

# 1<sup>st</sup> International UBI Summer School 2010

Oulu, Finland

May 31 – June 4, 2010

<http://www.ubioulu.fi/UBI-challenge> (to be opened)

## 1. Introduction

1<sup>st</sup> International UBI Summer School 2010 is the first phase of the “1<sup>st</sup> Open Ubiquitous City Challenge” (“UBI-challenge” for short) prepared in cooperation with leading international experts on ubiquitous and urban computing. The “UBI-challenge” invites the international R&D community to design, implement, deploy and evaluate novel urban computing application in City of Oulu, atop the open urban computing testbed developed by the UBI (UrBan Interactions) research program in collaboration with the City of Oulu and industry.

The motivation of the “UBI-challenge” is to:

- Provide international R&D community opportunity to demonstrate their expertise in application development atop open "urban computing testbed";
- Provide international R&D community opportunity to transfer their ideas from the lab into real-life urban environment;
- Stimulate global research collaboration on urban informatics in a very concrete manner;
- Support developing a framework for evaluating urban infrastructure and applications in real-life setting.

The phases and schedule of the 1<sup>st</sup> ”UBI-challenge”:

0. 1<sup>st</sup> International UBI Summer School 2010 in Oulu (31.5.-4.6.2010)
1. Submission of a written entry (tentative deadline: Sep 30, 2010)
2. Jury selects finalists (Oct 2010)
3. Finalists deploy their systems in Oulu (June 2011)
4. Collection of empirical evidence (Jul-Aug 2011)
5. Reporting (Sep 2011)
6. Jury nominates award recipients (Oct 2011)

The jury of the “UBI-challenge” (members confirmed so far):

- Prof. Heikki Ailisto (VTT Technical Research Centre of Finland)
- Prof. Anind Dey (Carnegie Mellon University, USA)
- Prof. Marcus Foth (Queensland University of Technology, Australia)
- Director Adam Greenfield (Nokia)
- CIO Juhani Heikka (City of Oulu, Finland)
- CEO Heikki Huomo (Center for Internet Excellence, Finland)
- Prof. Oskar Juhlin (Interactive Institute, Sweden)
- Prof. Vassilis Kostakos (University of Madeira, Portugal)
- Director Olli Lukkari (Ubiquitous Computing Cluster Programme, Finland)
- Dr. Artur Lugmayr (Tampere University of Technology, Finland)
- Director Veli-Pekka Niitamo (Nokia)
- Prof. Eric Paulos (Carnegie Mellon University, USA)
- Prof. Jukka Riekkö (University of Oulu, Finland)
- Prof. Albrecht Schmidt (University of Duisburg-Essen, Germany)
- Prof. Sasu Tarkoma (Aalto University, Finland)
- Prof. Mikael Wiberg (Umeå University, Sweden)
- Prof. Timo Ojala (University of Oulu, Finland), Chair (nonvoting)

## 2. Program

The purpose of the 1<sup>st</sup> International UBI Summer School 2010 is researcher training, international R&D networking and promotion of the “UBI-challenge”.

The 1<sup>st</sup> International UBI Summer School 2010 comprises of six parallel workshops (intensive postgraduate courses) organized mostly by the members of the “UBI-challenge” jury:

- Prof. Anind Dey (CMU, USA): Real World Context-Aware Systems
- Prof. Marcus Foth (QUT, Australia): Urban Informatics and Sustainable Cities
- Prof. Vassilis Kostakos (University of Madeira, Portugal): Urban Social Networks Analysis
- Jürgen Scheible (Aalto University, Finland): Creating and Sharing Artistic Experiences with Ubiquitous Technology
- CTO Zach Shelby (Sensinode Ltd., Finland): IP-based Wireless Sensor Networks
- Prof. Mikael Wiberg (Umeå University, Sweden): Interactive Textures – rethinking materiality?

The instructors of the workshops also serve as invited keynote speakers in the “2<sup>nd</sup> Open Ubiquitous City Seminar” to be held in Oulu on 31.5.2010. The seminar kicks off the 1<sup>st</sup> International UBI Summer School 2010 and releases UBI Pilot 2010, the second large-scale long-term prototype of the open ubiquitous city developed by the UBI program.

Preliminary daily schedule:

### *Monday 31.5.2010*

- 9-16 2<sup>nd</sup> Open Ubiquitous City Seminar, City Library, Pakkalan sali
- 19-24 Get together party (includes poster session for students)

### *Tuesday 1.6.2010*

- 9-16 Hard work at the workshops

### *Wednesday 2.6.2010*

- 9-16 Hard work at the workshops

### *Thursday 3.6.2010*

- 9-16 Hard work at the workshops
- 19-24 School dinner

### *Friday 4.6.2010*

- 9-12 Presentation of the results of the workshops
- 13-15 Introduction of the “UBI-challenge”

The passing criteria will be the submission of a written essay, which is reviewed by the instructor of a particular workshop.

The number of ECTS credits for the summer school has not been defined yet.

## 3. Workshop synopses

### **Real World Context-Aware Systems** by Prof. Anind Dey (CMU, USA)

This workshop will discuss the design and development of context-aware systems. It will engage participants in building their own context-aware systems with a variety of mobile phone and fixed environment sensors. Participants will be exposed to behavioral/anthropological methods in selecting systems to build, to a variety of software tools for building applications and to a variety of methods for evaluating these systems. In the workshop, we will discuss the details for building context-aware systems in domains such as healthcare,

mobile computing, and transportation. We will also investigate a number of aspects of context-aware systems related to the usability and experiences in using these systems: intelligibility, the role of machine learning, end user control, end user feedback, etc.

### **Urban Informatics and Sustainable Cities** by Prof. Marcus Foth (QUT, Australia)

One way to build more sustainable cities through network technologies is to start with monitoring the level and usage of resources as well as encourage citizens to participate in sustainable everyday practices. This workshop focuses on three fundamental areas of sustainable cities through urban informatics and ubiquitous computing:

- Environment: climate change adaptation
- Health: Food practices and cultures
- Civic engagement: citizen participation and interaction

In particular, the workshop seeks to come up with locally (Oulu) specific ‘mash-up’ solutions that enhance the interactions of citizens with the physical city using data from various sources such as sensor networks. Students will work in groups to research, analyze, design, and develop local mash-ups. The workshop is designed to help students gain understanding of sustainability in a techno-social context, such as how the existing data can be effectively utilized, how to gather new data, and how to design efficient and engaging computer-human interactions. Further issues of consideration include access to and privacy of information and spaces, cultural specificities, and transdisciplinary research.

### **Urban Social Networks Analysis** by Prof. Vassilis Kostakos (University of Madeira, Portugal)

This workshop will introduce students to the analysis of urban social networks. These are networks of encounter and co-presence that exist in a city. Although people's movement in the city and encounters with others are random, this is far from the truth. In this workshop we will present an overview of this topic, and give students the necessary skills to capture and analyze such networks. The students will get acquainted with the necessary software, will experience first-hand data collection in the city centre, and will get a chance to carry out their own analyses of the City of Oulu. Finally, the students will explore the new kinds of applications that these analyses enable, such as "Urban Facebook".

### **Creating and Sharing Artistic Experiences with Ubiquitous Technology** by Jürgen Scheible (Aalto University, Finland)

This workshop investigates new ways of deploying ubiquitous technologies for creating and sharing artistic experiences in the context of a city. We want to create new types of digital art making in public space and discover novel possibilities for interacting with the urban environment through multimodal interfaces. The aim is to design and build tools and applications for artistic expression by utilizing the latest mobile technologies, public displays as well as small and large-scale projections. The city of Oulu and the "Open Ubiquitous Oulu" urban computing test bed will serve as our playground for generating ideas and for testing our prototype solutions. The students will first get an introduction into the latest features of smartphones programming and then learn how to use ‘Pygame’ and the programming language ‘Python’ and ‘Processing’ to program multimedia, web and server applications quickly. Further they will learn how to use these technologies for building multimodal interfaces and tools for art making. With an iterative rapid prototyping process we will then build applications based on students ideas and have them fully working by the end of the week ready for final presentation and demonstration.

### **IP-based Wireless Sensor Networks** by CTO Zach Shelby (Sensinode Ltd., Finland)

Internet Protocol technology is quickly becoming critical for low-power wireless sensor network applications e.g. for the smart grid, building automation and logistics. In this workshop Zach Shelby gives a hands-on introduction to this exciting new application of IP technology and the recent IPv6 over Low-Power Area Network (6LoWPAN) standard based on his new book "6LoWPAN: The Wireless Embedded Internet". During the workshop students will learn and try the basics of 6LoWPAN networking, application protocol and embedded web services, and will design and prototype their own applications using the latest commercial technology.

### **Interactive Textures – rethinking materiality?** by Prof. Mikael Wiberg (Umeå University, Sweden)

In this workshop we will take a point of departure in current research and development within the field of ubiquitous computing. More specifically, we will work through current research within the fields of tangible user interfaces (TUIs), interactive architecture, and applications of new dynamic and computational materials in our everyday lives. The workshop will heavily focus on the notion of texture as a tool to rethink materiality in the context of unified digital and physical materials. We will work through this notion through the scaffolding concepts of composition, connections, competition and compromises as to develop our language for talking specifically about the intersection of the physical and the digital. Following from that, this workshop focuses on the design implications given this framework and how it can be useful for understanding and rethinking materiality in any digital design project related to the “material turn” in interaction design.

## **5. Instructor biographies**

**Anind K. Dey** is an Associate Professor in the Human-Computer Interaction Institute at Carnegie Mellon University. His interests lie at the intersection of human-computer interaction, machine learning and ubiquitous computing. He has spent the last decade developing techniques for building context-aware applications, and for improving the usability of such applications. Anind is the author of over 100 articles in the area of ubiquitous computing, has served as the Program Chair for several conferences on ubiquitous computing and serves on the editorial board for IEEE Pervasive Computing and the Personal and Ubiquitous Computing Journal. Before joining Carnegie Mellon University, Anind was a Senior Researcher at Intel Research Berkeley and an Adjunct Assistant Professor at the University of California-Berkeley. He holds a PhD and a Masters degree in Computer Science, as well as a Masters degree in Aerospace Engineering, all from Georgia Tech, and a Bachelors of Computer Engineering from Simon Fraser University.

**Marcus Foth** is Associate Professor and a Principal Research Fellow with the Institute for Creative Industries and Innovation. He founded and leads the Urban Informatics Research Group at QUT. He received a Vice-Chancellor's Research Fellowship (2009-2011), and a Smart Futures Fellowship from the Queensland State Government (2009-2011), co-sponsored by National ICT Australia (NICTA). He was an ARC Australian Postdoctoral Fellow (2006-2008), and a Visiting Fellow (2007) at the Oxford Internet Institute, University of Oxford, UK. Dr Foth's research explores human-computer interaction design and development at the intersection of people, place and technology with a focus on urban informatics, locative media and mobile applications. Dr Foth has published over sixty articles in journals, edited books, and conference proceedings in the last five years. He is the editor of the Handbook of Research on Urban Informatics (2009).

He is the conference chair of OZCHI 2009 (Melbourne) and the 5th International Conference on Communities and Technologies 2011 (Brisbane).

**Vassilis Kostakos** is an Assistant Professor in the Madeira Interactive Technologies Institute at the University of Madeira, and an Adjunct Assistant Professor at the Human Computer Interaction Institute at Carnegie Mellon University. He holds a BSc and PhD in Computer Science from the University of Bath. He was a member of the Cityware project, and worked closely with the Space Syntax group at the Bartlett School of Architecture at UCL and HP Research Labs. His research has been reported by popular media such as the BBC and New Scientist, and he regularly consults on social networking systems. His current projects address security and privacy for the web and situated services, novel sensing techniques for urban transport, sustainability, and modeling of city-scale mobility. His interests include: mobile and pervasive computing, human-computer interaction, social networks, security and privacy, modeling and simulation, epidemics, wireless technologies, and space syntax.

**Jürgen Scheible** is a researcher, musician and media artist. He is a doctoral student at the Aalto University School of Art and Design in Helsinki where he runs the Mobile Hub, a prototype development resource for mobile applications with a strong focus on artistic approaches and creative design. His research focuses on designing multimodal user interfaces for creating and sharing interactive artistic experiences. He has previously worked for 8 years at Nokia and in 2006 he was as a visiting scientist at MIT. He is the recipient of the Best Arts Paper Award in ACM Multimedia 2005 in Singapore, and ACM Computers in Entertainment Scholarship Award in 2006. In 2006, 2007 and 2009 Jürgen was recognized as a Forum Nokia Champion for his driving vision to be a bridge builder between art, engineering and research. Reuters and Sky have featured his latest creation, the MobiSpray Art tool. He is the author of the book 'Mobile Python - Rapid prototyping of Applications on the Mobile Platform' (Wiley, 2007). He has been giving innovation workshops on rapid mobile application prototyping in academic and professional settings e.g. at Stanford University, MIT, NTU Taiwan, Yahoo Research Berkeley and Nokia.

**Zach Shelby** is co-founder and Head of Research at Sensinode Ltd. where he leads low-power wireless IP networking research, standardization and IPR activities for the company. Earlier he has also served as Managing Director and CTO for Sensinode. Before starting Sensinode, he led wireless networking research at the Centre for Wireless Communications and at the Technical Research Center of Finland. He is an active participant in the IETF, with activities in the 6LoWPAN and ROLL working groups, ETSI standardization on M2M, and in several top EU research programs. Research activities include 6LoWPAN networking architectures for enterprise applications, low-power application protocols, embedded web services and Contiki. Zach is known as a pioneer in the use of IP technology in low-power networks with NanoIP, early BT Ultra-Low Power (ULP) and low-rate Ultra-Wide Band (UWB) technology development. Zach is co-author of the book "6LoWPAN: The Wireless Embedded Internet". His results include a large portfolio of courses, publications, public talks, broad research cooperation, and key patents. The mission is clear - making the Wireless Embedded Internet a reality.

**Mikael Wiberg**, PhD, is an associate professor at the department of Informatics at Umeå university in Sweden. From this position he works, teaches, supervises PhD students, and leads and conducts interaction research in several of his research projects in collaboration with industry partners including e.g. Google, Ericsson, Philips and ICEHOTEL. At the department of Informatics Wiberg is also program director for the

Masters programme in Human Computer Interaction. Wiberg is also the Research Director at UID - Umeå Institute of Design (swe: "Designhögskolan") at Umeå University and responsible for the Design Research Lab at UID. Wiberg has served as the main supervisor for several PhD students, and in his own research, mostly focused on mobile interaction, the emerging interaction society, interaction design and interactive architecture, he has published his work in a number of international journals, including ToCHI, BIT, IEEE Network, etc. and he has also published his work in books (including his role as editor for the book "The Interaction Society", and author of the forthcoming book "Interactive Textures for Architecture and Landscaping: Digital elements and technologies"). He has also published his work in encyclopedias, as book chapters, and in international conference proceedings with peer review systems. Wiberg has served as chair, reviewer, organizer, associate editor, and session chair for a number of international conferences (e.g. full paper session chair at CHI'04). Last year, 3-5 Dec '08 Wiberg served as general conference chair for MUM'08 – 7th international conference on Mobile and Ubiquitous Multimedia in cooperation with ACM SigMobile (this year, MUM'09 is organized by Microsoft research, Nokia research and University of Cambridge, UK). Currently Wiberg is also associate editor for ISJ - Information Systems Journal.