

3rd International Conference on System-integrated Intelligence: New Challenges for Product and Production Engineering, SysInt 2016

## Editorial: System-Integrated Intelligence – New Challenges for Product and Production Engineering

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### Abstract

The editorial introduces the SysInt conference series and the motivation behind it. It describes the structures and content as well as the scientific and technological background to the SysInt 2016 event held in Paderborn from June 13<sup>th</sup> – 15<sup>th</sup>, 2016, and provides an outline of the organizing institutions, detailing their individual perspectives on the general topic of system-integrated intelligence.

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### 1. Introduction

The volume contains the collected research and development activities presented at the 3rd International Conference on System-integrated Intelligence (SysInt) held in Paderborn, Germany from June 13<sup>th</sup> – 15<sup>th</sup> 2016. The SysInt 2016 is the third in a series of events started in 2012 in Hanover, Germany. Just like this first instalment, the current event

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derives its dynamic and innovative nature from the close cooperation between three major research centres which focus on similar topics, but maintain slightly different perspectives on it:

Their complementary constitutes the strength of the combined effort. In 2016, this setting has attracted more than 70 contributions from 9 countries worldwide.

## 2. Scope of the conference

Based on the success of the 1st and 2nd, we now announce the 3rd International Conference on System-Integrated Intelligence: New Challenges for Product and Production Engineering.

This international event provides a forum for academia and industry to disseminate their latest innovations and practices. The focus is on integration of new, intelligent functionalities into materials, components, systems and products to enable future technologies with enhanced capabilities.

Development of new sensor materials and technologies, intelligent products including Cyber-Physical Systems (CPS) and self-controlled processes for logistics and production engineering (Industrie 4.0) are within the scope of the conference. Fundamental research areas thus include functional materials research, mechatronic systems and production engineering, microsystems technology, systems engineering and computer science.

## 3. The Organizers behind SysInt 2016

Within this range, all three research centres set their very own specific stress. The Heinz Nixdorf Institute of Paderborn University as this year's host of the event is represented among the conference chairs by Prof. Trächtler as the head of the chair for "Control Engineering and Mechatronics" and as the director of the Fraunhofer Research Institution for Mechatronic Systems Design IEM. The Heinz Nixdorf Institute is an interdisciplinary research institute with a primary focus on Intelligent Technical Systems that are based on the interplay between engineering and computer science. Typically, such systems yield products in the field of information technology, communication technology, mechanical engineering, automotive and transport engineering, and the electrical and medical industry. The Heinz Nixdorf Institute aims to establish a new school of thought for the design of intelligent technical systems. Important research areas are:

- Self-coordination, self-optimization and reconfiguration
- Mechatronics and sensing in distributed systems
- Design methodology
- Strategic planning and knowledge management

The Leibniz Universität Hannover, represented among the chairs by Prof. Denkena, stresses the concept of intelligent materials and components. According to this vision, products are to be equipped with a memory of their past experiences that covers their full life cycle from beginning to end. The idea is that development of new products should incorporate knowledge from the past in an analogy to the way genes and their expression control who we are in relation to the experiences of our ancestors. Realization of this concept is supported by the German Research Foundation (DFG) via the Collaborative Research Centre 653 Gentelligent Components in their Life Cycle.

The University of Bremen is represented among the chairs by Prof. Thoben as head of the Bremer Institut für Produktion und Logistik GmbH (BIBA) and as the speaker of the Bremen Research Cluster for Dynamics in Logistics (LogDynamics). LogDynamics conducts research investigating dynamic processes in logistic systems. It combines fundamental and applied research with transfer and education at the interface between science and industry. Important research areas are: autonomous control in logistic processes and networks, Cyber-Physical Systems for Industrie 4.0, Internet of Things and Services and Supply Chain (Event) Management. Four faculties of the University of Bremen cooperate in LogDynamics with the Bremer Institut für Produktion und Logistik GmbH (BIBA), the Institute of Shipping Economics and Logistics (ISL), as well as with the Jacobs University Bremen.

The Leading-Edge Cluster Intelligent Technical Systems OstWestfalenLippe (it's OWL) is sponsoring the SysInt 2016 and is funded by the German Federal Ministry of Education and Research (BMBF) via the Project Management Agency Karlsruhe (PTKA) and a pioneer in Industrie 4.0. It pools the resources of global market leaders

in mechanical engineering and the electrical, electronics and automotive supply industries, as well as internationally renowned, cutting-edge research institutes. The objective they share is to secure the OWL region a leading position among global competitors in the field of intelligent technical systems.

#### **4. Structure of the event**

The SysInt 2016 conference covers the full range of these topics. The conference programme, which is reflected in the proceedings volume, is divided into five different topics, namely

- Intelligent Systems: Enabling Technologies
- The Future of Manufacturing: Cyber-Physical Production and Logistic Systems
- Pervasive and Ubiquitous Computing
- Structural Health Monitoring
- Systems Engineering in Advanced Mechatronics

The first of these covers fundamental technologies that facilitate the broader introduction of system-intelligence on conceptual, software and hardware level. The following four topics address different application scenarios.

#### **5. Conclusion and Outlook**

To organize this event, to bring together all contributors, to fairly judge their work and to provide them with the lively, motivated and open-minded environment that alone allows exchange across the disciplines can never be a single person's work. We would therefore like to take the opportunity to thank all those many people who contributed to the success of the SysInt 2016 conference. This includes the members of the Organizing Committee, the International Programme Committee and the Editorial Committee as well as all those who assisted on site to make the SysInt 2016 conference as smooth and memorable event. We would also like to thank our sponsors, the Leading-Edge Cluster it's OWL, the German Research Foundation (DFG), the Project Management Agency Karlsruhe (PTKA) and the International Academy for Production Engineering (CIRP).