

Founding Editors

Gerhard Goos

Karlsruhe Institute of Technology, Karlsruhe, Germany

Juris Hartmanis

Cornell University, Ithaca, NY, USA

Editorial Board Members

Elisa Bertino

Purdue University, West Lafayette, IN, USA

Wen Gao


Peking University, Beijing, China

Bernhard Steffen 

TU Dortmund University, Dortmund, Germany

Gerhard Woeginger 

RWTH Aachen, Aachen, Germany

Moti Yung 

Columbia University, New York, NY, USA

More information about this series at <https://link.springer.com/bookseries/558>

Carmelo Ardito · Rosa Lanzilotti ·
Alessio Malizia · Marta Larusdottir ·
Lucio Davide Spano · José Campos ·
Morten Hertzum · Tilo Mentler ·
José Abdelnour Nocera · Lara Piccolo ·
Stefan Sauer · Gerrit van der Veer (Eds.)

Sense, Feel, Design


INTERACT 2021 IFIP TC 13 Workshops
Bari, Italy, August 30 – September 3, 2021
Revised Selected Papers


Editors


Carmelo Ardito 
Polytechnic University of Bari
Bari, Italy

Alessio Malizia 
Computer Science Department
University of Pisa
Pisa, Italy


Lucio Davide Spano 
University of Cagliari
Cagliari, Italy

Morten Hertzum 
Department of Communication
University of Copenhagen
Copenhagen, Denmark

José Abdelnour Nocera 
ITI/Larsys
University of West London
London, UK

Stefan Sauer 
University of Paderborn
Paderborn, Germany

Rosa Lanzilotti 
University of Bari Aldo Moro
Bari, Italy

Marta Larusdottir 
Reykjavik University
Reykjavik, Iceland

José Campos 
Department of Information
University of Minho
Braga, Portugal

Tilo Mentler
Fachbereich Informatik
Trier University of Applied Sciences
Trier, Germany

Lara Piccolo 
Knowledge Media Institute
Open University
Milton Keynes, UK

Gerrit van der Veer
Faculty of Sciences, Department of Computer
Science
Vrije Universiteit
Amsterdam, The Netherlands

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-98387-1 ISBN 978-3-030-98388-8 (eBook)
<https://doi.org/10.1007/978-3-030-98388-8>

© IFIP International Federation for Information Processing 2022, corrected publication 2022

Chapter “Extreme Citizen Science Contributions to the Sustainable Development Goals: Challenges and Opportunities for a Human-Centred Design Approach” is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>). For further details see license information in the chapter.

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This volume presents a series of revised papers selected from workshops organized by IFIP TC 13 Working Groups (WGs) during the 18th IFIP TC 13 International Conference on Human-Computer Interaction, INTERACT 2021, held in September 2021 in Bari, Italy. The University of Bari Aldo Moro organized INTERACT 2021 in cooperation with ACM and ACM SIGCHI.

Seven IFIP TC 13 workshops were held at INTERACT 2021. They had various aims, which are listed below.

- WG 13.1 Workshop on Human-centred Technology for Sustainable Development Goals: Challenges and Opportunities (HCT4SDG)—to build an agenda defining challenges and opportunities for the design of interactive technologies addressing one or more United Nations’ Sustainable Development Goals.
- WG 13.2 Workshop on Human-Centered Software Engineering for Changing Contexts of Use—to share knowledge and experiences that address how to deal with evolving contexts of use in today’s and future application domains and the influence on human-centered socio-technical system design and development practices.
- WG 13.4/2.7 and WG 13.1 Joint Workshop on HCI Engineering Education for developers, designers and more (HCI-E²)—to identify, examine, structure, and share educational resources and approaches to support the process of teaching and learning human-computer interaction engineering (HCI-E).
- WG 13.5 Workshop on Control Rooms in Safety Critical Contexts: Design, Engineering and Evaluation Issues—to share experiences in designing, implementing, and evaluating interactive systems in control rooms.
- WG 13.6 Workshop on Pilot Implementation: Testing Human-Work Interaction Designs (PILOT4HWID)—to help mature and formulate the research agenda on the pilot implementation technique for evaluating human-work interaction designs during the process of their development and implementation.
- WG 13.7 Workshop on Wearables, Humans, and Things: Addressing Problems in Education—to discuss new ideas on how wearable or even implantable devices can be used in an educational context (collocated with HCI-E²).
- WG 13.8 Workshop on Geopolitical Issues in Human Computer Interaction—to explore, address, and discuss geopolitical issues in human-computer interaction as a field of knowledge and practice.

The chapters in this volume are the outcome of a thorough and competitive selection process that started with selecting workshops for INTERACT 2021. The IFIP TC 13 WGs organizers were encouraged to propose workshops for extending the work of the working groups. The workshops could be in diverse formats, including paper and poster presentations followed by forum discussions or collaboration sessions with participants. All the workshops were held both on-site and online. The workshop selection process was juried by the INTERACT 2021 workshop co-chairs.

The workshop organizers selected the technical programs, and also picked which workshop papers were eligible for being extended to chapters in this volume. For the selected papers, authors were requested to revise their contributions taking into account the comments and remarks they received during the event. To ensure the quality of these post-proceedings, we requested that the proposed chapters were peer-reviewed by the workshop organizers. In addition, workshop organizers were invited to write a summary chapter for their workshop, reporting on the aims and outcomes of the workshops. We received summary chapters from five workshops, which were reviewed by the INTERACT 2021 workshop co-chairs.

The selected chapters in this volume show the state of the art of research according to the aims of the workshops and demonstrate the maturity of the work performed by IFIP TC 13 WGs. In total, 45 chapters are published in this volume, which are organized into seven sections corresponding to the IFIP TC 13 workshops held at INTERACT 2021.

Interested readers of this volume should note that IFIP TC 13 WGs are open to new members. The full list of IFIP TC13 WGs is available at <http://ifip-tc13.org/working-groups/>. Please contact the officers of the WGs for further information on how to get enrolled in WG activities such as the workshops organized at the INTERACT conference.

January 2022

Carmelo Ardito
Rosa Lanzilotti
Alessio Malizia
Marta Larusdottir
Lucio Davide Spano
José C. Campos
Morten Hertzum
Tilo Mentler
José Abdelnour Nocera
Lara Piccolo
Stefan Sauer
Gerrit van der Veer

Organization

INTERACT 2021 Technical Program Co-chairs

Carmelo Ardito	Polytechnic University of Bari, Italy
Rosa Lanzilotti	University of Bari Aldo Moro, Italy
Alessio Malizia	University of Pisa, Italy

INTERACT 2021 Workshop Co-chairs

Marta Larusdottir	Reykjavik University, Iceland
Lucio Davide Spano	University of Cagliari, Italy

INTERACT 2021 Workshop Organizers

WG 13.1 Workshop on Human-centred Technology for Sustainable Development Goals: Challenges and Opportunities (HCT4SDG)

Lara Piccolo	The Open University, UK
Vânia Neris	Federal University of São Carlos, Brazil
Kamila Rodrigues	University of São Paulo, Brazil
Masood Masoodian	Aalto University, Finland

WG 13.2 Workshop on Human-Centered Software Engineering for Changing Contexts of Use

Carmelo Ardito	Polytechnic University of Bari, Italy
Regina Bernhaupt	Eindhoven University of Technology, The Netherlands
Stefan Sauer	Paderborn University, Germany

WG 13.4/2.7 and WG 13.1 Joint Workshop on HCI Engineering Education for Developers, Designers and More (HCI-E²)

Konrad Baumann	FH Joanneum University of Applied Sciences, Austria
José C. Campos	Universidade do Minho, Portugal
Alan Dix	Swansea University, UK
Laurence Nigay	University of Grenoble Alpes, France
Philippe Palanque	University of Toulouse III – Paul Sabatier, France
Jean Vanderdonck	Université catholique de Louvain, Belgium

Gerrit van der Veer Vrije Universiteit Amsterdam, The Netherlands
Benjamin Weyers University of Trier, Germany

WG 13.5 Workshop on Control Rooms in Safety Critical Contexts: Design, Engineering and Evaluation Issues

Tilo Mentler Trier University of Applied Sciences, Germany
Philippe Palanque Université Toulouse III – Paul Sabatier, France
Susanne Boll University of Oldenburg, Germany
Chris Johnson Queen’s University Belfast, UK
Kristof Van Laerhoven University of Siegen, Germany

WG 13.6 Workshop on Pilot Implementation: Testing Human-Work Interaction Designs (PILOT4HWID)

Morten Hertzum University of Copenhagen, Denmark
Torkil Clemmensen Copenhagen Business School, Denmark
Barbara Rita Barricelli Università degli Studi di Brescia, Italy
Pedro F. Campos University of Madeira, Portugal
Frederica Gonçalves University of Madeira, Portugal
José Abdelnour Nocera University of West London, UK
Ganesh Bhutkar Vishwakarma Institute of Technology, India
Arminda Guerra Lopes Polytechnic Institute of Castelo Branco, Portugal

WG 13.7 Workshop on Wearables, Humans, and Things: Addressing Problems in Education

Gerrit van der Veer Vrije Universiteit Amsterdam, The Netherlands
Achim Ebert University of Kaiserslautern, Germany
Nahum Gershon The MITRE Corporation, USA
Peter Dannenmann RheinMain University of Applied Sciences, Germany

WG 13.8 Workshop on Geopolitical Issues in Human Computer Interaction

José Abdelnour Nocera University of West London, UK, and ITI/Larsys, Portugal
Torkil Clemmensen Copenhagen Business School, Denmark
Zhengjie Liu Dalian Maritime University, China
Anirudha Joshi IIT Bombay, India
Xiangang Qin Beijing University of Posts and Telecommunications, China
Judy van Biljon University of South Africa, South Africa
Isabela Gasparini Santa Catarina State University, Brazil
Leonardo Parra-Agudelo University of los Andes, Colombia

IFIP TC 13

Established in 1989, the Technical Committee on Human–Computer Interaction (IFIP TC 13) of the International Federation for Information Processing (IFIP) is an international committee of 34 member societies and 10 Working Groups, representing specialists of the various disciplines contributing to the field of human–computer interaction. This includes (among others) human factors, ergonomics, cognitive science, and multiple areas of computer science and design.

IFIP TC 13 aims to develop the science, technology, and societal aspects of human–computer interaction (HCI) by

- encouraging empirical, applied, and theoretical research,
- promoting the use of knowledge and methods from both human sciences and computer sciences in design, development, evaluation, and exploitation of computing systems,
- promoting the production of new knowledge in the area of interactive computing systems engineering,
- promoting better understanding of the relation between formal design methods and system usability, user experience, accessibility, and acceptability,
- developing guidelines, models, and methods by which designers may provide better human-oriented computing systems, and
- cooperating with other groups, inside and outside IFIP, to promote user-orientation and humanization in system design.

Thus, TC 13 seeks to improve interactions between people and computing systems, to encourage the growth of HCI research and its practice in industry, and to disseminate these benefits worldwide.

The main orientation is to place the users at the center of the development process. Areas of study include

- the problems people face when interacting with computing devices;
- the impact of technology deployment on people in individual and organizational contexts;
- the determinants of utility, usability, acceptability, accessibility, privacy, user experience...;
- the appropriate allocation of tasks between computing systems and users, especially in the case of automation;
- engineering user interfaces, interactions, and interactive computing systems;
- modelling the user, their tasks, and the interactive system to aid better system design; and
- harmonizing the computing system to user characteristics and needs.

While the scope is thus set wide, with a tendency toward general principles rather than particular systems, it is recognized that progress will only be achieved through both general studies to advance theoretical understanding and specific studies on practical issues

(e.g., interface design standards, software system resilience, documentation, training material, appropriateness of alternative interaction technologies, guidelines, integrating computing systems to match user needs and organizational practices, etc.).

In 2015, TC 13 approved the creation of a Steering Committee (SC) for the INTERACT conference series. The SC is now in place, chaired by Anirudha Joshi, and is responsible for

- promoting and maintaining the INTERACT conference as the premier venue for researchers and practitioners interested in the topics of the conference (this requires a refinement of the topics above);
- ensuring the highest quality for the contents of the event;
- setting up the bidding process to handle the future INTERACT conferences (with decisions made at the TC 13 level);
- providing advice to the current and future chairs and organizers of the INTERACT conference;
- providing data, tools, and documents about previous conferences to the future conference organizers;
- selecting the reviewing system to be used throughout the conference (as this affects the entire set of reviewers, authors, and committee members);
- resolving general issues involved with the INTERACT conference; and
- capitalizing on history (good and bad practices).

In 1999, TC 13 initiated a special IFIP award, the Brian Shackel Award, for the most outstanding contribution in the form of a refereed paper submitted to and delivered at each INTERACT. The award draws attention to the need for a comprehensive human-centered approach in the design and use of information technology in which the human and social implications have been taken into account. In 2007, IFIP TC 13 launched an Accessibility Award to recognize an outstanding contribution in HCI with international impact dedicated to the field of accessibility for disabled users. In 2013, IFIP TC 13 launched the Interaction Design for International Development (IDID) Award that recognizes the most outstanding contribution to the application of interactive systems for social and economic development of people in developing countries. Since the process to decide the awards takes place after papers are sent to the publisher for publication, the awards are not identified in the proceedings. Since 2019, a special agreement has been in place with the International Journal of Behaviour and Information Technology (BIT), published by Taylor and Francis with Panos Markopoulos as editor in chief. In this agreement, authors of BIT papers whose work is within the field of HCI are offered the opportunity to present their work at the INTERACT conference. Reciprocally, the authors of a selection of papers accepted for presentation at INTERACT are offered the opportunity to extend their contributions to be published in BIT.

IFIP TC 13 also recognizes pioneers in the area of HCI. An IFIP TC 13 pioneer is one who, through active participation in IFIP Technical Committees or related IFIP groups, has made outstanding contributions to the educational, theoretical, technical, commercial, or professional aspects of analysis, design, construction, evaluation, and use of interactive systems. IFIP TC 13 pioneers are appointed annually and awards are handed over at the INTERACT conference.

IFIP TC 13 stimulates working events and activities through its Working Groups (WGs). Working Groups consist of HCI experts from multiple countries who seek to expand knowledge and find solutions to HCI issues and concerns within a specific domain. New Working Groups are formed as areas of significance in HCI arise.

Further information is available at the IFIP TC13 website: <http://ifip-tc13.org/>.

IFIP TC13 Members

Officers

Chairperson

Philippe Palanque, France

Vice-chair for Awards

Paula Kotze, South Africa

Vice-chair for Communications

Helen Petrie, UK

Vice-chair for Growth and Outreach

Jan Gulliksen, Sweden

Vice-chair for Working Groups

Simone D. J. Barbosa, Brazil

Vice-chair for Development and Equity

Julio Abascal, Spain

Treasurer

Virpi Roto, Finland

Secretary

Marco Winckler, France

INTERACT Steering Committee Chair

Anirudha Joshi, India

Country/Society Representatives

Australia

Henry B.L. Duh
Australian Computer Society

Austria

Geraldine Fitzpatrick
Austrian Computer Society

Belgium

Bruno Dumas
IMEC – Interuniversity Micro-Electronics Center

Brazil

Lara S. G. Piccolo
Brazilian Computer Society (SBC)

Bulgaria

Stoyan Georgiev Dentchev
Bulgarian Academy of Sciences

Croatia

Andrina Granic
Croatian Information Technology Association (CITA)

Cyprus

Panayiotis Zaphiris
Cyprus Computer Society

Czech Republic

Zdeněk Míkovec
Czech Society for Cybernetics and
Informatics

Finland

Virpi Roto
Finnish Information Processing
Association

France

Philippe Palanque and Marco Winckler
Société informatique de France (SIF)

Germany

Tom Gross
Gesellschaft für Informatik e.V.

Ireland

Liam J. Bannon
Irish Computer Society

Italy

Fabio Paternò
Italian Computer Society

Japan

Yoshifumi Kitamura
Information Processing Society of Japan

The Netherlands

Regina Bernhaupt
Nederlands Genootschap voor Informatica

New Zealand

Mark Apperley
New Zealand Computer Society

Norway

Frode Eika Sandnes
Norwegian Computer Society

Poland

Marcin Sikorski
Poland Academy of Sciences

Portugal

Pedro Campos
Associação Portuguesa para o
Desenvolvimento da Sociedade da
Informação (APDSI)

Serbia

Aleksandar Jevremovic
Informatics Association of Serbia

Singapore

Shengdong Zhao
Singapore Computer Society

Slovakia

Wanda Benešová
The Slovak Society for Computer
Science

Slovenia

Matjaž Debevc
The Slovenian Computer Society INFORMATIKA

Sri Lanka

Thilina Halloluwa
The Computer Society of Sri Lanka

South Africa

Janet L. Wesson and Paula Kotze
The Computer Society of South Africa

Sweden

Jan Gulliksen
 Swedish Interdisciplinary Society for Human-Computer Interaction
 Swedish Computer Society

Switzerland

Denis Lalanne
 Swiss Federation for Information
 Processing

Tunisia

Mona Laroussi
 Ecole Supérieure des Communications De Tunis (SUP'COM)

UK

José Abdelnour Nocera
 British Computer Society (BCS)

United Arab Emirates

Ahmed Seffah
 UAE Computer Society

ACM

Gerrit van der Veer
 Association for Computing Machinery

CLEI

Jaime Sánchez
 Centro Latinoamericano de Estudios en Informatica

Expert Members

Julio Abascal, Spain
 Carmelo Ardito, Italy
 Nikolaos Avouris, Greece
 Kaveh Bazargan, Iran
 Ivan Burmistrov, Russia
 Torkil Torkil Clemmensen, Denmark

Peter Forbrig, Germany
Dorian Gorgan, Romania
Anirudha Joshi, India
David Lamas, Estonia
Marta Kristin Larusdottir, Iceland
Zhengjie Liu, China
Fernando Loizides, UK/Cyprus
Ochieng Daniel “Dan” Orwa, Kenya
Eunice Sari, Australia/Indonesia

Working Group Chairpersons

WG 13.1 (Education in HCI and HCI Curricula)

Konrad Baumann, Austria

WG 13.2 (Methodologies for User-Centered System Design)

Regina Bernhaupt, The Netherlands

WG 13.3 (HCI, Disability and Aging)

Helen Petrie, UK

WG 13.4/2.7 (User Interface Engineering)

José C. Campos, Portugal

WG 13.5 (Human Error, Resilience, Reliability, Safety and System Development)

Chris Johnson, UK

WG 13.6 (Human-Work Interaction Design)

Barbara Rita Barricelli, Italy

WG 13.7 (HCI and Visualization)

Peter Dannenmann, Germany

WG 13.8 (Interaction Design and International Development)

José Adbelnour Nocera, UK

WG 13.9 (Interaction Design and Children)

Janet Read, UK

WG 13.10 (Human-Centred Technology for Sustainability)

Masood Masoodian, Finland

IFIP TC 13 Working Groups

WG 13.1 - Education in HCI and HCI Curricula

The Working Group 13.1 aims to improve HCI education at all levels of higher education, coordinate and unite efforts to develop HCI curricula, and promote HCI teaching.

Chair

Konrad Baumann FH Joanneum University of Applied Sciences,
Austria

Vice-chairs

Jean Vanderdonckt Université catholique de Louvain, Belgium
Carlo Giovannella University of Rome Tor Vergata, Italy

Secretary

Konrad Baumann FH Joanneum University of Applied Sciences,
Austria

WG 13.2 - Methodology for User-Centred System Design

The Working Group 13.2 aims to foster research, dissemination of information, and good practice in the methodical application of HCI to software engineering.

Chair

Regina Bernhaupt Eindhoven University of Technology,
The Netherlands

Vice-chair

Carmelo Ardito Polytechnic University of Bari, Italy

Secretary

Stefan Sauer Paderborn University, Germany

WG 13.3 - HCI, Disability and Aging

The Working Group 13.3 aims to make HCI designers aware of the needs of people with disabilities and encourage development of information systems and tools permitting adaptation of interfaces to specific users.

Chair

Helen Petrie University of York, UK

Vice-chair

Gerhard Weber Technical University Dresden, Germany

Secretary

David Sloan University of Dundee, UK

WG 13.4/WG 2.7 - User Interface Engineering

The Working Group 13.4 (also WG 2.7) investigates the nature, concepts, and construction of user interfaces (UIs) for software systems, using a framework for reasoning about interactive systems and an engineering model for developing UIs.

Chair

José C. Campos Universidade do Minho, Portugal

Vice-chair

Gaëlle Calvary Laboratoire d'Informatique de Grenoble, France

Secretary

Judy Bowen University of Waikato, New Zealand

WG 13.5 - Resilience, Reliability, Safety and Human Error in System Development

The Working Group 13.5 seeks a framework for studying human factors relating to systems failure, develops leading edge techniques in hazard analysis and safety engineering of computer-based systems, and guides international accreditation activities for safety-critical systems.

Chair

Christopher Johnson University of Glasgow, UK

Vice-chairs

Michael Feary NASA, Ames Research Center, USA
Asaf Degani General Motors R&D, Israel

Secretary

Philippe Palanque

ICS-IRIT, University of Toulouse III - Paul
Sabatier, France**WG 13.6 - Human-Work Interaction Design**

The Working Group 13.5 aims at establishing relationships between extensive empirical work-domain studies and HCI design. It promotes the use of knowledge, concepts, methods, and techniques that enable user studies to procure a better apprehension of the complex interplay between individual, social, and organizational contexts and thereby a better understanding of how and why people work in the ways that they do.

Chair

Barbara Rita Barricelli

Università degli Studi di Milano, Italy

Vice-chairs

Pedro Campos

University of Madeira, Portugal

Torkil Clemmensen

Copenhagen Business School, Denmark

José Abdelnour Nocera

University of West London, UK, and ITI/Larsys,
Portugal

Arminda Guerra Lopes

Polytechnic Institute of Castelo Branco, Portugal

Ganesh Bhutkar

Vishwakarma Institute of Technology, India

Xiangang Qin

Beijing University of Post and
Telecommunications, China

Judith Ann Molka-Danielsen

Molde University College, Norway

Secretary

Frederica Gonçalves

University of Madeira, Portugal

WG 13.7 - Human-Computer Interaction and Visualization

The Working Group 13.7 aims to establish a study and research program that will combine both scientific work and practical applications in the fields of human-computer interaction and visualization. It will integrate several additional aspects of further research areas, such as scientific visualization, data mining, information design, computer graphics, cognition sciences, perception theory, or psychology, into this approach.

Chair

Peter Dannenmann

RheinMain University of Applied Sciences,
Germany

Vice-chairs

Gerrit van der Veer
Nahum Gershon

Vrije Universiteit Amsterdam, The Netherlands
The MITRE Corporation, USA

Secretary

Achim Ebert

University of Kaiserslautern, Germany

WG 13.8 - Interaction Design and International Development

The Working Group 13.8 aims at supporting and developing the research, practice, and education capabilities of HCI in institutions and organizations based around the world taking into account their diverse local needs and cultural perspectives; promoting application of interaction design research, practice, and education to address the needs, desires and aspirations of people across the developing world; and developing links between the HCI community in general and other relevant communities involved in international development and cross-cultural aspects of ICT development.

Chair

José Abdelnour Nocera

University of West London, UK, and ITI/Larsys,
Portugal

Vice-chairs

Andy Dearden
Torkil Clemmensen
Christian Sturm

Sheffield Hallam University, UK
Copenhagen Business School, Denmark
Hamm-Lippstadt University of Applied Sciences,
Germany

Secretary

Anirudha Joshi

IIT Bombay, India

WG 13.9 - Interaction Design and Children

The Working Group 13.9 aims to support practitioners, regulators, and researchers to develop the study of interaction design and children across international contexts.

Chair

Janet Read

University of Central Lancashire, UK

Vice-chair

Panos Markopoulos

Eindhoven University of Technology,
The Netherlands**Secretary**

Matthew Horton

University of Central Lancashire, UK

WG 13.10 - Human-Centred Technology for Sustainability

The Working Group 13.10 aims to promote research, design, development, evaluation, and deployment of human-centered technology to encourage sustainable use of resources in various domains.

Chair

Masood Masoodian

Aalto University, Finland

Vice-chairs

Elisabeth André

University of Augsburg, Germany

Nuno J. Nunes

Instituto Superior Técnico, Universidade de
Lisboa, Portugal**Secretary**

Thomas Rist

University of Applied Sciences Augsburg,
Germany

INTERACT 2021 Partners and Sponsors

Partners



International Federation for Information Processing



In cooperation with ACM



In cooperation with SIGCHI



Sponsors



Contents

Human-Centred Technology for Sustainable Development Goals: Challenges and Opportunities

Human-Centred Technology for Sustainable Development Goals - Workshop Results	3
<i>Kamila Rios da Hora Rodrigues, Vânia Paula de Almeida Neris, Lara Piccolo, and Masood Masoodian</i>	
An Action-Management Video Game to Foster Sustainability Through Garbage Recycling	10
<i>Fabrizio Balducci and Paolo Buono</i>	
Extreme Citizen Science Contributions to the Sustainable Development Goals: Challenges and Opportunities for a Human-Centred Design Approach	20
<i>Artemis Skarlatidou, Dilek Fraisl, Yaqian Wu, Linda See, and Muki Haklay</i>	
Interactive Map Visualizations for Supporting Environmental Sustainable Development Goals	36
<i>Thomas Rist and Masood Masoodian</i>	
An Informatics-Based Approach for Sustainable Management of Factors Affecting the Spread of Infectious Diseases	47
<i>Saturnino Luz and Masood Masoodian</i>	
Internet of Things in Education for Sustainable Development	58
<i>Lara S. G. Piccolo, Luciano de Oliveira Neris, Luana Maria da Silva Menezes, and Vânia Neris</i>	
Guidelines for the Sustainable Development of Computing Technology	71
<i>Renata O. Rodrigues, Kamila Rios H. Rodrigues, and Vânia Paula A. Neris</i>	

Human-Centered Software Engineering for Changing Contexts of Use

Workshop Report for IFIP WG 13.2's HCSE@INTERACT 2021: International Workshop on Human-Centered Software Engineering for Changing Contexts of Use	85
<i>Regina Bernhaupt, Stefan Sauer, and Carmelo Ardito</i>	

How to Identify Changing Contexts of Use with Creativity Workshops – An Experience Report	88
<i>Wasja Brunotte, Lukas Nagel, Kurt Schneider, and Jil Klünder</i>	
Contextual Personas - A Method for Capturing the Digital Work Environment of Users	98
<i>Marta Lárusdóttir, Ruochoen Wang, and Ása Cajander</i>	
MyLYL: Towards Flexible Interaction Design for Operator Assistance Systems	113
<i>Jan Van den Bergh and Florian Heller</i>	
Creating a Post-sedentary Work Context for Software Engineering	123
<i>Martin Hedlund, Cristian Bogdan, and Gerrit Meixner</i>	
Coping with Changing Contexts: A Healthcare Security Perspective	139
<i>Bilal Naqvi and Carmelo Ardito</i>	
Privacy Knowledge Base for Supporting Decision-Making in Software Development	147
<i>Maria Teresa Baldassarre, Vita Santa Barletta, Danilo Caivano, Antonio Piccinno, and Michele Scalera</i>	
bBRIGHT – A Framework for Capturing and Adapting to Context for User-Centered Design	158
<i>Rukman Senanayake and Grit Denker</i>	
Affordance-Derived Declarative Interaction Models for Context Adaptation	174
<i>Cristian Bogdan</i>	
Ensuring User Interface Adaptation Consistency Through Triple Graph Grammars	183
<i>Kai Biermeier, Enes Yigitbas, Nils Weidmann, and Gregor Engels</i>	
HCI-E²: HCI Engineering Education - for Developers, Designers and More	
Teaching HCI Engineering: Four Case Studies	195
<i>Sybille Caffiau, José C. Campos, Célia Martinie, Laurence Nigay, Philippe Palanque, and Lucio Davide Spano</i>	
The Curriculum for Education in Engineering Interactive Systems at the Master in HCI of the University Toulouse III - Paul Sabatier	211
<i>Philippe Palanque and Célia Martinie</i>	

Interface Engineering for UX Professionals 221
Alan Dix

Adult Students Become Professionals Teaching or Learning – What’s
in a Name? 236
Gerrit van der Veer and Teresa Consiglio

Addressing Interactive Computing Systems’ Concerns in Software
Engineering Degrees 248
José Creissac Campos and António Nestor Ribeiro

Teaching End-User Development in the Time of IoT and AI 257
Fabio Paternò

Teaching Human-Computer Interaction in the Software Engineering
Master’s Degree Program of the University Grenoble Alpes 270
Sybille Caffiau and Laurence Nigay

**Control Rooms in Safety Critical Contexts: Design, Engineering and
Evaluation Issues**

Control Rooms from a Human-Computer Interaction Perspective 281
*Tilo Mentler, Philippe Palanque, Michael D. Harrison,
Kristof Van Laerhoven, and Paolo Masci*

A Generic Framework for Structuring Configuration Management
for Socio-technical System: Application to Control Rooms 290
*Célia Martinie, Philippe Palanque, Sandra Steere, David Navarre,
and Eric Barboni*

Improving Resilience by Communicating Predicted Disruptions in Control
Rooms 302
Suvodip Chakraborty, Peter Kiefer, and Martin Raubal

Proving Display Conformance and Action Consistency: The Example
of an Integrated Clinical Environment 316
Michael D. Harrison and Paolo Masci

Towards Control Rooms as Human-Centered Pervasive Computing
Environments 329
Nadine Flegel, Jonas Poehler, Kristof Van Laerhoven, and Tilo Mentler

LstSim-Extended: Towards Monitoring Interaction and Beyond
in Web-Based Control Room Simulations 345
Jonas Poehler, Nadine Flegel, Tilo Mentler, and Kristof Van Laerhoven

UX for Some and Usability for Others: Issues of Blending Multi-user and Multi-property in Control Centers	357
<i>Elodie Bouzekri, Célia Martinie, Philippe Palanque, Erwann Poupart, and Sandra Steere</i>	

Pilot Implementation: Testing Human-Work Interaction Designs

A Summary of the Workshop on Pilot Implementation for Testing Human-Work Interaction Designs	371
<i>Morten Hertzum</i>	

University Digital Engagement of Students	376
<i>Maria C. Pereira, João C. Ferreira, Sérgio Moro, and Frederica Gonçalves</i>	

Pilot Implementation: Organizational Alignment When Implementing an IT-System	391
<i>Linnea Krista Herbæk, Carl Emil Derby Hansen, and Torkil Clemmensen</i>	

AttnGAN: Realistic Text-to-Image Synthesis with Attentional Generative Adversarial Networks	397
<i>Shubham Mathesul, Ganesh Bhutkar, and Ayush Rambhad</i>	

Prototype Design of a Multi-modal AI-Based Web Application for Hateful Content Detection in Social Media Posts	404
<i>Tejas Pradhan, Ganesh Bhutkar, and Aditya Pangaonkar</i>	

Pilot Implementation for Driver Behaviour Classification Using Smartphone Sensor Data for Driver-Vehicle Interaction Analysis	412
<i>Pawan Wawage and Yogesh Deshpande</i>	

Co-design Workshops as a Step Towards Pilot Implementation for Complex Workplaces: A Case Study of London-Based Airport Future Workplace	421
<i>Parisa Saadati, José Abdelnour-Nocera, and Torkil Clemmensen</i>	

Dropping a Bomb or Providing a Gentle Loving Touch? Towards a Relation Artefact Theory of Pilot Implementation	429
<i>Torkil Clemmensen</i>	

Wearables, Humans, and Things – Addressing Problems in Education

Towards Advanced Evaluation of Collaborative XR Spaces	443
<i>Vera Marie Memmesheimer and Achim Ebert</i>	

Ears on My Back - Experiencing the Soundscape Without Hearing 453
Danzhu Li and Gerrit van der Veer

Using Wearables to Optimize Learning at Home 474
Fiona Draxler

Geopolitical Issues in Human Computer Interaction

Micro-politics, Semiotic Power and Infrastructural Inversion: Theoretical
 Lenses for Geopolitical HCI 483
José Abdelnour Nocera and Ali Gheitasy

Africanization of HCI Teaching and Learning 490
Jan H. Kroeze

Subverting Divisive Geopolitical Issues in HCI Through Autonomous
 Design and Punk Narratives 503
David Naranjo-Romero and Leonardo Parra-Agudelo

Correction to: Extreme Citizen Science Contributions to the Sustainable
 Development Goals: Challenges and Opportunities for a Human-Centred
 Design Approach C1
Artemis Skarlatidou, Dilek Fraisl, Yaqian Wu, Linda See, and Muki Haklay

Author Index 523