



# Modiquitous 2012

*Proceedings of the 2nd International Workshop on Model-based Interactive Ubiquitous Systems*



TECHNISCHE  
UNIVERSITÄT  
DRESDEN

**Proceedings of Modiquitous Workshop**

Copyright for the whole publication, Technische Universität Dresden, 2012

Copyright of the single articles remains with the authors.

Publication Online-CEUR Proceedings ([CEUR-WS.org](http://CEUR-WS.org))

CEUR-WS Vol-947

Publication Year 2012

V.i.s.d.P:

Jun.-Prof. Dr. Thomas Schlegel

Junior Professorship for Software Engineering of Ubiquitous Systems

Institute for Multimedia and Software Technology

Technische Universität Dresden

01062 Dresden

Germany

# CONTENTS

<b>1</b>	<b>WORKSHOP ORGANIZERS</b>	<b>4</b>
1.1	Thomas Schlegel . . . . .	4
1.2	Romina Kühn . . . . .	5
1.3	Stefan Pietschmann . . . . .	6
<b>2</b>	<b>PROGRAMME COMMITTEE</b>	<b>7</b>
<b>3</b>	<b>INTRODUCTION</b>	<b>8</b>
<b>4</b>	<b>THEME, GOALS, AND RELEVANCE</b>	<b>9</b>
<b>5</b>	<b>PROGRAM</b>	<b>11</b>
<b>6</b>	<b>ACCEPTED PAPERS</b>	<b>13</b>
6.1	Towards a flexible control center for cyber-physical systems . . . . .	14
6.2	Model-based support for energy-efficient production in SME . . . . .	18
6.3	A Situated Model and Architecture for Distributed Activity-Based Computing . . . . .	22
6.4	Models and Patterns for Smart Environments . . . . .	27
6.5	A Semantic Dashboard Description Language for a Process-oriented Dashboard Design Methodology . . . . .	31
6.6	Test Modeling for Context-aware Ubiquitous Applications with Feature Petri Nets . . . . .	37

# 1 WORKSHOP ORGANIZERS

## 1.1 Thomas Schlegel



Technische Universität Dresden

01062 Dresden

Germany

[thomas.schlegel@tu-dresden.de](mailto:thomas.schlegel@tu-dresden.de)

Thomas Schlegel is Junior Professor for Software Engineering of Ubiquitous Systems at the Institute of Software and Multimedia Technology of the Technical University of Dresden. Before he joined the University of Stuttgart as team leader for Interactive Systems, he worked as senior researcher and research project leader at Fraunhofer IAO from 2002, where he served as research cluster leader in the European Network of Excellence I\*PROMS and led various national and international research projects. He received his PhD in engineering from the University of Stuttgart. He is author and co-author of 60 scientific publications and serves as reviewer and committee member for diverse international conferences.

## 1 WORKSHOP ORGANIZERS

### 1.2 Romina Kühn



Technische Universität Dresden  
01062 Dresden  
Germany

[romina.kuehn@tu-dresden.de](mailto:romina.kuehn@tu-dresden.de)

Romina Kühn is a research associate at the Junior Professorship for Software Engineering of Ubiquitous Systems at the Technical University of Dresden. Her research interests include interaction concepts, interface design and development, and usability aspects. Public ubiquitous systems and especially systems in public transportation are her main application field.

## 1.3 Stefan Pietschmann



Technische Universität Dresden

01062 Dresden

Germany

[stefan.pietschmann@tu-dresden.de](mailto:stefan.pietschmann@tu-dresden.de)

Stefan Pietschmann is research associate and Ph.D. student at the Institute of Software and Multimedia Technology of the Technical University of Dresden. He has been actively involved in several research projects in the field of collaborative and context-aware web applications. In the project CRUISe he specifically addresses the model-driven development of adaptive interactive applications based on the idea of a universal service composition.

## 2 PROGRAMME COMMITTEE

- Uwe Aßmann, Technical University of Dresden, Germany
- Jan van den Bergh, Hasselt University, Belgium
- Birgit Bomsdorf, Hochschule Fulda, Germany
- Raimund Dachzelt, Otto von Guericke University of Magdeburg, Germany
- Florian Daniel, University of Trento, Italy
- Alfonso Garcia-Frey, University of Grenoble, France
- Geert-Jan Houben, Technical University of Delft, Netherlands
- Heinrich Hussmann, Ludwig-Maximilian University Munich, Germany
- Sevan Kavaldjian, Vienna University of Technology, Austria Programme Committee
- Gerrit Meixner, DFKI, Germany
- Philippe Palanque, University of Toulouse, France
- Fabiò Paterno, CNR-ISTI, Italy
- Michael Raschke, University of Stuttgart, Germany
- Dirk Roscher, Technical University Berlin, Germany
- Enrico Rukzio, University Duisburg-Essen, Germany
- Stefan Sauer, University of Paderborn, Germany
- Thomas Springer, Technical University of Dresden, Germany
- Gerhard Weber, Technical University of Dresden, Germany
- Anette Weisbecker Fraunhofer IAO, Stuttgart, Germany
- Jürgen Ziegler, University Duisburg-Essen, Germany

# 3 INTRODUCTION

Ubiquitous systems today are introducing a new quality of interaction both into our lives and into software engineering. Systems become increasingly dynamic making frequent changes to system structures, distribution, and behavior necessary. Also, adaptation to new user needs and contexts as well as new modalities and communication channels make these systems differ strongly from what has been standard in the last decades.

Models and model-based interaction at runtime and design-time form a promising approach for coping with the dynamics and uncertainties inherent to interactive ubiquitous systems (IUS). Hence, this workshop discussed how model-based approaches can be used to cope with these challenges. Therefore, it covers the range from design-time to runtime models and from interaction to software engineering, addressing issues of interaction with and engineering of interactive ubiquitous systems.

The MODIQUITOUS workshop was intended to discuss challenges and possible solutions of the EICS community to design and runtime aspects of interactive ubiquitous systems with a focus on model-based approaches. It aims to bring together researchers and practitioners focused on different problems of IUS.



# 4 THEME, GOALS, AND RELEVANCE

Model-based interactive ubiquitous systems form a new promising yet challenging domain within the scope of the Engineering of Interactive Computing Systems (EICS) conference. This workshop is intended to discuss these challenges and possible solutions of the EICS community to design and runtime aspects of interactive ubiquitous systems with a focus on model-based approaches. The related problem space becomes clear when looking at typical future scenarios: users will not only carry their data but also their applications and profiles with them. This may mean switching from planning a project on a desktop system to a collaborative setting in a meeting and further to a mobile or public display setting where a mobile device is used for creating sketches for the first steps in the project. Consequently, applications will evolve from device-oriented to emergent cyber-physical and ubiquitous software in a broad sense, forming interactive and socio-technical systems. This opens manifold possibilities, but also a number of research problems regarding both the development process and the execution environment for those kinds of applications.

The MODIQUITOUS workshop is intended to provide a basis for discussion the adequate solution space. Therefore, it aims to bring together researchers and practitioners focused on different challenges of IUS, including:

- Model-driven architecture (MDA) in the context of IUS
- Advantages and potential problems of using MDA in the IUS domain
- Domain and Meta models for IUS, specifically for IUS-related aspects like interaction, different modalities, dynamic distribution, context-awareness, etc.
- Domain-specific models for IUS
- Model-driven generation of (intelligent) IUS
- Model-to-model and model-to-code transformations for IUS development
- Model-driven development and execution architectures, i.e., runtime systems for IUS
- Tools and frameworks for supporting the model-driven development of IUS
- Concepts for context-awareness and self-adaptation of IUS at the model and runtime level
- Software and Usability Engineering aspects in the context of model-based IUS
- Innovative ideas and novel application solutions for new interactive ubiquitous settings, e.g., from the fields of mobile computing, pervasive computing and social software
- Studies on interaction concepts on IUS

## 4 THEME, GOALS, AND RELEVANCE

- Requirements, insights and experiences from existing mobile and pervasive settings

All these topics are of high relevance to a big part of the EICS community as their use is not restricted to ubiquitous systems and will show new ways for many kinds of new systems like mobile device settings, pervasive computing and social software.

# 5 PROGRAM

*2nd Workshop on Model-Based Interactive Ubiquitous Systems*  
Copenhagen, Denmark - June 25, 9:00-17:00

8:30

*Arrival and Registration*

9:30

*Welcome and introductions*

Introductory statements by the organizers and brief introduction by each participant

9:15

*Discussion and Topic Definition*

Discussion and definition of hot research topics

10:30

*Coffee Break*

11:00

*Paper presentations*

- Peter Fobrig and Michael Zaki  
*Models and Patterns for Smart Environments*
- Steven Houben, Morten Esbensen and Jakob Bardram  
*A Situated Model and Architecture for Distributed Activity-Based Computing*
- Uwe Laufs, Christopher Ruff and Jan Zibuschka  
*Model based support for energy efficient production in SME*

12:30

*Lunch*

14:00

*Paper presentations*

- Martin Franke, Diana Brozio and Thomas Schlegel  
*Towards a flexible control center for cyber-physical systems*
- Maximilian Kintz  
*A Semantic Dashboard Description Language for a Process-oriented Dashboard Design Methodology*

## 5 PROGRAM

- Georg Püschel, Ronny Seiger and Thomas Schlegel

*Test Modeling for Context-aware Ubiquitous Applications with Feature Petri Nets*

**15:30** *Coffee Break*

**16:00** *Group Work*

Discussion of the selected topic, e.g., identification of research roadmap items

**16:30** *Discussion*

Plenum discussion and topic integration

**17:00** *End*

## 6 ACCEPTED PAPERS

The following papers were accepted:

- Towards a flexible control center for cyber-physical systems
- Model-based support for energy-efficient production in SME
- A Situated Model and Architecture for Distributed Activity-Based Computing
- Models and Patterns for Smart Environments
- A Semantic Dashboard Description Language for a Process-oriented Dashboard Design Methodology
- Test Modeling for Context-aware Ubiquitous Applications with Feature Petri Nets