# The 16th ACM International Conference on PErvasive Technologies Related to Assistive Environments

# PETRA 2023

## Conference Program

July 05 – July 07, 2023
Corfu, Greece

## Organized by

*The University of Texas at Arlington, Arlington, Texas, USA*

## With sponsorship from:

***The National Science Foundation (NSF), USA***
***The College of Engineering, University of Texas at Arlington (UTA), USA***
***The Department of Computer Science and Engineering at UTA, USA***
***The Human Centered Computing Laboratory (Heracleia) at UTA, USA***
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***The National Center for Scientific Research (NCSR)-Demokritos, Greece***
***Ionian University, Corfu, Greece***
***Technologies Journal***

## Conference Proceedings

***Conference proceedings are available to authors only at www.petrae.org/proceedings***

**ACM - Association for Computing Machinery**
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# *Welcome from the Conference Chair*

**Dear Friends and Colleagues,**

On behalf of the PETRA Program Committee and the Organizing Committees, I welcome you to the ***16th ACM International Conference on PErvasive Technologies Related to Assistive Environments, PETRA 2023*****,** taking place July 05 – July 07, 2023, on the magnificent island of Corfu. PETRA is sponsored by the University of Texas Arlington, the National Science Foundation (NSF) and several other organizations. It is an interdisciplinary conference with focus on **pervasive technologies** that improve the quality of life and enhance human experience and performance in a wide range of settings and impacting different disciplines.

As we are coming out of a deep pandemic crisis and entering normalcy again, the scientific results presented can play an important role in meeting emerging human needs and address compelling social applications to survive in an increasingly challenging world. Results range from basic to applied research in different areas of computer science, and impacting applications in robotics, sensors, devices, wearables, and software. PETRA outcomes can also improve healthcare, workplace training, and devise software solutions that address both physical and cognitive human performance.

PETRA 2023 has 153 submissions from 35 countries and 132 registrations. Paper acceptance included 48 full papers, 13 short papers, 4 poster papers, 2 demo papers and twelve workshops. Like all previous years, the US National Science Foundation (NSF) has supported the conference with a **Doctoral Consortium (DC) award** to 16 student authors. In addition, several accepted papers have undergraduate student coauthors, supported by *NSF's Research Experiences for Undergraduates program.*

The conference has three parallel sessions. On Day 2, there is a **fourth parallel session**. Our aim has been to enable ending the talks each day a little earlier so people can have a chance to network informally and also enjoy Corfu.

Furthermore, due to the hybrid nature of this year's conference, virtual presentations are placed in **SESSION V** and presented over Zoom. SESSION V presentations are shown on page 8 and should not be missed.

***PETRA 2023 distinguishes papers with six types of awards: Best Technical Paper, Best Paper for Novelty, Best Student Paper, Best Poster Paper, Best Demo Paper, and Best Workshop Paper.***

We hope that PETRA 2023 will provide you with exciting new research opportunities to showcase your research and to network. We truly appreciate your participation and look forward to seeing you all in person in PETRA 2024! Wishing you a happy and safe summer.

**Fillia Makedon**
2023 PETRA Conference Chair
makedon@uta.edu

# *KEYNOTE SPEAKERS*

**DAY 1**

**Petros Maragos** received his **Ph.D. degree** from Georgia Tech, Atlanta, in 1985**.** Then, he joined the faculty of the Division of Applied Sciences at Harvard University, where he worked for 8 years as professor of EE affiliated with the Harvard Robotics Lab. In 1993 he joined the faculty of the School of ECE at Georgia Tech, affiliated with its Center for Signal & Image Processing. Since 1999, he has been working **as professor at the NTUA,** where he is currently the **director of the Intelligent Robotics & Automation Lab.** He has held visiting positions at MIT in 2012 and at UPenn in 2016. He is a co-founder and since 2023 the acting director of the Institute of Robotics at the Athena RC. His research and teaching interests include signal processing, computer vision & speech, machine learning, and robotics. He is the recipient of several awards including an NSF-PYIA, Best Paper awards from IEEE journals and Computer Vision conferences, and Technical Achievement award from EURASIP**.** For his research contributions he was elected a **Fellow of IEEE in 1995** and a **Fellow of EURASIP in 2010.** He has served as **IEEE SPS Distinguished Lecturer** for 2017-2018.

**DAY 2**

**Dr. Ahmad Lotfi is Professor of Computational Intelligence and Head of the Department of Computer Science at Nottingham Trent University, Nottingham,** where he is also leading the Computational Intelligence and Applications (CIA) research group. Areas of his research interest include computational intelligence, ambient intelligence, assistive robotics, and smart homes. His research has been recognized internationally for significant contributions to the application of computational intelligence techniques in control systems and intelligent environments. He has supervised many research fellows and over 20 PhD research students to successful completion. He has worked in collaboration with many healthcare commercial organizations and end-users. He has authored and co-authored over 200 scientific papers in the areas of computational intelligence, anomaly detection and machine learning in highly prestigious journals and international conferences. He has been invited as an **Expert Evaluator and Panel Member for many EU Framework Research Programmes**.

**DAY 3**

**Dr. Ming Li** is an **Associate Professor** with the Computer Science and Engineering Department of the **University of Texas at Arlington**. Her research interests are in the general area of mobile computing and human-centered computing, with the focus on their novel applications in networking(e.g., crowdsensing/crowdsourcing, QoE assessment, resource optimization), smart city(e.g., mobility enhancement), andsecurity and privacy(e.g., user-centered security, privacy-aware computing). Dr. Li explores those research topics with approaches within the core computer science and engineering discipline, including systems, signal processing, optimizations, and artificial intelligence, and with the principles across disciplines, including physiology and economics. She obtained her Ph.D. from the Electrical and Computer Engineering Department at Mississippi State University. Her research has been funded by the US National Science Foundation (NSF), Department of Transportation (DoT) and the National Institutes of Health (NIH). She is a recipient of the **NSF CRII Award** (2016) and **NSF CAREER Award** (2020)

## CONFERENCE DAY 1: July 05, 2023

| | | | |
|---|---|---|---|
| 08:00-09:00 | **Conference Registration** | | |
| | *Room 1 (KERKYRA)* | | |
| 09:00-09:25 | **Conference Opening**<br>**Fillia Makedon**, Conference Chair, *University of Texas Arlington, USA* | | |
| 09:30-10:25 | ***KEYNOTE:*** ***Multimodal Robot Perception and Interaction***<br>**Prof. Petros Maragos**<br>**National Technical University of Athens, Greece**<br>*Session Chair: Fillia Makedon* | | |
| 10:30-11:00 | **Coffee Break & Session P: Poster & Demo Presentations** ***(List of presentations on page 11)***<br>*Location: Room 2 (NAUSICA)* | | |
| 11:00-12:30 | *Room 1 (KERKYRA)* | *Room 2 (NAUSICA)* | *Room 3 (ITHACA)* |
| | **Session A:** ***Accessibility Tools, Methods & Applications***<br>***Session Chair:*** *Hamza Reza Pavel*<br>**A-1 Online symposium with touch: An attempt to organise an online 3D model tactile symposium for the visually impaired** (12+3 min) Kazunori Minatani and Tetsuya Watanabe<br>**A-2 TalkConnect: A Mobile Networking App for People with Visual Impairments Attending In-person Formal Events** (10+2 min) Manizheh Zand, Joyce Ayoola, Roopan Tuli, Akshat Kalra, John Quach and Maria Kyrarini<br>**A-3 Towards a Haptic-based Virtual Cane to Assist Blind People in Obstacle Detection** (10+2 min) Barbara Leporini, Michele Raucci, Michele Rosellini and Nicola Forgione<br>**A-4 Artificial cognitive functions towards AI-enabled collaborative robots** (10+2 min) Evi Zouganeli and Athanasios Lentzas<br>**A-5 Lung Nodule Segmentation Using Federated Active Learning** (12+3 min) Andrei Tenescu, Cristian Avramescu, Bogdan Bercean and Marius Marcu<br>**A-6 Assisting radiologists with transformer-based fracture detection for chest radiographs** (12+3 min) Bogdan-Alexandru Bercean, Andrei Tenescu, Cristian Avramescu and Marius Marcu | **Session B:** ***Assistive Robotic Systems and Human-Robot Interaction***<br>***Session Chair:*** *Sadjad Asghari-Esfeden*<br>**B-1 Research through Design of Socially Cooperative Agents for Exoskeleton-based at Home Stroke Rehabilitation** (12+3 min) Milton Mariani & John Paulin Hansen<br>**B-2 Fabric-Silicone Composite Haptic Muscles for Sensitive Wearable Force Feedback** (12+3 min) Raagini Rameshwar, Erik Howard Skorina and Cagdas D. Onal<br>**B-3 Real-Time Object Localization for Human-Robot Handover** (12+3 min) Sadjad Asghari-Esfeden, Garrit Strenge, Kyle Lockwood, Yunus Bicer, Tales Imbiriba, Mariusz Furmanek, Mathew Yarossi, Eugene Tunik, Taskin Padir and Deniz Erdogmus<br>**B-4 Effects of Presence on Human Performance and Workload in Simulated VR-based Telerobotics** (12+3 min) Federica Nenna, Davide Zanardi and Luciano Gamberi<br>**B-5 Gamified experiences using 360° photography** (12+3 min) Aldo Xhako, Emmanouil Zidianakis, Eirini Kontaki, Konstantina Manoli, Stavroula Ntoa, Nikolaos Partarakis and Constantine Stephanidis<br>**B-6 Reflect-AR: Insights into Mirror-Based Augmented Reality Instructions to Support Manual Assembly Tasks** (12+3 min) Pascal Karg, Roman Stöhr, Lisa Jonas, Julian Kreimeier and Timo Götzelmann | **Workshop W1:** ***Assistive Technologies for Activities of Daily Living Workshop***<br>***Session Chair:*** *Ashish Jaiswal*<br>**W1-1 Lightweight Mood Estimation Algorithm For Faces Under Partial Occlusion** (12+3 min) Nikolas Petrou, Georgia Christodoulou, Konstantinos Avgerinakis and Pavlos Kosmides<br>**W1-2 A Teleoperation Framework for Robots Utilizing Control Barrier Functions in Virtual Reality** (12+3 min) Aref Hebri, Sneh Acharya, Michail Theofanidis and Fillia Makedon<br>**W1-3 Assistive Robots for Persons with Visual Impairments: Current Research and Open Challenges** (12+3 min) Maria Kyrarini, Manizheh Zand and Krisha Kodur<br>**W1-4 Towards prediction of Quality of Life aspects using wearable data with limited ground truth** (12+3 min) Konstantina Pantelidou, Christoforos Papastergiopoulos, Ilias Kalamaras, Konstantinos Votis and Dimitrios Tzovaras<br>**W1-5 A Framework Towards Ambient Assisted Living Enhanced by Service Robots** (12+3 min) Petros Toupas, Georgios Tsamis, Andreas Kargakos, Dimitrios Giakoumis, Konstantinos Votis and Dimitrios Tzovaras<br>**W1-6 Beatrice: A Chatbot for Collecting Psychoecological Data and Providing QA Capabilities** (12+3 min) Yeming Ni, Yuqing Chen, Ruyi Ding and Shiguang Ni |
| 12:30-14:00 | **Lunch Break** *(Lunch tickets can be obtained at the hotel front desk)*<br>(Lunch is included **for participants** staying at the main venue during the conference; if *at other hotels, the cost for lunch is €18 for students & €24 for others.).* | | |

<table>
<tr><th></th><th>Room 1 (KERKYRA)</th><th>Room 2 (NAUSICA)</th><th colspan="2">Room 3 (ITHACA)</th></tr>
<tr><td rowspan="2">14:00-<br>15:30</td><td rowspan="2">Session C: Human Affect, Physiology and Biosignal Analysis<br>Session Chair: Vangelis Metsis<br>C-1 Medical Face Masks and Emotion Recognition from the Body: Insights from a Deep Learning Perspective (12+3 min) Nikolaos Kegkeroglou, Panagiotis P. Filntisis and Petros Maragos<br>C-2 Facial Emotion Recognition in Immersive Virtual Reality: A Systematic Literature Review (12+3 min) Thorben Ortmann, Qi Wang and Larissa Putzar<br>C-3 DETECTING COGNITIVE FATIGUE IN SUBJECTS WITH TRAUMATIC BRAIN INJURY FROM FMRI SCANS USING SELF-SUPERVISED LEARNING (12+3 min) Ashish Jaiswal, Ashwin Ramesh Babu, Zaki Zadeh, Glenn Wylie and Fillia Makedon<br>C-4 An LLVM-Inspired Framework for Unified Processing of Multimodal Time-Series Data (10+2 min) Lee B. Hinkle and Vangelis Metsis<br>C-5 Human Experts' Perceptions of Auto-Generated Summarization Quality (12+3 min) Maryam Lotfigolian, Christos Papanikolaou, Samaneh Taghizadeh and Frode Eika Sandnes<br>C-6 Sporadic Audio-Visual Embodied Assistive Robot Navigation For Human Tracking (12+3 min) Gaurav Singh, Paul Ghanem and Taskin Padir</td><td rowspan="2">Session D: Wearable Systems & Monitoring Devices<br>Session Chair: Enamul Karim<br>D-1 Modeling Behavior, Perception and Cognition of Pilots in a Real-time Training Assistance Application (12+3 min) Christian Thomay, Peter Fritz, Benedikt Gollan, Carsten Mangasser, Michael Matscheko and Harald Schitnig<br>D-2 Developing Brain-Computer Interfaces with Everyone (12+3 min) Garrett Flynn, Joshua Brewster, Dong Song and Marientina Gotsis<br>D-3 Decentralized Resilient Smart Lock System with Offline Capabilities - ChainLock (10+2 min) Robert Manthey, Richard Vogel, Matthias Baumgart, Christian Roschke, Marc Ritter and Matthias Vodel<br>D-4 Digital technology for elders better living: a usability and user-experience assessment (12+3 min) Agnese Brunzini, Manila Caragiuli, Flavia Atzori, Micol Bronzini and Michele Germani<br>D-5 An EEG-based Cognitive Fatigue Detection System (12+3 min) Enamul Karim, Hamza Reza Pavel, Ashish Jaiswal, Mohammad Zaki Zadeh, Michail Theofanidis, Glenn Wylie and Fillia Makedon<br>D-6 Remote Operated Human Robot Interactive System using Hand Gestures for Persons with Disabilities (10+2 min) Enamul Karim, Harish Ram Nambiappan, Sneh Acharya and Fillia Makedon</td><td>14:00<br>-<br>14:45</td><td>Workshop W2: <u>MeaVAB Workshop</u><br>On Measuring Vital and Affective Biosignals<br>Session Chair: Dimitri Kraft<br>W2-1 Visual detection of short-wave blood pressure fluctuations (12+3 min) Gerald Bieber, Angelina Schmidt, Dimitri Kraft and Michael Fellmann<br>W2-2 Evaluation of Machine Learning based Pose Estimation of Surfers on River Waves (12+3m) Michael Zöllner, Moritz Krause, Jan Gemeinhardt, Michael Döllinger and Stefan Kniesburges<br>W2-3 Reliability factor for accurate remote PPG systems (12+3 min) Dimitri Kraft, Gerald Bieber and Michael Fellmann</td></tr>
<tr><td>14:50<br>-<br>15:50</td><td>Workshop W3: <u>TOTAL and AIEd Workshop</u><br>Session Chair: Erik Wästlund<br>W3-1 CoSy - AI enhanced assistance system for face to face communication trainings in higher healthcare education (12+3m) Fabian Samek, Mathias Eulers, Markus Dresel, Nicole Jochems, Andreas Schrader and Alfred Mertins<br>W3-2 Continuous eHealth monitoring ecosystem for bronchial asthma and air quality (12+3m) Sergio Escalona López, Miquel Alfaras Espinàs, Rosana Hernando Salvador, Luis Lores Obradors and Zouhair Haddi<br>W3-3 IoT for Health and Well-being: A case study and call for action (12+3m) Karint Ahlin, Agnieszka Kitkowska and Erik Wästlund<br>W3-4 Research agenda for IoT-based comfort management systems in open-plan office spaces (12+3m) Christoph Stahl, Benjamin Gateau, Yannick Naudet and Cedric Pruski</td></tr>
<tr><td>15:45-<br>16:15</td><td colspan="3">Meeting of NSF Doctoral Consortium Students - Session 1<br>Room 2 (NAUSICA) (close to the registration desk)</td></tr>
<tr><td>19:00<br>-21:00</td><td colspan="3">Welcome Reception<br>(Room 2 (NAUSICA) – appetizers & drinks) (please bring reception coupons – <u>accompanying persons need to purchase them</u>)</td></tr>
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## CONFERENCE DAY 2: July 06, 2023

| | Room 1 (KERKYRA) | Room 2 (NAUSICA) | Room 3 (ITHACA) |
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| 09:00 - 09:55 | ***KEYNOTE:*** ***Computational Intelligence Approaches for Anomaly Detection in Activities of Daily Living***<br>**Prof. Ahmad Lotfi**<br>**Nottingham Trent University, United Kingdom**<br>***Session Chair: Dr. Jordan Bird*** | | |
| 10:00 - 10:30 | **Coffee Break (**remember to bring coffee coupons please**)** | | |
| 10:30 - 12:30 | **Workshop W4: *NOTION Workshop***<br>***The Seventh Workshop on: Human Behaviour Monitoring, Interpretation and Understanding***<br>***Session Chair: Jordan J. Bird, Amir Pourabdollah***<br>**W4-1 Generative Transformer Chatbots for Mental Health Support: A Study on Depression and Anxiety** (12+3 min) Jordan J. Bird and Ahmad Lotfi<br>**W4-2 Explainable AI for Medical Image Processing: A Study on MRI in Alzheimer's Disease** (12+3 min) Linda M. Duamwan and Jordan J. Bird<br>**W4-3 SmartFunction: An Immersive Vr System to Assess Attention Using Embodied Cognition** (12+3 min) Ashish Jaiswal, Aref Hebri, Hamza Reza Pavel, Mohammad Zaki Zadeh and Fillia Makedon<br>**W4-4 Toward a holistic elderly-centred behaviour monitoring solution: Achievements and Opportunities** (12+3 min) Abdallah Naser, Ahmad Lotfi, Amir Pourabdollah and Jordan Bird<br>**W4-5 An Integrated Development Environment for the Design of Fuzzy Human-centric System in accordance with IEEE Standard 1855-2016.** (12+3 min) Bhavesh Pandya, Amir Pourabdollah and Ahmad Lotfi<br>**W4-6 Exploring the Role of Fear in Human Decision Making** (12+3 min) Patrick Kelly, David Ada Adama, Isibor Kennedy Ihianle, Pedro Machado and Richard I. Otuka<br>**W4-7 Employee Behavior Analysis Towards Multi-Label Classification of Customer Reviews** (12+3 min) Alaeddin Türkmen, Barış Bayram and Gözde Aydın | **Session E: *Activity Recognition, Human Tracking and Localization***<br>***Session Chair: Antonis Argyros***<br>**E-1 Gaze-based Attention Recognition for Human-Robot Collaboration** (12+3 min) Pooja Prajod, Matteo Lavit Nicora, Matteo Malosio and Elisabeth André<br>**E-2 3D Hand Shape and Pose Estimation based on 2D Hand Keypoints** (12+3 min) Drosakis Drosakis and Antonis Argyros<br>**E-3 Design, development and usability of a dashboard for supporting healthcare professionals in managing people with dementia** (12+3 m) Federico Barbarossa, Giulio Amabili, Arianna Margaritini, Nicole Morresi, Sara Casaccia, Fabrizio Marconi, Yeh-Liang Hsu, Fong-Chin Su, Nathalie Stolwijk, Henk Herman Nap, Elvira Maranesi and Roberta Bevlacqua<br>**E-4 Native interaction experience for computational maps with mobile devices (10+2 min)** Anton Akusok, Leonardo Espinosa-Leal, Kaj-Mikael Björk and Renjie Hu<br>**E-5 Towards Safe Encounters between Pedestrians and Autonomous Driverless Vehicles: Comparing Adults and Children's Perceptions of External Human Machine Interface Design Features (12+3 min)** Mohammad Awais Hameed, Fuwad Chaudhry, Fatema Tuz Sabiha & Frode Eika Sandnes<br>**E-6 Technological Tools for Assisting People with Autism Spectrum Disorder (ASD), Intellectual Development Disorder (IDD) and Physical Disabilities (PD)** (12+3 min) Mattys Gervais, Bruno Bouchard, Leoni Labreque, Virginie Tremblay, Julie Bouchard, Maud-Christine Chouinard, Carole Dionne, Kevin Bouchard and Sebastien Gaboury | **Workshop W5: *CVIn4 Workshop***<br>***On Computer vision for Industry 4.0 applications***<br>***Session Chair: Antonios Gasteratos***<br>**W5-1 Encoding Semantic Attributes - Towards Explainable AI in Industry** (12+3 min) Sarah Schneider, Doris Antensteiner, Daniel Soukup and Matthias Scheutz<br>**W5-2 Achieving Zero Defected Products in Diary 4.0 using Digital Twin and Machine Vision** (12+3 min) Fotios Konstantinidis, Vasiliki Balaska, Symeon Symeonidis, Foivos Psarommatis, Athanasios Psomoulis, Georgios Giakos, Spyridon Mouroutsos and Antonios Gasteratos<br>**W5-3 Anomaly Detection in the Metal-Textile Industry for the Reduction of the Cognitive Load of QC Workers** (12+3 min) Tobias Arndt, Max Conzen, Ingo Elsen, Alexander Ferrein, Oskar Galla, Hakan Köse, Stefan Schiffer and Matteo Tschesche<br>**W5-4 Object detection and colour evaluation of multicoloured waste textiles using machine vision** (12+3 min) Sebastian E. Schrøder, Uffe L. Christensen, Mikkel Hessellund, Andreas L. Enevoldsen, Anders F. Mikkelstrup and Morten Kristiansen<br>**W5-5 Analysis of EV Charging Infrastructure and its impact on Public Adoption: Examining the Critical Role of Charging Stations in the Acceleration of Electric Vehicle Market Growth** (12+3 min) Safa Hamdare, Omprakash Kaiwartya, Manish Jugran, David Brown and Pratik Vyas<br>**W5-6 A vision-based application for container detection in Ports 4.0.** (12+3 min) Maria Angeles Burgos Simon, Eduardo Garro Crevillen, Miguel Llacer Sanfernando, Francisco Blanquer, Tommi Leino and Fotios Konstantinidis |

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| 12:30-14:00 | **Lunch Break**<br>*(Lunch is included **for registered participants** staying at the main venue during the days of the conference; if at other hotels, the cost for lunch is €18 for students & €24 for others. Lunch tickets can be obtained at the hotel front desk).* | | |
| 14:00-15:00 | **Session F:** ***Pattern Recognition in Assistive Technology Applications***<br>***Session Chair:*** *Ankur Yadav*<br>**F-1 Analyzing Arc Welding Techniques improves Skill Level Assessment in Industrial Manufacturing Processes** (12+3 min) Markus Laube, Georgios Sopidis, Bernhard Anzengruber-Tanase, Michael Haslgrübler and Alois Ferscha<br>**F-2 An RGB-D Fusion System for Indoor Wheelchair Navigation** (12+3 min) Christos Sevastopoulos, Sneh Acharya and Fillia Makedon<br>**F-3 Machine Learning for Rhabdomyosarcoma Whole Slide Images Sub-type Classification** (10+2 min) Ankur Yadav, Ovidiu Daescu, Patrick Leavey and Erin Rudzinski<br>**F-4 Enhancing Action Recognition in Vehicle Environments with Human Pose Information** (10+2 min) Michaela Konstantinou, George Retsinas and Petros Maragos | **Session G:** ***Pervasive Systems for the Aged & Smart Health Devices***<br>***Session Chair:*** *Arno Appenzeller*<br>**G-1 Usability for Data Sovereignty - Evaluation of Privacy Risk Quantification Interfaces** (12+3 min) Arno Appenzeller, Falk Balduf and Jürgen Beyerer<br>**G-2 Human Digital Twin-based interactive dashboards for informal caregivers of stroke patients** (12+3 min) Martin Wolfgang Lauer-Schmaltz, Israa Kerim, John Paulin Hansen, Gábor Máté Gulyás and Henning Boje Andersen<br>**G-3 Optimization of CT Lung Lobe Segmentation for Edge Inference** (10+2 min) Cristian Avramescu, Andrei Tenescu, Bogdan Bercean and Marius Marcu<br>**G-4 Development of a Real-Time Stress Detection System for Older Adults with Heart Rate Data** (12+3 min) Patrizia Di Campli San Vito, Gözel Shakeri, James Ross, Xiaochen Yang and Stephen Brewster | **Workshop W6:** ***HD-THIS Workshop Workshop on Human Digital Twins in Hybrid Intelligence Systems***<br>***Session Chair:*** *Christoph Stahl*<br>**W6-1 Preliminary Systemic Model of (Human) Digital Twin** (12+3 min) Yannick Naudet, Christoph Stahl and Marie Gallais<br>**W6-2 Exploring the Feasibility of Data-Driven Emotion Modeling for Human Digital Twins** (12+3 min) Catarina Dias de Oliveira, Alireza Khanshan and Pieter Van Gorp<br>**W6-3 Challenges of learning human digital twin: case study of mental wellbeing** (12+3 min) Elena Vildjiounaite, Johanna Kallio, Julia Kantorovitch, Atte Kinnula, Simão Ferreira, Matilde Rodrigues and Nuno Rocha<br>**W6-4 TONIC: A teamwork simulator and digital twin for organizational innovation challenges** (12+3 min) Jiayuan Hu and Ioanna Lykourentzou |
| **NOTE: On DAY 2, today, there's a FOURTH PARALLEL SESSION taking place in Room LEFKAS. To see the program of this fourth session, please refer to the next page.** | | | |
| 20:30-22:30 | **GALA Dinner, BBQ, Greek Folk Dancing and Entertainment**<br>***By Hotel Main Pool (DC Students try to sit together)*** | | |

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| **Day 02**<br><br>**July 06, 2023** | 10:30-12:30 | ***Day 2 Parallel Session: Room 4 (LEFKAS)*** |
| | | **Workshop W10: *CogTech Workshop***<br>***Low-cost, non-invasive technologies for decision-making, cognitive wellness, and mental health***<br>***Session Chair: Varun Dutt***<br>**W10-1 Effects of Simulation Tools and Videos on People's Cognizance of Climate Change** (12+3 min) Gitanshu Choudhary, Keshav Tadia, Varun Dutt<br>**W10-2 Learning channel attention for decoding of visual imagined text from multi-band EEG using metric learning** (12+3 min) Gaurav Jaswal, Geetanjali Sharma, Varun Dutt and Arnav Bhavsar<br>**W10-3 An integrated framework for classifying mammograms according to BIRADS scale and breast tissue density** (12+3 min) Ioannis Tzortzis, Stavros Sykiotis, Ioannis Rallis and Nikolaos Doulamis<br>**W10-4 Assessing stress, anxiety, and depression with social robots via conversational AI** (12+3 min) Anuj Nandanwar and Varun Dutt<br>**W10-5 Attention based 1D-CNN for mental Workload Classification using EEG** (12+3 min) Fiza Parveen and Arnav Bhavsar<br>**W10-6 Impact of Indian Classical Raga in Immersive Environments on Human Psycho-physiological Parameters** (12+3 min) Shilpa Chandra, Kulbhushan Chand and Varun Dutt<br>**W10-7 The impact of Odissi dance on stress, anxiety, and depression levels among young adults** (12+3 min) Ankita Garg, Kirti Tripathi, Shatakshi Goyal, Lakshmidhar Behera and Varun Dutt |
| | 12:30-14:00 | **Lunch Break** |
| | 14:00-15:00 | **W10-8 Prediction of decision-making performance post-longitudinal tDCS administration via EEG features and machine learning** (12+3 min) Akash K Rao, Zoha Fatma, Vishnu K Menon, Kulbhushan Chand, Arnav Bhavsar, Shubhajit Roy Chowdhury, Sushil Chandra and Varun Dutt<br>**W10-9 Evaluating the Effectiveness of Mantra Meditation in a 360 Virtual Reality Environment** (12+3 min) Durgesh Ameta, Ankita Garg, Parveen Kumar, Laxmidhar Behera and Varun Dutt<br>**W10-10 Predicting Adverse Childhood Experiences via Machine Learning Ensembles** (12+3 min) Akash K Rao, Gunjan Y Trivedi, Anshika Bajpai, Gajraj Singh Chouhan, Riri G Trivedi, Anita Kumar, Kathirvel Soundappan, Hemalatha Ramani and Varun Dutt<br>**W10-11 Does longitudinal, anodal tDCS improve working memory? A behavioral investigation** (12+3 min) Darshil Shah, Akash K Rao, Arnav Bhavsar, Shubhajit Roy Chowdhury, Sushil Chandra and Varun Dutt |

## CONFERENCE DAY 3: July 07, 2023

<table>
<tr><th></th><th colspan="4">Room 1 (KERKYRA)</th></tr>
<tr><td>09:00-<br>09:55</td><td colspan="4"><u>KEYNOTE</u>: Enhancing Safety of Vulnerable Road Uses: Smartphone-Centered Approaches<br>Prof. Ming Li (Virtual Presentation)<br>The University of Texas at Arlington, USA<br>Session Chair: Fillia Makedon</td></tr>
<tr><td>10:00-<br>11:00</td><td>Room 1 (KERKYRA)</td><td>10:00-<br>11:00</td><td>Room 2 (NAUSICA)</td><td>10:00<br>-<br>11:00</td><td>Room 3 (ITHACA)</td></tr>
<tr><td></td><td>Workshop W7: <u>PerInt Workshop</u><br>5th Workshop on Pervasive Intelligence in Engineering<br>Session Chair: Anastasios Doulamis<br><br>W7-1 An interoperable and cost-effective IoT-based Framework for Household Energy Monitoring and Analysis (12+3 min) Sotirios Athanasoulias, Athina Katsari, Michail Savvakis, Stelios Kalogridis and Nikolaos Ipiotis<br>W7-2 Deep transformer networks for precise pothole segmentation tasks (12+3 min) Iason Katsamenis, Athanasios Sakelliou, Nikolaos Bakalos, Eftychios Protopapadakis, Christos Klaridopoulos, Nikolaos Frangakis, Anastasios Doulamis and Dimitris Kalogeras<br>W7-3 Real time road defect monitoring from UAV visual data sources (12+3 min) Iason Katsamenis, Nikolaos Bakalos, Eftychios Protopapadakis, Eleni Eirini Karolou, Georgios Kopsiaftis and Athanasios Voulodimos<br><br>W7-4 Dynamically tangible cultural heritage monitoring from web video sources (12+3 min) Ioannis Kavouras, Rallis Ioannis, Nikolaos Doulamis and Anastasios Doulamis</td><td></td><td>Workshop W8: <u>CRYSTAL Workshop</u><br>Workshop on ConveRsational sYSTems for Assisted Living<br>Session Chairs: Asier López Zorrilla<br><br>W8-1 Voice-Based Conversational Agents and Knowledge Graphs for Improving News Search in Assisted Living (12+3 min) Phillip Schneider, Nils Rehtanz, Kristiina Jokinen and Florian Matthes<br><br>W8-2 The CITA GO-ON dialogue system: mid-term achievements (12+3 min) Javier Mikel Olaso, Maite García-Sebastián, Asier López Zorrilla, Mikel Tainta, Mirian Ecay-Torres, María Inés Torres and Pablo Martínez-Lage<br><br>W8-3 Challenges with Voice Assistants for the Elderly in Semi-Public Spaces (12+3 min) Biju Thankachan, Markku Turunen and Kristiina Jokinen<br><br>W8-4 A virtual Assistant Dedicated to the Accompaniment of the Person, Informed of his Life Context, thanks to the Smartphone (12+3 min) Florian Szczepaniak, Jérôme Boudy, Gérard Chollet, Mossaab Hariz and Christophe Lohr</td><td></td><td>Workshop W9: <u>NLP4Disability Workshop</u><br>A Workshop on Natural Language Processing (NLP) for Disability<br>Session Chair: Abeer Alessa<br><br>W9-1 Towards Designing a ChatGPT Conversational Companion for Elderly People (12+3 min) Abeer Alessa and Hend Al-Khalifa<br><br>W9-2 A Preliminary Cross-Language Investigation of Empathy in #Disability Discourse on Twitter (12+3 min) Zainab Almeraj and Fatemah Husain<br><br>W9-3 Evaluating Search Results Overviews and Previews with Visually Impaired Users (12+3 min) Dena Al-Thani and Aboubakr Aqle<br><br>W9-4 JUMLA-QSL-22: Creation and Annotation of a Qatari Sign Language Corpus for Sign Language Processing (12+3 min) Achraf Othman, Oussama El Ghoul, Maryam Aziz, Khansa Chemnad, Sammy Sedrati and Amira Dhouib</td></tr>
<tr><td>11:00-<br>11:30</td><td colspan="4">Coffee Break &<br>Award Ceremony</td></tr>
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| 11:30-12:30 | **W7-5 Towards Accelerating the Adoption of Federated Learning for Heterogeneous Data** (12+3 min) Christos Ntokos, Nikolaos Bakalos and Dimitrios Kalogeras<br><br>**W7-6 An end-to-end system for transcription, translation, and summarization to support the co-creation process. A Health CASCADE Study.** (12+3 min) Georgios Balaskas, Homer Papadopoulos, Quentin Loisel, Dimitra Pappa, Georgios Efthimoglou and Sebastien Chastin<br><br>**W7-7 Tensor-based embedding for graph-based semi-supervised approaches** (12+3 min) Ioannis Georgoulas, Eftychios Protopapadakis, Konstantinos Makantasis and Anastasios Doulamis<br><br>**W7-8 Lightweight machine learning for privacy-preserving and secure networked medical devices: The SEPTON project use cases** (12+3 min) Sotiris Messinis, Nicholas Protonotarios, Ioannis Tzortzis, Ioannis Rallis, Dimitrios Kalogeras and Nikolaos Doulamis | 11:30-12:30 | ***Doctoral Consortium Session 3:***<br>***(Meeting of DC Students Only)***<br><br>This session is planned for all graduate students who participate in the Doctoral Consortium (DC) Program funded by the US National Science Foundation.<br><br>As this is the third and last session of the DC program, students will exchange and share experiences about the conference and make plans for next year's conference.<br><br>Networking among DC and Non-DC students is encouraged, as well as sharing information about their research.<br><br>Four students will be asked to provide a 4-minute presentation of their Ph.D. research and the audience will be asked to ask questions and provide feedback.<br><br>The list of DC awardees is found on the back of this program. | 11:30-12:15 | **Workshop W9: *NLP4Disability Workshop***<br>***A Workshop on Natural Language Processing (NLP) for Disability***<br>***Session Chair:*** *Abeer Alessa*<br><br>**W9-5 Easy-to-Read Language Resources and Tools for three European Languages** (12+3 min) Margot Madina, Itziar Gonzalez-Dios and Melanie Siegel<br><br>**W9-6 Practical Study of Deep Learning Models for Speech Synthesis** (12+3 min) Quentin Langlois and Sébastien Jodogne<br><br>**W9-7 Fostering websites accessibility: A case study on the use of the Large Language Models ChatGPT for automatic remediation** (12+3 min) Achraf Othman, Amira Dhouib and Aljazi Nasser Al Jabor |
| **NOTE: Virtual presentations are listed in the next two pages in SESSION V. These presentations can be attended virtually from any location.** | | | | | |
| 12:30-14:00 | **Lunch** | | | | |
| **End of Conference** | | | | | |

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| | | **Session V: Virtual Presentations (Over Zoom)** |
| **Day 01**<br><br>**July 05, 2023** | 11:00<br>-12:30 | **Session V-1:** ***Multimodal Interfaces and Human-Computer Interaction***<br>***Session Chair:*** *Krishna Kodur, Enamul Karim, Sneh Acharya*<br>**V1-1 Leveraging Sensorimotor Realities for Assistive Technology Design Bridging Smart Environments and Virtual Worlds (15 min)** Radu-Daniel Vatavu<br>**V1-2Display and Use of Station Floor Plans on 2D Pin Matrix Displays for Blind and Visually Impaired People (15 min)** Gaspar Ramôa, Omar Moured, Karin Mueller, Thorsten Schwarz and Rainer Stiefelhagen<br>**V1-3 Human digital twins in interaction design – from abstract to concrete** (15 min) Pertti Saariluoma, Mari Myllylä and Antero Karvonen<br>**V1-4 Accessible Document Layout: An Interface for 2D Tactile Displays** (12+3 min) Omar Moured, Sara Alzalabny, Thorsten Schwarz, Bastian Rapp and Rainer Stiefelhagen<br>**V1-5 Investigating the Potential and Impacts of Social Robots to Engage People with Advanced Dementia and their Caregivers: Early Insights from an Exploratory Ethnographic Study within a Protected Care Environment** (12+3 min) Elisabeth Raß, David Unbehaun, Volker Wulf, Jens Lüssem, Hannes Eilers, Gaby Lenz, Jutta Tandler, Seyed Nima Afzali and Beyza Eroglu<br>**V1-6 How Could I Learn Rhythm Better? Investigating Three Learning Signals for Passive Haptic Learning in Different Context** (12+3 min) Likun Fang, Erik Pescara, Patrick Karl Reiter and Michael Beigl |
| | 14:00<br>–<br>15:15 | **Session V-2:** ***Telepresence, Virtual and Augmented Reality***<br>***Session Chair:*** *Manizheh Zand, Aref Hebri*<br>**V2-1 Gesture-based Interaction for AR Systems: A Short Review** (12+3 min) Despoina Gavgiotaki, Stavroula Ntoa, George Margetis, Konstantinos Apostolakis and Constantine Stephanidis<br>**V2-2 Real-Time Activity Recognition for Surveillance Applications on Edge Devices** (12+3 min) Vasileios Tsinikos, Ioannis Pastaltzidis, Iason Karakostas, Nikolaos Dimitriou, Katerina Valakou, George Margetis, Constantine Stefanidis and Dimitrios Tzovaras<br>**V2-3 Evaluation of Video Compression Methods for Network Transmission on Diverse Data: A Case Study** (12+3 min) Roman Strukov and Vassilis Athitsos<br>**V2-4 Compacting MocapNET-based 3D Human Pose Estimation via Dimensionality Reduction** (12 +3 min) Ammar Qammaz and Antonis Argyros<br>**V2-5 How Social Robots can Influence Motivation as Motivators in Learning: A Scoping Review** (12+3 min) Heqiu Song, Shiyuan Huang, Emilia Barakova, Jaap Ham and Panos Markopoulos |
| **Day 02**<br><br>**July 06, 2023** | 10:30<br>–<br>12:00 | **Session V-3:** ***Reasoning systems and machine learning for assistive environments***<br>***Session Chair:*** *Maria Kyrarini, Aref Hebri*<br>**V3-1 The DARLENE XR platform for intelligent surveillance applications** (12+3 min) Christos Ntoumanopoulos, Efstathia Martinopoulou, Iason Karakostas, Nikolaos Dimitriou and Dimitrios Tzovaras<br>**V3-2 Deep Action Recognition for Cognitive Assessment** (12+3 min) Sayda Elmi and Morris Bell<br>**V3-3 Introducing responsibly self-healing into the incident management lifecycle** (10+2 min) Alexandros Papanikolaou, Christos Ilioudis and Vasilis Katos<br>**V3-4 Sounds of Play: Designing Augmented Toys for Children with Autism** (12+3 min) Maryam Jahadakbar, Carlos Araujo de Aguiar, Arman Nikkhah Dehnavi and Mona Ghandi<br>**V3-5 TOUCH: A Multi-sensory Communication System that Communicates Emotions** (12+3 min) Carlos Araujo de Aguiar, Zezhi Guo and Yuhe Cui<br>**V3-6 Case study analysis of medical and pharmaceutical chatbots in digital marketing and proposal to create a reliable chatbot with summary extraction based on users' keywords.** (12+3 min) Alexios S. Kaponis, Alexios A. Kaponis and Manolis Maragoudakis |

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| | 14:00<br>-15:15 | **Session V-4:** ***Reasoning systems and machine learning for assistive environments***<br>***Session Chair:*** *Manizheh Zand, Aref Hebri*<br>**V4-1 Small Data, Big Challenges: Pitfalls and Strategies for Machine Learning in Fatigue Detection** (12+3 min) André Jeworutzki, Jan Schwarzer, Kai von Luck, Peer Stelldinger, Susanne Draheim and Qi Wang<br>**V4-2 Towards Deriving Organizational Key Performance Indicators in a Metaverse Workplace: A Systematic Literature Review** (12+3 min) Elena Tsappi and George N. Papageorgiou<br>**V4-3 Enabling People with Blindness to Distinguish Lines of Mathematical Charts with Audio-tactile Graphic Readers** (12+3 min) Gaspar Ramôa, Omar Moured, Thorsten Schwarz, Karin Müller and Rainer Stiefelhagen<br>**V4-4 Emovo: A real-time anger detector on the smartphone using acoustic signal** (10+2 min) Yuang Tong, Wanying Mo and Yue Sun<br>**V4-5 A Systematic Review of Interaction Approaches based on Visually Evoked Potentials** (12+3 min) Philipp Wolf and Timo Götzelmann |

## Poster / Demo Presentations (Session P) DAY 1, 10:30–11:00

**P1.** ***A Visualization Bookmarklet for Assessing the Readability of Texts on the Web.***
Frode Eika Sandnes and Evelyn Eika

**P2.** ***An Intelligent and Accessible Wardrobe***
Alexandra Plexousaki, Maria Korozi, Asterios Leonidis, Vasilios Kouroumalis, Nikolaos-Menelaos Stivaktakis, Theodoros Evdaimon, Emmanouil Stamatakis, Antonios Katzourakis and Constantine Stephanidis

**P3.** ***NeckWatcher: A Real-time Monitoring Tool for the Assessment of the Neck Posture***
Iryna Trygub, Johanna Ahlf, Martina Campanale, André Jeworutzki and Jan Schwarzer

**D1.** ***Curating User Galleries in Europeana using Topic Modeling Technology***
Medina Andresel, Sergiu Gordea and Srdjan Stevanetic

**D2. The Projection Mapping Situational Layer: Tabletop Projection Mapping for Visualization of Real-time Geospatial Data**
Costas Boletsis, Antoine Pultier and Ophelia Prillard

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