

Invited speakers for SAIE 29, October 2018



Dr ir Eric Lutter

University of Twente
The Netherlands

Dr Eric Lutters was educated as a Mechanical Engineer at the University of Twente. He continued to work at the University of Twente as an assistant professor. During this professorship he was given the opportunity to formulate his PhD project. He finished his PhD in 2001 on the thesis 'Manufacturing integration based on Information Management'. He currently holds a position as an associate professor at the Faculty of Engineering Technology at the University of Twente in the Netherlands. Next to this, he is a scientific board member of the Fraunhofer Project Center at the University of Twente. Additionally, he is a Professor Extraordinary at the Department of Industrial Engineering at the Stellenbosch University in South Africa.

Presentation: *Surviving Industry 4.0*

The first three industrial revolutions and their respective impact were recognised and interpreted in hindsight. Now, for the first time, establishing a new industrial revolution is seen as a purposeful endeavour. However, technological innovation essentially is – and has always been - continuous. So, the essence of Industry 4.0 might foremost be that it allows for a paradigm shift in thinking about technological abilities and their interrelations. Therefore, Industry 4.0 can hardly be captured in terms of strategy, purpose, guideline or directive. Rather, it allows industry and academia alike to purposefully take on challenges related to the efficiency with which technological and business processes are organised. For this purpose, the Industry 4.0 'toolbox' almost bursts with an abundance of tools related to e.g. IoT, Big Data, Cyber-physical-systems, Digital Twins and many more. However, it is essential to recognise that such tools only add value in the hands of proficient engineers that use them to address the right challenges – with ample common sense. This is only possible if a company works towards actual and self-determined goals and then purposefully assimilates the appropriate (i.e. effective and efficient) elements from the Industry 4.0 armoury. After all, usually substantial investments and efforts are involved, while having significant repercussions on the company, its culture and on how it interacts with other companies. Consequently, actualising the envisaged benefits or added value might be a far bigger challenge than effectuating the technological highlights involved. Therefore, to outlive and to harness the fourth industrial revolution, engineers need to address the right challenges with the right mindset. Surely, the success of Industry 4.0 does not depend on bits and bytes, but on the common sense and creativity of the engineers that align smart tools and approaches with purposeful visions and objectives. This keynote therefore aims to challenge engineers to rely on their ability to fathom actual and relevant challenges and to address these with purposefully selected (or developed) tools and techniques, irrespective of the 'Industry 4.0' label they might or might not have.



Marang Marekimane

Business Process Mechanics
South Africa

Founder – Business Process Mechanics
Managing Partner – Lean Business Platform

Marang Marekimane is the founder of Business Process Mechanics, assisting entrepreneurs to review their business models and automate business processes to build sustainable businesses.

In 2018 Marang joined Lean Business South Africa as a Managing Partner –a tech start-up providing an innovative tool to track investments in developing small and medium sized enterprises (SME). The platform hosts data that can be used to develop products and services for SMEs while providing insights on the sector.

As part of Designathon Works in South Africa, Marang assists entrepreneurs to develop and commercialise innovative products and services. Some of these designathons are with children as young as 7 years old.

She was previously a Management Consultant for banks and insurances companies such as FNB, Standard Bank and Liberty.

Presentation: *To Follow or Lead – at what expense*

Small and medium sized enterprises (SME) are expected to be the lifeline for exposing job opportunities. Considering the cost of doing business in South Africa, small business owners are forced to bootstrap their business operations, often at the cost of hiring. Is it still relevant or practical to expect SME's to create jobs? What role do large corporates and governments play in facilitating job creation in the SME sector? Have we adapted our measures for growth in this sector to account for the 4th Industrial Revolution?



Prof Wikus van Niekerk

Faculty of Engineering, Stellenbosch University
South Africa

Prof Wikus van Niekerk is a Professor in the Department of Mechanical and Mechatronic Engineering and Director of the Centre for Renewable and Sustainable Energy Studies at Stellenbosch University. He is registered as a Professional Engineer with the Engineering Council of South Africa (registration no. 940462), and currently evaluated by the NRF as a C2 internationally recognised researcher. He is regularly consulted by industry on a variety of areas including noise and vibration, especially human response to noise and vibration, NVH, vehicle dynamics, renewable energy systems and wave energy.

He completed his PhD on the active control of transient noise transmission at the University of California at Berkeley, working on a project for Mazda Corp and is currently doing research in human response to noise and vibration, seat transmissibility and its effect on automotive NVH, sound quality and optimal design of

seats for novel applications. He has a keen interest in wave energy and is investigating the exploitation of wave energy along the southwest coast of South Africa.

Presentation: *How to survive in the Digital Disruption*

The Fourth Industrial Revolution are fundamentally changing the world of work for which we are preparing our students. At the same time the students who enter our programmes are much better prepared for the Digital World than they were in the past, expect for those students, in the South African context, who come from disadvantaged environments. Universities tend to be slow to react to changes in the environment and therefore all these factors put together result in a significant challenge for the development and implementation of Engineering Programmes.

The integration of fast computing, big data and machine learning enable engineers to be significantly more product than in the past by speeding up and integrating processes, from design to manufacture, implementation and commissioning. This new approach is also blurring the boundaries between disciplines forcing engineers to work collectively in multi-disciplinary teams. It also poses new challenges such as mastering software suites and manipulating complex digital models of physical systems. “Multiphysics” refers to digital models that can simultaneously solve for multiple physical phenomena. These models speed up the design processes and deliver large amounts of data that need to be analysed.

Stellenbosch University is approaching this challenge through the establishment of the Stellenbosch School for Data Science and Computational Thinking. This new initiative will attempt to work across all ten faculties of the University and will span the entire academic project: from under- and postgraduate training to research and specialist consultation. The main purpose will be to coordinate and integrate the various activities in this area at Stellenbosch University and provide a platform for collaborative learning and research as well as the generation of knowledge, ideas, applications and products.

In this presentation we will share some of the detail of the plans of Stellenbosch University to prepare our students for the world of the Digital Disruption.



Prof Dietmar Theis

Technical University Munich
Germany

Dr. Dietmar Theis obtained his doctoral degree in Solid State Physics from the Technical University Berlin.

He joined Siemens’ Research Laboratories in Munich where he worked on optoelectronics, flat panel displays and power semiconductors. He was responsible for internal R&D marketing communication, R&D policy, government relations and university liaisons. He edited the Siemens R&D Journal “Pictures of the Future” and was involved in the company’s technical foresight activities. Dr. Theis lectured at the Technical University of Munich and later was appointed Honorary Professor. He served as an R&D advisor to the CEO and the Head of the Supervisory Board of Siemens.

In 2008 Dr. Theis retired from Siemens and now pursues his professional life as a consultant to high-tech companies and scientific and engineering associations. At the university he continues teaching about flat panel display technologies and he keeps contributing to European Foresight Projects.

Presentation: *The Digital Transformation: Chances and Challenges in Industry 4.0 and beyond*

A profound change is now underway in the world's leading industrial and manufacturing companies. They are digitizing essential functions within their vertical operation processes and along their horizontal value chains. The new product portfolios are enhanced with digital functionalities and innovative data-based services are generated. At the end of these transformative processes we will see the emergence of truly digital enterprises, working together with customers and suppliers in industrial digital ecosystems.

The term Industry 4.0 was coined in Germany to emphasize this computerization of manufacturing. The core of this vision is being built on the (Industrial) Internet of Things, the ubiquitous interlinking and networking of persons, things and machines.

The talk will highlight the developments in Industry 4.0 from a German/European perspective, introduce the corresponding reference architecture model and try to give an outlook on the digital transformation in our societies at large, including short glances on platform industries, artificial intelligence and employment. The talk will conclude with some considerations on social and ethical aspects in the context of the digital transformation.