

digest

May - August 2019 Issue



A Career Head Start
p.04 - 05



**Designing The Brains
Of A Hard Disk Drive**
p. 06 - 07



**Practical Interactions
With The Industry**
p. 14

CONTENTS

IN THIS ISSUE

- 03** Director's Message
- 04** A Career Head Start
- 06** Alumni Feature:
Designing The Brains Of
A Hard Disk Drive
- 08** Alumni Feature:
Critical Thinkers,
Problem Solvers
- 10** Beyond Women In Tech
- 12** Professor Feature:
Women In Engineering
- 14** Practical Interactions
With The Industry
- 16** Student Feature:
Life Of A TUM Student
- 18** The Chatter



CRITICAL THINKERS, PROBLEM SOLVERS

An alumnus of TUM Asia shares the importance for engineers to develop critical thinking skills to solve real-life problems



WOMEN IN ENGINEERING

Professor Gabriele Schrag shares her thoughts on female engineers in the engineering sector



LIFE OF A TUM STUDENT

Prabu, a second year Bachelor student, talks about juggling between his studies and taking up a leadership role at TUM Asia

ON THE COVER

- A Career Head Start - TUM Asia (Photo 1)
- Designing The Brains Of A Hard Disk Drive - Pexels (Photo 2)
- Practical Interactions With The Industry - TUM Asia (Photo 3)

This newsletter is published by:

Office of Corporate Communications
Technische Universität München Asia
SIT@SP Building
510 Dover Road #05-01
Singapore 139660

Tel: +65 6777 7407
Email: info@tum-asia.edu.sg
Website: www.tum-asia.edu.sg
Facebook: www.facebook.com/tum-asia

CPE Registration No. 200105229R (13/06/2017 - 12/06/2023)
German Institute of Science & Technology – TUM Asia Pte Ltd

director's message



Warm greetings to all our students, alumni and readers!

The demand for skilled and competent graduates in the STEM fields – short for science, technology, engineering and mathematics – is expected to grow as companies work towards tackling national and global challenges. Future STEM jobs will require cognitive skills, critical thinking, the resolution of complex and creative problems, and the ability to adapt – in addition to knowledge that is traditionally taught in the curriculum. In this issue of DIGEST, we spoke with two of our alumni, Ashwini Wali and Gaja Kugan, who graduated from their Master's and Bachelor's studies respectively and now pursue their desired careers in the engineering sector. They shared how they found their footing in the industry, the challenges they faced, and the aspects of engineering that keeps them motivated at work. To read more about Ashwini's and Gaja's thoughts on the industry, turn to pages 4 to 5 and 8 to 9.

We also spoke with Professor Gabrielle Schrag, head of the Chair for Physics of Electrotechnology at the Technical University of Munich. Prof Schrag shares

her journey of becoming involved with academic in the STEM field, and tells you more about her thoughts on gender equality in the STEM industries. Read more about her interview on pages 12 and 13.

In the past quarter, we also held several industry site visits which gave our Master's students the chance to visit companies and witness operations that are directly related to the taught components in their course. Find out more about their visits on pages 14 and 15. Besides this, TUM Asia also held its annual career networking event, Career Opportunity's Day, for alumni and graduates to interact with companies in the industries. Check out pages 6 and 7 to view snippets of the event.

Finally, we had a chat with Prabu, president of SIT-TUM's Student Management Committee (SMC). Prabu gave interesting insights into the life of a TUM student, and revealed some of the upcoming plans and events that TUM Asia students can look forward to in the months ahead.

We hope you will enjoy this issue of DIGEST.

Yours Sincerely,

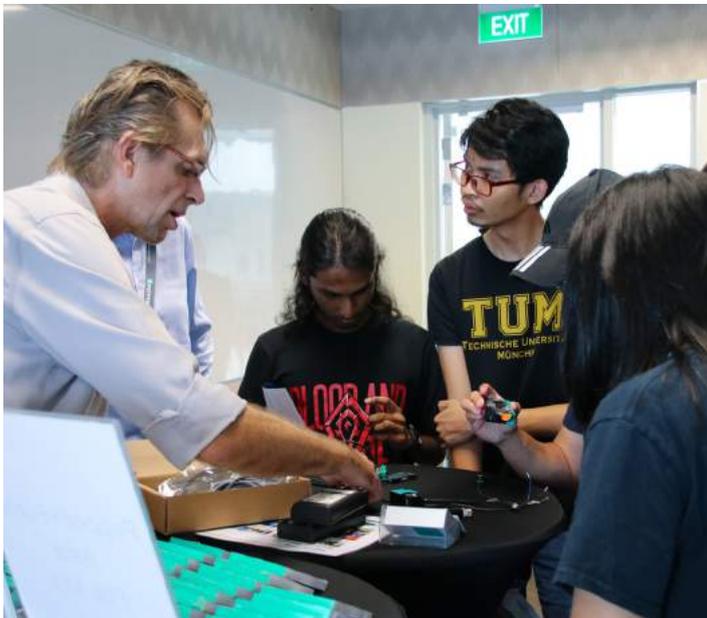
A handwritten signature in black ink, appearing to read 'Markus Wachter', written in a cursive style.

Dr. Markus Wächter
Managing Director, TUM Asia

CAREER OPPORTUNITY DAY A Career Head Start



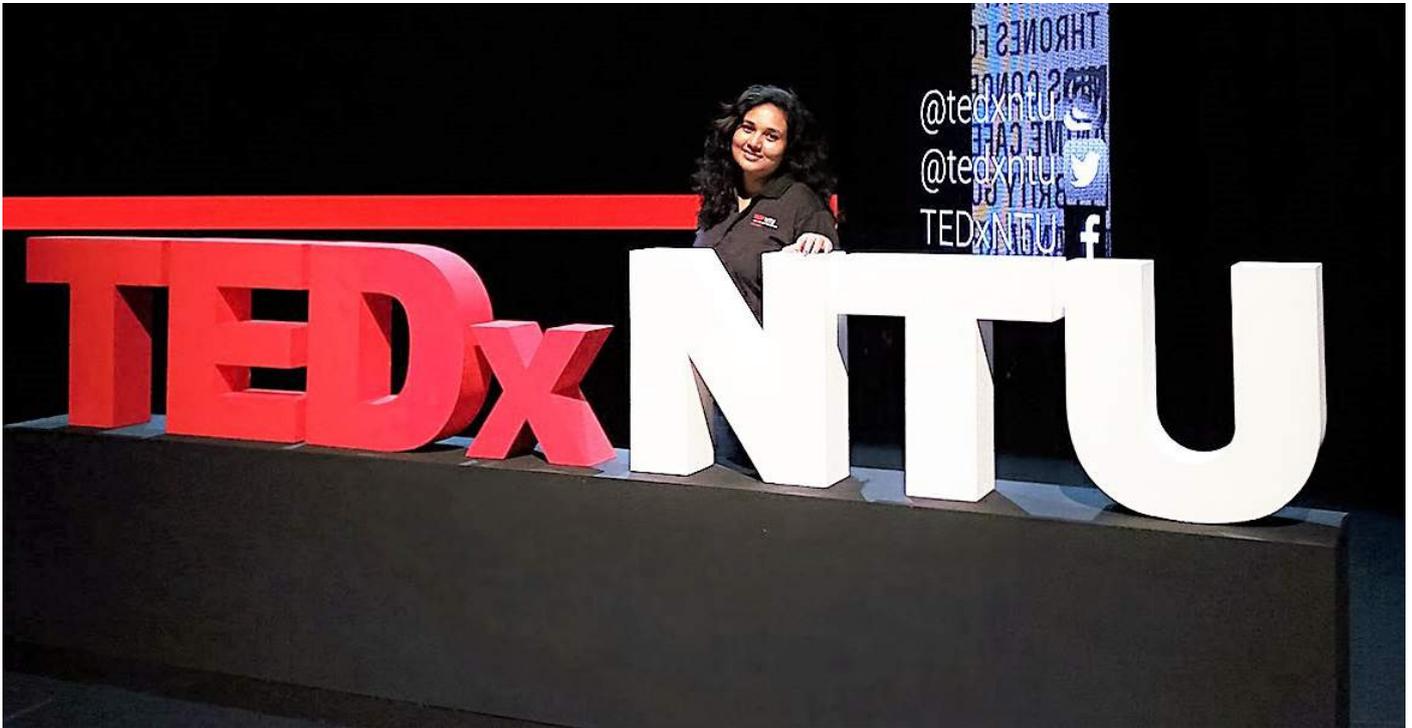
TUM Asia held its annual Career Opportunity Day, an exclusive career networking event for TUM Asia students and alumni, on 27 February 2019. Aimed at facilitating interactions between students, graduates and the industry, representatives from various companies in the Engineering sectors were invited to meet and mingle with potential employees. With more than one hundred students and alumni in attendance, the networking session served as an excellent platform for potential hires to learn about the employment opportunities available in the companies and to find out more about the day-to-day functions of the companies.



Photos: TUM Asia

ALUMNI FEATURE

Designing The Brains Of A Hard Disk Drive



A photo of Ashwini, who participated in the TEDxNTU Event in 2016 as a co-curator

For Ashwini Wali, being passionate about electronics and the desire to understand the intricacies of an integrated circuit led her to pursue a Master of Science in Integrated Circuit Design at TUM Asia. After graduating, she joined Marvell Asia Pte. Ltd. as an Analog Integrated Circuit Design Engineer, working on the design of preamplifier chips, which are the brains of a hard disk drive.

Hi Ashwini, could you give us a short introduction about yourself?

My native is a small town in the southern part of India. I moved to Singapore about three years ago and I enjoyed living here till today. I am currently an Analog Design Engineer employed with Marvell Asia Pte. Ltd.

2. How did your interest in electronics and integrated circuit design first begin?

When I was younger, I have always wondered about the working mechanism of things around me, which naturally drew my attention towards science. Coming from a small town with limited educational resources, pursuing a higher education was not a popular option. My determination to explore further drove me to pursue my bachelor's

degree in Electrical and Electronics Engineering at a private engineering college in Dharwad, India. My four years stint with engineering was an amazing journey for me, where I had an opportunity to learn basic disciplines that helped me understand the emerging new technologies like Artificial Neural Network, Nanotechnology and Photonics. But what really stood out to me was the breakthrough in semiconductors – which was why I decided to enroll into TUM Asia's Master of Science in Integrated Circuit Design programme.

Tell us more about your role at Marvell.

Marvell is a leading provider of innovative storage technologies – hard disk drive (HDD) is one of them. HDD have an embedded analog – mixed signal preamplifier chip which acts as the brain, and I am a part of Analog Design team at Marvell that designs these preamplifier chips.



Ashwini and her family at TUM Asia's Graduation Ceremony 2018

What do you enjoy about being a Design Engineer?

Being a design engineer has given me the advantage of having a better understanding of the product that I am working on, from device specification, design concepts, to device manufacturing. Having a thorough knowledge always boosts my confidence.

How do you think you have grown as an individual since graduating from your Master studies?

The self-confidence that I gained during my Master's has helped me to improve my interpersonal skills. From an introvert girl hailing from a small town, I have grown to become a more confident, pragmatic and responsible person.

Were there any barriers or obstacles you had to overcome when you first entered your new job?

During my Master's studies, I took up an internship role at Intel Mobile Communications which gave me exposure to working on real-time projects. The experiences gained were helpful when I first joined Marvell. At first, it took time to connect the dots between what I studied and the technical concepts of my project work. But with time, I was able to keep pace with the project concepts - though I still have a long way go.

“The self-confidence that I gained during my Master's has helped me to improve my interpersonal skills. From an introvert girl hailing from a small town, I have grown to become a more confident, pragmatic and responsible person.”

Photos: Ashwini

What would you consider your greatest achievement in your career so far?

I believe I still have a lot to achieve in my career, but I do consider working my career journey as one my greatest accomplishments. I started as an Automatic Test Equipment (ATE) Test Engineer, then as a Radio Frequency (RF) Validation Engineer and now an Analog Design Engineer. Accomplishing this in a new environment and new country has also opened my eyes to new possibilities. The opportunities presented in each of these roles were all part of the learning process that helped me deepen my knowledge of engineering concepts.

Any advice for female engineers who are considering entering the STEM industry?

I would say, be open to learning new skills, always be self-driven and self-motivated. With all the latest developments in technology, it is a great time to be in STEM because the industries are expanding and changing so quickly that there are a lot of opportunities for new graduates. Build an early interest in technology during college days and keep yourself updated in the field of technology that you are interested in.

“With all the latest developments in technology, it is a great time to be in STEM because the industries are expanding and changing so quickly that there are a lot of opportunities for new graduates.”



Ashwini (4th from left) and her colleagues at Marvell

Critical Thinkers, Problem Solvers



Gaja receiving his graduation certificate from a professor at TUM Asia's Graduation Ceremony 2016

Gaja has been acquainted with the field of chemical engineering since his polytechnic days. After graduating from the Bachelor of Science in Chemical Engineering in 2016, he delved right into the field from process engineering to operations engineering, acquiring skills in plant operations, process design, data analysis and root cause assessment. The DIGEST team speaks with him to find out some of the experiences he had as an engineer.

Hi Gaja, can you give us a short introduction about yourself?

Hi! I'm Gaja and I graduated from the Bachelor of Science in Chemical Engineering programme in 2016. Since then, I have been involved in the field of chemical engineering - first as a process engineer, and now currently as an operations engineer at The Linde Group. Chemical engineering has been a part of my education since my polytechnic days and so you can say I'm a fan of the field.

What is one thing you particularly enjoyed during your university life?

Personally, I enjoyed bonding with my classmates especially during our time spent in Munich for the Overseas Immersion Programme. It kept us close and till today, we still meet up with one another for special occasions. Academics wise, I enjoyed learning about the intricacies of Physics, Chemistry and Mathematics. The course provided by TUM was not just limited to the engineering concepts, but it gave us insights into the rationale behind the theories we learn and the equations we utilize.



Gaja and his classmates traveling in Europe during their Overseas Immersion Programme

Was there an Aha!-experience in your university time? What is it?

The loudest ‘Aha!’s tend to come during the lectures and tutorials when we finally understood what the professor has been talking about for the past four hours.

From a process engineer to an operations engineer, how has your career experiences contributed to your growth as an engineer?

Engineering is an ever-learning field. In theory, everything can be assumed to be ideal or with a bit of variation. In real-life scenarios, engineers are required to apply critical thinking especially when the unexpected comes into play. As an engineer for two and a half years, I encountered countless on-site challenges such as issues with the purity of a product at parts per billion (PPB) levels, surging compressors for no obvious reasons, locating a faulty transmitter out of hundreds before the plant trips and even carbon monoxide leaks. Encountering and dealing new challenges along the way has helped me grow as an engineer, as they helped me develop better critical thinking and problem-solving skills.

Share with us an interesting encounter you had at your current company.

The plant that I am working in consists of a liquid argon purification system connected to the cryogenic distillation column, which we use to purify argon. We were notified that the storage tank was venting excessively due to pressure build up, which happens when the liquid turns into gas in the tank. We had a re-condenser system to prevent this problem from happening. I was tasked to find out the cause of the excessive venting and resolve the issue. Together with my colleague, I discovered that there was a faulty control valve to the re-condenser system which prevented the gaseous argon from condensing back to a liquid state. It was not commercially viable to shut down the entire plant to repair one system, thus I worked with an expert to come up with another solution. We changed the piping which allowed better heat transfer and increased the efficiency of our purification system. And it worked!

Photos: Gaja

“**In theory, everything can be assumed to be ideal or with a bit of variation. In real-life scenarios, engineers are required to apply critical thinking especially when the unexpected comes into play.**”

Was there an experience or encounter in TUM Asia that has helped to shape your life? What is it?

It would be the life lessons that were learned along the way. While being a student was fun, I learnt to take responsibility for my own decisions especially in my studies. Transitioning to university life right after army was overwhelming at first, because I had lost touch with Mathematics. The topics we studied were challenging and I had to constantly keep up with the pace of the curriculum. But at one point, I told myself that choosing to study this course was my own decision, and I should be responsible of my own decision. With this mindset and the constant support of my classmates, I made it to graduation and the completion of my degree course.

What is your advice for the younger generation of students in TUM Asia?

Study hard and have fun at the same time! Let your memories of university life be more than just lectures, tutorials and notes. Keep your hobbies, play your games and engage your social circle. While the curriculum may not be easy, remember that you are part of a program will give you an edge over the others with the knowledge and skills that you will gain.



A photo of Gaja taken for a photo competition at The Linde Group

Beyond Women In Tech



On 27 March 2019, the TUM Alumni Network organized a workshop, titled “Beyond Women in Tech” at The Bridge, Science Park. Open to all TUM alumni, the purpose of the event was to gather and share inspiring stories of women in the industry, leveraging on their technical expertise to give back to the society. The workshop aims to inspire the community and the next generation to positively serve the community.

The speakers of the workshop include two of our alumni students, Ashwini Wali, alumnus from the Master of Science in Integrated Circuit Design programme; and Tai Jien Nee, alumnus from the Master of Science in Industrial Chemistry programme; as well as industry experts in the engineering fields, Kah Yen Lim, Information Technology Manager at Janssen Pharmaceutical Companies of Johnson & Johnson, and Zoey Lee, Full Stack Developer at Anqlave. During the panel discussion, the speakers spoke about their career stories, the challenges they faced as females in the engineering industry, and how they overcame these challenges. It was a unique experience for alumni members to hear from the perspectives of female engineers and to be inspired by their stories to move beyond industry stereotypes and norms.



Women In Engineering



Professor Gabriele Schrag began her research journey with the Institute for Physics of Electrotechnology at the Technical University of Munich (TUM) in 2002. She received her habilitation in January 2018 and now holds the Chair of Physics of Electrotechnology, heading the research activities in the group. The DIGEST team speaks with her to find out more about her academic career.

Hi Prof. Dr. Schrag, can you give our readers an introduction about your academic background?

I studied physics at the University of Stuttgart, in the south of Germany. After my diploma (Bachelor and Masters), I went to Munich and began my doctoral degree at TUM. During this time, I began working in the faculty of Electrical and Computer Engineering while writing my thesis on the topic of modeling and simulation methodologies for microsystems (sensors and actuators).

After obtaining my PhD, I stayed on in TUM and became a permanent research staff member. Since then, I have been coordinating research activities at the Microelectromechanical Systems (MEMS) group. I was involved in teaching and other administrative fields, such as TUM's Examination Board. I was habilitated in January 2019 and currently, I lead the MEMS research group as the Head ad interim, Chair for Physics of Electrotechnology.

How did your interest in physics first begin?

I was interested in a variety of subjects when I was in school. I was drawn to mathematics and physics, as well as music and languages. In the end, I decided to specialize in the physics due to the influence and encouragement of my physics teacher and my mother.

What motivated you to go into research and eventually pursue a teaching career in physics?

The decision to pursue a PhD at a university was largely due to the fact that it would grant me freedom and time to work on a specific topic more in-depth than it is possible in the industry. The period when I completed my degree happened to be a time when the industry was in crisis. This led to my decision to stay on in the academia. I enjoy working at the university because it gives me the flexibility to do a large variety of things related to my research field and it is never boring.

Share with us more about your teaching experience at TUM Asia.

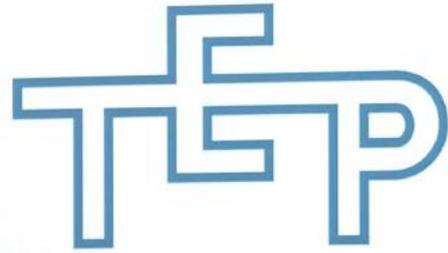
At TUM Asia, the module that I teach is on Electricity and Magnetism, and how the basic physical concepts of this topic are related to other disciplines of Electrotechnology. I find it an interesting experience to teach in a new environment and with a new group of students. Additionally, I like Singapore and its climate.

Women are typically under-presented in physics and engineering. Do you think there are challenges or barriers women may face in the STEM industries, and if yes, what are they?

I think the problem often lies in the ability to balance both work and family in a reasonable way. A lot of things have changed during the last decade regarding gender roles in our society, but the mental load and responsibility of a caregiver often still lies on the shoulders of the women. Also, companies with higher expectations on the availability of employees make it more challenging for female employees to cope with family commitments.

“**A lot of things have changed during the last decade regarding gender roles in our society, but the mental load and responsibility of a caregiver often still lies on the shoulders of the women.**”

Photos: Gabriele Schrag



The Institute of Physics of Electrotechnology in TUM coordinates research activities related to the fields of micro-electro-mechanical systems (MEMS), power electronics and nanoelectronics.

How do you think gender equality can be promoted in the science and engineering fields?

We find that some regulations and policies put in place by the governments in the Scandinavian countries can help to empower women to achieve their professional goals. One example is the distribution of parental leave. If parental leave could be equally distributed between men and women, it levels the playing field at the office.

In terms of the academia, a standard career of a professor requires the fulfilment of certain requirements such as international exposure in research and involvement in various committees, which entails a fair bit of traveling. This level of commitment may not be probable for both men and women with family commitments. Taking on a deeper view when evaluating one's qualification would help both women and men in this respect. For instance, asking questions such as "Who is this person?", "What are his or her capabilities?", "Is he or she qualified to do the job although the "key figures" are differing from a standard career?"

What advice would you give to young women who are seeking to pursue a career in science and engineering?

Never ever give up, you can do it! And don't be dazzled by others who pretend to know and understand everything. It's mostly not true.

INDUSTRY VISITS

Practical Interactions With The Industry



Company visits are common events that are part of the curriculum at TUM Asia. Such visits complement the knowledge taught during lectures and allow students to witness the practical applications of their studies plus gain hands-on experience of how industry operations are carried out.

In the past quarter, TUM Asia's Master of Science in Industrial Chemistry (IC) students were able to make industry visits to two companies: Hong Leong Asia and Wacker Chemicals. The first trip to Hong Leong Asia's Building Materials Unit, the largest integrated building materials supplier in Singapore, took place in January 2019. Students had the opportunity to witness the company's plant set-up, tour the laboratories and learn more about the prefabrication of building components. The IC students were also invited to visit Wacker Chemicals (South Asia) Pte. Ltd, a leader in semiconductors, polysilicon, polymers, silicones and specialty chemicals, in March 2019. Students were introduced to Drymix Technology, Coatings Technology and Silicone Technology in construction application.

The most recent industry visit was held on 12 April 2019, catered for our students in Master of Science in Rail, Transport and Logistics. Students specializing in Railway Engineering were able to witness the construction of the Thomson-East Coast Line (TEL), the sixth line of to be built and introduced into Singapore's Mass Rapid Transit (MRT) system. These visits allowed our students to view some of the latest and current infrastructure in the industry and gave them a glimpse of what to expect in their future workplaces.



From top to bottom: Industrial Chemistry students at Hong Leong Asia; Industrial Chemistry students at Wacker Chemicals and Transport and Logistics Students at the construction site of Thomson-East Coast Line

STUDENT FEATURE

Life Of A TUM Student



The DIGEST Team catches up with Prabu, a second year Bachelor's student, who shares how he copes with managing his studies and taking on the role of the President of the Student Management Committee (SMC) at the same time.

Hi Prabu, can you give us a short introduction about yourself?

I'm Prabu, currently completing the second year of studies in the Bachelor of Science in Chemical Engineering programme at TUM Asia. I am also the president of the Student Management Committee, also known as TUM-SMC. Outside of school, I work as a paramedic and a debate coach.

What do you particularly enjoy about university life in TUM Asia?

I enjoy being taught by dedicated lecturers who are willing to discuss and equip us with knowledge beyond what the syllabus offers. Not only that, learning about German culture and the opportunity to head to Munich also motivates me.

What are some challenges you have faced as a TUM student, and how did you overcome them?

One of the challenges I faced in TUM is the pace and the depth of content that you learn in a short period of time. The university adopts a block teaching method whereby you study one module at one time and take an examination every three weeks or so. For me, what helped me to adapt to this system is to be diligent in making summary notes at the end of lessons and to study in groups with your classmates. I realized that it is always easier when you have a team to study together with.

Since joining the SIT-TUM Family, what are some interesting events you have been involved in outside of curriculum?

I participated in the cosmic bowling activity organized by the previous SMC, which is a good breather for all students going through hectic schedules. I'm currently working with SIT to start a debate club. I am also moderating the upcoming Dialogue with SITizens.

How did your involvement in the SMC first begin?

I was first involved with the SMC when I signed up to be part of the Orientation committee to run the TUM Orientation 2018. It allowed me to network with a lot of TUM students across courses and batches.

How do you find the balance between your academics, leading the SMC, and the other commitments you have outside school?

Time management is important but my classmates, friends and my reliable SMC exco members all play a big role in helping me find this balance. Without all their support, I will not be where I am now.



A photo of Prabu (second-right) and his classmates at Singapore Polytechnic

Photos: Prabu



A photo of Prabu speaking to prospective students at the SIT Open House 2019



Prabu and his classmates at the TUM Cosmic Bowling event

“ I enjoy being taught by dedicated lecturers who are willing to discuss and equip us with knowledge beyond what the syllabus offers. ”

What are some SMC events that are coming up that our students can look forward to?

The most recent event we organized was the TUM Avengers: Endgame Movie Night on 26 April 2019. Some other events that we are currently planning include TUM Trivia Night, Chill-Out and the next round of TUM Cosmic Bowling.

What do you hope to achieve by the end of your studies here in TUM Asia?

I hope to graduate with the skills and knowledge the industry demands and a great network of friends.

What advice would you give to your juniors?

TUM is a very prestigious university which offers courses that meet the needs of the industry. The journey might test your perseverance as it is tough and fast paced, but it will be worthwhile journey. “Alone we can do so little; together we can do so much.” Work together with your friends and the process will be so much easier!

The Chatter



DAAD Dinner Talk - 4 April 2019

Agile Supply Networks and Advanced Manufacturing

The Technical University of Munich Asia (TUM Asia) along with the German Academic Exchange Service (DAAD) organized a Scientific Dinner Talk on 4th April 2019 at Mandarin Oriental Hotel in Singapore. The main topic of discussion was 'Agile Supply Networks and Advanced Manufacturing'. Prof. Dr. Andre Krischke, Professor of the Logistics and Supply Chain Management from the University of Applied Sciences Munich, was the main speaker of this event. He shared his experiences with his in-depth knowledge on Logistics and Supply Chain Management with an active question and answer session.

While discussions about the ramification of Smart Manufacturing and Smart Supply Chains often have a strong focus on smart technologies, the talk gave a fresh perspective on why it is crucial to take a strategic viewpoint, to define the range of future capabilities and implement a mixture of pro-active and reactive measures in order to attain the necessary level of agility in manufacturing and supply chain system.

The discussions and information offered at the event attracted interest from international participants and they had the opportunity to learn more about DAAD and its activities world-wide.

Photos: Israel Tan Photography



TUM Avengers: Endgame Movie Night - 26 April 2019

In the month of April, the most highly-anticipated blockbuster in the cinema was the Avengers: Endgame, a Marvel Cinematic Universe film. The TUM Asia Student Management Committee (SMC) assembled the TUM Asia family consisting of our Bachelor and Master students as well as TUM Asia's staff, to catch epic sequel on 26 April 2019 at Cathay Cineplexes, JEM. It was a successful turn-out where students and staff were able to bond over the action movie as well as food and beverages.

Photos: TUM Asia



SHAPING THE FUTURE FOR 150 YEARS

The Technical University of Munich has been shaping the future since 1868.
Join the ranks of engineering greats at Germany's #1 University*.

Available programmes at TUM's Singapore campus:

- Bachelor of Science** (Chemical Engineering) by Technical University of Munich
- Bachelor of Science** (Electrical Engineering & Information Technology) by Technical University of Munich
- Master of Science (Aerospace Engineering) by Technical University of Munich
- Master of Science (Green Electronics) by Technical University of Munich and Nanyang Technological University
- Master of Science (Industrial Chemistry) by Technical University of Munich and National University of Singapore
- Master of Science (Integrated Circuit Design) by Technical University of Munich and Nanyang Technological University
- Master of Science (Rail, Transport and Logistics) by Technical University of Munich

Admissions for Bachelor and Master degrees are open till March 2019.
Visit www.tum-asia.edu.sg to find out more.

 facebook.com/TUMAsia

 info@tum-asia.edu.sg

*As rated by QS World Ranking 2015 - 2018

**In partnership with Singapore Institute of Technology (SIT).

TUM Asia is a 100% subsidiary of the Technische Universität München / www.tum.de. TUM Asia is recognized as an Institute of Higher Learning (IHL) in Singapore.
CPE Registration No. 200105229R / Reg. Period: 13/06/2017 - 12/06/2023