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*IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.*

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Luis M. Camarinha-Matos Pedro Pereira  
Luis Ribeiro (Eds.)

# Emerging Trends in Technological Innovation

First IFIP WG 5.5/SOCOLNET Doctoral Conference on  
Computing, Electrical and Industrial Systems, DoCEIS 2010  
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Proceedings



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# Preface

## Identifying Emerging Trends in Technological Innovation

Doctoral programs in science and engineering are important sources of innovative ideas and techniques that might lead to new products and technological innovation. Certainly most PhD students are not experienced researchers and are in the process of learning how to do research. Nevertheless, a number of empiric studies also show that a high number of technological innovation ideas are produced in the early careers of researchers. The combination of the eagerness to try new approaches and directions of young doctoral students with the experience and broad knowledge of their supervisors is likely to result in an important pool of innovation potential.

The DoCEIS doctoral conference on Computing, Electrical and Industrial Engineering aims at creating a space for sharing and discussing ideas and results from doctoral research in these inter-related areas of engineering. Innovative ideas and hypotheses can be better enhanced when presented and discussed in an encouraging and open environment. DoCEIS aims to provide such an environment, releasing PhD students from the pressure of presenting their propositions in more formal contexts.

The first edition of DoCEIS, which was sponsored by SOCOLNET, IFIP and IEEE Industrial Electronics Society, attracted a considerable number of paper submissions from a large number of PhD students (and their supervisors) from 15 countries. This book comprises the works selected by the International Program Committee for inclusion in the main program and covers a wide spectrum of topics, ranging from collaborative enterprise networks to microelectronics. Thus, novel results and ongoing research in the following areas were presented, illustrated, and discussed:

- Value systems alignment in enterprise networks
- Collaborative networks governance and support
- Information modelling and management
- Risk assessment and decision support based on imprecise information
- Evolvable manufacturing systems and cooperative robotics
- Systems modelling and control
- Advances in telecommunications and electronics
- Sensorial perception and signal processing
- Energy systems and novel electrical machinery

As a gluing element, all authors were asked to explicitly indicate the (potential) contribution of their work to technological innovation.

We expect that this book will provide readers with an inspiring set of promising ideas, presented in a multi-disciplinary context, and that by their diversity these results can trigger and motivate new research and development directions.

We would like to thank all the authors for their contributions. We also appreciate the dedication of the DoCEIS Program Committee members who both helped with the selection of articles and contributed with valuable comments to improve their quality.

February 2009

Luís M. Camarinha-Matos  
Pedro Pereira  
Luis Ribeiro



**First IFIP / SOCOLNET Doctoral  
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