



Singapore

SUMMER SCHOOL 2023

ABOUT OUR UNIVERSITY



German engineering with Asian relevance

Founded in 1868, the Technical University of Munich (TUM) is the top university in Germany ranked by QS World Ranking 2023, Times Higher Education 2022, and Shanghai Ranking 2022. As one of the most research-intensive and most innovative universities in Europe, TUM strives to create sustainable solutions for society through excellence in education and research. Since 1927, 18 TUM professors and alumni have been awarded the Nobel Prize in various scientific fields. TUM's unwavering commitment to the betterment of society has led to the establishment of its first and only overseas campus, TUM Asia, offering bachelor's and master's degree conferred by TUM and other top universities in Singapore.

Opening its doors in 2002, TUM Asia has produced close to 2,300 graduates from different countries to establish a foothold in various arenas. TUM Asia now offers a new suite of Executive Education courses in areas such as Industrie 4.0 and Precision Engineering.

As the first German academic venture abroad, TUM Asia is supported by the Singapore Government through the Economic Development Board (EDB), and by the German Government through the Federal Ministry of Education and Research and the German Academic Exchange Service (DAAD).

SUMMER SCHOOL 2023



Discover all about Asia's smartest city* and how it is being powered by digital innovation and technology that respond to the citizen's ever-changing needs at TUM Asia's Summer School 2023. Join us for a dynamic learning experience that combines captivating industry visits, cutting-edge lessons on Industry 4.0 and exciting tours around Singapore's iconic landmarks.

Gain real-world insights and firsthand knowledge as you step into the heart of Singapore's industries. Visit renowned companies and witness innovation in action. Interact with industry professionals, discover cutting-edge technologies, and grasp the inner workings of diverse sectors.

Beyond the classroom, embark on an adventure to experience the sights, sounds, and flavours of Singapore. Uncover the city's rich cultural heritage as you visit historical monuments. Marvel at the breathtaking skyline of the iconic Marina Bay Sands, and indulge in a tantalising array of flavors and spices with Singapore's diverse cuisine.

This summer school programme offers a perfect blend of academic learning and cultural immersion. Expand your knowledge, forge new friendships with like-minded peers, and create lasting memories as you navigate the intersection of cutting-edge technology and Singapore's captivating landscape.

** According to 2023 Smart City Index*



PROGRAMME SCHEDULE

* Schedule may be subjected to change

SUN	30/07	Arrival in Singapore
MON	31/07	AM Welcome Activities PM City Tour
TUE	01/08	AM Industrial Visit and Workshop: Vertical Farming PM Industrial Visit: Siemens
WED	02/08	Industrial Visit: CDTI
THU	03/08	AM Industrial Visit: NEWater Visitor Centre PM Industrial Visit: Tranzplus Engineering
FRI	04/08	Planning the Future of Electromobility to Achieve Sustainable Transportation Dr.-Ing Ali Bawono Some Recent Applications of Machine Learning and Open Data in Transport Prof. Dr. Constatinos Antoniou Demand Management - How to Reduce Congestions and Make the Transport System More Efficient? Dr.-Ing Andreas Rau
SAT - SUN	05-06 /08	Rest Day
MON	07/08	AM Blood, Blood Cancer, and Infection Dr. Komal Kumar Javarappa
TUE	08/08	AM Group Presentations PM Visit to Paulaner Bräuhaus - The First and Only Authentic German Microbrewery
WED	09/08	Departure

OUR SPEAKERS



Prof. Dr. Constantinos Antoniou

TUM

Some Recent Applications of Machine Learning and Open Data in Transport

Machine learning applications using open data are increasingly relevant in the field of transportation. A typology of open data will first be discussed, followed by an overview of transfer learning. Transfer learning allows models to leverage knowledge gained from one task and apply it to another. In this talk, transfer learning will be demonstrated for traffic state estimation using scalable and non-scalable data from large European cities.



Dr.-Ing Andreas Rau

TUM Asia

Demand Management - How to Reduce Congestions and Make the Transport System More Efficient?

The presentation will discuss the question how to reduce congestion on the road and maximize the efficiency of the transportation system.

The talk will start with introducing the concept of “generated traffic” - the links between improvements of road infrastructure and the vehicles kilometres travelled. Examples from cities worldwide will be shown.

The principles and strategies of transport demand management will be presented. What are suitable transport policies to reduce the traffic volume on the roads and give priority for traffic which can't be avoided and generates the highest benefits / revenue for the society?

The last part of the presentation will focus on the implementation of these theoretical concepts into a real transport policy using Singapore as an example.

OUR SPEAKERS



Dr.-Ing Ali Bawono

TUM Asia

Planning the Future of Electromobility to Achieve Sustainable Transportation

The electromobility concept has now started to become a trend and it is often seen as one of the alternatives in achieving sustainable transport. Electromobility was first developed in the 1880s and since that time has grown into extensive modes of private vehicles, and public transport modes including buses, trams, two-wheelers, trains, and trolleybus systems all over the world. Planning a sustainable electromobility requires a comprehensive strategy, clear framework, and integration of multiple systems including vehicles, infrastructure and charging infrastructure, energy, and connectivity. On the other hand, there are impediments and challenges in electromobility implementation that needs to be strategically handled. Policies, regulations, and financing schemes supporting electromobility should be planned and embraced. This topic aims to address the latest study on electromobility. Case studies will be presented.



Dr. Komal Kumar Javarappa

TUMCREATE

Blood, Blood cancer, and Infection

The human immune system is a sophisticated defence mechanism that prevents foreign pathogens from damaging healthy tissue and cells. However, cancers like blood cancer might hinder the immune system. Cancers of the blood system disrupt the normal development and function of your blood cells. Most of these malignancies begin in the bone marrow. Most blood cancers result from the uncontrolled growth of an aberrant blood cell type, which disrupts the normal blood cell formation process. These malignant cells in the blood impede the blood from carrying out its regular activities, such as fighting off infections or stopping severe bleeding.

INDUSTRIAL VISITS

Tranzplus Engineering

Tranzplus Engineering Pte Ltd is one of the early adopters of Lean Manufacturing and digital transformation in Singapore.

Through this visit the participants will learn how the adoption of Industry 4.0 and Lean Management increased the business performance of the company. They will also learn some of the Good Manufacturing Practices on 5s, Kaizen and Lean Management and implementations also the common challenges faced during digital transformation journey.



I.F.F.I. Urban Farm

IFFI (Indoor Farm Factory Innovation) Urban Farm is a vertical indoor farm located in Singapore. It focuses on sustainable and efficient farming practices, utilizing vertical farming techniques to grow a variety of crops in a controlled indoor environment. The farm aims to provide locally grown, fresh, and pesticide-free produce to the community.

Through this visit, participants will have the opportunity to learn about the cutting-edge technology used in indoor farming, witness the cultivation process first hand, and gain insights into sustainable agriculture practice and educate visitors about urban farming and its benefits.





Siemens AMTC

The Siemens AMTC (Advance Manufacturing Transformation Centre) is a hybrid competence centre that provides guidance, support and training to manufacturing facilities in Southeast Asia on their journey of adoption, transition and transformation towards advance manufacturing.

The visitors will have the opportunity to explore and experience a showcase of advanced manufacturing technologies and solutions. This includes automation systems, robotics, Additive manufacturing technologies, digitalization tools, and other cutting-edge technologies relevant to the manufacturing industry.

CDTI

The Competence Centre for Digitalisation, Technology, and Innovation (CDTI) is a joint training facility between TUM Asia and Festo Didactic, incorporating academic excellence and industrial know-how to develop a pipeline of future-ready talents that harness the potential of 4.0 to address the evolving needs of the industry.

Participants, will learn about the:

- Fundamentals of industrial revolutions and have a holistic perspective of the underlying concept of Industry 4.0 – a paradigm shift to the production of the future that integrates automation and information technology to enhance productivity, efficiency and flexibility in manufacturing processes
- Overview of the important characteristics of a Cyber Physical System and the concepts of modularity and flexibility in manufacturing which are vital to increasing productivity and adaptability of the production configurations to meet the changing demands of the market.



REGISTRATION DETAILS

1

Sign-up

1. Register at the link: bit.ly/TumAsiaSummerSchool2023 ,or
2. Scan the QR code to sign-up



2

Payment

Upon completion of the online registration form, you will receive an email with instructions to make payment.

3

Enrolment

E-mail the payment proof to TUM Asia alongside the following scanned documents:

- Letter of Enrolment at the University, or
- Academic Transcripts (up to most recent semester) for current undergraduate studies
- Passport Biodata page (if applicable)

Additional Information

Registration will be completed upon receipt of a full payment of \$1,980 Singapore Dollars.

The fee is inclusive of the accommodation, classes, and activities conducted during the TUM Asia Summer School 2023 and is valid for one participant only. Airfare, meals, personal leisure activities, public transport fares as well as travel insurance are not included in the Fee.

A quad room equivalent accommodation will be provided.

**TUM Asia reserves the right to cancel the Summer School in the event of unforeseen circumstances. A full refund will be reimbursed to participants who have made the payment.*



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