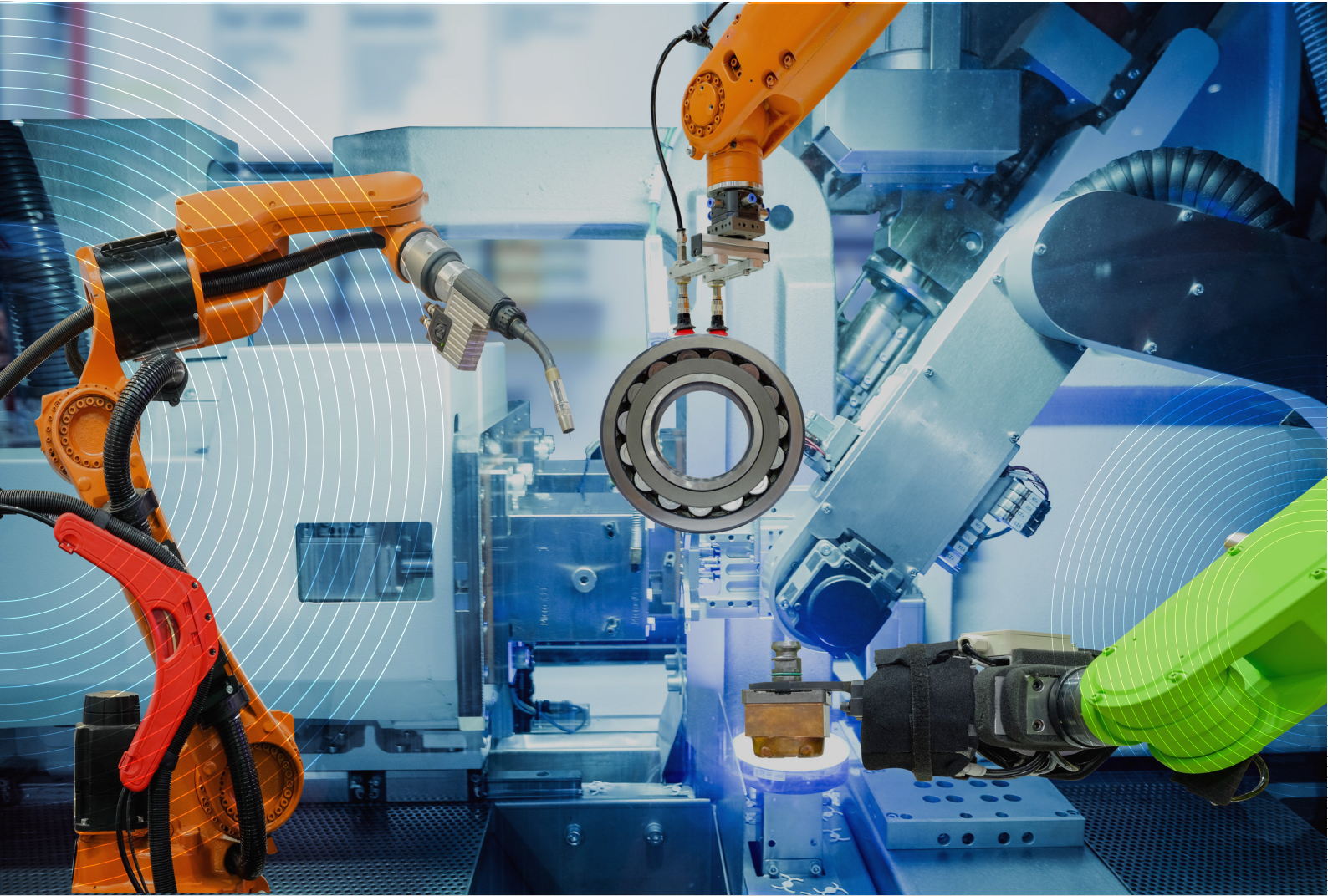


The Future of Digitalization And Industrial Production

**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:

we2i
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

(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

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
- Learning in Digitalization And Industrial Production

Management and computer science perspective:

- Human-centered Innovation & Design Thinking
- Business Model Innovation
- Learning in Digitalization And Industrial Production: Current and future developments of work and occupation
- Learning in Digitalization And Industrial Production: Competences in Digitalization And Industrial Production



Photos from TUM Asia Industrie 4.0 Summer School 2017

SPEAKERS



Prof. Dr. Sabine Maassen

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



Mr. Jörg Weking

Research Associate
Chair for Information Systems
Technical University of Munich (TUM)



Prof. Dr. Daniel Pittich

Professor for Technical Education
TUM School of Education
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.

Business Model Innovation

This module is advancing on existing knowledge about Digital Transformation and Business Model Innovation. It builds upon technological and societal trends as well as on the principles of Digital Transformation as a source of Business Model Innovation. We will discuss how firms transform their organization and business model as well as challenges and implications of Digitalization initiatives. Second, this course will introduce the students to advanced tools for Business Model Development. The e³-value modelling method is introduced as a tool to evaluate the economic sustainability of a business model by analysing the value streams between actors of a business ecosystem. Furthermore, the concept of Business Model Patterns is introduced as a creative technique to ideate further innovative Business Model alternatives.

Learning in Digitalization And Industrial Production

Industry 4.0 and Digitalization are central phenomena of the technical-productive change and do not only affect technological innovations, but focus on the human as a crucial and decisive factor. Two of the essential facets and perspectives are 1) an organizational and 2) a qualifying perspective.

Current and future developments of work and occupation

The first part of the module is to address the effects and interactions of Digitalization in the context of work and occupation. In particular, students will learn how job profiles change due to the increase of process orientation and knowledge work etc. Furthermore, the main differences between these changes and the current state of the art will be focused.

Competences in Digitalization And Industrial Production

On the prior basis, the necessary competencies, its structuring, accentuation in the context of the technical-productive change will be shown. The students will develop ideas of the skill/competence requirements and the key aspects. Therefore, a competence approach will be discussed and specified with technological examples deriving from Engineering. The workshop is focused on the implementation of the previously mentioned aspects in technical teaching and learning practice. The basis is a validated approach of technical teaching and learning which has been implemented several times in curricula and learning approaches in TVET and learning factories. The students will learn how to specify competences as a fundamental starting point for learning processes and will develop an understanding of the impact for the design and realization in concrete treatments and learning scenarios. Finally, possibilities for a practically relevant diagnostic and feedback approaches will be discussed.

The Future of Digitalization And Industrial Production

TUM Asia Summer School Schedule | 29 - 31 July 2019, 9:00AM - 5:00PM

29 July 2019 (Monday)		30 July 2019 (Tuesday)	31 July 2019 (Wednesday)
09:00AM – 10:30AM	Socio-Technical Framework in Industry: Societal Impacts	Multidisciplinary modelling - How to ease design and operation of innovations, Work 4.0 - Human in the Loop	Human-centered Innovation & Design Thinking
10:30AM – 11:00AM	MORNING TEA BREAK		
11:00AM – 12:30PM	Socio-Technical Framework in Industry: Societal Impacts	Agents to support design of innovations, Agents to achieve flexible self-adaptive products and production systems	Business Model Innovation
12:30PM – 01:30PM	LUNCH BREAK		
01:30PM – 03:00PM	An Interdisciplinary Perspective of Innovation	Case Studies & Successful Demonstrators: Applying Enabling Technologies	Learning in Digitalization And Industrial Production: Current and future developments of work and occupation
03:00PM – 03:30PM	AFTERNOON TEA BREAK		
03:30PM – 05:00PM	An Inter-Organisational Perspective of Innovation	Smart Data Enabled Learning During Operation	Learning in Digitalization And Industrial Production: Competences in Digitalization And Industrial Production
SPEAKERS	<p>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)</p> <p>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)</p>	<p>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</p>	<p>Mr. Jörg Weking Research Associate Chair for Information Systems Technical University of Munich (TUM)</p> <p>Prof. Dr. Daniel Pittich Professor for Technical Education TUM School of Education Technical University of Munich (TUM)</p>