlines. When faced with obstacles, I rely on flexibility, creativity, and innovation. It's not just about skills and tools—it's also about keeping a long-term perspective. The right attitude is indispensable. This belief keeps me proactive and committed to continuous growth.

The work culture at STATS ChipPAC has been a big factor in my success. The fast-paced environment and a team of supportive leaders and peers have been instrumental in my professional and personal development. I'd describe this dynamic as a "safe haven" where mistakes become learning opportunities. The willingness of my colleagues to share their knowledge has created an atmosphere where innovation flourishes.

One of my proudest accomplishments has been mentoring and leading a team of 40. Guiding them to become subject matter experts and watching them grow into leadership roles has been incredibly rewarding. These connections are a testament to the collaborative spirit that drives success in our industry.

Looking back, I remember a pivotal moment when I was tasked with leading a new department. The challenge was daunting and even triggered anxiety. I realized I lacked the necessary skills and knowledge, but instead of giving up, I pushed myself to learn from scratch. Through persistence and long hours, I overcame my fears and gained confidence. That experience taught me the value of courage and preparation.

To aspiring engineers, my advice is simple: Be brave and courageous when opportunities come your way. Take on challenges head-on and commit to the journey, knowing there are no shortcuts to success. Tell yourself you can do it, and you will. The decision to prove yourself makes success even sweeter and more fulfilling. My story is proof that with growth, collaboration, and belief in your abilities, you can achieve incredible things in this demanding yet rewarding field.

STATSChipPAC

PRESEVERANCE, COLLABORATION
AND CONTINUOUS LEARNING:

REWARDING EXPERIENCE AT SSMC

My name is Muhammad Idris, an Electrical Engineering graduate from the National University of Singapore (NUS). With a keen interest in the latest consumer electronics and automobiles, I found my passion in the semiconductor industry—a field that drives the technological advancements shaping our modern lives. Knowing that semiconductor chips are at the heart of innovations, I aspired to contribute directly to their manufacturing. This ambition led me to join Systems on Silicon Manufacturing Company (SSMC) in mid-2022 as a Product Engineer. In this role, I monitor product yields and collaborate with customers on yield improvement projects.

The start of my journey came with challenges, especially integrating into a team of experienced engineers while supporting ongoing projects. It was a steep learning curve, but it also pushed me to take ownership of my responsibilities. As I became more adept at low-yield investigations, I initiated my own yield improvement projects. These experiences not only expanded my skills but also taught me the value of teamwork and communication in driving project success. Coordinating efforts with colleagues and partners ensured timely and effective results, fostering a collaborative spirit within the team.

My motivation stems from the supportive work environment at SSMC. My manager and Head of Department have been incredibly approachable and encouraging, providing mentorship and validation for my findings. Weekly one-on-one meetings serve as vital checkpoints, ensuring alignment and offering a platform for advice. Their guidance reminds me that challenges are best tackled with the support of a team, empowering me to explore innovative solutions confidently.

The most rewarding aspect of my role is uncovering the root causes of systematic issues. This involves employing low-yield analysis techniques, from categorizing wafer map signatures to analyzing test failures. Investigations may include process abnormalities, defect scans, tool studies, or even sending wafers for Failure Analysis. While these methods don't always yield immediate results, finding the root cause is an exhilarating milestone for me and my team. Reflecting on past successes and witnessing yield trends improve further fuels my drive and pride in the work we do.

Over the past two years, I've learned that perseverance is essential for thriving in this field. Identifying root causes often lacks predefined solutions, requiring patience and resilience in analyzing data and implementing corrective actions. Leveraging tools like Lean Six-Sigma methodologies and maintaining an open mind have been key to navigating the complexities of semiconductor manufacturing.

For aspiring engineers, my advice is to be proactive in honing your problem-solving skills and exploring best practices across industries. Stay open to new learning opportunities and embrace collaboration, as these elements are crucial for success in this dynamic field.

Through my journey at SSMC, I've come to value perseverance, teamwork and continuous learning as the cornerstones of a fulfilling career in semiconductors. This industry is ever-evolving, and with dedication, you can play a vital role in shaping the future of technology.

FEARLESS PURSUIT OF
A SEMICONDUCTOR CAREER:

EMBRACING A GROWTH MINDSET
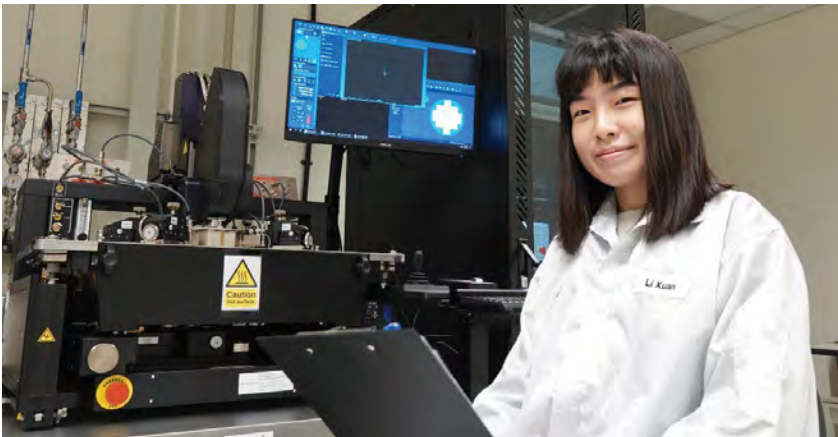
My name is Lim Li Xuan, I graduated from the National University of Singapore (NUS) with a Bachelor of Science (Honours) in Physics in 2022. During my final year project, I discovered a passion for laboratory work, which led me to join Systems on Silicon Manufacturing Company (SSMC) as a Reliability Engineer. This role perfectly combines my love for hands-on lab work with the semiconductor reliability field. My responsibilities include conducting reliability stress tests on devices, analyzing test results to identify issues in chips, and maintaining a safe and efficient lab environment.

Transitioning from university to a professional role came with its challenges, especially adapting to extensive documentation and the complexities of reliability testing.

Initially, I found the high volume of paperwork overwhelming, but I developed a systematic approach to organizing tasks and double-checking details. Over time, this reduced errors and improved my efficiency.

My journey at SSMC has been greatly supported by my mentor and team who provide valuable insights and alternative approaches to problem-solving. Monthly one-on-one coaching sessions with my department head have further sharpened my skills, allowing me to tackle new challenges confidently. Participating in an accelerated program on Failure Mode and Effects Analysis (FMEA) and Statistical Process Control (SPC) has also enhanced my technical abilities, particularly in root cause analysis.

These experiences have prepared me to take on greater responsibilities and step outside my comfort zone.

What keeps me motivated is my commitment to learning and growth. I embrace a growth mindset, seeing every obstacle as an opportunity to improve. Reflecting on past experiences helps me tackle difficult situations and make meaningful progress. For me, success isn't defined by achievements alone but by the continuous journey of learning and evolving.

My role focuses on ensuring semiconductor chips meet high standards of reliability and durability, contributing to technologies in IoT, healthcare, and automotive industries. Knowing that my work plays a part in enriching lives around the world is deeply rewarding and fuels my desire to keep improving.

There's a saying that resonates with me: "Fear is useless and temporary, glory is forever." I remind myself—and aspiring engineers—that it's natural to feel uncertain, but those moments are temporary. Don't let fear hold you back. Focus on your goals, keep pushing forward and embrace the journey ahead.

The semiconductor industry is dynamic and impactful, offering countless opportunities to make a real difference. With hard work, dedication and a fearless mindset, the possibilities are limitless.

∖SSMC

(A Joint Venture of NXP and TSMC)

A DATA SCIENTIST'S VOYAGE AT TEL

Can you tell us a bit about your background and what drew you to a career in data science within the semiconductor industry?

Absolutely! I have a master's degree in industrial engineering and have dedicated the past 7 years of my career in the semiconductor manufacturing equipment industry. My passion for data analytics and machine

Wei Ke, *Data Scientist, Tokyo Electron Singapore*

learning was developed during this time, as I discover how valuable these tools can be used to solve real-world problems. I am fascinated by the crucial role that data plays in advancing technology, especially in the integration of these learning into optimizing our equipment.

When I relocated from Tokyo Electron Shanghai to Tokyo Electron Singapore in November 2023, I was thrilled to dive into the innovative projects we are tackling here locally. The company's strong focus on quality and innovation has inspired me to join a mission that continually pushes boundaries while addressing significant manufacturing challenges. Being part of something larger truly motivates me.

Can you share some of the exciting projects you've worked on at Tokyo Electron and how your role has evolved?

At Tokyo Electron, I've had the chance to work on several impactful projects that genuinely excite me, which I believe have been able to translate into tangible value for our customers. One notable example is the development of a deep-learning model for the image data output from an in-situ measurement tool. By leveraging the key data patterns extracted from the machine learning model, an effective early detection

signal was built to capture potential defects occurring during the etching process. This integration opens up numerous opportunities for enhancing machine performance, which makes me more excited about the future of smart equipment.

My role has evolved considerably over the years. Initially, I was focused primarily on data analysis, interpreting numbers and drawing conclusions. However, I've transitioned to a more collaborative position, working closely with engineers and software developers to ensure our solutions are both data-driven and practical for our customers' needs. This evolution has allowed me to contribute more meaningfully to our projects and our team believes that this will help to drive our company to be at the forefront of innovation in this rapidly evolving industry.

How does your team integrate machine learning technologies to address the smart manufacturing needs of your customers?

Our team takes a hands-on approach by incorporating advanced machine learning techniques on real-time data collected from our equipment. We collaborate closely with our customers, focusing on essential areas like early detection, predictive maintenance, proactive chamber matching, and yield improvement.

For instance, by using predictive analytics, we can spot potential equipment failures before they happen. This proactive strategy not only saves time but also significantly reduces downtime and enhances overall productivity—a win-win for everyone involved.

We also apply advanced analytics to get to the core of yield or defect issues more effectively. This collaborative effort is crucial, as it ensures that our solutions are practical and tailored to the specific needs of our customers. Whether we're improving existing tools or introducing new ones, this kind of close, pro-active team-work allows us to achieve better outcomes for the industry.

What challenges and opportunities do you see in advancing data science technologies specifically for semiconductor equipment?

Advancing data science in semiconductor equipment comes with its unique challenges and exciting opportunities. One major hurdle we face is the increasing complexity of semiconductor processes and the vast amounts of data our tools generate. Crafting customized algorithms that meet each customer's specific needs requires us to think creatively and remain flexible.

However, these challenges can also lead to even more exciting opportunities. By enhancing our data infrastructure, we can better leverage machine learning algorithms to transform our operations. A perfect illustration of this is predictive maintenance—by analyzing real-time data, we can predict equipment failures before they occur. This proactive approach allows us to minimize downtime, which is crucial in a fast-paced manufacturing environment.

Furthermore, as we implement more advanced algorithms, our equipment can become smarter by continuously learning and improving based on the data it collects. I genuinely believe these advancements can help us tackle challenges while delivering significant benefits to our customers.

From your perspective, what does the future hold for data science in the semiconductor equipment industry?

Looking ahead, I'm genuinely excited about the future of data science specifically in the semiconductor equipment industry! We're at a pivotal point where data science can fundamentally reshape our approach to manufacturing. As technology continues to evolve, the complexity and richness of the data we collect create incredible opportunities for innovation at TEL.

I envision a future where data science becomes the backbone of decision-making within our operations. Advanced algorithms will enable us to improve predictive analytics not only for maintenance but also for process optimization. Imagine a scenario where our equipment can learn from real-time data and historical trends to continuously enhance its performance and efficiency.

At TEL, I believe we'll see a rise in cross-disciplinary collaborations that integrate insights from various domains, helping us unlock new capabilities in semiconductor manufacturing and meet the ever-increasing demands of our customers. It's an exciting time to be a part of this landscape, and I can't wait to see how our collective work will drive innovation and efficiency in the industry.

What can you share with those interested in pursuing a career in data science or engineering in the semiconductor industry?

I'm deeply passionate about the work we do at TEL and how it shapes the future of technology, particularly in the realm of semiconductor equipment. I've seen firsthand how bringing together different perspectives leads to innovative solutions for real-world challenges. The spirit of collaboration—both within our team and with our industry partners—creates a welcoming environment where individuals from all backgrounds can contribute meaningfully to advancements in semiconductor technology.

This is an exciting time for anyone considering a career in the semiconductor industry in Singapore. The rapid growth of the sector offers a fertile ground for your engineering dreams to flourish, especially in data science roles that are crucial for enhancing equipment performance and efficiency.

Whether you're entering the field for the first time or looking to apply your existing skills in a new way, there are countless avenues to fulfill your passion. My experience at TEL has shown me the value of diverse voices in driving technological advancements. While the journey may present challenges, the rewards— like being able to use my data science knowledge/skills to contribute to develop innovative solutions to enhance the capability of semiconductor manufacturing equipment—are incredibly fulfilling. In view of this, I sincerely encourage more of you to take the plunge and explore the amazing opportunities that await you in this vibrant industry!

TEL

A PROCESS ENGINEER'S VOYAGE AT TEL

Lee Yu Zhen, *Process Engineer, Tokyo Electron Singapore*

Can you tell us a bit about your background and what drew you to a career as a process engineer within the semiconductor industry?

I graduated with a degree in Chemical Engineering from Nanyang Technological University, where I developed a strong foundation in process design and optimization. My career began in a biotech company, where I gained valuable experience in managing complex processes and problem-solving within a highly regulated environment. While I found this field rewarding, I was eager to challenge myself further and explore the fast-paced world of the semiconductor industry.

The semiconductor sector's focus on innovation and technology advancements intrigued me, as it constantly evolves with new materials and manufacturing techniques. I was drawn to the opportunity to apply my engineering skills to develop cutting-edge processes that drive productivity and efficiency. Transitioning into this industry has allowed me to leverage my background while embracing the complexity and dynamism that come with semiconductor manufacturing, aligning perfectly with my passion for continuous learning and improvement.

Can you share some of the exciting projects you've worked on at Tokyo Electron and how your role has evolved?

At Tokyo Electron, I've had the opportunity to work on several exciting projects that have significantly shaped my role as a process engineer. One of the most impactful projects I contributed to was an initiative for time reduction. This project involved analyzing and optimizing processes to minimize downtime, ultimately enhancing efficiency and productivity on the manufacturing floor. Collaborating with cross-functional teams, we developed an optimized time reduction project that resulted in substantial time savings with comparable output.

In addition to my technical responsibilities, I've also been actively involved in the company's social recreation committee Planning events such as Family Day and Dinner & Dance has allowed me to connect with colleagues outside of our typical work environment and foster a sense of community within the company. Through these activities, I've honed my organizational and leadership skills while promoting team bonding and employee engagement.

Overall, my role has evolved from a purely technical focus to a more holistic approach that encompasses both process improvement and team collaboration, equipping

Chinese New Year 2023
Furama Riverfront, 3 Feb

me with a well-rounded skill set to contribute to our workplace culture and operational excellence.

How does your team integrate machine learning technologies to address the smart manufacturing needs of your customers?

Our team integrates machine learning technologies to enhance smart manufacturing and improves operational efficiency through real-time data analysis and optimization of manufacturing processes. Additionally, we apply machine learning algorithms for the early detection of pin torque sensor anomaly behavior. This proactive approach allows us to identify and address problems before they escalate, ensuring consistent product quality and reducing downtime. By seamlessly incorporating these technologies, we effectively meet our customers' increasingly complex manufacturing needs while driving innovation and efficiency in their operations.

What challenges and opportunities do you see as a process engineer for semiconductor equipment?

As a process engineer in the semiconductor equipment industry, I face several challenges, such as the rapid pace of technological advancements and the need for continuous innovation to meet evolving customer demands. Additionally, managing the complexity of processes and ensuring equipment reliability can be quite demanding. However, these challenges also present significant opportunities. Advancements in automation and machine learning can enhance efficiency and yield, while the growing focus on sustainability opens avenues for developing eco-friendly processes. By embracing these challenges, I can contribute to innovative solutions, driving both personal and industry-wide growth in this dynamic field.

From your perspective, what does the future hold for process engineers in the semiconductor equipment industry?

The future for process engineers in the semiconductor equipment industry looks promising and dynamic. With the industry's rapid growth driven by advancements in technologies like AI, IoT, and 5G, process engineers will play a crucial role in optimizing complex manufacturing processes and enhancing equipment efficiency. Emphasis on sustainability and reducing environmental impact will also shape our work, leading to the development of greener manufacturing practices. As semiconductor devices become more sophisticated, process engineers will be essential in driving innovation and ensuring quality. Continuous learning and adaptation will be key, positioning us as vital contributors to the industry's evolving landscape.

What can you share with those interested in pursuing a career in engineering in the semiconductor industry?

For those interested in pursuing a career in engineering within the semiconductor industry, I recommend starting with a solid foundation in relevant disciplines such as materials science, electrical engineering, and chemical engineering. Understanding the intricacies of semiconductor physics and manufacturing processes is crucial.

Seek internships or co-op programs to gain hands-on experience, as practical application of your knowledge is invaluable. The semiconductor industry is constantly evolving, driven by technological advancements, so staying curious and committed to lifelong learning will be essential. Networking is equally important; connecting with professionals in the field can provide insights and mentorship opportunities.

Emphasize soft skills like teamwork, communication, and problem-solving, as these are vital in collaborative environments. Lastly, embrace challenges and be open to various career paths, whether in research and development, manufacturing, or quality assurance. The semiconductor industry offers numerous opportunities to make a significant impact, both technologically and environmentally, so pursue your passion with determination.

ENGINEERING EXCELLENCE:

FONG JOEE'S JOURNEY IN FACILITIES PROJECT MANAGEMENT

I'm Fong Joee, an Engineer in Facilities Project Management at United Test and Assembly Center Ltd (UTAC). I graduated with a Bachelor's Degree in Chemical Engineering and a Master's Degree in Safety, Health, and Environmental Technology from NUS. My role involves coordinating and overseeing various projects, identifying and mitigating risks, and ensuring compliance with safety and regulatory standards. Working closely with contractors, vendors, and cross-functional teams, I ensure projects meet our expectations for quality and performance.

Transitioning into Facilities Project Management from a background in Health and Safety was a challenge. Entering a new work environment and collaborating with a fresh team was initially overwhelming. However, with the unwavering support of my colleagues, the transition became

seamless. Their encouragement not only boosted my confidence but also helped me adapt and thrive in my new role. Along the way, I sharpened my skills in AutoCAD, Power BI, and Excel, enabling me to work more effectively on complex projects.

At UTAC, the work culture is defined by Unity, Trust, Accountability, and Communication. This nurturing environment has been instrumental in my professional development. My team has been a cornerstone of this journey, offering guidance and encouragement every step of the way. Their experience and approachability have made challenges more manageable and successes even more fulfilling.

One of the most valuable lessons I've learned is to approach tasks with an open mind and a willingness to ask questions. Realizing the wealth of

knowledge and expertise around me was a turning point, encouraging me to learn from my peers. For anyone stepping into a similar role, my advice is to embrace curiosity and seek guidance. No one expects you to know everything from the start, but a proactive attitude will set you on the path to success.

My supervisor has been an exceptional mentor, providing clear direction and constructive feedback that eased my transition into this role. Collaborating with colleagues has also shaped my growth, offering diverse perspectives that push me to think differently and refine my approach to problem-solving.

Working in the semiconductor industry has given me a deep appreciation for the complexity and innovation that drives this field. While my focus is on supporting back-end operations, I see the tangible impact of our work, from everyday gadgets to groundbreaking advancements in healthcare. The immense potential of this industry excites me, knowing that we contribute to technologies that shape lives around the world.

One of my most memorable projects was designing and building a deionized water plant. The process was incredibly complex, requiring meticulous planning and coordination. Seeing the project come together successfully was immensely rewarding, showcasing the importance of teamwork and precision in delivering impactful solutions.

Looking back, my experiences at UTAC have prepared me to tackle future opportunities with resilience and confidence. To future engineers, my advice is to stay adaptable and embrace learning. The semiconductor industry is brimming with potential, and being open to challenges will unlock countless opportunities for growth and success.

BUILDING EXPERTISE AND CONFIDENCE:

NUR SYAKIRAH SALLEH'S JOURNEY IN SEMICONDUCTORS

I'm Nur Syakirah Salleh, an Associate Engineer in Test Product Engineering at United Test and Assembly Center (UTAC). After graduating with a Diploma in Microelectronics and a Specialist Diploma in IC Assembly & Test from Temasek Polytechnic, I began my journey in the semiconductor industry. Over the past six years, I've developed skills and confidence while navigating both the front-end and back-end testing processes, starting in Final Test and later moving to Wafer Sort.

When I first started, it was challenging to transition from theory-based learning to real-world applications. Using multiple applications and portals daily, combined with a 12-hour shift schedule, felt overwhelming. However, I leaned on my peers and senior colleagues, whose guidance and encouragement made all the difference. With their support, I gained valuable hands-on experience, learning from mistakes and steadily improving my confidence. Along the way, I also picked up technical skills like basic UNIX commands and VBA coding, which have made my daily tasks more efficient.

The supportive work culture at UTAC has been instrumental in my growth. My colleagues are always open to sharing insights, ensuring nothing is overlooked, especially during shift changes. My superiors, too, have been understanding and encouraging, offering guidance on balancing responsibilities and motivating me to pursue further education. This environment has not only helped me grow professionally but also enabled me to take on leadership roles, such as becoming a Union Leader with the United Workers of Electronics & Electrical Industries (UWEEI).

As a Union Leader, I've gained knowledge on employment laws and workplace fairness through training and events, broadening my ability to support peers. I've also had the opportunity to connect with individuals from other electronics companies, exchanging insights to address workplace challenges. Joining the Young NTUC Committee has allowed me to give back to the community through volunteering and advocacy. None of this would have been possible without the unwavering support of my superiors and management.

One of my most memorable experiences was supporting engineering activities for a new account during my first year at UTAC. Qualifying and verifying multiple loadboards for production was a unique challenge that pushed me out of my comfort zone. Completing this task felt incredibly rewarding, as I knew my efforts directly contributed to production readiness.

Looking back, my time in the semiconductor industry has been both fulfilling and eye-opening. Working with devices whose end products range from cars to pacemakers has shown me the meaningful impact of my role. What excites me most about this field is its constant evolution and the opportunity to be part of an industry that achieves incredible advancements.

For those considering a similar path, my advice is simple: stay curious and be open to learning. Don't hesitate to ask questions or seek help—it's the best way to grow. Embrace challenges and step out of your comfort zone, as that's where the most valuable experiences and confidence are gained. The semiconductor industry offers endless opportunities, and with the right mindset, you can make a lasting impact.

CURIOSITY AND PERSISTENCY IS THE FOUNDATION OF ENGINEERING

A career in the semiconductor industry wasn't necessarily what my younger self envisioned, but after completing an internship at Advanced Micro Devices (AMD), I can confidently say I wouldn't trade the experience for anything.

I have always known that I wanted a career related to engineering and computers since young, but I was undecided as to the specific track as no particular field stood out to me. Even when I chose Electrical and Electronic Engineering (EEE) as my undergraduate programme, it was primarily for the versatility of the degree and the opportunities that it will open for me.

Before my internship, the semiconductor sector seemed safe and unassuming. It is fundamental to innovation and has applications in all aspects of technology – in fact, it is primarily this significance that attracted me to this career – but I don't associate the industry to anything beyond that.

Interning at AMD introduced me to a new perspective: the industry is truly cutting-edge. As the high performance and adaptive computing leader, AMD is uniquely positioned to power the significant demand for compute performance driven by AI with a broad portfolio of AI platforms and solutions from Cloud to Edge to Endpoints. I had the privilege of being mentored by the brilliant minds behind their products and joining a community of like-minded engineers dedicated to advancing the industry.

Growing on the fly

At AMD, my role centred around Automatic Test Equipment (ATE). These sophisticated systems and machines are crucial for automating the testing of our semiconductor products, such as computer chips, to ensure they meet our stringent quality standards. This technology is essential for verifying that our products perform as designed before they reach the end user, without which, the computer chips in our everyday electronic devices could fail to function properly.

I had to learn numerous new skills to proficiently operate, debug and write programs for ATE. These include coding in programming languages I have never used before such as Ruby, Perl and Bash, as well as operating in a Unix environment.

Two memorable aspects of my time at AMD stood out to me upon reflection. Firstly, I had several opportunities to head down to the test floor to operate and test the hardware that I've helped debug firsthand. While it did not occur to me at the start of the project, by the time I had to return my lab equipment at the end of my internship, it represented something bigger to me – it was the culmination of my hard work over the past few months, and a tangible affirmation of my contribution to the project.

Another vivid memory I have is the feeling of being overwhelmed at the start of my internship due to the extensive technical jargon used daily. However, I took the initiative to compile a comprehensive list of industry terms, their definitions, and contextual usage. This effort allowed me to gradually understand the scope of our work, its purpose, and our methodologies. I am deeply appreciative

of my co-workers, who, despite their busy schedules, generously took the time to guide and mentor me.

What's next?

For me, the internship with AMD was everything I could have hoped for and more. It was a challenging period of growth, but I enjoyed every second of it.

Beyond the skills I acquired and the people I met, I also developed two key traits that I am confident will serve me well in the future. The first is a genuine curiosity for the technology being developed, and the second is a persistent attitude towards continuous learning and problem-solving. While some may call this the "engineering mindset", I believe it applies to all aspects of life, not just our daily work.

I consider myself fortunate to have been part of AMD, and I strive to pay forward the kindness my colleagues have shown me to my juniors. I look forward to returning to the company after completing my undergraduate programme and contributing to the advancement of the local semiconductor industry.

AMD

Attributed to, **Chia Xin Rui**
SgIS Recipient

AN AMD ENGINEER'S PERSPECTIVE ON THE IMPORTANCE OF LIFELONG LEARNING AND MENTORSHIP

"I just had a great curiosity about how things worked." This quote from the CEO of AMD, Lisa Su, deeply resonated with me the first time I heard it, and it has since become the driving force behind my personal and professional development. I have always been fascinated by how things work, which is a key reason that led me down the path to becoming a young engineer in the semiconductor industry.

I find the pivotal role of semiconductors in driving meaningful change across all aspects of our lives truly inspiring. Although semiconductor chips and devices may appear unassuming, they serve as the foundational building blocks powering groundbreaking technologies that enhance our lives and advance humanity. This is in addition

to the ongoing race against Moore's Law, which has presented its fair share of challenges and opportunities within the industry. The progress we have collectively achieved in this space is nothing short of amazing.

Growth through AMD

I was fortunate enough to land a role as a failure analysis engineer in the device analysis lab at AMD Singapore shortly after graduating from the National University of Singapore (NUS). As a Chemistry major with a love for science and analytical thinking, becoming a failure analysis engineer was the perfect fit for me.

Our lab is equipped with cutting-edge technology and the necessary resources to analyse all AMD products effectively. It was up to me to fully leverage these assets to fulfil my role. Thankfully, my experiences in forensic science prepared me well for the investigative aspects of failure analysis. Over time, I honed my skills in using a variety of techniques, including optical microscopes, scanning electron microscopes, X-ray machines, and thermal cameras.

In addition to my technical development, I was also given the opportunity to participate in various programmes that AMD offers to employees to help them learn and grow further. I was part of the industrial placement programme (IPP) arranged by AMD in collaboration with the Economic Development Board. The programme allows employees to work with university academics while providing them with postgraduate conferment.

Through the IPP, my AMD colleagues and I worked on graduate projects in materials preparation, simulation work for product reliability, and innovative machine-learning

solutions. I was fortunate to contribute my work to technical conferences like the International Symposium on the Physical and Failure Analysis of Integrated Circuits and the Electronics Packaging Technology Conference organised by the Institute of Electrical and Electronics Engineers. These initiatives empower employees and have a profoundly positive influence on both the quality of work and the overall company culture. I will always be grateful to the company for investing in AMDers to embrace lifelong learning.

Empowering growth in other AMDers

Mentoring and onboarding interns at AMD is one of my favourite extracurricular activities. The company places a strong emphasis on nurturing local talent in the STEM field. We believe in placing AMD technology in the hands of the next generation so that the best and brightest minds can solve the world's biggest problems for a better tomorrow.

I am part of a committee at AMD known internally as the Talent Orientation Network (TALON), where we connect with interns and ensure they have a fruitful experience at the company. Being a mentor to the interns has been incredibly fulfilling. I not only guide them on the technical aspects of the job but also have the special privilege of supporting them with their career planning. Working with them has taught me a lot and reinvigorated my enthusiasm and passion for this industry. I am proud of the work we do at TALON, and it is always heartening to see the juniors respond positively and express interest in returning to AMD.

My positive experience with TALON inspired me to join another mentorship programme initiated by the NUS Faculty of Science. I hope my journey can serve as a blueprint for my juniors, helping them carve their own paths in the industry. With the extensive resources available, I am confident that the future is bright for young engineers, regardless of their background. They will undoubtedly be equipped to overcome the challenges posed by this rapidly advancing field.

AMD

Attributed to, **Tang Wai Kit**
Senior Product Development Engineer (Device Analysis), AMD

GREENPAC EXPANDS ITS
FACILITY IN PENANG:

ELEVATING SUSTAINABLE PACKAGING SOLUTIONS IN SOUTHEAST ASIA

Greenpac, Southeast Asia's leading sustainable total packaging solutions provider, has expanded its facility in Penang to better serve the growing semiconductor industry. Greenpac has been operating in Malaysia since 1999, with an existing 280,000 square feet facility in Pasir Gudang, Johor. This strategic expansion up north in Penang further solidifies the company's commitment to serving Southeast Asia's growing manufacturing landscape while reinforcing its position as a trusted partner for innovative and sustainable total packaging solutions.

Boosting Penang's Economic Landscape

The decision to invest in Penang is rooted in the region's dynamic industrial ecosystem and strategic location. Known as the "Silicon Valley of the East", Penang is a thriving hub for semiconductor and electronics manufacturing, making it an ideal strategic location for Greenpac, whose clients are mainly manufacturers of sensitive and high-value equipment. Their investment will contribute to Penang's economy by fostering growth in adjacent sectors and boosting regional trade. Chika Imakita, CEO of Greenpac, stated, "The expansion of Greenpac's facility in Penang underscores our commitment to delivering innovative, sustainable, and value-driven total packaging solutions across Southeast Asia."

Strengthening the Semiconductor ecosystem

The expansion is made possible through robust partnerships with the relevant government bodies and industry associations. These collaborations aim to strengthen semiconductor ecosystem as Penang continues to attract primary investments. Greenpac's focus on eco-friendly packaging aligns with Malaysia's broader sustainability goals, fostering a synergy that benefits all stakeholders. This is to create a vibrant and sustainable ecosystem to support the industry This expansion not only supports the semiconductor industry but also contributes to creating a vibrant and sustainable ecosystem that supports the industry's long-term growth.

Enhancing Customer Engagement

Greenpac's entry into Penang enables the company to engage more closely with its customers in the region. By offering bespoke packaging solutions tailored to the needs of semiconductor manufacturers, Greenpac's localisation in Penang ensures reduced supply chain complexities and enhanced operational efficiency for its clients. This proximity allows Greenpac to respond more swiftly to customer needs, provide customised service, and build stronger relationships with its clients. The expansion also

facilitates better collaboration and innovation, ensuring that Greenpac remains at the forefront of the packaging industry.

Competitive Market Positioning

In a highly competitive packaging landscape, Greenpac distinguishes itself through innovation, sustainability, and customer-centricity. The Penang facility enhances the company's ability to deliver cutting-edge solutions while reinforcing its commitment to environmental stewardship. As a result, Greenpac is poised to solidify its leadership position in Southeast Asia, offering unparalleled value to its diverse clientele. By continuously investing in advanced technologies and sustainable practices, Greenpac ensures that it remains a preferred partner for businesses seeking reliable and eco-friendly packaging solutions.

A Vision for the Future

Greenpac's expansion into Penang marks a significant milestone in its journey towards becoming a global leader in total packaging solutions. By combining economic impact, job creation, and sustainable practices, Greenpac is not only contributing to the region's growth but also setting new benchmarks for the industry.

As Greenpac embarks on this exciting new chapter, it reaffirms its dedication to innovation and excellence, ensuring a brighter, more sustainable future for packaging in Southeast Asia.

THE QUEST FOR PROFESSIONAL PURPOSE

How an MBA internship at Henkel led me from finance and consulting to sustainability.

Mukesh Reddy

Singapore Management University MBA Candidate and Henkel Intern

My journey from auditing and consulting to sustainability was a professional shift and a profound personal transformation. I was proficient in auditing, regulations, and consulting, but these roles didn't fulfill my longing to dedicate my days to projects that would make a tangible and lasting difference. After earning a finance degree, working at my family accountancy business in Bangalore, India, and then in risk consulting for Big 4 firms, I decided to pursue my MBA and secure an internship where I could deliver meaningful impact. This led me to Henkel's Adhesive Technologies Electronics business, where I supported the group's sustainability initiatives. The experience was more than just a career move; it was a discovery of my professional purpose in promoting human flourishing through climate, safety, and natural resource preservation.

During my eight months at Henkel, I focused on two markets -- semiconductor and consumer devices -- across four categories: customer engagement, market competitiveness, staff upskilling, and portfolio analysis. Evaluating customers' sustainability priorities and discovering how Henkel can help them achieve specific objectives through its product portfolio was a fascinating part of my work. I also engaged with internal teams to communicate Henkel's progress in satisfying specific sustainability initiatives like right-to-repair and responsible chemistry. Finally, I participated in a large project to reclassify the company's chemicals portfolio to analyze each product's sustainability score. Aspects such as the percentage of renewable raw materials used in formulation, health and safety characteristics, and energy-efficiency properties such as curing mechanisms or production emissions were identified.

One of the most enriching parts of my time at Henkel was the exposure to global interactions. In my previous roles, I was accustomed to working with colleagues and customers within a specific region. However, at Henkel, I had the opportunity to collaborate with teams across different functional roles in multiple countries. This experience was not just eye-opening, but also crucial for my international business ambitions. I also deeply value Henkel's commitment to inclusion and its emphasis on work-life balance, both of which are integral to a healthy corporate culture and the attraction and retention of top talent.

The opportunity at Henkel has been more than just a stepping stone in my career; it has been a launch pad into the world of sustainability strategy. I am grateful to the company for exposing me to such meaningful work and the invaluable experiences I gained there. I have now transitioned to another sustainability internship, this time supporting BMW's e-mobility business. With my MBA graduation on the horizon, I am eager to apply my problem-solving and critical thinking skills in a professional sustainability role. The journey has just begun, and I am excited about the future!

FROM ACADEMICS TO APPLICATION:

HENKEL SEMICONDUCTOR ENGINEERING INTERN GAINS PRACTICAL PERSPECTIVE

Chemical Engineering Master's student Shengyuan Tai has spent the last five years studying chemistry. She knows the periodic table, thermodynamics and fluid mechanics principles, chemical reaction kinetics, and more. However, applying this knowledge in a practical sense was essential to Shengyuan's desire to become an Application Engineer. Her recent internship at Henkel's Adhesive Technologies Electronics business in Singapore proved to be the right formula to advance her career ambition.

"While I appreciate the science of chemistry, what I really enjoy is application and analysis work," shares Shengyuan, who has spent considerable time in Henkel's state-of-the-art lab during her internship tenure. "Semiconductor applications are especially interesting to me, and through my work at Henkel, I've honed my materials testing skills to better understand die attach quality and reliability standards compliance. It's exciting to work with technologies vital to our modern way of life."

Mentored by experienced Henkel Application Engineers, Shengyuan has learned how to conduct advanced materials testing procedures specific to die attach adhesives, including bond line thickness (BLT), resin bleed out (RBO), viscosity, die shear strength, and thermogravimetric analysis (TMA). The company's application laboratory houses some of the industry's most advanced quality analysis tools and gaining knowledge about how to properly prepare testing samples, use the equipment, and analyze data is invaluable.

"When I complete my master's degree at the National University of Singapore, I can enter the workforce with a high level of confidence, knowing that I understand not just the science but also have experience assessing customer expectations and delivering the reporting data they require. I am grateful to have had the opportunity to intern with such a consequential semiconductor materials company. The Henkel staff has been helpful and welcoming, and my immediate supervisors were knowledgeable and patient. I believe there is no substitute for hands-on training and apprenticeship."

Shengyuan completed her Henkel internship in December 2024 and will graduate with a master's in chemical engineering this Spring. She looks forward to pursuing an Application Engineering career in the semiconductor field. Her journey is a testament to the transformative power of practical experience and the potential it holds for shaping future careers.

Henkel has a long history of investing in workforce development and nurturing young talent that will impact the industries it serves. This is true across all businesses within Henkel, where many of the company's interns have ultimately become its employees. For more information about internship opportunities at Henkel, visit:

www.henkel.com/careers/students-graduates

NIGEL'S INTERNSHIP JOURNEY

I'm Nigel Leung, a Chemical Engineering student currently interning as a Wafer Fabrication Engineering Intern at HP Inc. My role involves analyzing wafer fabrication machine performance, improving machine parameter monitoring, identifying wafer defects, and running wafers. These responsibilities have given me a hands-on introduction to the intricate world of semiconductor manufacturing.
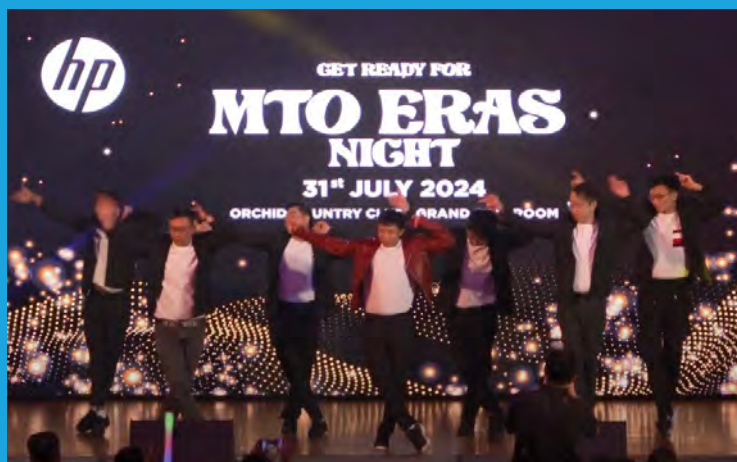
When I first joined HP, the steep learning curve of wafer fabrication felt daunting. There were countless unfamiliar terms and processes, and I had no experience with the complex machinery involved. Fortunately, the engineers on my team were incredibly supportive. They not only explained the sophisticated capabilities of the machines but also allowed me to work with them directly. This hands-on experience transformed what seemed overwhelming into an exciting challenge, like assembling a complex Lego set. Through this, I've come to appreciate the intricacy of creating advanced technology.

The collaborative work culture at HP has been a key part of my learning. Wafer fabrication involves a multitude of machines and processes, making teamwork essential. Whether analyzing wafer defects or discussing machine performance data, meaningful discussions and sharing perspectives with my team have been vital. I've learned to voice my opinions and approach problems with precision and supporting data, a necessity in this detail-oriented, data-driven field. What initially felt intimidating turned into inspiration as I observed how knowledgeable and quick-thinking my colleagues were. Their support and willingness to arrange personal sharing sessions for me have been instrumental in my growth.

One of the most valuable lessons I've learned is the importance of being adaptable and stepping out of my comfort zone. During an All Employee Meeting, our vice president emphasized the significance of acquiring diverse skills outside of one's immediate role—such as a photolithography engineer learning about business finance. This advice motivated me to connect with colleagues from other departments, gaining insights that helped me approach my projects more effectively. For instance, I developed a PowerBI dashboard to analyze wafer fabrication performance data. Initially, it was challenging to create relevant insights for engineers and managers, but with feedback and collaboration, I succeeded. The dashboard even caught the attention of our overseas counterparts, marking a milestone in my internship.

Looking back, one of my most memorable moments was presenting my first machine performance analysis to supervisors and managers. It was nerve-wracking yet exciting to contribute something meaningful. Unlike university presentations, I had to carefully determine what information was essential for the audience. The positive reception and follow-up discussions made me feel like I had transitioned from a novice to a contributing member of the team.

My time at HP has equipped me with technical skills like PowerBI, SQL, and Python, as well as hands-on experience with complex machinery. But more importantly, I've learned the value of teamwork and communication in achieving objectives. To anyone considering this path, I'd say be adventurous, proactive, and open to new challenges. The semiconductor industry is full of opportunities to learn and grow, and it's incredibly rewarding to be part of an industry that drives technological innovation.

TIO GUO YONG'S INTERNSHIP JOURNEY AT HP
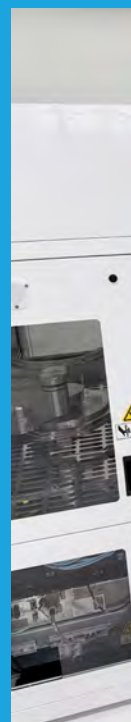
I am Tio Guo Yong, a Year 4 Data Science & Artificial Intelligence (DSAI) student from NTU and a Data Scientist Intern at HP Inc. My internship, part of my Work-Study Degree Programme, has been a transformative experience. Since May 2023, I have worked on various smart manufacturing projects, leveraging data analytics and artificial intelligence to enhance efficiency and problem-solving processes in semiconductor manufacturing.

In my first phase, I developed a manufacturing data dashboard using Python for improved process monitoring. This dashboard was quickly adopted by the engineering team. Building on this foundation, I enhanced the dashboard in phase two by adding metrics such as yield and defect tracking, benefiting manufacturing sites across Southeast Asia and the US. Currently, in phase three, I am proposing the use of Generative AI combined with data visualization to improve root-cause analysis and provide actionable recommendations for quality improvement.

The journey has not been without its challenges. One of the toughest was integrating Generative AI with the existing dashboard, particularly given the compute power limitations. To overcome this, I had to explore new Python and JavaScript libraries while delving into prompt engineering—a skill I had never used before. With guidance from my HP Data Analytics team and my NTU faculty supervisor, I navigated these challenges and developed a proof-of-concept that demonstrated the potential of GenAI for troubleshooting.

The work culture at HP has been a cornerstone of my growth. Collaborative and supportive, the team emphasizes collective ownership of complex problems. My mentor and manager have been particularly inspiring, consistently encouraging me to seek feedback and take ownership of my projects. By engaging team members to understand their concerns, I was able to refine my solutions, making tools like the dashboard more impactful for multiple stakeholders.

One memorable moment was presenting my manufacturing dashboard and GenAI projects to higher management and teams. Initially, I hesitated to showcase the incomplete GenAI project, but my manager's advice to seek feedback paid off. Their input helped secure the compute power I needed for further development and validated my efforts in a tangible way. These experiences underscored the value of collaboration and feedback in driving meaningful improvements.

My internship has shaped my perspective on the semiconductor industry, particularly in how data and AI are transforming manufacturing. Singapore, as a key semiconductor hub, has significant potential to harness AI for productivity gains in high-volume manufacturing. My projects have deepened my understanding of the "three V's" of big data: volume, variety, and value, and how to translate them into actionable insights.

To future data scientists, my advice is to approach this field with curiosity and a growth mindset. Engage proactively with stakeholders, seek feedback, and align your solutions with real-world needs. Taking ownership of your projects not only enhances your technical skills but also equips you with the management expertise needed to thrive in this ever-evolving industry.

FROM APPRENTICESHIP TO EXCELLENCE:

IMAN'S SEMICONDUCTOR JOURNEY AT STMICROELECTRONICS

MUHAMMAD NUR'IMAN BIN BADRUL HESHAM

Bronze Medal
Diploma in Microelectronics

ST STudent World Tour
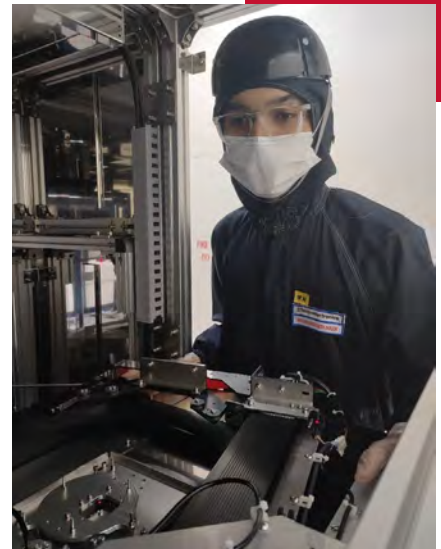
Hello! I am Iman, a proud graduate of ITE's Work-Study Diploma (WSDip) in Microelectronics, a 2.5-year apprenticeship-based program. My journey began with a Higher Nitec in Electronics Engineering in 2018, and I eventually joined STMicroelectronics as a technician during my WSDip course. Today, I am an Assistant Equipment Engineer in the Defectivity and Metrology department, where I service and troubleshoot advanced machinery.

Before pursuing the WSDip program, I worked in a semiconductor-related role specializing in laser products. This experience ignited my fascination with the intricate and innovative world of semiconductors. However, I was unsure whether I'd enjoy this path when I first started. That changed the moment I looked into a microscope and glimpsed the "micro world"—an incredible miniature working environment that sparked joy and curiosity. Combined with learning about the semiconductor industry's booming potential, I realized I had found my calling.

Learning and Overcoming Challenges

One of the most significant challenges I faced during my engineering studies was coding. Projects often hit roadblocks due to coding errors, requiring patience and persistence to resolve. My strategy was to dive deeply into understanding coding logic, ensuring I could identify and fix issues effectively.

I'm particularly excited about the integration of AI in semiconductor manufacturing. My company is tapping into AI to address quality issues from wafer defects, and I had the opportunity to work with the AI team on one such project. It was an eye-opening experience that broadened my understanding of emerging technologies and their transformative potential.

Work Culture and Collaboration

I am fascinated by the cleanroom work culture at STMicroelectronics. From the meticulous attire to the high standards required for maintaining a contaminant-free environment, every detail reflects the semiconductor industry's commitment to excellence. This attention to precision and discipline aligns perfectly with my own work ethic.

Collaboration with peers and mentors has been incredibly rewarding. Sharing technical knowledge and working on team projects foster a sense of camaraderie, and I enjoy contributing to this collaborative spirit by mentoring junior team members.

Memorable Moments and Key Lessons

A defining moment in my journey was receiving the bronze course medal at my WSDip graduation ceremony. This medal symbolizes how far I've come, from being uncertain about my future to standing on stage with a sense of pride and accomplishment. It reminds me that determination and hard work can open doors to incredible opportunities.

A valuable lesson I've learned is to "Learn, Unlearn, and Re-learn." Technology evolves rapidly, and staying adaptable is crucial. I also keep a favorite quote close to my heart: "A crazy idea today might not be a crazy one tomorrow." This mindset fuels my creativity and willingness to embrace new challenges.

Looking Ahead

The semiconductor industry's fast-paced evolution excites me. From machine upgrades to new installations, every project offers a chance to learn and grow. I am preparing to pursue a degree at a local university to deepen my expertise and advance my career.

To fellow students considering this field, my advice is simple: embrace mentorship and seize every opportunity to learn. The semiconductor industry holds immense potential to shape the future, offering a dynamic and rewarding career path for those ready to embark on the journey.

ITE

Institute of Technical Education

LIM ZHENG YANG'S JOURNEY IN SEMICONDUCTOR ENGINEERING AT GLOBALFOUNDRIES

Zheng Yang (on right) has been equipped with a foundation in semiconductor technology through the WSDip programme.

Zheng Yang (middle) is well-mentored at GF.

I am Lim Zheng Yang, a senior technician at GlobalFoundries (GF) currently enrolled in ITE's Work-Study Diploma (WSDip) in Microelectronics. My journey into the semiconductor industry began during my internship at GF while pursuing my Nitec studies. Witnessing how tiny chips drive groundbreaking innovations fascinated me and inspired me to pursue a career in this field.

After completing my National Service, I joined GF as an equipment technician. Encouraged by my supervisor, I enrolled in the WSDip programme in 2023, an opportunity that has been transformative. Through this programme, I've been able to upgrade my skills and contribute meaningfully to an industry that positively impacts the world. Knowing the value of my work motivates me to give my best every day.

Overcoming Challenges and Expanding Knowledge

Integrating theoretical concepts with real-world applications has been one of my biggest challenges. Concepts like manufacturing processes, process optimisation, and data analysis often felt abstract until I applied them in practical settings. By actively using what I've learned at work and discussing my progress with mentors and supervisors, I've been able to bridge this gap effectively.

One area I'm particularly excited about is using machine learning models to predict semiconductor manufacturing equipment failures. These tools provide valuable insights that can reduce manufacturing downtime and improve efficiency, which is crucial in a fast-paced industry like semiconductors. Exploring this emerging technology has deepened my understanding of its potential to revolutionise production processes.

A Culture of Innovation and Teamwork

What draws me to the semiconductor industry is its relentless pursuit of process innovation and improvement. This field requires continuous learning, critical thinking, and creative problem-solving. Working in such an environment has strengthened my problem-solving skills and technical expertise, enabling me to contribute effectively to cross-functional teams.

At GF, I've been fortunate to collaborate with peers and mentors who value open communication and teamwork. My supervisor, Amon Tan, has been an unwavering source of support. His guidance has helped me navigate complex challenges, such as optimising film deposition process parameters. His advice "It's okay not knowing everything;

what matters more is the willingness to learn" has stuck with me and shaped my approach to learning and growth.

Key Takeaways and Memorable Moments

A valuable lesson I've learned is the importance of adaptability and flexibility when facing challenges. Whether it's adjusting to shifting project deadlines, navigating team dynamics, or addressing unexpected complexities, adaptability has been key to overcoming obstacles. Developing my own workflows has helped me prioritise tasks and manage my time more effectively while balancing work, school, and personal life.

One of my most memorable experiences was working on a DRAM fabrication team project during the WSDip programme. Completing the project and seeing our hard work pay off was incredibly rewarding, giving me a sense of pride and confidence to tackle future challenges. This experience reinforced the value of teamwork and perseverance, demonstrating that progress often comes through collaboration and learning from mistakes.

Looking Ahead

My studies and experiences have prepared me for a fulfilling career in the semiconductor industry. The WSDip programme has equipped me with a solid foundation in semiconductor technology, deepening my technical knowledge and problem-solving skills while strengthening my ability to work effectively in teams.

For students considering a career in this field, I encourage you to embrace mentorship and actively seek opportunities to learn from experienced professionals. Mentors provide invaluable guidance, share practical insights, and help you navigate your career path. By staying curious, proactive, and eager to learn, you can unlock incredible opportunities in this dynamic and impactful industry.

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FROM CURIOSITY TO INNOVATION:

ANN LEM WEY EN'S ASPIRATIONS IN THE SEMICONDUCTOR INDUSTRY
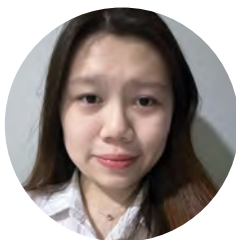
I am Ann Lem Wey En, a third-year Diploma in Electronic & Computer Engineering student at Ngee Ann Polytechnic. My journey into the semiconductor industry began with a curiosity about its vital role in modern technology. Semiconductors form the backbone of nearly every electronic device, driving breakthroughs in areas like smart cities, automation, and sustainability. The industry's potential to inspire innovation and shape the future of technology fascinates me.

This interest first sparked during my school lab sessions, where I worked with equipment incorporating semiconductor technology. Although I didn't fully understand their significance at the time, these experiences ignited my curiosity. Ngee Ann Polytechnic further deepened this interest through opportunities like A*STAR's Research and Development Camp, where hands-on exposure to semiconductor fabrication processes gave me a deeper appreciation for their role in advancing technology. Events such as SSIA's Semiconductor Awareness Day and Electronics Day also provided valuable insights into career opportunities within this dynamic field.

Semiconductors are key to shaping the future of technology and innovation. They enable devices to become faster, smaller, and more energy-efficient, meeting the growing demand for compact, high-performance electronics. As an electronics student, I've found circuit design skills particularly relevant. These skills are essential for creating innovative semiconductor devices, ensuring they are energy-efficient while delivering optimal performance—qualities that are critical in today's fast-evolving tech landscape.

The prospect of contributing to advancements in semiconductor technology excites me because of its potential to solve real-world challenges. For example, energy-efficient semiconductors can drive sustainable technologies, reducing environmental impact and fostering a cleaner, healthier planet for future generations. Semiconductors also power transformative fields like AI and 5G, enabling smarter solutions and building more inclusive communities. I am inspired by the opportunity to make a meaningful impact through these advancements.

If given the chance to work on a groundbreaking semiconductor project, I would focus on designing low-power, high-performance semiconductors for energy-efficient applications such as renewable energy systems and electric vehicles. These innovations could significantly improve energy efficiency and accelerate the adoption of green technologies. My goal would be to contribute to a more sustainable future where semiconductors play a pivotal role in reducing environmental impact and supporting global sustainability efforts.

Mentorship has been instrumental in shaping my journey, especially through the guidance of my lecturers. They have equipped me with both theoretical knowledge and practical experience, bridging the gap between classroom learning and real-world applications. Beyond academic support, they've provided industry exposure through projects, events, and collaborations, deepening my passion for the field. The qualities I value most in a mentor include a willingness to share their experiences and expertise, the ability to provide honest and constructive feedback, and a passion for inspiring others to explore new possibilities. Such guidance accelerates learning, fosters personal growth, and fuels a deeper commitment to pursuing excellence in the semiconductor industry.

As I look to the future, I am excited about the opportunities to contribute to this innovative field. The semiconductor industry's continuous evolution and its potential to shape technologies that improve lives inspire me to push boundaries and embrace challenges. With determination and curiosity, I am eager to be part of the journey toward a smarter, more sustainable world.

ngee ann polytechnic

MERGING MACHINE LEARNING AND
SEMICONDUCTORS:

ADITYA SIVADAS'S VISION FOR INNOVATION

I am Aditya Sivadas (EEE, Batch of 2022), and the semiconductor industry first caught my attention during SSIA's Semiconductor Awareness Day. Listening to industry experts share insights into the life of an engineer and the sector's multi-disciplinary nature opened my eyes to the possibilities. As someone passionate about Machine Learning and Artificial Intelligence, I was drawn to the idea of applying these skills to semiconductors. Understanding how these devices accelerate the development of Machine Learning models created a unique niche where I could contribute meaningfully.

Semiconductors are at the heart of innovation. They serve as the building blocks of modern technology, powering everything from smartphones to advanced AI systems. Their role in driving economic growth became especially clear during the COVID-19 pandemic, when a sudden surge in demand for smart devices led to a semiconductor shortage. This highlighted the industry's critical importance not only in advancing AI and 5G technologies but also in making devices more cost-effective and sustainable. Semiconductors are the catalyst for progress in any field that requires processing power, making their continuous development essential to shaping the future of technology.

As an Electrical and Electronic Engineering (EEE) student, I've found that a strong foundation in technical fundamentals is crucial for making an impact. Understanding Circuit Analysis, Digital Electronics, and Semiconductor Fundamentals has been instrumental in preparing me for a career in this field. Equally important is the ability to integrate software applications, such as Machine Learning models, into workflows. Beyond technical knowledge, maintaining a growth mindset and embracing new challenges are key soft skills that drive innovation and ensure competitiveness in this fast-evolving industry.

The prospect of contributing to advancements in semiconductor technology excites me immensely. I often wonder what it felt like to witness the rise of the internet in the 1990s, as people began to grasp its transformative potential. Today, I see parallels in how semiconductors and AI are revolutionizing industries. The idea of being part of a generation developing the "brain" (semiconductors) and the "intelligence" (AI) behind future technologies is incredibly inspiring. I aspire to help create innovations that enhance processing speed and efficiency, breathing life into industries that rely on these advancements while avoiding stagnation like the AI winter.

If given the opportunity, I would focus on improving the semiconductor manufacturing workflow. The current processes are environmentally taxing and costly. My goal would be to enhance the reliability and sustainability of manufacturing, making production more efficient and reducing costs. This would ultimately make devices more accessible and affordable for everyone, amplifying the industry's impact on global progress.

Mentorship has played a pivotal role in shaping my journey. Before joining NTU's EEE program, I was set on a software-focused career in Machine Learning and Data Analytics. However, the Semiconductor Fundamentals class rekindled my passion for physics and showed me how foundational technology enables today's smart devices. Professors who taught the course inspired me to merge my interests in Machine Learning and semiconductors. A great mentor, in my view, is someone who inspires new ways of thinking, nurtures a passion for foundational technology, and drives innovation by anticipating future industry needs.

Looking ahead, I am excited to contribute to the semiconductor industry's evolution. The opportunities to merge cutting-edge Machine Learning applications with semiconductor advancements are endless. By embracing challenges, seeking mentorship, and maintaining curiosity, I am confident that this field will offer me the chance to make a lasting impact on technology and society.

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Electrical and Electronic Engineering College of Engineering

DRIVING INNOVATION:

MY ASPIRATION IN THE SEMICONDUCTOR INDUSTRY

By, **Peng Yalin**

Electrical Engineering Year 3 Student, Specialisation in Advanced Electronics

The semiconductor industry fascinates me because it forms the foundation of nearly all modern technology. From smartphones to supercomputers, small silicon chips have the power to transform how we live and work. The field is dynamic and energetic, constantly evolving in materials and processing methods, and making a profound impact in areas like AI, healthcare, and energy. My interest in this industry was sparked during a Year 1 career fair, where companies like Micron demonstrated semiconductor technologies such as silicon wafers. Seeing these innovations up close ignited my passion and set me on the path to pursue a career in this exciting field.

Semiconductors are vital to shaping the future of technology and innovation. They provide the processing power and efficiency necessary for transformative advancements. From AI and IoT to sustainable energy solutions, semiconductors drive progress across a broad spectrum of applications. For instance, they enable immense computational power for machine learning algorithms, create the infrastructure for high-speed 5G connectivity, and make green energy solutions like solar power and electric vehicles more efficient and accessible. Their role in addressing critical global challenges underscores their importance in reshaping industries and improving lives.

As an Electrical and Electronic Engineering (EEE) student, I've developed skills and knowledge that are highly relevant to a career in semiconductors. Problem-solving and logical thinking have been essential, whether designing circuits or optimizing processes. A solid grasp of semiconductor physics, including concepts like doping, energy band theory, and electron behavior, has provided the theoretical foundation for designing and improving devices. Hands-on experience with electronics, such as circuit design, debugging, and working with semiconductor devices like transistors, has allowed me to translate theory into practical applications. Equally important is collaboration, as semiconductor projects often require interdisciplinary teamwork and effective communication across diverse backgrounds.

The prospect of contributing to advancements in AI, 5G, and green energy through semiconductor technology excites me greatly. These areas have the potential to reshape how we live, work, and interact with the world. Semiconductors make AI more efficient and accessible, enabling faster processing and more capable machine learning algorithms. For 5G, they are critical to building high-speed, low-latency connectivity infrastructure. Additionally, they play a pivotal role in making green energy solutions more affordable and efficient, reducing reliance on fossil fuels and combating climate change.

If given the opportunity, I would focus on advanced multichip integration and 3D semiconductor packaging. This innovative area integrates multiple chips vertically or within compact packages, significantly enhancing performance and efficiency while reducing device footprints. Such advancements could lead to better heat dissipation, faster data transfer, and lower power consumption. By contributing to this field, I hope to enable breakthroughs in AI, high-performance computing, and IoT, advancing smarter and more sustainable technologies.

Mentorship has been instrumental in my semiconductor journey. As a student at NUS and an SSIA Semiconductor Youth Ambassador, I've had the privilege of receiving guidance from many mentors who have refined my technical understanding and provided invaluable insights into industry trends and career pathways. The qualities I value most in a mentor include expertise, a supportive nature, and a long-term vision. An ideal mentor not only shares technical knowledge and industry wisdom but also offers constructive feedback and fosters a trusting relationship. They inspire growth and help me think strategically about my career, encouraging me to consider the broader implications of my work.

The semiconductor industry's potential to drive transformative change motivates me to pursue this career path with dedication and curiosity. By contributing to advancements in this field, I hope to be part of shaping a future defined by innovation, sustainability, and connectivity.

By, **Raymand Tey Jia Cheng**

Electrical Engineering Year 3 Student, Specialisation in Advanced Electronics

The semiconductor industry captivates me with its critical role as the backbone of modern innovation. It's fascinating how tiny silicon chips power transformative technologies like AI and green energy, reshaping industries and daily life. The field's dynamic nature—with constant advancements in materials, processes, and applications—motivates me to keep learning and contribute to its progress. My first exposure to this field was during junior college through the H3 Semiconductor Physics and Devices course. This introduction to the fundamental physics and wide-ranging applications of semiconductors sparked my curiosity and showed me how these intricate components enable groundbreaking innovations.

Semiconductors are indispensable in shaping the future of technology. They are the foundation for transformative innovations like AI, 5G, and IoT, which are redefining industries and everyday experiences. They also drive progress in green energy solutions, such as renewable energy systems and electric vehicles, empowering us to address critical global challenges. The prospect of being part of this essential and impactful industry excites me immensely.

As an Electrical and Electronic Engineering (EEE) student, I've developed skills and gained knowledge that are highly relevant to a career in semiconductors. Through the NUS Innovation & Design Programme, I collaborated with students from diverse engineering disciplines to tackle complex, multidisciplinary projects. This taught me the value of teamwork and effective communication in delivering innovative solutions. Logical thinking has also been pivotal—whether debugging circuits or analyzing semiconductor physics, it has enabled me to identify issues and devise effective solutions. My coursework, including EE3431C Microelectronics Materials and Devices and EE2027 Electronic Circuits II, provided me with a strong foundation in semiconductor physics and the operational principles of BJTs and MOSFETs. These courses enhanced my ability to apply theoretical knowledge to practical challenges in the field.

The opportunity to contribute to advancements in semiconductor technology excites me because of its transformative potential to impact lives meaningfully. Semiconductors drive energy-efficient solutions that reduce the carbon footprint of transportation, data centers, and electronics, contributing to global sustainability efforts. At the same time, their critical role in enabling technologies like AI and 5G offers a chance to innovate in areas that enhance connectivity, automation, and decision-making. Together, these advancements shape a smarter and more sustainable future.

If given the opportunity to work on a groundbreaking semiconductor project, I would focus on Advanced Multichip Packaging. This innovative approach integrates multiple components into a single package, contributing to the "More than Moore" paradigm. By moving beyond the traditional single-chip-per-package model, advanced packaging revolutionizes device design and manufacturing, improving performance and energy efficiency while reducing production costs. Through this work, I hope to enable more compact, powerful, and efficient systems that accelerate innovation in fields like AI and renewable energy, driving smarter and more sustainable technologies for the future.

Mentorship has played a significant role in my journey. At NUS and as an SSIA Semiconductor Youth Ambassador, I've had the privilege of receiving guidance from professors and industry experts who provided invaluable insights into navigating the semiconductor industry's career pathways, challenges, and opportunities. These mentors have inspired me to think boldly and creatively when tackling problems. I value mentors who possess technical expertise, a supportive and encouraging nature, and visionary thinking—qualities that foster growth, inspire confidence, and challenge me to consider the broader implications of my work.

The semiconductor industry's potential to create meaningful impact drives my passion and commitment. With continuous learning, collaboration, and innovative thinking, I look forward to contributing to this transformative field and helping shape a sustainable and connected future.

NUS
National University of Singapore

CHARTING A PATH IN
MICROELECTRONICS:

CHUA BING JIANG'S SEMICONDUCTOR JOURNEY

Chua Bing Jiang: 4th from left in 2nd row (GlobalFoundries Joint-Poly Industrial Holiday Programme in Sep-Oct 2024)

I am Chua Bing Jiang, a Year 2 Diploma in Electrical and Electronic Engineering (EEE) student at Republic Polytechnic, specialising in microelectronics. My passion for technical and analytical subjects led me to pursue a career in engineering. I've also had the privilege of participating in SSIA's Semiconductor Active Youth (SAY) Ambassador initiative, guided by a mentor from Applied Materials.

The semiconductor industry captured my interest because it goes far beyond studying transistors and fabricating microchips. It bridges multiple STEM disciplines and finds applications in diverse fields, including healthcare. My participation in the A*STAR Research & Development Camp at the Institute of Microelectronics (IME) gave me invaluable exposure to fabrication processes and research areas like photonics and medtech. These experiences solidified my decision to pursue this dynamic and impactful industry.

*Chua Bing Jiang: 2nd from left (A*STAR Research & Development Camp at IME in Jun 2024)*

Singapore's semiconductor industry is one of its most prominent, closely tied to technological advancements and the nation's development. My passion for technology and design, combined with my interest in fundamental science, aligns seamlessly with this career path. As an EEE student, I've found circuit-level and device-level analysis particularly impactful for understanding semiconductor engineering. Beyond technical skills, I've embraced a growth mindset as a guiding principle for learning. This approach has reshaped how I view mistakes—not as setbacks, but as opportunities for mastery through practice and meaningful connections.

What excites me most about semiconductors is the opportunity to contribute to advancements that can improve lives. Participation in programs by A*STAR IME and GlobalFoundries, as well as mentorship from Applied Materials, has deepened my understanding of the industry and its potential. These experiences have guided my decision-making and prepared me to face challenges as a problem-solver.

Mentorship has been a cornerstone of my journey, offering invaluable guidance and refining my career aspirations. My mentor at Applied Materials has demonstrated patience and attentiveness, helping align my goals with tangible opportunities. A planned tour of Applied Materials' facilities will further broaden my perspective on the industry's inner workings.

To anyone aspiring to enter the semiconductor field, my advice is to stay curious and proactive in your learning. Build a solid foundation in electronics and semiconductor physics, and actively seek opportunities like industry programs or job shadowing to gain deeper insights. Finally, balance your pursuits with hobbies or meaningful relationships—these elements recharge your energy and sustain your passion, even in a demanding industry.

The semiconductor industry offers endless opportunities to innovate and make a difference, and I'm eager to continue exploring this exciting field.

REPUBLIC POLYTECHNIC
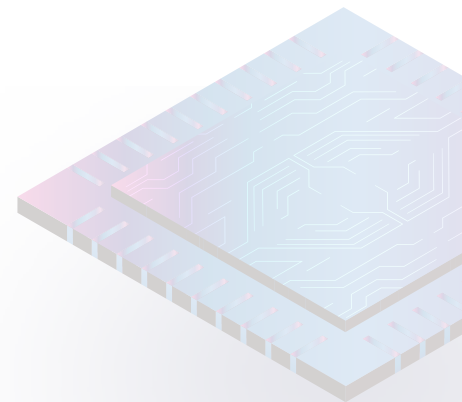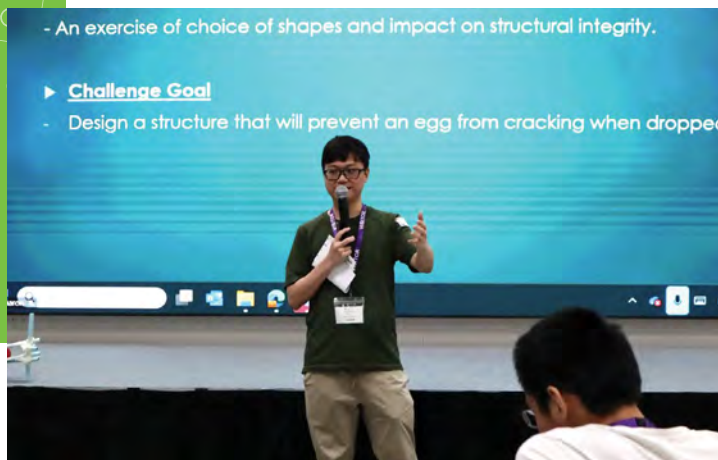
EXPLORING POSSIBILITIES IN THE
SEMICONDUCTOR INDUSTRY:

JAY'S ASPIRATION AND JOURNEY

The semiconductor industry fascinates me with its pivotal role in powering modern technologies. Microchips are the unsung heroes behind everything we use daily—from smartphones to home appliances like microwaves. My journey into this field began at the A*STAR IME Research and Development Camp, where I experienced firsthand the intricate processes of microelectronics. That exposure ignited my curiosity and cemented my decision to pursue a career in this exciting industry.

Semiconductors are the foundation of almost all modern technologies. They enable advancements in AI, 5G, green energy, and medical devices by improving efficiency, reducing costs, and opening doors to new possibilities. Their significance in driving innovation is what motivates me to pursue this field further.

As part of my studies in Electrical and Electronic Engineering (EEE) at Singapore Polytechnic, I took a module called Wafer Fabrication Fundamentals, which gave me a clear understanding of the semiconductor process chain—from bare silicon to a fully completed integrated circuit (IC). Another key module was Digital Systems Design, where I learned the basics of programming Field-Programmable Gate Arrays (FPGA), understanding the language used and the processes involved after writing the code. These modules provided me with the foundational knowledge and skills crucial for a career in semiconductors.

What excites me most about the semiconductor industry is the prospect of contributing to advancements that make technology more sustainable and accessible. Developing energy-efficient semiconductors that reduce the carbon footprint of manufacturing and improve the energy efficiency of tech devices is a vision I'm passionate about. Reducing heat output and increasing efficiency should be a priority in the industry, and I hope to be part of these transformative innovations.

Mentorship has been an essential part of my journey. My lecturers have inspired me to pursue microelectronics manufacturing and have guided me with practical advice and encouragement. A good mentor, in my view, is someone who shares their experiences, highlights what to look out for, and helps build confidence to tackle challenges. This guidance has been invaluable in shaping my aspirations and preparing me for the complexities of the semiconductor field.

Looking ahead, I am excited to contribute to the ever-evolving world of semiconductors. The knowledge and mentorship I've gained so far have equipped me to tackle future challenges and explore the endless possibilities this industry offers.

DRIVING TOMORROW'S TECHNOLOGY:

JOEL WONG'S SEMICONDUCTOR JOURNEY

The semiconductor industry has always fascinated me, serving as the backbone of modern technology and powering innovations like AI, 5G, IoT, and quantum computing. My journey into this field began during a school-organised visit to an industrial cleanroom. Witnessing the intricate processes and microscopic structures of fabricated chips inspired me to explore semiconductors further. Joining the SSIA SAY Ambassadors Programme was another turning point, exposing me to fab visits and industry networking events, where I discovered the vast opportunities this field offers.

Semiconductors are critical to shaping the future of technology, despite misconceptions about the industry's decline. I believe semiconductors remain essential for enabling breakthroughs in AI, automation, and beyond. The industry is constantly advancing, producing smaller, more powerful, and energy-efficient chips. Technologies like quantum computing are now within reach, thanks to these innovations. It's exciting to see how these advancements will shape the future.

As an Electrical and Electronic Engineering (EEE) student, my education has provided a solid foundation for a career in semiconductors. Courses in semiconductor physics, circuit design, and fabrication processes have been particularly valuable. General topics like circuit analysis and digital electronics also play a crucial role. Familiarity with industry-standard programming and simulation tools further enhance my capabilities, ensuring I'm prepared for the challenges ahead.

The pace of innovation in semiconductors is exhilarating. Just a few years ago, generative AI was an unfamiliar concept, but today it's integral to everyday life. The push for energy-efficient chips has never been more important, especially as transistor miniaturisation becomes increasingly challenging. With the world transitioning to 5G and discussions already underway for 6G and 7G, the industry's forward momentum is inspiring. If given the opportunity, I would focus on developing the world's most energy-efficient chips. Considering the enormous energy consumption of data centres—sometimes rivaling that of entire countries—this would not only yield financial benefits but also have a significant positive impact on the planet.

Mentorship has played a pivotal role in my journey. My mentors have provided guidance and industry knowledge while opening doors through their connections. From lecturers and seniors to professionals I've met at events, their support has been invaluable in navigating the complexities of this field. They've introduced me to key figures, helped me secure internships, and offered insights that no textbook could provide.

Looking ahead, I'm eager to contribute to advancements in semiconductor technology. This field offers endless possibilities to innovate and create solutions that address the world's most pressing challenges. For aspiring engineers, my advice is to stay curious, seek mentorship, and embrace every opportunity to learn and grow. The semiconductor industry is the heart of modern technology, and being part of it is both an honor and a thrilling adventure.

SP Singapore Polytechnic

EMPOWERING ENGINEERS FOR THE FUTURE

The Singapore Institute of Technology introduces a competency-based education model for its Bachelor of Engineering (Honours) in Electrical and Electronic Engineering (EEE) degree programme, and learners can choose to specialise in semiconductor manufacturing.

The first class for Electronic Systems, a micro-credential in the Bachelor of Engineering (Honours) in Electrical and Electronic Engineering programme under the Competency-based Stackable Micro-credential pathway, started in September 2024 for working professionals. (Photo: A/Prof Neelakantam Venkatarayalu)

The global semiconductor market is on track to reach a value of US$1 trillion by 2030, driven by the rapid growth of technologies such as artificial intelligence (AI) and the increasing adoption of electric vehicles. Singapore plays a vital role in this industry, contributing to 10% of global chip production and 20% of the world's semiconductor manufacturing equipment output. [1] With Southeast Asia's semiconductor supply chain expected to expand at an annual rate of 8.84% through 2027[2], SIT's Bachelor of Engineering (Honours) in

Electrical and Electronic Engineering (EEE), offered through the Competency-based Stackable Micro-credential (CSM) pathway aims to develop more skilled engineers to meet the needs of this dynamic sector. Learners can choose to specialise in semiconductor manufacturing.

SIT is the first university in Singapore to implement the CSM pathway, designed based on the Competency-Based Education (CBE) model. The EEE programme is one such programme delivered via the CSM pathway. CSM equips graduates to be future-ready by introducing micro-credentials — selected, focused learning modules designed to develop industry-relevant skills. These micro-credentials, co-developed with leading industry partners, provide targeted training that aligns with the evolving needs of the workforce. For SIT students, this means gaining hands-on expertise and a competitive edge in high-demand fields like semiconductor technology and energy systems.

Flexible Learning for All

Launched in September 2024 for working professionals, this programme signals a bold step forward, catering to aspiring engineers. By blending flexibility with industry relevance, SIT ensures that its graduates are equipped to meet the evolving needs of Singapore's critical electronics sector.

Continuing Education and Training (CET) learners, many of whom juggle full-time jobs, can now pursue their degrees over a course of a maximum of six years, at their own pace. With largely asynchronous online lessons, they can learn during lunch breaks, weekends, or whenever their schedules allow. This innovative structure is designed to accommodate the realities of modern work-life demands, without compromising academic rigour.

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[1] https://www.edb.gov.sg/en/business-insights/insights/what-makes-singapore-a-prime-location-for-semiconductor-companies-driving-innovation.html

[2] https://www.iaasiaonline.com/semicon-southeast-asia-2024-a-key-event-for-singaporean-electronics-players

Participants in the Electronic Systems class collected their take-home kit for their integrated project assignment of proto-typing an electronic system. (Photo: A/Prof. Neelakantam Venkatarayalu)

Micro-credentials as a Pathway to a Degree

The CSM pathway enables students to earn micro-credentials that they can accumulate toward earning a degree. The micro-credentials allow learners to focus on acquiring specific, job-relevant skills, covering a comprehensive learning spectrum from foundational principles to advanced specialisations. Each micro-credential culminates in an integrated project that assesses students' ability to apply their knowledge in real-world contexts. This modular approach offers flexibility and helps equip graduates with wide-ranging and highly relevant skills.

Key competencies taught in these micro-credentials include data analytics, operational excellence, robotics and automation, semiconductor manufacturing and sustainable energy systems. Learners with prior relevant on-the-job experience or qualifications, such as specialist diplomas or certifications earned from SIT's partner polytechnics or universities, may be exempted from certain competencies under each micro-credential.

Made for the Industry

The programme's semiconductor manufacturing speciali-sation is a timely addition given Singapore's ambitions to strengthen its semiconductor industry. Students who opt for this track will be immersed in the world of semiconduc-tor fabrication and automation, gaining both theoretical knowledge and hands-on experience. The specialisation was designed in consultation with major industry players in the electronics and semiconductor industry, such as STMi-croelectronics and Applied Materials. Their input has

ensured that the curriculum aligns with the latest techno-logical advancements and workforce needs.

The support from these companies has been instrumental in developing the programme. As Associate Professor Neelakantam Venkatarayalu, Programme Leader for the EEE programme, said, "They help shape the curriculum, and provide opportunities for our learners to hear from industry veterans on real-world insights. Some of the companies, such as STMicroelectronics, Applied Materials, Micron and Kulicke & Soffa have supported their employ-ees to enrol in our CSM pathway to upskill while continuing their careers."

One adult learner currently in the programme is Ben Xiao, a 68-year-old Senior Engineer at MSV Systems & Services Pte Ltd, who embodies the spirit of lifelong learning. After decades in the field, Ben enrolled in the EEE programme to fulfil his dream of earning an engineering degree. "The flexible nature of the CSM pathway has made it possible for me to realise my lifelong dream of getting an EEE degree. With the new knowledge acquired, I can be a better mentor to my colleagues, too," he shared.

"The programme provides the exposure for learners to upskill and stay relevant for the long term in the semicon-ductor industry as the sector evolves," said A/Prof Venkatarayalu. He pointed out that the degree is more than just an academic qualification; it is for those who are eager to acquire competencies and aspire to elevate their career. "The programme is for those who are passionate about all the electronic gadgets that surround us, who are driven by that passion to be a part of the technology that is driving the evolution of the world around us."

The EEE programme will be adapted for full-time under-graduate students and made available from September 2025. Find out more about SIT's electrical and electronics degree programmes here:

https://www.singaporetech.edu.sg/under-graduate-programmes/electrical-and-electronics-engineering-degrees

CLAUDIA GISELLA POUNDER'S JOURNEY INTO SEMICONDUCTORS

I am Claudia Gisella Pounder, a third-year student pursuing a Diploma in Electronics at Temasek Polytechnic (TP). My journey into the semiconductor industry began during my second year of studies, where TP's hands-on curriculum and comprehensive modules sparked my curiosity about how Integrated Circuit (IC) chips power our everyday devices. This experience not only ignited my interest but also laid a strong foundation for my aspirations in this transformative field.

A turning point in my studies came when I selected the semiconductor elective in Year 3. This decision opened doors to understanding the intricacies of IC chip manufacturing, from process integration on bare silicon wafers to creating patterned IC wafers. The practical exposure to cleanroom environments, where I practiced contamination control protocols, provided an immersive introduction to the precision and innovation driving the semiconductor industry. These experiences underscored the importance of meticulous attention to detail and advanced technical knowledge.

The practical lab sessions in the Electronics course were equally impactful, equipping me with essential skills like data visualization and analytics. These competencies proved invaluable during my internship at Micron, a global leader in memory semiconductors. As a manufacturing intern, my primary focus has been troubleshooting printed circuit boards (PCBs), a task that perfectly complements the skills I gained at TP. This hands-on role has deepened my understanding of semiconductor manufacturing while refining my analytical and problem-solving abilities.

My involvement in the Semiconductor Active Youth (SAY) program at Micron further strengthened my passion for the industry. Under the guidance of a dedicated mentor, I explored various departments, including process engineering, manufacturing, and equipment management. This exposure offered clarity about my career aspirations and allowed me to tailor my internship experience to align with my interests.

What excites me most about the semiconductor industry is its boundless potential to shape the future. From Artificial Intelligence (AI) to autonomous vehicles and 5G technologies, IC chips lie at the heart of innovations that promise to revolutionize societies. I am inspired by the opportunity to contribute to advancements that make daily life more convenient and sustainable—whether it's ensuring the safety of AI-driven systems or supporting the development of electric vehicles. Knowing that my work can create a tangible, positive impact drives my enthusiasm for this field.

My journey at TP and my internship at Micron have shown me that the Diploma in Electronics is more than an academic program. It is a launchpad for students passionate about cutting-edge technology. TP's focus on practical skills, industry-relevant electives, and collaborations with leading companies like Micron ensures that students graduate well-prepared and inspired to excel in the semiconductor industry.

To future students considering the Electronics course at TP: if you are curious about how technology works and eager to be part of a constantly evolving industry, this course will unlock countless opportunities. My own journey has been transformative, and I am excited to continue contributing to the growth and innovation of the semiconductor field.

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SAJAL CHOUDHARY:

CONNECTING THE WORLD WITH SEMICONDUCTOR CHIPS

TUM Asia alumnus, Sajal Choudhary, reveals how his role as the Principal Business Analyst at GlobalFoundries helps open the door to smaller and faster chips.

When Sajal Choudhary talks about electronics, his face lights up. "If you see all the semiconductor actions through the lens of supply chains, you can see how a tiny ripple could potentially cause a wave down the value chain. You would be able to see how these chips are powering not one but almost every aspect of the economy across the world – be it IT (Information Technology), computers, household appliances or national security systems," Sajal elaborated.

At 30, Sajal is already spearheading the business processes and systems as the Principal Supply Chain Analyst of GlobalFoundries, a multinational semiconductor contract manufacturing and design company. With a Master of Science (MSc) in Transport and Logistics* conferred by TUM under his belt, he plays a pivotal role in the semiconductor industry bringing these microchips from one corner of the world to the other.

Known as the "brains of modern electronics", semiconductors or microchips are omnipresent. They are found in practically every single electronic device in communications, computing, military systems, transportation, and countless of other devices that we own and use today. According to the European Commission, in 2020, more than one trillion microchips were manufactured around the world, which is equivalent to about 130 chips for every person on Earth. Though the size of a large grain of rice, a microchip requires hundreds of manufacturing steps and up to four months to design and manufacture before arriving at original electronic manufacturers (OEMs) for use.

Navigating today's highly intricate and globalised nature of semiconductor supply chains is a never-ending juggling act - transgressing many different and varied geographical, political, and legal boundaries. It is in such a high-intensity and fast-paced environment that he finds it exceptionally exhilarating.

"For me, it is very addictive to be in this exciting industry. I meet with a new challenge almost every day that I have never encountered before. Being in the logistics industry provides a glimpse of the global movements. You get to experience the rapid dynamics of the supply chain and appreciate the symbiotic relationship between the supply and demand.

Being in the semiconductor industry and taking charge of its supply chain feels surreal because you get to witness the rapid advances and proliferation of our chips today. They are getting smaller, more sophisticated and we are making them more accessible. The semiconductor industry has the potential to develop to a trillion-dollar industry by 2030. I foresee the impact of my role as a key enabler in connecting the world to bigger and greater technology," Sajal elaborated.

With little technical knowledge of the semiconductor domain, working in an environment that is inherently deep-tech might seem like a daunting experience. But his second year at TUM Asia where he completed his internship and master's thesis at Infineon, gladly made up for it.

"Throughout my time at Infineon, I managed to learn more about how supply chain planning in a semiconductor setting works. And you have to possess a thorough knowledge of its operations to plan the movement of its goods and prepare ahead for any disruptions," Sajal explained.

The knowledge gained during Sajal's two-year stint at TUM Asia coupled with his years of experience working at semiconductor firms such as Micron Technology and Infineon in Singapore have catapulted his career. He is now the Principal Supply Chain Analyst responsible for optimising GlobalFoundries' processes and inventory to make the most out of the resources availed while improving efficiency and reducing cost.

For more information, visit **www.tum-asia.edu.sg**.

"The course that TUM Asia offers is beautifully organised with the foundational knowledge and real-life case studies. Professors go above and beyond the textbook by sharing many real-life scenarios and experiences, which are truly invaluable. Prof. Peter Klaus is such a veteran in the industry with a vast wealth of knowledge and experience. It was amazing to learn directly from him."

SAJAL CHOUDHARY
Alumnus of MSc in Transport and Logistics, Class of 2017

The Technical University of Munich (TUM), founded in 1868, is one of Europe's most research-intensive and innovative universities. Ranked #26 globally, and #13 in the Global University Employability Ranking by Times Higher Education (THE) 2025, TUM has produced 19 Nobel laureates.

Established in 2002, TUM Asia is the most successful overseas campus of any German university, extending German academic excellence globally. It offers bachelor's and master's degrees awarded by TUM, including joint programmes with renowned universities in Singapore, as well as executive education in areas such as rail and transport, logistics, and sustainable food. With over 3,000 graduates from 45 countries, TUM Asia equips professionals for success across diverse industries.

TUM Asia

*The Master of Science in Transport and Logistics has been restructured into two distinct programmes: the Master of Science in Rail and Urban Transport, and the Master of Science in Logistics Engineering and Management.

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