

**Human-Computer Interaction – INTERACT 2019: 17th  
IFIP TC 13 International Conference, Paphos, Cyprus,  
September 2–6, 2019, Proceedings, Part IV**

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# Human-Computer Interaction – INTERACT 2019


17th IFIP TC 13 International Conference  
Paphos, Cyprus, September 2–6, 2019  
Proceedings, Part IV

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# Foreword

The 17th IFIP TC13 International Conference on Human-Computer Interaction, INTERACT 2019, took place during September 2–6, 2019, in Paphos, Cyprus. This conference was held at the Coral Beach Hotel & Resort. The conference was co-sponsored by the Cyprus University of Technology and Tallinn University, in cooperation with ACM and ACM SIGCHI.

The International Federation for Information Processing (IFIP) was created in 1960 under the auspices of UNESCO. The Technical Committee 13 (TC13) of the IFIP aims at developing the science and technology of human-computer interaction (HCI). TC13 has representatives from 32 countries, 2 international organizations, apart from 14 expert members and observers. TC13 started the series of INTERACT conferences in 1984. These conferences have been an important showcase for researchers and practitioners in the field of HCI. Situated under the open, inclusive umbrella of the IFIP, INTERACT has been a truly international in its spirit and has attracted researchers from several countries and cultures. The venues of the INTERACT conferences over the years bear a testimony to this inclusiveness.

INTERACT 2019 continued the INTERACT conscious efforts to lower barriers that prevent people from developing countries to participate in conferences. Thinkers and optimists believe that all regions of the world can achieve human development goals. Information and communication technologies (ICTs) can support this process and empower people to achieve their full potential. Today ICT products have many new users and many new uses, but also present new challenges and provide new opportunities. It is no surprise that HCI researchers are showing great interest in these emergent users. INTERACT 2019 provided a platform to explore these challenges and opportunities, but also made it easier for people from developing countries to participate.

Furthermore, hosting INTERACT 2019 in a small country with a small HCI community presented an opportunity to expose the local industry and academia to the concepts of HCI and user-centered design. The rich history and culture of the island of Cyprus provided a strong networking atmosphere and collaboration opportunities.

Students represent the future of our community. They bring in new energy, enthusiasm, and fresh ideas. However, it is often hard for students to participate in international conferences. INTERACT 2019 made special efforts to bring students to the conference. The conference had low registration costs, and thanks to our sponsors, we could provide several travel grants.

Finally, great research is the heart of a good conference. Like its predecessors, INTERACT 2019 aimed to bring together high-quality research. As a multidisciplinary field, HCI requires interaction and discussion among diverse people with different interests and backgrounds. The beginners and the experienced, theoreticians and practitioners, and people from diverse disciplines and different countries gathered together in Paphos to learn from each other and to contribute to each other's growth.

We thank all the authors who chose INTERACT 2019 as the venue to publish their research.

We received a total of 669 submissions distributed in 2 peer reviewed tracks, 4 curated tracks, and 4 juried tracks. Of these, the following contributions were accepted:

- 111 Full Papers (peer reviewed)
- 55 Short Papers (peer reviewed)
- 7 Industry Case Studies (curated)
- 3 Courses (curated)
- 9 Demonstrations (curated)
- 18 Interactive Posters (juried)
- 2 Panels (curated)
- 9 Workshops (juried)
- 1 Field Trips (juried)
- 17 Doctoral Consortium (juried)

The acceptance rate for contributions received in the peer-reviewed tracks was 29% for full papers and 28% for short papers. In addition to full papers and short papers, the present proceedings feature contributions accepted in the form of industry case studies, courses, demonstrations, interactive posters, panels, and description of accepted workshops. The contributions submitted to workshops were published in adjunct proceedings.

INTERACT 2019 innovated the reviewing process with the introduction of sub-committees. Each subcommittee had a chair and set of associated chairs who were in charge of coordinating the reviewing process with the help of expert reviewers. Hereafter we list the ten subcommittees of INTERACT 2019:

- Accessibility and Assistive Technologies
- Design for Business and Safety/Critical Interactive Systems
- Design of Interactive Entertainment Systems
- HCI Education and Curriculum
- Information Visualization
- Interaction Design for Culture and Development
- Interactive Systems Technologies and Engineering
- Methodologies for User-Centred Design
- Social Interaction and Mobile HCI
- Understanding Human Aspects of HCI

The final decision on acceptance or rejection of full papers was taken in a Program Committee meeting held in London, United Kingdom in March 2019. The full papers chairs, the subcommittee chairs, and the associate chairs participated in this meeting. The meeting discussed a consistent set of criteria to deal with inevitable differences among the large number of reviewers. The final decisions on other tracks were made by the corresponding track chairs and reviewers, often after electronic meetings and discussions.

INTERACT 2019 was made possible by the persistent efforts across several months by 10 subcommittees chairs, 62 associated chairs, 28 track chairs, and 510 reviewers. We thank them all.

September 2019

Panayiotis Zaphiris  
David Lamas



## IFIP TC13 (<http://ifip-tc13.org/>)

Established in 1989, the International Federation for Information Processing Technical Committee on Human–Computer Interaction (IFIP TC 13) is an international committee of 32 member national 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, computer science, and design. INTERACT is its flagship conference of IFIP TC 13, staged biennially in different countries around the world. The first INTERACT conference was held in 1984 running triennially and became a biennial event in 1993.

IFIP TC 13 aims to develop the science, technology, and societal aspects of HCI by encouraging empirical research; promoting the use of knowledge and methods from the human sciences in design and evaluation of computer systems; promoting a better understanding of the relation between formal design methods and system usability and acceptability; developing guidelines, models, and methods by which designers may provide better human-oriented computer systems; and, cooperating with other groups, inside and outside IFIP, to promote user-orientation and humanization in systems design. Thus, TC 13 seeks to improve interactions between people and computers, 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 computers; the impact of technology deployment on people in individual and organizational contexts; the determinants of utility, usability, acceptability, learnability, and user experience; the appropriate allocation of tasks between computers and users especially in the case of automation; modeling the user, their tasks, and the interactive system to aid better system design; and harmonizing the computer 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, design guidelines, the problems of integrating interactive systems to match system needs, and organizational practices, etc.).

In 2015, TC13 approved the creation of a Steering Committee (SC) for the INTERACT conference. The SC is now in place, chaired by Anirudha Joshi and is responsible for:

- Promoting and maintaining the INTERACT conference as the premiere 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 (decision is made up at 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 impacts the entire set of reviewers)
- Resolving general issues involved with the INTERACT conference
- Capitalizing 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 award takes place after papers are sent to the publisher for publication, the awards are not identified in the proceedings.

This year a special agreement has been made with the *International Journal of Behaviour and Information Technology* (published by Taylor and Francis) with Panos Markopoulos as editor in chief. In this agreement, authors of BIT whose papers are within the field of HCI are offered the opportunity to present their work at the INTERACT conference. Reciprocally, a selection of papers submitted and accepted for presentation at INTERACT are offered the opportunity to extend their contribution 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 many countries, who seek to expand knowledge and find solutions to HCI issues and concerns within their domains. The list of Working Groups and their area of interest is given below.

WG13.1 (Education in HCI and HCI Curricula) aims to improve HCI education at all levels of higher education, coordinate and unite efforts to develop HCI curricula, and promote HCI teaching.

WG13.2 (Methodology for User-Centered System Design) aims to foster research, dissemination of information and good practice in the methodical application of HCI to software engineering.

WG13.3 (HCI and Disability) aims to make HCI designers aware of the needs of people with disabilities and encourage the development of information systems and tools permitting adaptation of interfaces to specific users.

WG13.4 (also WG2.7) (User Interface Engineering) investigates the nature, concepts, and construction of user interfaces for software systems, using a framework for reasoning about interactive systems and an engineering model for developing user interfaces.

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

WG13.6 (Human-Work Interaction Design) aims at establishing relationships between extensive empirical work-domain studies and HCI design. It will promote 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.

WG13.7 (Human-Computer Interaction and Visualization) aims to establish a study and research program that will combine both scientific work and practical applications in the fields of HCI and Visualization. It integrates 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.

WG13.8 (Interaction Design and International Development) is currently working to reformulate its aims and scope.

WG13.9 (Interaction Design and Children) aims to support practitioners, regulators, and researchers to develop the study of interaction design and children across international contexts.

WG13.10 (Human-Centered Technology for Sustainability) aims to promote research, design, development, evaluation, and deployment of human-centered technology to encourage sustainable use of resources in various domains.

New Working Groups are formed as areas of significance in HCI arise. Further information is available on the IFIP TC13 website: <http://ifip-tc13.org/>.

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# Contents – Part IV

## User Modelling and User Studies

An Analysis of (Non-)Use Practices and Decisions of Internet of Things . . . .	3
<i>Radhika Garg</i>	
Analysis of Utilization in the Message Card Production by Use of Fusion Character of Handwriting and Typeface. . . . .	25
<i>Mikako Sasaki, Junki Saito, and Satoshi Nakamura</i>	
Communicating User Insights with Travel Mindsets and Experience Personas in Intra-city Bus Context. . . . .	34
<i>Elina Hildén and Kaisa Väänänen</i>	
Effects of Age-Related Cognitive Decline on Elderly User Interactions with Voice-Based Dialogue Systems . . . . .	53
<i>Masatomo Kobayashi, Akihiro Kosugi, Hironobu Takagi, Miyuki Nemoto, Kiyotaka Nemoto, Tetsuaki Arai, and Yasunori Yamada</i>	
GDI as an Alternative Guiding Interaction Style for Occasional Users . . . . .	75
<i>Antonio L. Carrillo and Juan A. Falgueras</i>	

## User Experience

A Novel Method to Build and Validate an Affective State Prediction Model from Touch-Typing . . . . .	99
<i>Subrata Tikadar and Samit Bhattacharya</i>	
Acceptability of Persuasive Prompts to Induce Behavioral Change in People Suffering from Depression . . . . .	120
<i>Rabiah Arshad, Murtaza Ali Baig, Marium Tariq, and Suleman Shahid</i>	
The UX Construct – Does the Usage Context Influence the Outcome of User Experience Evaluations? . . . . .	140
<i>Andreas Sonderegger, Andreas Uebelbacher, and Jürgen Sauer</i>	
User Experience of Driver State Visualizations: A Look at Demographics and Personalities. . . . .	158
<i>Michael Braun, Ronee Chadowitz, and Florian Alt</i>	



**Users’ Emotions, Feelings and Perception**

As Light as Your Scent: Effects of Smell and Sound on Body Image Perception . . . . . 179  
*Giada Brianza, Ana Tajadura-Jiménez, Emanuela Maggioni, Dario Pittera, Nadia Bianchi-Berthouze, and Marianna Obrist*

Experiencing Materialized Reading: Individuals’ Encounters with Books . . . . . 203  
*Verena Fuchsberger and Thomas Meneweger*

“I Kept Browsing and Browsing, But Still Couldn’t Find the One”: Salient Factors and Challenges in Online Typeface Selection . . . . . 225  
*Y. Wayne Wu, Michael Gilbert, and Elizabeth Churchill*

Integrating a Binaural Beat into the Soundscape for the Alleviation of Feelings . . . . . 235  
*Noko Kuratomo, Yuichi Mashiba, Keiichi Zempo, Koichi Mizutani, and Naoto Wakatsuki*

What Is Beautiful Continues to Be Good: People Images and Algorithmic Inferences on Physical Attractiveness . . . . . 243  
*Maria Matsangidou and Jahna Otterbacher*

**Virtual and Augmented Reality I**

Design and Evaluation of Three Interaction Models for Manipulating Internet of Things (IoT) Devices in Virtual Reality . . . . . 267  
*Günter Alce, Eva-Maria Ternblad, and Mattias Wallergård*

Head Mounted Display Interaction Evaluation: Manipulating Virtual Objects in Augmented Reality . . . . . 287  
*Maite Frutos-Pascual, Chris Creed, and Ian Williams*

On the Use of Persistent Spatial Points for Deploying Path Navigation in Augmented Reality: An Evaluation Study. . . . . 309  
*Vasileios Bachras, George E. Raptis, and Nikolaos M. Avouris*

User Experience Guidelines for Designing HMD Extended Reality Applications . . . . . 319  
*Steven Vi, Tiago Silva da Silva, and Frank Maurer*

**Virtual and Augmented Reality II**

Am I Moving Along a Curve? A Study on Bicycle Traveling-In-Place Techniques in Virtual Environments . . . . . 345  
*Tanh Quang Tran, Holger Regenbrecht, and Minh-Triet Tran*

Design and Evaluation of an Augmented Reality App for Learning Geometric Shapes in 3D . . . . .	364
<i>Pornpon Thamrongrat and Effie Lai-Chong Law</i>	
Enhance Engine Room Diagnostics Through Audio-Focused VR Simulation . . . . .	386
<i>Tychonas Michailidis, Christopher Barlow, Gordon Meadow, John Gouch, and Eshan Rajabally</i>	
Head-Controlled Menu in Mixed Reality with a HMD. . . . .	395
<i>Charles Bailly, François Leitner, and Laurence Nigay</i>	
VR Interaction Modalities for the Evaluation of Technical Device Prototypes . . . . .	416
<i>Patrick Harms</i>	
<b>Wearable and Tangible Interaction</b>	
Combining Tablets with Smartphones for Data Analytics . . . . .	439
<i>Gary Perelman, Marcos Serrano, Christophe Bortolaso, Celia Picard, Mustapha Derras, and Emmanuel Dubois</i>	
COMMONS: A Board Game for Enhancing Interdisciplinary Collaboration When Developing Health and Activity-Related Wearable Devices. . . . .	461
<i>Dennis Arts, Len Kromkamp, and Steven Vos</i>	
On-Body Tangible Interaction: Using the Body to Support Tangible Manipulations for Immersive Environments . . . . .	471
<i>Houssein Saidi, Marcos Serrano, Pourang Irani, Christophe Hurter, and Emmanuel Dubois</i>	
<i>SplitSlider</i> : A Tangible Interface to Input Uncertainty . . . . .	493
<i>Miriam Greis, Hyunyoung Kim, Andreas Korge, Albrecht Schmidt, and Céline Coutrix</i>	
The Possibility of Personality Extraction Using Skeletal Information in Hip-Hop Dance by Human or Machine . . . . .	511
<i>Saeka Furuichi, Kazuki Abe, and Satoshi Nakamura</i>	
<b>Courses</b>	
Introduction to Automation and to Its Potential for Interactive Systems Design . . . . .	523
<i>Philippe Palanque, Célia Martinie, and Elodie Bouzékri</i>	

Introduction to Data Visualization . . . . .	527
<i>Simone Diniz Junqueira Barbosa and Gabriel Diniz Junqueira Barbosa</i>	
The Science Behind User Experience Design . . . . .	530
<i>Asad Ali Junaid</i>	
<b>Demonstrations and Installations</b>	
A Multitouch Drawing Application with Occlusion-Free Interaction Strategies . . . . .	535
<i>Yi Ren Tan, Hyowon Lee, Insuk Ko, Dongliang Zhang, and Chunxiao Li</i>	
CityCompass VR - A Collaborative Virtual Language Learning Environment . . . . .	540
<i>Pekka Kallioniemi, Kimmo Ronkainen, Jussi Karhu, Sumita Sharma, Jaakko Hakulinen, and Markku Turunen</i>	
GazeMotive: A Gaze-Based Motivation-Aware E-Learning Tool for Students with Learning Difficulties. . . . .	544
<i>Ruijie Wang, Yuanchen Xu, and Liming Chen</i>	
Hybrid Wireless Sensor Networks: A Prototype . . . . .	549
<i>Alá Khalifeh, Novella Bartolini, Simone Silvestri, Giancarlo Bongiovanni, Anwar Al-Assaf, Radi Alwardat, and Samer Alhaj-Ali</i>	
Memories of Carvalho's Palace: Haunted Encounters, a Museum Experience to Engage Teenagers. . . . .	554
<i>Vanessa Cesário, Rui Trindade, Sandra Olim, and Valentina Nisi</i>	
Multi-level Engagement in Augmented Reality Children's Picture Books . . . .	558
<i>Nicholas Vanderschantz, Annika Hinze, and Aysha AL-Hashami</i>	
On-the-Fly Usability Evaluation of Mobile Adaptive UIs Through Instant User Feedback . . . . .	563
<i>Enes Yigitbas, Ivan Jovanovikj, Klementina Josifovska, Stefan Sauer, and Gregor Engels</i>	
SwipeBuddy: A Teleoperated Tablet and Ebook-Reader Holder for a Hands-Free Interaction. . . . .	568
<i>Max Pascher, Stefan Schneegass, and Jens Gerken</i>	
VibroSquare: Vibro-Tactile Display for Body-Centric Implicit Interactions . . .	572
<i>Yulia Zhiglova, David Lamas, Ilja Smorgun, and Amir Zare Pashaei</i>	

**Industry Case Studies**

A Human-Centred Business Scenario in SIoT – The Case of DANOS Framework . . . . . 579  
*Daniel Defiebre and Panagiotis Germanakos*

A Method and Tool for Analyzing Usability Testing Data in the Business Sector . . . . . 584  
*Panagiotis Germanakos and Ludwig Fichte*

Applying UCD for Designing Learning Experiences for Romanian Preschoolers. A Case Study . . . . . 589  
*Guran Adriana-Mihaela, Cojocar Grigoreta-Sofia, and Moldovan Anamaria*

Developing a User Interface for an Ultrasound Device Designed for Midwives and General Health Practitioners Situated in Low Resource Nations and Communities. . . . . 595  
*Bassam Jabry, Karin Aue, John Chan, and Jeffrey T. K. V. Koh*

It AIn’t Nuttin’ New – Interaction Design Practice After the AI Hype . . . . . 600  
*Lassi A. Liikkanen*

R++, User-Friendly Statistical Software . . . . . 605  
*Christophe Genolini, Emmanuel Dubois, and David Furió*

Towards a Framework for the Classification of Usability Issues . . . . . 610  
*Martin Böckle and Jens Rühmkorf*

**Interactive Posters**

A Mobile App for Illiterate and Semi-illiterate Pregnant Women- A User Centered Approach . . . . . 617  
*Jane Katusiime and Niels Pinkwart*

Adding Images to Psychometric Questionnaires to Improve User Engagement . . . . . 621  
*Mohammed Khwaja and Sarah Shepherd*

Applications for In-Situ Feedback on Social Network Notifications . . . . . 626  
*Frederic Raber and Antonio Krüger*

Combating Misinformation Through Nudging. . . . . 630  
*Loukas Konstantinou, Ana Caraban, and Evangelos Karapanos*

Exploring the Application of Social Robots in Understanding Bullying Perpetrators . . . . .	635
<i>Aiza Hasib, Mehr-un-Nisa Arif Kitchlew, Saad Jamal, and Suleman Shahid</i>	
Initial Steps Towards Infrastructuring Body-Centric Computing . . . . .	640
<i>Amir Zare Pashaei, Ilja Smorgun, David Lamas, and Vladimir Tomberg</i>	
Model-Driven Framework for Human Machine Interaction Design in Industry 4.0 . . . . .	644
<i>Patricia Leal, Rui Neves Madeira, and Teresa Romão</i>	
MyCompanion: A Digital Social Companion for Assisted Living . . . . .	649
<i>Fernando Loizides, Kathryn E. Jones, Daniel Abbasi, Christopher Cardwell, Ieuan Jones, Liam D. Turner, Athanasios Hassoulas, Ashley Bale, and Scott Morgan</i>	
OmniWedges: Improved Radar-Based Audience Selection for Social Networks. . . . .	654
<i>Frederic Raber and Antonio Krüger</i>	
Reducing Anxiety for Dental Visits. . . . .	659
<i>Kathryn Elizabeth Jones, Fernando Loizides, Parisa Eslambolchilar, Ilona Johnson, Shannu Bhatia, Owen Crawford, McClaine Beirne, Raj Chand, Laura Vuilleumier, and Idunah Araneta</i>	
SCAH!RF: A Novel Wearable as a Subconscious Approach for Mitigating Anxiety Symptoms. . . . .	664
<i>Láís Lopes and Pedro F. Campos</i>	
Search Results on Flight Booking Websites: Displaying Departure and Return Flights on a Single Page vs Two Consecutive Pages . . . . .	668
<i>Tatiana Zlokazova, Irina Blinnikova, Sergey Grigorovich, and Ivan Burmistrov</i>	
Smart Objects for Speech Therapies at Home . . . . .	672
<i>Paolo Buono, Fabio Cassano, Antonio Piccinno, and Maria Francesca Costabile</i>	
Transparency Heuristic: Effect of Implicitness of Online Data Acquisition on Sensitivity Perception. . . . .	676
<i>Mariavittoria Masotina, Patrik Pluchino, Francesca Freuli, Luciano Gamberini, and Anna Spagnolli</i>	
Using Virtual Reality to Enable Individuals with Severe Visual Disabilities to Read Books . . . . .	680
<i>Kurtis Weir, Fernando Loizides, Vinita Nahar, and Amar Aggoun</i>	

Vibro-Tactile Implicit Interactions: So What? . . . . . 685  
*Yulia Zhiglova, David Lamas, Ilja Smorgun, and Paul Seitlinger*

Visualizations of User’s Paths to Discover Usability Problems . . . . . 689  
*Paolo Buono, Giuseppe Desolda, Rosa Lanzilotti,  
 Maria Francesca Costabile, and Antonio Piccinno*

Word Association: Engagement of Teenagers in a Co-design Process . . . . . 693  
*Vanessa Cesário, António Coelho, and Valentina Nisi*

**Panels**

Social Media and the Digital Enterprise . . . . . 701  
*Wietske Van Osch, Constantinos K. Coursaris, Dov Te’eni,  
 and George Giaglis*

User Experience in an Automated World . . . . . 706  
*Philippe Palanque, Pedro F. Campos, José Abdelnour Nocera,  
 Torkil Clemmensen, and Virpi Roto*

**Workshops**

Challenging Misinformation: Exploring Limits and Approaches . . . . . 713  
*Lara S. G. Piccolo, Somya Joshi, Evangelos Karapanos,  
 and Tracie Farrell*

Designing for Aging People . . . . . 719  
*Masood Masoodian and Paula Alexandra Silva*

HCI Challenges in Human Movement Analysis . . . . . 725  
*Lilian Genaro Motti Ader, Benoît Bossavit, Brian Caulfield,  
 Mathieu Raynal, Karine Lan Hing Ting, Jean Vanderdonckt,  
 and Nadine Vigouroux*

The Human(s) in the Loop—Bringing AI and HCI Together . . . . . 731  
*Tom Gross, Kori Inkpen, Brian Y. Lim, and Michael Veale*

Visualizing Information Retrieved from (Large) WHAT Networks . . . . . 735  
*Gerrit van der Veer, Achim Ebert, Nahum Gershon,  
 and Peter Dannemann*

#SociallyAcceptableHCI: Social Acceptability of Emerging  
 Technologies and Novel Interaction Paradigms . . . . . 741  
*Marion Koelle, Ceenu George, Valentin Schwind, Daniel Perry,  
 Yumiko Sakamoto, Khalad Hasan, Robb Mitchell, and Thomas Olsson*

**Pushing the Boundaries of Participatory Design . . . . . 747**  
*Jessica Korte, Aurora Constantin, Cristina Adriana Alexandru,  
 Jerry Alan Fails, Eva Eriksson, Judith Good, Helen Pain,  
 Juan Pablo Hourcade, Franca Garzotto, and Annalu Waller*

**User Experiences and Wellbeing at Work. . . . . 754**  
*Ganesh Bhutkar, Virpi Roto, Torkil Clemmensen,  
 Barbara Rita Barricelli, Jose Abdelnour-Nocera,  
 Alexander Meschtscherjakov, Arminda Guerra Lopes, Pedro Campos,  
 and Frederica Gonçalves*

**Handling Security, Usability, User Experience and Reliability  
 in User-Centered Development Processes: IFIP WG 13.2 and WG 13.5  
 Workshop at INTERACT 2019. . . . . 759**  
*Carmelo Ardito, Regina Bernhaupt, Philippe Palanque,  
 and Stefan Sauer*

**Author Index . . . . . 763**