

# The Future of Digitalization And Industrial Production

**Multi-disciplinarity as success factor for systems  
design and management of innovations**



## TUM Asia Summer School

29 - 31 July 2019

9.00 AM - 5.00 PM

Organised by:

**TUM** Asia

In Corporation With:  
Collaborative Research Center  
CRC / SFB768

**TUM**

Supported by:

**u\*2i**  
Better Jobs For Life  
Employment and Employability Institute

## How Does The Future Of Industrial Production Look Like?

Industries are becoming increasingly digital. Terms like Industrie 4.0 (the 4th Industrial Revolution), Cyber-Physical Systems (CPS), Product-Service-Systems (PSS), Big Data or Artificial Intelligence (AI) has created massive awareness of the topic within many companies and among the public. There can be no doubt that beyond the hype, digitalization will transform industries. In early 2019, Volkswagen in Germany teamed up with Amazon in the U.S. to create an “industry cloud” to connect over one hundred factories and 1500 suppliers and partners. As a result, companies achieved shortened cycle times, improved product quality, and implemented efficiency across their operations, while reaping the benefits of manufacturing highly customized products on a global scale. In an advanced manufacturing ecosystem where modern technologies such as the Internet of Things (IoT), the Industrial Internet of Things (IIoT), automation, cloud computing, Big Data processing, and highly integrated communication capabilities work together – cybersecurity and the social-technical impacts it brings about are aspects that cannot be ignored as well.

This 3-Day Summer School will comprise of a series of lectures, case studies and discussions conducted and facilitated by 3 leading departments in the future of industries domain from the Technical University of Munich (TUM). The Summer School is conducted in collaboration with the Collaborative Research Center CRC / SFB 768 Committee at TUM.

### PROGRAMME DETAILS

**Date:** 29 – 31 July 2019  
**Time:** 9:00AM – 5:00PM  
**Venue:** SIT@SP Building  
510 Dover Road, #05-01  
Singapore 139660

*Lunch & Refreshments  
are included.*

### PROGRAMME FEES

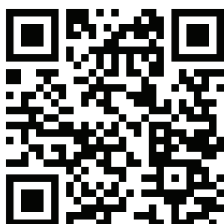
\$900/ pax (SMEs)  
\$1,200/ pax (Non-SMEs)

*(Fees stated exclude 7% GST)*

### REGISTRATION

To register for the TUM Asia  
Summer School 2019,  
scan the QR code or visit  
[www.tum-asia.edu.sg/i4ss2019](http://www.tum-asia.edu.sg/i4ss2019)

**Application opens from  
1 May 2019 – 15 July 2019**



### PROGRAMME OVERVIEW

This Summer School adopts a unique multi-disciplinary approach to ‘The Future of Digitization and Industrial Production’. It offers in-depth knowledge of a range of aspects on the digitalization of industries.

Participants will gain a holistic overview of the most relevant aspects of the future of industries from an engineering, social science and organization studies as well as management and computer science perspective.

### PROGRAMME OBJECTIVE

- Strengthen key knowledge and insights relevant to digital industries among professionals and senior management of local industries
- Encourage local industries to take the next step towards digitization and optimization of their manufacturing processes and implement new innovative measures
- Motivate professionals to adopt agile project management and risk management approaches for digital networks
- Equip professionals with an analytical, socio-technical framework knowledge from both inter-disciplinary and inter-organizational perspectives

### WHO SHOULD ATTEND

- Engineers, Professionals, Managers and Executives (PMEs)
- Middle – Senior Management Decision Makers

### MULTI-DISCIPLINARITY PERSPECTIVE

#### Engineering perspective:

- Multidisciplinary modelling- how to ease design and operation of innovations
- Work 4.0 - Human in the Loop
- Agents to support design of innovations
- Agents to achieve flexible self-adaptive products and production systems
- Case Studies & Successful Demonstrators: Applying Enabling Technologies
- Smart Data Enabled Learning during Operation

#### Social science and organization studies perspective:

- Socio-Technical Framework for the industry of the future
- An Interdisciplinary Perspective on Innovation
- An Inter-Organisational Perspective on Innovation

#### Management and computer science perspective:

- Human-centered Innovation & Design Thinking
- Managing Digital Innovation Projects & Agile Project Management
- Fundamentals & Risk Management in IT Security
- Case Studies: Managing IT Security





Photos from TUM Asia Industrie 4.0 Summer School 2017

## SPEAKERS



### **Prof. Dr. Sabine Maasen**

Director of the Munich Center for Technology in Society (MCTS)  
Chair of Friedrich Schiedel Endowed Chair in the Sociology of Science  
Department of TUM School of Governance  
Technical University of Munich (TUM)



### **Dr. Uli Meyer**

Group Research Leader  
Munich Center for Technology in Society (MCTS)  
Technical University of Munich (TUM)  
Acting professor for “sociology of digital work” Ruhr Universität Bochum (RUB)



### **Prof. Dr.-Ing. Birgit Vogel-Heuser**

Head of Chair and Director of Institute Chair of Automation and Information Systems  
Department of Mechanical Engineering  
Technical University of Munich (TUM)

## MODULE SYNOPSIS

### **Socio-Technical Framework in Industry: Societal Impacts**

Technology is expected to bring disruptive innovation. But what exactly are the implications of that? This module will cover the larger societal implications of this kind of innovation. It will tackle questions like: How will society change? How can a society profit from this and what are the possible risks and dangers? In particular – students will learn what engineers can do to promote the first and prevent the latter.

### **An Interdisciplinary Perspective of Innovation**

Adapting a company to innovation is challenging on a technical level. However, it also poses organizational challenges. New professions are included in the company, power relations change, and new skills are required. Work and tasks become even more heterogeneous and interdisciplinary than before. Students will learn how to analyse and manage interdisciplinary and organizational settings. They will be provided with different tools, which allow them to handle organizational aspects of innovation.

### **An Inter-Organisational Perspective of Innovation**

A large part of a company’s environment consists of other companies. These inter-organizational relations a company has change significantly once innovation technologies and practices are introduced. In this module, students will learn how to analyse the inter-organizational network among companies, how it may change with innovation and how to manage these changes.

### **Multidisciplinary modelling - How to ease design and operation of innovations, Work 4.0 - Human in the Loop, Agents to support design of innovations, Agents to achieve flexible self-adaptive products and production systems, Case Studies & Successful Demonstrators: Applying Enabling Technologies, Smart Data Enabled Learning during Operation**

Engineering concepts of cyber-physical systems, human machine interaction systems and intervention of smart data approaches will be discussed in these modules. These subjects will equip students with the skills to judge and evaluate what a cyber-physical system is, its components, capabilities and the necessity of the underlying models and technologies like agents and data analytics. After the module, students will be able to identify beneficial use cases for their companies and the necessary prerequisites. Students will also learn to model the knowledge of a cyber-physical system as a prerequisite for increased reliability and overall equipment effectiveness.

## SPEAKERS



### **Dr. Markus Böhm**

Chair of Information Systems  
Department of Informatics  
Technical University of Munich (TUM)



### **Dr. Manuel Wiesche**

Chair of Information Systems  
Department of Informatics  
Technical University of Munich (TUM)

## MODULE SYNOPSIS

### **Human-centered Innovation & Design Thinking**

In today's hypercompetitive markets, companies that fulfill customer needs in the fastest and best way are successful. Therefore, companies need to focus on human-centered innovation. Design Thinking is one framework that helps organizations to develop new ideas that are relevant for their customers. In this module, students will gain an understanding why focusing on customers' needs is crucial and what implications that has for innovation processes. Students will get to know Design Thinking as a framework and will apply different Design Thinking methods in a hands-on way in small teams. For example, students will try out methods for gaining user insights and developing low-resolution prototypes.

### **Managing Digital Innovation Projects & Agile Project Management**

Once an innovative idea for a digital product or service is on the table, organizations need to manage the innovation project to bring the idea to life. Due to the fast-moving environment, digital innovation projects face a high degree of uncertainty such as changing customer needs or the emergence of new technologies. Therefore, digital innovation projects need to be managed in an agile way. In this module, students will gain knowledge about the challenges of digital innovation projects and how these challenges can be addressed by agile project management. Students will get to know the agile principles and the SCRUM framework, which represents one way to implement agile principles.

### **Fundamentals & Risk Management in IT Security**

Many companies today consider information or IT security as a central element of their IT strategy. Data breaches as experienced by Sony in 2011, Yahoo in 2013, or Equifax in 2017 illustrate that hackers are a real and serious threat for companies. Therefore, companies need to implement strategies how they can improve IT security. In addition, they need to be able to assess and manage the diverse risks in the context of IT management – from internal data losses or leaks to external cyber-attacks. IT security and risk management gains further relevance because production equipment and other critical infrastructure is exposed. In this module, students will gain knowledge about the basics and objectives of information security. They will get familiar with risks within information management and will be able to outline and apply a risk management process. Finally, students will discuss why IT security and risk management is crucial and what assumptions need to be reconsidered.

### **Case Studies: Managing IT Security**

In this module, students will work on a case study to apply their knowledge on IT security and risk management. Students will work in small teams on a real-world case and develop strategies how the IT security risks can be mediated. The teams will present their findings in the group and discuss their learnings.

### **For more information, please contact:**

TUM Asia, Office of Executive Development  
Email: [exd@tum-asia.edu.sg](mailto:exd@tum-asia.edu.sg) | Tel: +65 6777 7407 (office hours)

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