**TIM** Asia



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#### director's message



hroughout the years, we have constantly sought out change to improve the methods of our structure. However, our mission has always stayed the same; to equip the next generation of world-changers with science and technology. At TUM Asia, we believe in providing a vibrant and diverse experience that allows our students to not only have an excellent education, but to also make friends that will someday become valuable professional connections.

This season in the academic calendar corresponds with a time of farewell as we wished our best to the graduating Class of 2014, who have moved on to establish their careers in different parts of the world. This year, we marked the successful graduation of the pioneer batch of the Bachelor of Science in Chemical Engineering programme, alongside our 2nd cohort of Bachelor of Science in Electrical Engineering & Information Technology students and 11th cohort of Master of Science students. Read about the graduating class on pages 4 to 7.

Now into our 4th and 13th cohort of Bachelor and Master students respectively, we were excited to see yet another group of students joining the TUM family. The vibrant and diverse experience of these new students kicked off with a bang as they joined in engaging and exciting race around Singapore, making new friends as they battled to complete their race objectives. This year's orientation was also made extra special as it was planned by students for students. To see what our new students enjoyed, do flip to page 8.

Following the theme of graduation, the editorial team also caught up with 4 of our Master of Science alumni to find out more about their journey after graduating from TUM Asia. Jocelyn, Kalin, Sundy and Ryan hail from different educational and cultural backgrounds but now share a similar story – their time with us have allowed them to become successful professionals who actively contribute to the betterment of society. Hear what they have to say about their time in school and the opportunities they have received in an exclusive alumni interview on pages 14 to 17.

This issue is packed with exciting reads and thoroughly showcases our desire to provide quality education in varied ways to benefit the public-at-large. We hope to see you, our readers, become part of our story as well. With that, I hope that you will have an insightful read.

Yours Sincerely,

Dr. Markus Wächter Managing Director, TUM Asia



Graduation

## **With the degree** we received, we can be sure that we have the best starting point we can 671 imagine.

Dario Remmler Best Student in Master of Science in Industrial Chemistry

Photo: Playground Pictures / TUM Asia

"

# A SENSE OF ACHIEVEMENT

n 23rd July 2014, TUM Asia graduated its 11th and largest cohort of student at the Stephen Riady Centre. The graduates were able to celebrate their joyous occasion with family members, friends and numerous academic and industrial partners. This has been the largest graduation since TUM Asia's establishment in 2002 by TUM, one of Europe's top Engineering universities, who sought to bring German academic excellence to Asia.

aduation

The auditorium was filled to the brim, with eager family members peering over the edge of their seats to snap photos of their graduating loved ones. Speeches by our distinguished guests – Dr. Steffen Koch, the Acting Head of Mission from the German Embassy Singapore, Dr. Markus Wächter representing TUM and Dr Marc Jung, Head of Global Research Center Singapore from BASF South East Asia - poured forth congratulatory messages, mixed with humour, admonition for the professional journey ahead and much encouragement for the graduates.

The graduation scrolls were then presented to the graduates by Professor Fritz Kühn, Professor Kai-Olaf Hinrichsen and Professor Ulf Schlichtmann, all Deans and Professors of TUM. It was an exciting occasion for everyone to witness these students graduate as they concluded their 18 to 24 month studies at TUM Asia. The graduates hailed from many different nationalities, such as Denmark, Germany, India, China and Singapore, among others. For some of them, this would be the last time meeting their classmates for a long time to come, as these graduates are employed in countries all over the world.

TUM Asia has come a long way since its inception and this has been a huge milestone for German education on an international scale. The unique curriculum at TUM Asia incorporates German expertise with Asian relevance and industry knowledge. Graduates are prepared to handle the challenges in the competitive industry due to the management skills and theoretical knowledge learnt from their education.

This graduation was especially special for some. Lee Poh Sein, the Valedictorian from the Bachelor Class of 2014, was initially uninterested in pursuing higher education after a Polytechnic diploma. However, the love of learning imparted to him by his professors changed his attitude towards learning. "Although there were times of frustrations and disappointments, it was often followed by a sense of fulfillment and achievement when those difficulties were overcome. Our years in TUM Asia have taught us how to learn and not so much of what to think, but how to think. My time at TUM Asia has been memorable," Poh Sein commented in his speech.

The ceremony was also an occasion for the outstanding graduates to be rewarded for their hard work. Best Student and Best Thesis awards were sponsored and paid for by our industry partners, which included Rhode & Schwarz Asia, Continental Automotive, BASF South East Asia, SDV Logistics and Advanced Micro Devices (AMD). Several of these companies have also hired the students that had conducted their internships with them.

As the ceremony concluded, guests and graduates alike were treated to an evening of food and fun. There was also a customized photo-booth for the graduates to snap some fun photos for memory's sake.

With this chapter of their lives coming to a close, some wise advice was imparted to them. "Don't ever stop asking questions & keep pushing against the boundaries set for you", said Dr. Markus Wächter, Managing Director of TUM Asia, to the graduates. Alles Gute! (All The Best!)















Photos: Playground Pictures / TUM Asia

#### Orientation 2014: Team Building Games















Photos: TUM Asia and Group 8 (MSc Race)



very August, the TUM Asia campus will be busied with a flurry of activities as we welcome our new students in our Bachelor and Master programmes. Whether it be anxious, excited or nervous expressions on the students' faces, the orientation programme by TUM Asia aims to address the various administrative and lifestyle needs of the new students.

Facing a new environment with new acquaintances, the Orientation is a time where new friendships can be made in a stress-free environment. The new undergraduates enjoyed an afternoon of exciting team building games that allowed them to compete in teams to bag the winning prize. They engaged in a series of competitive games that involved both brawn and brains. The games were planned and conducted by their seniors. The new undergraduates commented that the games were very innovative and unique. This helped to break the tense atmosphere before the start of the school term, creating a more relaxed environment for the new classes.

In the same weekend, the Master students were treated to an intensive and exhilarating race around Singapore. Dubbed "The Amazing Race: Masters Edition", students were grouped at random and then passed a number of clues and objectives. The goal of the race was to complete all the checkpoints within the stipulated time frame and the quickest team will win the Grand Prize, \$100 worth of Starbucks Coffee card value. Hailing from many different countries, including China, Canada and Singapore, everyone had different ideas to contribute to their teams on how to win the race. Despite differences, the teams managed to utilize it to their advantage, uniting amongst themselves and racing against the clock to finish the race.

Completing the race in 2 to 3 hours, the teams were able to travel to different parts of Singapore and had to take pictures as proof. Some pictures involved posing like Sir Stamford Raffles and forming the word "TUM" in front of the Cavenagh Bridge, one of Singapore's oldest bridges.

The winning team for the Master of Science Amazing Race was Team 8, a group comprising of students from over 5 different countries. When asked on what they enjoyed about the race, they excitedly chattered about the exciting experiences that they had. Alejandro Rendon Icaza, an Ecuadorian studying in the Master of Science in Transport and Logistics, commented "The sights were very interesting and the Merlion stood out to me the most".

#### "The competition made the race very exciting, fun, yet challenging. The teamwork was the best part!"

#### Daniele Sirigatti

Student, Master of Science in Aerospace Engineering

The orientation activities allowed the students from the different programmes to bond with one another, not just while they were racing, but even after the event had ended. The students were able to get to know one another and meet others who were from different fields of study, while bonding with fun, something they would not be able to do as much once classes commence.

Student involvement by the current undergraduate students played a significant role in this orientation. They sacrificed their free time to continue the tradition of planning orientation activities for their juniors. Thank you for all the hard work by the two undergraduate student teams who made this orientation special!

#### Stammtisch









# PROST

It is always tricky to get together and meet up with fellow students, especially when many students have varying timetables, be it with classes in their respective programmes, working on their thesis or internship, or working in the industry. However, the proximity in Singapore combined with the huge variety of international food provides the TUM Asia community opportunities to meet up on a regular basis. On the 12th of September, TUM Asia organized its quarterly Stammtisch - a friendly get together - where industry representatives, professors, students and alumni all got together to enjoy food and chat over mugs of German Bier. Seniors were able to meet their juniors and catch up with the latest happenings and give them advice. Fellow students from the different Master programmes sat together with their professors and had meaningful exchanges accompanied by much laughter, breaking down the studentprofessor barrier. It seems like everyone had a great night at the Stammtisch and we all look forward to the next one.













#### TUM Alumni Dinner



### MAKING SOCIAL CONNECTIONS WORLDWIDE



Photos: TUM Asia

On 10<sup>th</sup> September 2014, TUM Asia organized the TUM Alumni Dinner at Paulaner Bräuhaus Singapore for TUM alumni in the region to meet up and reconnect with their alma mater. Several TUM alumni were in Singapore to attend the TUM Expert Seminar and attended the dinner along with other alumni who are working in Singapore. The warm atmosphere coupled with authentic Bavarian Bier allowed everyone to relax in the casual but stylish setting. It was the perfect ambience for the alumni to engage in social interactions and catch up with one another. Some were able to meet classmates that they had not seen for some time, and others were able to make some new friends or reconnect with professors. The cultural exchanges were undeniable and everyone had a great time!

#### ALUMNI SPECIAL "WHY TUM ASIA?" - Hear Their Success Stories



Sundy Wiliam Yaputra, 33 Indonesia Master of Science in Aerospace Engineering





#### Jocelyn Tan Liying, 31 Singapore

Master of Science in Industrial Chemistry



#### "Ryan" Lim Y Hao, 28 Vietnam

Master of Science in Integrated Circuit Design



#### Kalin Yordanov Stoyanov, 27 Bulgaria

Master of Science in Transport & Logistics

#### "Why TUM Asia?" is a big question on our student's minds when it comes to choosing a higher education institution. DIGEST speaks with a few of our outstanding alumni to find out what influenced their decision process, as well as learn more about their education journey and achievements.

#### What made you decide to pursue a Masters?

**Sundy:** I was working as a metallurgist and was considering to move to the semiconductor industry. It was when TUM Asia appeared on my Google search results that I saw the opportunity to pursue my Masters in Aerospace Engineering. The scholarship helped to secure the finances needed to pursue the Masters and it was an obvious choice since I had a love for aircraft all this while.

**Jocelyn:** I had been working for 5 years as a Medicinal Chemist with Novartis Institute for Tropical Diseases when I decided to pursue a graduate degree. I knew of ex-colleagues and friends who had graduated from the Masters programme under TUM. Hence, I decided to give the application a shot.

**Ryan:** At that time, the TUM-NTU program was still quite new in Singapore. Both TUM and NTU are prestigious universities in Europe and Asia respectively. I was fascinated that the programme offered state-of-the-art knowledge from experienced TUM and NTU professors.

**Kalin:** I was born and raised in a family of engineers. While pursuing my Bachelor in Business Administration, I was able to spend a year in Germany on exchange. After graduation, I did many internships but it was not till I started working at Lufthansa Technik that I realized that I wanted to pursue a career in Aviation, Logistics & Supply Chain Management. During my courses with Harvard Business School, Singapore was discussed on several occasions and put forward as a successful example of a nation which successfully formed highvalue adding industries. These factors led me to TUM Asia's Masters programme.

#### As a foreigner, what was studying in Singapore like?

**Sundy:** It was a great experience! At TUM Asia, I was able to meet many professors from Germany and Singapore who love to teach and are very knowledgeable in the fields they teach. The great support of my classmates was also very important for me.

**Ryan:** The knowledge learnt is very relevant to the industry. The multi-cultural practices in Singapore actively promote racial harmony, which allows people from other countries to feel at home.

#### Looking back, what was enjoyable about your time at TUM Asia?

**Jocelyn:** I liked that the class was small and you could get to know everyone well. The choice of lecturers was great as well. They were all very knowledgeable and you could see that they were passionate about teaching.

**Ryan:** The programme is intensive and technical, but it will significantly benefit you in your career. I found not only "like-minded" classmates in the course, but now they are part of my professional network on a global scale.



**Kalin:** What made the program attractive to me from the start was the practical nature of the lectures, which provided students with the opportunity to gain insights of the actual tendencies and realities in the industry. Personally, I found the interactive nature of the lectures to be particularly useful because it allowed for really interesting discussions to take place which added value to the whole experience of the programme. The diversity of students taking part in the programme is another advantage as they bring the knowledge and perspectives of their own countries.

#### All of you had to complete the Master Thesis and Internship. How did that prepare you for your career?

**Sundy:** In NUS, I learnt a great amount of knowledge about the different aspects in scientific research. As someone who had spent an entire career working in industry, it was a huge eye opener.

**Jocelyn:** I worked at the Genomics Institute of the Novartis Research Foundation in San Diego for a full year. This experience will be something I will never forget. You learn more through discussions when the multidisciplinary departments come together for a certain drug discovery project. The people were also very polite and always very encouraging.

**Ryan:** My internship with Infineon Technologies enabled me to develop a Thesis that is relevant and practical in the industry, which was also beneficial for me in my career later on. During the internship, I gained both soft skills and technical knowledge required for the job. I would say that an internship is one of the important bridging steps for the working world.

**Kalin:** Coming from a family where my father worked as a pilot, I was really excited for my internship with Airbus Operations GmbH. I worked at the Hamburg facility in Germany that had 15,000 employees. My internship gave me huge insight and exposure, as well as helped me in my communication and interpersonal skills. I also learnt that in order to be successful, an organization should also actively seek feedback and improve its own performance, which I applied in my Master Thesis.

#### Jocelyn, we heard that you love performing arts. Why did you choose a career in Science instead?

**Jocelyn:** I have always been very into the performing arts. I did dramatic art and music during my school years. Dance came into my life later. But growing up in the 80s, most never considered a career in arts. I did well for my sciences so it naturally led to this career path. Nevertheless, I have no regrets. I can still commit to dance while working full-time for the last 6 years. It can be tiring but it is fulfilling. I believe we should have a balance in life, so dance and music is my balance.

#### As working professionals now, how has your Master degree benefited you?

**Ryan:** There are certain advantages and opportunities with obtaining the Masters. I think the prestigious degree itself catches more attention from headhunters through professional social networking such as LinkedIn. In this technical field, especially in IC design, employers demand more from employees so having a Master degree is usually preferred in the job requirements.

**Jocelyn:** My current job is the first job out of the laboratory. I am glad to have the business modules as part of the Masters curriculum. It gave me the skills of business intuition (marketing) and numbers sensitivity. My internship made me understand the culture and work environment in an American company. Hence I was able to understand the work culture and management style of my current employer, which is also an American company.

**Kalin:** A positive feature of the Transport and Logistics degree is that it covers in detail a wide variety of topics. My current occupation involves frequent rotations and I lead key projects at different sites of the company. The ability to be flexible, adaptive and capable of assessing adequately each individual situation is a key enabler for me to achieve high-level performance. The diverse environment at TUM Asia also helped me to collaborate effectively with people from all over the world, which is a prerequisite when working at a global company.



Photos: Sundy Yaputra, Ryan Lim Y Hao, Jocelyn Lim, Kalin Stoyanov

#### Any advice to those who are considering to study at TUM Asia?

**Sundy:** I would say, go for it! You will have the chance to learn, experience and work on many types of advanced technologies that you thought you would only see in science fiction movies. But not only that, one day some of your ideas might come alive and be used to contribute back to the society!

**Ryan:** Studying IC design gives you the opportunities to be the creator of electronic products to be used by millions of people. You will feel the joy when your product is rolled out and then

reaches the world market. If you have a passion for technology and the eagerness to create things, you are a perfect fit for ICD. But it does not come easy – hard work, patience and an attention to detail are needed for a successful career.

**Kalin:** TUM-Asia and Singapore offers a lot of opportunities to students. However, what to take and how to explore these opportunities depends on the individual. The programme itself is very well structured and provides students with the knowledge to become successful on a professional scale.



#### The Chatter



Photo: TUM CREATE

#### Introducing Electromobility and its Impact on Singapore's Power System

In 2012, there were approximately 600,000 private cars on Singapore's roads. In this article, some of the impacts on the power system will be presented. Assuming that every private car in Singapore drives 52 km per day on average, the overall mileage is about 11.4 billion kilometres per year. Further assuming an energy consumption of 200 Wh/km (including air conditioning), this sums up to approximately 2500 GWh per year (including transmission losses) which amounts to about 5.2% of Singapore's electricity generation in 2012. This is not much considering that the installed capacity was 11.6 GW in 2012 whereas the peak load was just 7 GW. However, an increase in peak load means that more power plant capacity has to be held available which is expensive. Smart charging strategies can help to lower the increase in peak load and even flatten the demand curve which is beneficial for the power system operation. In addition to the large-scale impact, the impact on transmission and distribution level has to be considered. TUM CREATE investigated in which areas most private cars start or end their trips. Based on this investigation, the spatial distribution of the energy demand of electric cars could be determined. It turned out that the biggest concentration of cars in residential areas is in the east of Singapore (Bedok, Tampines). Many of these cars go to the Central Business District. Hence, we can expect additional load on the transmission and distribution network in the east. A further investigation using the respective data could show whether there could be bottlenecks in this area. Previous studies imply that the impact on transmission level would be very low. The impact on distribution level can be determined using actual transformer data from the respective area.

Electromobility is definitely beneficial for the people living in the city area since pollution, noise, and heat emissions are much lower than those of combustion engine cars and the power plants generating electricity cars are located in the outskirts of Singapore. However, it is also important to consider overall emissions. Singapore's electricity is almost exclusively generated from fossil fuels – about 80% from gas-fired power plants and the rest mainly from oil-fired power plants. Hence, higher electricity demand leads to higher emissions from electricity generation. Power plants and electric motors are much more efficient than combustion engines, but the overall reduction in emissions is rather low. The CO2 emissions of electricity generation in Singapore are assumed to be 450 g/kWh. Hence, CO2 emissions caused by private electric cars would amount to approximately 100 g/km and consequently 1.15 Mt per year. The emissions of a petrol car amount to approximately 180 g/km which yields 2.07 Mt CO2 emissions per year. This means, there would only be a slight reduction. Regarding Singapore's total CO2 emissions of approximately 50 Mt per year, switching to 100% electric private cars would lead to a reduction of about 2% in CO2 emissions.

Private cars cover about 60% of the mileage driven by vehicles in Singapore. Further studies will show the impact of electrifying other vehicles like buses, taxis or transport vehicles. However, it is clear that emissions can only significantly be reduced if Singapore changes its electricity mix, which would be a big challenge.

#### Info: TUM CREATE Ltd.

www.tum-create.edu.sg



Photo: TUM Asia

#### **TUM Expert Seminar: Electromobility in Tropical Megacities**

TUM alumni from all around the world gathered in Singapore for a 4-day seminar to address relevant technical, social and political issues connected with e-mobility, with strong relevance to tropical megacities like Singapore. Such seminars are conducted regularly for TUM alumni every year. The topic of electromobility is significantly important as it is one of the major themes of our times and ranks among the leading fields of research at TUM. This seminar brought together a diverse group of speakers and allowed them to share their views on electromobility with participants from around the world. The participants also engaged in hands-on activities at the TUM CREATE automotive workshop and experienced the electric multi-purpose scooter and electric taxi for Singapore, while making unique cultural exchanges at the same time. This is extremely significant to what TUM Asia has been doing in Singapore; to bring and educate global talents from around the world so they may give back to society!



Photo: TUM Asia

#### The Semiconductor Industry And Its Challenges: TUM Asia Speaker Series

Semiconductors are the heart of the electronics industry. The internet of things is made possible by the rapid advancements in the mobile internet, cloud computing, big data and analytics. With rapid advancements, the challenge of cyclical demand remains. TUM Asia thus conducted its first Speaker Series on the 10th of September, open to the public, to address upcoming trends and challenges we should be prepared for in the semiconductor industry. Participants were able to gain greater understanding on areas such as smart mobility, technological convergence and integrated solutions. We hope that everyone who came out was able to learn more on what to expect next from the semiconductor industry!

### With an education that will outlast the trends of change, we are ready to combat the challenges of **TUMorrow**

Wang Cong Graduate Fellowship (PhD Student) Singapore-MIT Alliance for Research & Technology (SMART) Master of Science in Microelectronics



Wong Kye Howe IC Design Engineer, Lantiq Asia Pacific Master of Science in Integrated Circuit Design Industrial Scholarship Recipient (Lantig Asia Pacific) Action

Nurhidavah Basri Research Officer Bioprocessing Technology Institute, A\*STAR Master of Science in Industrial Chemistry Richard Tan Project Engineer, Leading Electronics & Communications Organization Bachelor of Science in Electrical Engineering & Information Technology

Prof. Dr. Fritz Kühn

Saravanan BJ Project Engineer Rolls Royce Singapore Master of Science in Aerospace Engineering

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