Pervasive Health 2013

7th International Conference on
Pervasive Computing Technologies for Healthcare

Technical Programme

San Servolo Island
Venice, Italy
5th to 8th of May 2013
## Conference at a glance

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<td><strong>SESSION A (SHORT PAPERS)</strong> Therapy and Rehabilitation</td>
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<td>16:15 Townhall Meeting 17:00 Closing remarks End of Pervasive Health 2013</td>
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PERVASIVE HEALTH: EMPOWERING INDIVIDUALS,  
FACILITATING LEARNING AND DELIVERING BETTER HEALTH

Elizabeth Mynatt  
Professor  
Executive Director, Institute for People and Technology  
Georgia Institute of Technology, USA

While health is a pervasive human concern, healthcare is often siloed into acute care centers with misaligned incentives and fragmented care. However, the unique capabilities of pervasive technologies have the potential to transform healthcare practices by shifting care from acute to home settings, by enabling continuous data capture and analysis, by creating a network of communication and collaboration channels, and by helping individuals engage in their own care. In the end, the emphasis changes from healthcare and chronic disease to a focus on health and wellness.

In this talk, I will draw from a number of research projects that combine computing research, human-centered design, and health management theory to create promising approaches for promoting wellness, supporting behavior change and delivering improved health outcomes.

About Elizabeth Mynatt

Elizabeth Mynatt is the Executive Director of the Institute for People and Technology (IPaT) and Professor of Interactive Computing at the Georgia Institute of Technology. The Institute for People and Technology (IPaT) at Georgia Tech focuses on examining and transforming the human-centered enterprises of media, health, education, and humanitarian systems. IPaT connects industry, non-profit, and public sector partners with Georgia Tech research and technology innovations across a breadth of disciplines, departments, and research centers, integrating academic and applied research through a unique array of living laboratories and multidisciplinary projects.

Mynatt is an internationally recognized expert in the areas of human-centered computing, ubiquitous computing and assistive technologies. Her research contributes to ongoing work in personal health informatics, computer-supported collaborative work and human-computer interface design. She is also one of the principal researchers in the Aware Home Research Initiative; investigating the design of future home technologies, especially those that enable older adults to continue living independently as opposed to moving to an institutional care setting.

Mynatt is a member of the ACM SIGCHI Academy, a Sloan and Kavli research fellow, and serves on Microsoft Research's Technical Advisory Board. Mynatt is also a member of the Computing Community Consortium, an NSF-sponsored effort to engage the computing research community in envisioning more audacious research challenges. She has published more than 100 scientific papers and chaired the CHI 2010 conference, the premier international conference in human-computer interaction. Prior to joining the Georgia Tech faculty in 1998, she was a member of the research staff at Xerox PARC, working with the founder of ubiquitous computing, Mark Weiser.
S1: GAMIFICATION AND VIRTUAL ENVIRONMENTS
SESSION CHAIR:

PAPER | Exploring Audio Storytelling in Mobile Exergames to Change the Perception of Physical Exercise (Best Paper candidate)
Luca Chittaro and Francesco Zuliani, HCI Lab, Department of Mathematics and Computer Science University of Udine, Italy

PAPER | Design Strategies for Youth-Focused Pervasive Social Health Games (Best Paper candidate)
Andrew D. Miller, Jessica Pater, Elizabeth D. Mynatt, College of Computing, Georgia Institute of Technology Atlanta, GA, USA

PAPER | Modeling Stress Recognition in Typical Virtual Environments
Nandita Sharma and Tom Gedeon, Research School of Computer Science, Australian National University Canberra, Australia

S2: ACTIVITY AND BEHAVIOUR EVALUATION
SESSION CHAIR:

PAPER | Towards Robust Activity Recognition for Everyday Life: Methods and Evaluation
Attila Reiss, Didier Stricker, Department of Augmented Vision German Research Center for Artificial Intelligence (DFKI) Kaiserslautern, Germany
Gustaf Hendeby, Department of Electrical Engineering Linkoping University Linkoping, Sweden

PAPER | Derivation of Night Time Behaviour Metrics using Ambient Sensors
Andrea Kealy, John Loane, Lorcan Walsh, Julie Doyle, CASALA, Dundalk Institute of Technology, Dublin Road Dundalk, Co. Louth, Ireland
Kevin McDaid, StORC, Dundalk Institute of Technology, Dublin Road Dundalk, Co. Louth, Ireland

SHORT PAPER | “Moon Phrases”: A Social Media Facilitated Tool for Emotional Reflection and Wellness
Munmin De Choudhury, Microsoft Research, USA
Michael Gamon, Microsoft Research, USA
Aaron Hoff, Microsoft Research, USA
Asta Roseway, Microsoft Research, USA

SHORT PAPER | Virtual-spine: The Collaboration Between Pervasive Environment Based Simulator, Game Engine (Mixed-Reality) and Pervasive Messaging
Stephen Jia Wang, Monash University
Di Yu, Monash University

S3: GAIT AND EXERCISE EVALUATION
SESSION CHAIR:
PAPER | Evaluating Rehabilitation Exercise Performance Using a Single Inertial Measurement Unit
Oonagh Giggins, Daniel Kelly and Brian Caulfield, Clarity Centre for Sensor Web Technologies, University College Dublin, Ireland.

PAPER | Mapping Kinect-based In-Home Gait Speed to TUG Time: A Methodology to Facilitate Clinical Interpretation
Erik E. Stone and Marjorie Skubic, Center for Eldercare and Rehabilitation Technology Department of Electrical and Computer Engineering, University of Missouri Columbia, MO, USA

PAPER | Personalizing Energy Expenditure Estimation Using a Cardiorespiratory Fitness Predicate
Marco Altini and Julien Penders, Holst Centre/imec, The Netherlands
Oliver Amft, ACTLab, Eindhoven University of Technology, Eindhoven, The Netherlands

SHORT PAPER PRESENTATIONS | VENUE SALA TEATRO
16:00 – 17:00

SS-A: THERAPY AND REHABILITATION
SESSION CHAIR: TBD

SHORT PAPER | MyWalk: A Mobile App for Gait Asymmetry Rehabilitation in the Community
Tuck-Voon How, University of Toronto
Justin Chee, University of Toronto
Eric Wan, University of Toronto
Alex Mihailidis, University of Toronto

SHORT PAPER | Computerized-Eyewear Based Face Recognition System For Improving Social Lives of Prosopagnosics
Xi Wang, University of Houston, USA
Xi Zhao, University of Houston, USA
Varun Prakash, University of Houston, USA
Weidong Shi, University of Houston, USA
Omprakash Gnawali, University of Houston, USA

SHORT PAPER | A Research Platform using Active Local Cooling directed at Minimizing the Blood Flow in Human Fingers
Jan Steckel, University of Antwerp
Frank Goethijn, University of Antwerp
Guido De Bruyne, University of Antwerp
Vincent Nulens, University of Antwerp
Daniel Lacko, University of Antwerp
Samuel Bey, University of Antwerp
Stijn Verwulgen, University of Antwerp

SHORT PAPER | Adding Individual Patient Case Data to The Melanoma Targeted Therapy Advisor
Jovan Stevovic, CRG - Centro Ricerche GPI, Italy
Alban Maxhuni, CREATE-NET, Italy
Iman Khadhanifar, University of Trento, Italy
Jeff Shrager, Stanford University, USA
Gregorio Convertino, Xerox Research Centre Europe, France
Randy Gobbel, Stanford University, USA
SHORT PAPER PRESENTATIONS | VENUE SALA TEATRO
17:00 – 18:00

SS-B: SUPPORTING THE ELDERLY
SESSION CHAIR:

SHORT PAPER | Supporting Reflection on Dementia Care using Proximity Sensors
Lars Müller, FZI Forschungszentrum Informatik
Mark Sonnentag, FZI Forschungszentrum Informatik
Stephan Heuer, FZI Forschungszentrum Informatik

SHORT PAPER | A Spoonful of Sugar: Understanding the Over-the-Counter Medication Needs and Practices of Older Adults
Aqueasha Martin, Clemson University
Jessica Jones, Clemson University
Juan Gilbert, Clemson University

SHORT PAPER | Sensor Monitoring in the Home: Giving Voice to Elderly People
Marije Kanis, Amsterdam University of Applied Sciences, Netherlands
Saskia Robben, Amsterdam University of Applied Sciences, Netherlands
Ben Kröse, Amsterdam University of Applied Sciences, Netherlands

SHORT PAPER | Dealing with Wandering in Institutional Care: Exploring the Field
Claudia Mueller, University of Siegen, Germany
Lin Wan, University of Siegen, Germany
Volker Wulf, University of Siegen, Germany
Tuesday, May 7, 2013

ANNOUNCEMENT | VENUE SALA TEATRO
8:45 – 9:00

9:00 – 10:00
KEYNOTE TALK

CAN A DIET OF DATA MAKE YOU HEALTHY?

Yvonne Rogers
Professor of Interaction Design
UCLIC Director, Department of Computer Science
University College London, UK

Self-quantifying and self-tracking devices are becoming mainstream. Examples include FitBit, Wii games and an assortment of mobile apps (e.g. Boozerlyzer), that aim to give people new aggregate and profiled data about their behaviours and bodily functions to help them improve their sleep, moods and drinking habits. Real-time feedback about their everyday habits is provided through graphs and relative scores. The hope is that this form of personalised data will become the future for healthcare that focuses on monitoring and prevention. The Quantified Self movement has also attracted many followers worldwide who have started to record their patterns of activity levels (e.g. how many hours they sleep, how many cups of coffee they drink a day). But how healthy are they? In my talk I will consider how effective the new data diets are at changing and improving healthy behaviour.

About Yvonne Rogers

Yvonne Rogers is the director of the Interaction Centre at University College London and a professor of Interaction Design. She has been awarded a prestigious EPSRC dream fellowship to rethink the relationship between ageing, computing and creativity. She is passionate about designing computers to be engaging, exciting and even provocative. She is known for her visionary research agenda of user engagement in ubiquitous computing and has pioneered an approach to innovation and ubiquitous learning. Her current research focuses on behavioural change, through augmenting everyday, learning and collaborative work activities with interactive technologies. She has published over 200 articles, and is a co-author of the definitive textbook on Interaction Design that has sold over 150,000 copies worldwide and been translated into 6 languages.

TECHNICAL PRESENTATIONS | VENUE SALA TEATRO
10:15 – 11:45

S4: HEALTH PROFESSIONALS’ NEEDS
SESSION CHAIR: Andrew T. Campbell, Dartmouth College, USA

PAPER | Visual Feedback on Nonverbal Communication: A Design Exploration with Healthcare Professionals
Rupa A. Patel, Andrea Hartzler, Wanda Pratt, Anthony Back, University of Washington Seattle, Washington, USA
Mary Czerwinski, Asta Roseway, Microsoft Research, Redmond, Washington, USA

PAPER | Interpreter-Mediated Physician-Patient Communication: Opportunities for Multimodal Healthcare Interfaces
Adaptive Daily Rhythm Atmospheres for Stroke Patients: A Staff Evaluation (Best Paper candidate)

S5: SUPPORTING PATIENTS' NEEDS
SESSION CHAIR:

Gaze-contingent audio-visual substitution for the blind and visually impaired
Lukas Twardon, Hendrik Koesling, Andrea Finke and Helge Ritter, Center of Excellence Cognitive Interaction Technology - CITEC Bielefeld University Bielefeld, Germany

Accounting for Medication Particularities: Designing for Everyday Medication Management
Lea Gulstav Dalgaard, Pervasive Healthcare, The Alexandra Institute Copenhagen, Denmark
Erik Grönvall, Nervo Verdezoto, Department of Computer Science Aarhus University Aarhus, Denmark

Findings of Mobile based Palliative Care System: Towards a Generic Framework for Measuring QoL
Md Haque, Md Adibuzzaman, Md Uddin, Ferdaus Kawsar, S. I. Ahamed, Ubicomp Lab, Marquette University, WI, USA
Richard Love, David Roe, International Breast Cancer Research Foundation Madison, WI, USA
Rumana Dowla, T. Ferdousy, Reza Salim, Syed Hossain. AGBC Center Khulna, Bangladesh

S6: MONITORING SLEEP AND AFFECT
SESSION CHAIR:

Unobtrusive Sleep Monitoring Using Smartphones
Zhenyu Chen, Mu Lin, Fanglin Chen, Rui Wang, Tianxing Li, Andrew T. Campbell, Dartmouth College, USA
Nicholas D. Lane, Microsoft Research Asia
Giuseppe Cardone, University of Bologna
Yiqiang Chen, Institute of Computing Technology, Chinese Academy of Sciences
Tanzeem Choudhury, Cornell University

Designing for Positive Health Affect: Decoupling Negative Emotion and Health Monitoring Technologies
Tammy Toscos, School of Health and Human Services, Indiana University-Purdue University Fort Wayne, Indiana, US
Kay Connelly, School of Informatics, Indiana University Bloomington, Indiana, US
PAPER | Designing for Spectators and Coaches: Social Support in Pervasive Health Games for Youth
Erika Poole, Information Sci. & Technology, The Pennsylvania State University University Park, PA USA
Elsa Eiríksdóttir, Reykjavik Academy, Reykjavik, Iceland
Andrew Miller, Yan Xu, Elizabeth Mynatt, College of Computing, Georgia Institute of Technology, Atlanta, GA USA
Richard Catrambone, School of Psychology, Georgia Institute of Technology, Atlanta, GA USA

POSTERS AND DEMOS | VENUE ATRIO COLONNE
16:00 – 18:00

DOCTORAL COLLOQUIUM | VENUE SALA TEATRO
16:00 – 18:00
Wednesday, May 8, 2013

TECHNICAL PRESENTATIONS | VENUE SALA TEATRO
9:00 – 10:00

SS-C: FROM DATA CAPTURE TO DIAGNOSIS
SESSION CHAIR:

PAPER | A validation protocol for wearable sensors: theory and application for textile electrodes
Giuseppe Andreoni, Andrea Fanelli, Witkowska Izabela, Paolo Perego, Marcello Fusca, Marco Mazzola and Maria Gabriella Signorini, Politecnico di Milano, Milano, Italy

SHORT PAPER | Decision Support System for Detection of Diabetic Retinopathy Using Smartphones
Prateek Prasanna, Rutgers University, USA
Shubham Jain, Rutgers University, USA
Neelakshi Bhagat, University of Medicine and Dentistry of New Jersey, USA
Anant Madabhushi, Case Western Reserve University, USA

SHORT PAPER | Designing with Midwives: Improving Prenatal Care in Low Resource Regions
Abdullah Al Mahmud, Delft University of Technology
David Keyson, Delft University of Technology

TECHNICAL PRESENTATIONS | VENUE SALA TEATRO
10:15 – 11:45

S7: SELF-MONITORING
SESSION CHAIR:

PAPER | Enabling Self-Reflection with LifelogExplorer: Generating Simple Views from Complex Data
Rafał Kocieniak, Natalia Sidorova, Eindhoven University of Technology, The Netherlands
Fabrizio Maria Maggi, University of Tartu Estonia

PAPER | Embodied-Self-monitoring: Embracing the Context for Adherence to Physical Rehabilitation in the Design for Self-monitoring
Naveen Bagalkot, Srishti Labs, Srishti School of Art, Design and Technology, Bangalore, India
Tomas Sokoler, Interaction Design Group, IT University of Copenhagen, Denmark

PAPER | Towards Long Term Large Scale Visual Health Monitoring Using Cyber Glasses
Hoang Le, Thanh Dang, School of Engineering and Computer Science, Washington State University Vancouver, Vancouver, Washington
Feng Liu, Department of Computer Science, Portland State University Portland, Oregon

TECHNICAL PRESENTATIONS | VENUE SALA TEATRO
11:45 – 13:15

S8: PATIENTS AND PHYSICIANS
SESSION CHAIR:

PAPER | Co-designing Patient-centered Health Communication Tools for Cancer Care
Michael Gonzales and Laurel D. Riek, Dept. of Computer Science and Engineering University of Notre Dame Notre Dame, IN
PAPER | Care-giver Tailoring of IT-based Healthcare Services for Elderly at Home: A Field Test and its Results
Mohammad Zarifi Eslami, Alireza Zarghami, Marten van Sinderen, Roel Wieringa Department of Electrical Engineering Mathematics and Computer Science University of Twente, The Netherlands

PAPER | Identifying barriers in telesurgery by studying current team practices in robot-assisted surgery
Shirley A. Elprama, Katriina Kilpi, Pieter Duysburgh, An Jacobs, iMinds-SMIT-Vrije Universiteit Brussel Brussels, Belgium
Lotte Vermeulen, Jan van Looy, iMinds-MICT-Universiteit Gent, Gent, Belgium

SHORT PAPER PRESENTATIONS | VENUE SALA TEATRO
14:15 – 15:15

SS-D: IN-HOME MONITORING
SESSION CHAIR:

SHORT PAPER | ARAS Human Activity Datasets in Multiple Homes with Multiple Residents
Hande Alemdar, Bogazici University
Halil Ertan, Bogazici University
Ozlem Durmaz Incel, Bogazici University
Cem Ersoy, Bogazici University

SHORT PAPER | Feasibility of Using a Lightweight Context-Aware System for Facilitating Reliable Home Blood Pressure Self-Measurements
Karina Kusk, Aarhus University, Denmark
Troels Thylstrup, Aarhus University, Denmark
Ditte Bruus Nielsen, Aarhus University, Denmark
Jacob Jørvang, Aarhus University, Denmark
Christian Fischer Pedersen, Aarhus University, Denmark
Stefan Wagner, Aarhus University, Denmark

SHORT PAPER | CareStore Platform for Seamless Deployment of Ambient Assisted Living Applications and Devices
Stefan Wagner, Aarhus University, Denmark
Finn Overgaard Hansen, Aarhus University, Denmark
Christian Fischer Pedersen, Aarhus University, Denmark
Mukhtiar Memon, Aarhus University, Denmark
Femina Hassan Aysha, Aarhus University, Denmark
Morten Mathissen, Sekoia ApS
Claus Nielsen, Sekoia ApS
Ole Langvad Wessby, Sekoia ApS

SHORT PAPER | Longitudinal Residential Ambient Monitoring: Correlating Sensor Data to Functional Health Status
Saskia Robben, Amsterdam University of Applied Sciences, Netherlands
Ben Krose, Amsterdam University of Applied Sciences, Netherlands
SS-E: PERSONAL TRACKING AND MEASUREMENT

SESSION CHAIR:

SHORT PAPER | PVT-Touch: Adapting a Reaction Time Test for Touchscreen Devices
Matthew Kay, *University of Washington*
Kyle Rector, *University of Washington*
Sunny Consolvo, *University of Washington*
Benjamin Greenstein, *University of Washington*
Jacob Wobbrock, *University of Washington*
Nathaniel Watson, *University of Washington*
Julie Kientz, *University of Washington*

SHORT PAPER | CRNTC+: A smartphone-based sensor processing framework for prototyping personal healthcare applications
Gabriele Spina, *TU Eindhoven, Netherlands*
Frank Roberts, *TU Eindhoven, Netherlands*
Jens Weppner, *Embedded Intelligence TUKaiserslautern, Germany*
Paul Lukowicz, *Embedded Intelligence TUKaiserslautern, Germany*
Oliver Amft, *TU Eindhoven, Netherlands*

SHORT PAPER | Physical activity recognition via minimal in-shoes force sensor configuration
Christopher Moufawad El Achkar, *EPFL*
Fabien Massé, *EPFL*
Arash Arami, *EPFL*
Kamiar Aminian, *EPFL*

SHORT PAPER | Simplifying Mobile Phone Food Diaries
Adrienne Andrew, *University of Washington*
Gaetano Borriello, *University of Washington*
James Fogarty, *University of Washington*
Posters

Cancer Compass: Examining Personal Health Record Usage Among Breast Cancer Survivors
Maia Jacobs, Georgia Institute of Technology, US
James Clawson, Georgia Institute of Technology, US
Elizabeth Mynatt, Georgia Institute of Technology, US

Design and Verification of a Health-Monitoring Driver Assistance System
Helena Gruhn, Technische Universität, Berlin, Germany
Daniel Stöhr, Technische Universität, Berlin, Germany
Mehmet Gövercin, Charité Universitätsmedizin, Berlin, Germany
Sabine Glesner, Technical University of Berlin, Germany

DETACH: Authoring Digital Therapeutic Artefacts
Filipe Fernandes, LaSIGE & Department of Informatics, University of Lisbon, Portugal
Luís Duarte, LaSIGE & Department of Informatics, University of Lisbon, Portugal
Luís Carriço, University of Lisbon, Portugal

Identifying and measuring stressors present in pre-hospital care
Peter Kindness, University of Aberdeen, United Kingdom
Chris Mellish, University of Aberdeen, United Kingdom
Judith Masthoff, University of Aberdeen, United Kingdom

Make Me Move at Work! An Ambient Light Display to Increase Physical Activity
Jutta Fortmann, University of Oldenburg, Germany
Tim Stratmann, University of Oldenburg, Germany
Benjamin Poppinga, OFFIS - Institute for Information Technology, Germany
Susanne Boll, University of Oldenburg, Germany
Wilko Heuten, OFFIS - Institute for Information Technology, Germany

MANTRA: Mobile Anticoagulant Therapy Management
Barbara Rita Barricelli, University of West London, United Kingdom
Yanet Devis, University of West London, United Kingdom
Jose Abdelnour-Nocera, University of West London, United Kingdom
Jennie Wilson, University of West London, United Kingdom
John Moore, University of West London, United Kingdom

Multimodal Data Analysis and Visualization to Study Usability of Electronic Health Records
Nadir Weibel, University of California San Diego, US
Shazia Ashfaq, HSRD VA San Diego Healthcare System, US
Alan Calvitti, HSRD VA San Diego Healthcare System, US
Jim Hollan, University of California San Diego, US
Zia Agha, HSRD VA San Diego Healthcare System, US

MyReDiary Exploring the concepts of collaborative articulation, self-monitoring and social scaffolding for supporting adherence to physical rehabilitation
Jeppe Boutrup, IT University of Copenhagen, Denmark
Kenni Odelheim, IT University of Copenhagen, Denmark
Naveen Bagalkot, Srishti Labs, Srishti School of Art, Design and Technology, India
Tomas Sokoler, IT University of Copenhagen, Denmark
Opportunities for Blended Interaction in Emergency Medicine: Coupling Displays with Digital Pen Input
Diana Kusunoki, Drexel University, US
Aleksandra Sarcevic, Drexel University, US
Nadir Weibel, University of California San Diego, US
Randall Burd, Children's National Medical Center, US

The Role of the Enhanced Remote Control in Pervasive Healthcare in the Home
Adam Bujnowski, Gdansk University of Technology, Poland
Jacek Ruminski, Gdansk University of Technology, Poland
Arkadiusz Palinski, Gdansk University of Technology, Poland
Jerzy Wtorek, Gdansk University of Technology, Poland

Spokespersons, negotiators and actuators. The invisible workers of pervasive healthcare
Enrico Maria Piras, Fondazione Bruno Kessler, Italy
Alberto Zanutto, Facoltà di Sociologia di Trento, Italy

Supporting situational awareness through a patient overview screen for Bipolar Disorder treatment
Mads Frost, University of Copenhagen, Denmark
Silvia Gabrielli, CREATE-NET, Italy

Understanding the Needs of Low SES Patients with Type 2 Diabetes
Priscilla Barnes, Indiana University, US
Kelly Caine, Clemson University, US
Kay Connelly, Indiana University, US
Katie Siek, University of Colorado, US

FEEDBACK?

http://goo.gl/sKU1d