

**13th INTERNATIONAL CONFERENCE
APPLIED COMPUTING 2016**

**PROCEEDINGS OF THE
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APPLIED COMPUTING 2016**

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FOREWORD

These proceedings contain the papers and posters of the 13th International Conference Applied Computing 2016, which was organised by the International Association for Development of the Information Society and co-organized by University of Mannheim, Germany, 28-30 October 2016.

The Applied Computing 2016 conference aims to address the main issues of concern within the applied computing area and related fields. This conference covers essentially technical aspects. The applied computing field is divided into more detailed areas.

The following thirty-six areas have been object of paper and poster submissions:

Agent Systems and Applications, Algorithms, Applied Information Systems, Bioinformatics, Case Studies and Applications, Communications, Data Mining, Database Systems, E-Commerce Theory and Practice, Embedded Systems, Evaluation and Assessment, Global Tendencies, Grid Computing, Information Retrieval, Intelligent Systems, Mobile Networks and Systems, Multimedia, Networking, Object Orientation, Parallel and Distributed Systems, Payment Systems, Programming Languages, Protocols and Standards, Security, Semantic Web, Software Engineering, Storage Issues, Technologies for E-Learning, Wireless Applications, WWW Applications, WWW Technologies, Ubiquitous Computing, Usability Issues, Virtual Reality, Visualization, XML and other Extensible Languages

The Applied Computing 2016 Conference had 94 submissions from more than 20 countries. Each submission has been anonymously reviewed by an average of four independent reviewers, to ensure the final high standard of the accepted submissions. Out of the papers submitted, 23 got blind referee ratings that published them as full papers, which means that the acceptance rate of 24%. Some other submissions were published as short and reflection papers and posters/demonstrations. Authors of the best published papers in the Applied Computing 2016 proceedings will be invited to publish extended versions of their papers in the IADIS International Journal on Computer Science and Information Systems (IJCSIS) (ISSN 1646-3692).

The conference, besides the presentation of full papers, short papers, reflection papers and posters also includes one keynote presentation from an internationally distinguished researcher. We would therefore like to express our gratitude to Prof. Miriam Foeller-Nord, Hochschule Mannheim, Germany.

As we all know, a conference requires the effort of many individuals. We would like to thank all members of the Program Committee for their hard work in reviewing and selecting the papers that appear in the book of the proceedings. Special thanks also to the auxiliary reviewers that contributed to the reviewing process.

Last but not the least, we hope that everybody will have a good time in Mannheim, and we invite all participants for the next year edition of the International Conference Applied Computing 2017.

Hans Weghorn, BW Cooperative State University Stuttgart, Germany
Conference & Program Chair

Mannheim, Germany
October 2016

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KEYNOTE LECTURE

THE INTERNET OF THINGS – BOON AND BANE OF THE MODERN WORLD?

**By Prof. Miriam Foeller-Nord,
Hochschule Mannheim,
Germany**

Abstract

The Internet of Things (IoT) is currently all around. It finds its way in nearly all areas of life. But what does it exactly mean, what stands behind this name? Is it a brand-new technology, a business case or a mere buzzword? What is the difference or the addition to the “normal” Internet, so what is necessary to go for IoT?

Seems, we need “things”. But what kind of things, and what must be their features? In fact, they need to be connected to Internet and for that, they need to transform from simple (stupid) objects to “smart” objects. So, regarding IoT everything has to become connected and “smart”. In private we use smart watches to track our activities and even our home is no longer a simple housing, but will become a smart home. In business and industry smart production, smart factory and smart retail are the upcoming keywords, in healthcare smart health and in traffic smart mobility.

The keynote highlights some answers to the questions above and describes main challenges from technical, social and security side. It gives an overview over the technical aspects and requirements. It shows typical scenarios, the architecture and the components of IoT applications and relations to other current trends like cloud computing and big data. But also a look to the social aspects is necessary. How will the Internet of Things influence our life, will it lead to more freedom and enrichment or to technical dependency? Last but not least, strongly related to the brave new IoT-World and leading us far beyond pure technical issues we have to face a new dimension of security risks.

