

# SmartHEALTH: 5th International Workshop on Smart Healthcare and Wellness Applications

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## ABSTRACT

Research in the area of smart healthcare systems has reached a point where significant improvements are only possible if academics and practitioners from various disciplines collaborate in order to develop new strategies for conceptualizing, designing, and implementing new applications. The underlying strategies must be harmonized and balanced in two ways: first, within the technological areas, and second, regarding the integration of technologies into the medical, cognitive, and social context. This also includes the way technology acts within the life courses of individuals and societies, and the balance of the benefits that technology brings against perceived or actual medical, social as well as ethical drawbacks. Therefore, this workshop aims to bring together researchers and industry practitioners from different fields to share their research positions and practical experiences and discuss new ideas, innovative approaches and challenging research questions, which have the potential to motivate future research activities within the field of smart healthcare systems.

## Author Keywords

Human-Computer Interaction, Human-Centered Design, Ambient Intelligence, Health Care, Smart Services, Ambient Assisted Living, E-Health.

## INTRODUCTION

Within the last five to ten years a variety of new healthcare concepts for supporting and assisting users in technology-enhanced environments emerged (see, e.g., Jähn, 2003 or Tan, 2005 for an overview over state-of-the-art applications). These so-called smart healthcare applications open up new possibilities for supporting diagnosis and therapy, by bridging temporal and spatial gaps between patients and physicians. Personal mobile devices enable autonomous and unobtrusive collection of clinical data and support the continuous transmission of physiological information between patients and remote

healthcare providers (Leonhardt, 2005). For patients with chronic diseases, like, e.g., chronic heart failures or diabetes, mobile e-health systems help to minimize hospital stays and in doing so enable an independent life in a domestic environment. Nevertheless, the complexity of e-health systems raises fundamental questions of behaviour, communication and technology acceptance. For example, users of future e-health systems will be increasingly characterized by diversity. Relying only on highly experienced and technology-prone user groups, which might have been typical users in the last decades, is not sufficient anymore (Czaja and Sharit, 1998; Ellis and Allaire, 1999). Rather, elderly users, users with a completely different upbringing and domain knowledge, and ill or handicapped people will have to use the systems. As previous research focussed mainly on information and communication technologies (Arning and Ziefle, 2007; Ziefle, 2008), there is a major need to understand in which way physical, emotional and cognitive abilities, caused by individual learning histories and health states, may impact the usage and acceptance of e-health technologies (Mellenhorst et al., 2007). Today, research activities in the e-health sector are dominated by professionals from engineering, natural sciences, informatics and medical sciences, who mainly concentrate on aspects of technical feasibility and medical treatment. But in order to fully exploit the potential of e-health applications, not only aspects of technical feasibility, but also acceptance and usability issues of e-health applications have to be carefully considered. In order to meet the needs of future user groups, an integrative and multidisciplinary approach is required, which combines engineering and medical knowledge with theoretical and methodological contributions of the humanities.

## WORKSHOP

The proposed workshop will be based on workshops held at previous OzCHI conferences in Melbourne (2009 and 2012), Brisbane (2010), Canberra (2011). For more information please see: <http://www.humtec.rwth-aachen.de/smarthealth2013>.

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## Workshop Goal

The workshop aims to bring together researchers from different disciplines to discuss the interrelation of medical, environmental, technical, communicative, psychological and social factors and their consequences for the design, use and acceptance of smart healthcare systems.

## Workshop Topics

Recommended topics for position papers include, but are not limited to, the following:

### 1. Methodology

- Usability of Healthcare Information Systems
- Usability of Mobile Computing in Healthcare
- User Experience Design
- Universal (or Disability) Access
- Empirical Methods (Qualitative and Quantitative)
- User and Cognitive Models
- Participatory Design
- Model-Based Design of E-Health Systems
- Tools for Design, Modelling, and Evaluation

### 2. Concepts and Applications

- Novel E-Health Concepts
- Software Infrastructures and Architectures for Implementing E-Health Applications
- Tools and Design Techniques for E-Health Systems
- Interaction Design
- Multidisciplinary or Interdisciplinary Design
- Trade-off between Technical, Medical, and User Requirements
- Aesthetic vs. Functional Design Aspects
- Emotional and Hedonic Design

### 3. Human-Computer Interaction

- Human Aspects of Future and Emerging Healthcare Technologies
- Human-Computer Interaction in Healthcare
- User-Centered or Human-Centered Design
- Emotion and Affective User Interface
- Adaptive and Tangible User Interfaces for E-Health Systems
- Universal (or Disability) Access

### 4. Social and Ethical Aspects

- Accessibility and Usability
- User Diversity
- Ethical and Normative Requirements
- Gender Specific Healthcare Design
- Economical, Legal, and Environmental Constraints
- Technology Acceptance and Performance
- Social and Societal Implications of E-Health Applications
- Legal Issues in E-Health Applications
- Privacy, Security, and Trust in E-Health Applications
- Cultural Aspects of E-Health Systems

## 5. Technology and Systems

- Technologies and Devices for Smart Healthcare Systems
- Medical Devices and Sensors Infrastructures
- Wireless Communication and Sensor Networks
- Collaborative and Distributed Healthcare Systems
- Handheld Devices and Mobile Computing in E-Health Systems
- Ubiquitous and Pervasive Computing in Healthcare
- Ambient Assisted Living Environments

## ORGANIZERS



**Carsten Röcker** is a senior researcher at the Human-Computer Interaction Center (HCIC) and a lecturer at the Linguistics and Communication Science Institute at RWTH Aachen University, Germany. His current research addresses technical as well as

social aspects of human-computer interaction in intelligent environments. Previously, he was a senior researcher at the Human Technology Centre (HumTec), working in the research program “eHealth Enhancing Mobility with Aging”. Before joining RWTH Aachen University in 2008, he was a PostDoc at the Distributed Cognition and HCI Laboratory at the University of California in San Diego, USA. From 2000 to 2006 he worked as a research associate at the Fraunhofer Integrated Publication and Information Systems Institute (IPSI) in Darmstadt. During this time he was involved in two EU-funded projects designing novel information and communication technologies for intelligent home and office environments. Besides these appointments, he was a research fellow at Tokyo University, Japan (2010) and guest professor at the Medical University of Graz, Austria (2012). He has an interdisciplinary background with academic degrees in the areas computer science (PhD), psychology (PhD), electrical engineering (Master), and management (Master).



**Martina Ziefle** is professor for Communication Science at RWTH Aachen University and head of the eHealth Research group at the Human Technology Centre at RWTH Aachen University. Martina Ziefle studied psychology at the universities of Göttingen and

Würzburg, Germany, where she finished her studies with honors. From the University of Fribourg, Switzerland, she received her Ph.D. in psychology summa cum laude. After her habilitation at RWTH, in which she examined reading processes in electronic media, Martina Ziefle took up positions as assistant professor at the University of Münster and, subsequently, at the RWTH Aachen. The research of Prof. Ziefle addresses the human factor in different technology types and using contexts. Technology acceptance decisively depends on the extent to which user diversity is considered and implemented in technological design. A special research focus is directed

to the design of medical technologies. Here, the identification of users' specific needs as well as affective barriers towards new technologies is essential in this sensitive field. In addition to teaching and directing research in HumTec, Prof. Ziefle leads various projects funded by industrial and public authorities, dealing with the interaction and communication of humans with technology.



**Andreas Holzinger** is head of the Research Unit HCI, Institute for Medical Informatics, Statistics & Documentation, Medical University Graz, and Associate Professor at Graz University of Technology, where he teaches Biomedical Informatics at the

Institute of Bioinformatics & Genomics, and supervising engineering students at the Institute of Information Systems & Computer Media. He started as apprentice in Information Technology, and after his second chance education and IT industry experience, he began his academic studies at the age of 26, studied Information Technology, Physics, and Psychology, Media at Graz University, obtained his PhD in Cognitive Science from Graz University in 1997 and his Habilitation in Computer Science from Graz University of Technology in 2003. Andreas was Visiting Professor in Berlin, Innsbruck, Vienna, London and Aachen. Since 1999 he has participated in leading positions in 30+ R&D multinational projects, budget 3+ MEUR, 300+ publications, 3000+ citations, h-index=26, g-index=68.



**Kevin McGee** leads the Partner Technologies Research Group. He is currently an Associate Professor in the Communications and New Media Programme at the National University of Singapore. He does research to develop computational partners that facilitate and increase

participation in life's interesting and important challenges. This involves theoretical and applied work at the intersection of end-user programming, artificial intelligence, cognitive science, design methods, media studies, and the arts. His background includes work as a theater dramaturge, director, actor, and technician; as a research scientist in the field of AI and computational media; as a designer, developer, and product manager of educational and entertainment products; as a business strategy consultant to new-media companies; as the head of operations for a startup developing advanced consumer applications; and as a university lecturer and thesis advisor in computer science, human-computer interaction, and media technology. He has a Masters degree from Harvard University and a PhD from the MIT Media Laboratory.



**Susan Hansen** is a PhD candidate investigating the role of ICT (Information Communications Technologies) for delivering services to underserved communities. In her previous role as a researcher for the CSIRO ICT Centre she was involved in the

design, implementation and evaluation of telemedicine systems to facilitate the delivery of health services to rural and regional Australia. Her current thesis involves working in partnership with Rhodes University in South Africa to explore how ICT's can facilitate the delivery of health, education and other fundamental services to rural South Africa.



**Jochen Meyer** studied Computer Science at the University of Oldenburg from 1989 to 1994. From 1994 to 1995, he worked as a software developer. Since 1995, he works at OFFIS, where he first was active as a research assistant in the area of digital libraries and internet

technologies. From 1998 to 2008 he was director of the division 'Multimedia and Internet Information Services'. Since 2008 he is director of the Health department at OFFIS. His research areas include semantic multimedia data retrieval, mobile multimedia services & intelligent user interfaces.

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