

The 15th ACM International Conference on PErvasive Technologies Related to Assistive Environments PETRA 2022

Conference Program

June 29 – July 01, 2022
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

The iPerform Industry-University NSF Center at UTA, USA

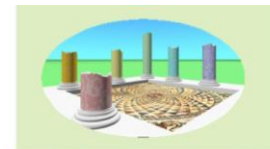
The National Center for Scientific Research (NCSR)-Demokritos, Greece

Ionian University, Corfu, Greece

Technologies Journal



UNIVERSITY OF
TEXAS
ARLINGTON



Heracleia – Human Centered Computing Lab



technologies
an Open Access Journal by MDPI



Conference Proceedings

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

ACM - Association for Computing Machinery
Digital Library Proceedings





WELCOME FROM THE CONFERENCE CHAIR

Welcome you to the *15th ACM International Conference on Pervasive Technologies Related to Assistive Environments, PETRA 2022, June 29 – July 01, 2022, on the majestic island of Corfu*. PETRA is an interdisciplinary conference with focus on pervasive technologies that improve the quality of life and enhance human experience and performance. PETRA'22 takes place in person after 2 years of a virtual conference. PETRA 2022 has 138 submissions from 27 countries and 138 registrations. Paper acceptance was 33 full papers, 4 short papers, 11 poster papers, 5 demo papers and twelve workshops. Like all previous years, the US National Science Foundation (NSF) has awarded a *Doctoral Consortium (DC) award* to support to 16 student authors, from different universities, 6 of them female. In addition, several accepted papers have undergraduate student coauthors, supported by the REU (**R**esearch **E**xperiences for **U**ndergraduates) NSF program. This year, PETRA 2022 distinguishes papers with 5 awards: *Best Technical Paper, Best Demo Paper, Best Student Paper, Best Poster Paper, and Best Workshop Paper*. Many of PETRA's AI based methods show compelling social applications to help build, stone by stone (*PETRA means stone in Greek*), new ways of life to survive in an increasingly challenging world. Results range from basic research in computer vision, machine learning, data mining, human robot interaction, and big data, to engineering applications in robotics, sensors, devices, wearables and software solutions that address physical, cognitive, and mental human performance and monitoring. The conference addresses the needs of both healthy individuals and persons with special needs. We hope that PETRA 2022 provides its participants an impetus to address the diverse human needs that the COVID-19 health crisis has brought, as well as opportunities to showcase new research and to network. We truly appreciate your participation and look forward to seeing you all in person in **PETRA 2023!**

Wishing you a happy and safe summer,
Fillia Makedon, Conference Chair

Invited Speakers



Yvonne Rogers is a Professor of Interaction Design, the director of UCLIC and a deputy head of the Computer Science department at University College London. Her research interests are in the areas of interaction design, human-computer interaction and ubiquitous computing. A central theme of her work is concerned with designing interactive technologies that augment humans. A current focus of her research is on human-data interaction and human-centered AI. Central to her work is a critical stance towards how visions, theories and frameworks shape the fields of HCI, cognitive science and Ubicomp. She has been instrumental in promulgating new theories (e.g., external cognition), alternative methodologies (e.g., in the wild studies) and far-reaching research agendas (e.g., "Being Human: HCI in 2020"). She is a fellow of the ACM, BCS and the ACM CHI Academy.



Cynthia Matuszek is an assistant professor of computer science and electrical engineering at the University of Maryland, Baltimore County, and the director of UMBC's Interactive Robotics and Language lab. She received her Ph.D. in computer science and engineering from the University of Washington. Her research is focused on how robots can learn grounded language from interactions with non-specialists, which includes work in not only robotics, but human-robot interactions, natural language, machine learning, machine bias, and collaborative robot learning, informed by a background in common-sense reasoning and classical artificial intelligence. Dr. Matuszek's work has been published in machine learning, artificial intelligence, robotics, and human-robot interaction venues.



Dr. Ismini Lourentzou is an assistant professor of computer science at Virginia Tech. Her research interests are at the intersection of machine learning and data science, specifically in learning with limited imperfect supervision, self-supervision, multi-modal representation learning with applications to vision and language, and sequential decision making. Dr. Lourentzou's research is focused on building intelligent task assistants that augment human intelligence, and her work has been published in artificial intelligence, machine learning, and data science venues and journals. She obtained her Ph.D. from the Computer Science Department at the University of Illinois at Urbana - Champaign. Dr. Lourentzou was selected as a Rising Star in EECS in 2019, has received an NSF EAGER grant, a Microsoft Azure Research Award, and an IBM Invention Plateau.

08:00-09:00	Conference Registration	
09:00-09:20	<i>Room 1</i> Conference Opening Fillia Makedon	
09:25-10:25	<p style="text-align: center;"><i>Room 1</i></p> <p>Session A: Wearable Systems and Monitoring Devices</p> <p>Session Chair: Eduardo Casilari</p> <p>A-1 A Cross-dataset Evaluation of Wearable Fall Detection Systems (12+3 min) Jose Antonio Santoyo-Ramón, Eduardo Casilari and Jose M. Cano-García</p> <p>A-2 User Preferences in Occupational Sedentary Behaviour Digital Interventions: Design and Evaluation of a Low-Intrusive Software Tool (12+3 min) Bojan Simoski, Michel Klein, Aart Van Halteren and Henri Bal 📍</p> <p>A-3 Performance Comparison of E-Textile Electrode Properties in a Capacitive Proximity Sensing Setting (12+3 min) Silvia Faquiri and Arjan Kuijper</p> <p>A-4 Determining occupant's Thermal Comfort and Well-Being towards facilitating energy demand management utilizing a low-cost wearable device (12+3 min) John Gialelis, Maria Krizea, Grigoris Protopsaltis, Christos Mountzours, Tasos Kladas, Gerasimos Theodorou and Stylianos Karatzas</p>	<p style="text-align: center;"><i>Room 2</i></p> <p>Session B: Telepresence, Virtual and Augmented Reality</p> <p>Session Chair: Sebastian Büttner</p> <p>B-1 Development and Evaluation of a Low-cost Wheelchair Simulator for the Haptic Rendering of Virtual Road Conditions (12+3 min) Thi Kim Ngan Ly, Pascal Karg, Julian Kreimeier and Timo Götzelmann</p> <p>B-2 Conveying Procedural and Descriptive Knowledge with Augmented Reality (12+3 min) Clemens Hoffmann, Sebastian Büttner and Michael Prilla 📍</p> <p>B-3 The Gaia System: A Tabletop Projection Mapping System for Raising Environmental Awareness in Islands and Coastal Areas (12+3 min) Costas Boletsis</p> <p>B-4 Design process and design evaluation of web-based visualization dashboard to monitor and support the decision-making of travel-related physical activity (12+3 min) Tooba Batool, Yves Vanrompay, An Neven, Martijn Scherrenberg, Veerle Ross, Paul Dendale and Davy Janssens</p>
10:30-11:30	<p>Session C: Activity Recognition, Human Tracking & Pattern Recognition in Assistive Applications</p> <p>Session Chair: Nikolaos Doulamis</p> <p>C-1 Determining Best Hardware, Software and Data Structures for Worker Guidance during a Complex Assembly Task (12+3 min) Bernhard Anzengruber-Tanase, Michael Haslgruebler-Huemer, Georgios Sopidis and Alois Ferscha 📍</p> <p>C-2 Skill Level Detection in Arc Welding towards an Assistance System for Workers (12+3 min) Markus Laube, Michael Haslgrübler, Behrooz Azadi, Bernhard Anzengruber-Tánase and Alois Ferscha</p> <p>C-3 Diabetic foot ulcers monitoring by employing super resolution and noise reduction deep learning techniques (12+3 min) Agapi Davradou, Eftychios Protopapadakis, Maria Kaselimi, Anastasios Doulamis and Nikolaos Doulamis</p> <p>C-4 A Deep Learning Based Human Fall Detection Solution. (12+3 min) Hamidreza Tohidypour, Anahita Shojaei-Hashemi, Panos Nasiopoulos and Mahsa T. Pourazad</p>	<p>Session E: Reasoning Systems and Machine Learning</p> <p>Session Chair: Konstantinos Tsiakas</p> <p>E-1 Learn from the Best: Harnessing Expert Skill and Knowledge to Teach Unskilled Workers (12+3 min) Hitesh Dhiman, Didarul Alam, Yu Qiao, Matthias Upmann and Carstent Röcker</p> <p>E-2 Micro-activity recognition in industrial assembly process with IMU data and deep learning (12+3 min) Georgios Sopidis, Michael Haslgrübler, Behrooz Azadi, Bernhard Anzengruber-Tánase, Abdelrahman Ahmad, Alois Ferscha and Martin Baresch</p> <p>E-3 Interpretation of net promoter score attributes using explainable AI (12+3 min) Ioannis Rallis, Yannis Markoulidakis, Ioannis Georgoulas, George Kopsiaftis, Maria Kaselimi, Nikolaos Doulamis and Anastasios Doulamis</p> <p>E-4 [Data] Quality Lies In The Eyes Of The Beholder (12+3 min) Xavier Pleimling, Vedant Shah and Ismini Lourentzou</p>

11:35-12:25	<p>Workshop W1: <u>AGENT Workshop</u> <i>Multimodal signal sensing and AI-algorithms in assistive environments for improving quality-of-life</i> Session Chair: Kosmas Dimitropoulos</p> <p>W1-1 Robo-cook's Path: An online multiplayer board dietary game (12+3 min) Thanassis Kalvourtzis, Lazaros Gymnopoulos, Elena Milli, Stefano Cobello, Kosmas Dimitropoulos and Petros Daras</p> <p>W1-2 Robot Navigation in Human Populated Unknown Environments based on Visual-Laser Sensor Fusion (12+3 min) Christina Theodoridou, Dimitrios Antonopoulos, Andreas Kargakos, Ioannis Kostavelis, Dimitris Giakoumis and Dimitrios Tzovaras</p> <p>W1-3 An Investigation of Quantitative Measures of Sleep-Apnea-Induced Nocturnal Cardiac Stress (12+3 min) Pegah Askari, Mahrshi B. Jani, Donald E. Watenpaugh and Khosrow Behbehani</p>	<p>Workshop W2: <u>ASSIST Workshop</u> <i>AI and Sensor-Supported Integrated care Solutions (ASSIST) workshop</i> Session Chair: Yusuf Can Semerci</p> <p>W2-1 Modelling Behaviours of People Living with Neurodegenerative Conditions (12+3 min) Esam Ghaleb, Yusuf Can Semerci and Stylianos Asteriadis</p> <p>W2-2 PROCare4Life: An integrated care platform to improve the quality of life of Parkinson's and Alzheimer's patients (12+3 min) Alberto Belmonte Hernández, Yusuf Can Semerci, João Pedro Proença and Sergio Romera-Giner</p> <p>W2-3 Simultaneous Real-Time Human Fall Detection and Reidentification Based on Multisensors Data (12+3 min) Matteo Bastico, Verónica Ruiz Bejerano and Alberto Belmonte-Hernández</p>
12:30-14:00	Lunch Break & Doctoral Consortium Session 1 (<i>DC Students meet outside Nausica Room</i>)	
14:00-15:00	<p style="text-align: center;"><u>Invited Talk</u></p> <p style="text-align: center;">Presenter: Yvonne Rogers, <i>University College London</i> Title: <i>Augmenting vs. Assisting Humans with Pervasive Technology?</i> Session Chair: Vassilis Athitsos</p>	
NSF Doctoral Consortium Students		
<p>Farnaz Farahanipad - <i>University of Texas at Arlington, USA</i> Aref Hebri – <i>University of Texas at Arlington, USA</i> Ashish Jaiswal - <i>University of Texas at Arlington, USA</i> Enamul Karim - <i>University of Texas at Arlington, USA</i> Kyle Lockwood – <i>Northeastern University, USA</i> Marina Makri - <i>School of Medicine, Aristotle University of Thessaloniki, Greece</i> Robyn Moncrief – <i>DePaul University, USA</i> Harish Ram Nambiappan - <i>University of Texas at Arlington, USA</i> Hamza Reza Pavel - <i>University of Texas at Arlington, USA</i> Xavier Pleimling – <i>Virginia Tech, USA</i> Md Jillur Rahman Saurav – <i>University of Texas at Arlington, USA</i> Ava Scott - <i>University College London, UK</i> Christos Sevastopoulos - <i>University of Texas at Arlington, USA</i> Anushka Anil Kumar Srivastav – <i>University of Texas at Arlington, USA</i> Mohammad Zaki Zadeh – <i>University of Texas at Arlington, USA</i> Manizheh Zand – <i>Santa Clara University, USA</i></p>		

* *Lunches during the conference are free for participants staying at the venue hotel. For those participants staying at other hotels, the cost for lunch is €15 for students and €20 for others. Lunch tickets can be obtained at the hotel front desk. Additionally, there are lunch/snacks at the venue by the pool or outside the hotel grounds.*

15:05-16:15	<p>Session F: <i>Pervasive Sys. for the Aged & Smart Health</i> Session Chair: Oliver Korn</p> <p>F-1 Perspectives on Social Health Robots: How Experts' Views Improved from 2017 to 2021. (8+2 min) Oliver Korn and Matteo Zallio</p> <p>F-2 Identifying User Preferences of Data Handling Using Assisting Technologies (12+3 min) Julia Offermann, Wiktoria Wilkowska and Martina Ziefle</p> <p>F-3 Perspectives on the Collection of Health-related Data in Long-term Care (12+3 min) Wiktoria Wilkowska, Julia Offermann and Martina Ziefle</p> <p>F-4 Investigating Motivations and Patient Profiles for Personalization of Health Applications for Behaviour Change (12+3 min) Cindel Bonneux, Paul Dendale and Karin Coninx</p> <p>F-5 Practical High-Fidelity Sensing of the Sleep Environment in the Home (8+2 min) Clayton Feustel, Nicolas Shu, Gari Clifford, David Anderson and Craig Zimring</p>	<p>Session G: <i>Multimodal Interfaces and HCI</i> Session Chair: Matthias Jost</p> <p>G-1 PARTAS: A Personalizable Augmented Reality Based Task Adaption System for Workers with Cognitive Disabilities (12+3 min) Matthias Jost, Andreas Luxenburger, Soenke Knoch and Jan Alexandersson</p> <p>G-2 Peter 2.0: Building a Cyborg (12+3 min) Matthew P. Aylett, Ari Shapiro, Sai Prasad, Lama Nachman, Stacy Marcella and Peter Scott-Morgan</p> <p>G-3 BL.MIXEDR: Augmenting Traditional Maintenance Procedures to Better Exploit the Capabilities of Head-Worn AR (12+3min) Housseem Saidi, Laetitia Carreteros, Stephanie Rey, Laurent Truscello and Youssef Miloudi</p>
16:15-16:45	Coffee Break	
16:45-17:30	<p>Session V: <u>Virtual Paper Presentations</u></p> <p>V1. COPD Severity Prediction in Elderly with ML Techniques (10 min) Elias Dritsas, Sotirios Alexiou and Konstantinos Moustakas</p> <p>V2. Social Media vs. News Platforms: A Cross-analysis for Fake News Detection Using Web Scraping and NLP (10 min) Fahad Alsuliman, Siddhartha Bhattacharyya, Khaled Slhoub, Nasheen Nur and Candice Normalee Chambers</p> <p>V3. Human Identification Using a Smartphone Motion Sensor and Gait Analysis. Muhammad Talha, Hasan Ali Soomro, Nadeem Naeem, Ehsan Ali and Maria Kyrarini</p> <p>V4. Person Identification And Tinetti Score Prediction Using Balance Parameters: A Machine Learning Approach To Determine Fall Risk. (12+3 min) Varsha Rani Chawan, Manfred Huber, Nicholas Burns and Kathryn Daniel</p> <p>V5. Learning Progression-based Automated Scoring of Visual Models. Ari Sagherian, Suhasini Kalaiah Lingaiah, Mohamed Abouelenien, Chee Wee Leong, Lei Liu, Mengxuan Zhao, Blake Lafuente, Shu-Kang Chen and Yi Qi</p> <p>V6. Enhancing interaction of people with quadriplegia. (12+3 min) Natacsha Raposo, Alberto Castro, Thais Castro and David Lima</p>	
19:00-21:00	<p>Welcome Reception <i>Location: Nausica Room (close to registration desk)</i></p>	

* Accompanying person tickets for reception can be obtained online and proof provided to registration desk to obtain reception coupons.

Room 1	
08:55-09:55	<p><u>Invited Talk</u> Presenter: <i>Cynthia Matuszek, Interactive Robotics and Language (IRAL) Lab, UMBC, USA</i> Title: <i>Robots and Language: Grounded Language Learning from Human Interaction</i> Session Chair: Dean Krusienski</p>
Room 1	
10:00-11:45	<p>Workshop W3: <u>NOTION Workshop</u> <i>Human Behaviour Monitoring, Interpretation and Understanding</i> Session Chair: Ahmad Lotfi</p> <p>W3-1 Contactless sleep quality monitoring through thermal vision (12+3 min) Abdallah Naser, Ahmad Lotfi and Joni Zhong</p> <p>W3-2 EEG Wavelet Classification for Fall Detection with Genetic Programming (12+3 min) Jordan J. Bird</p> <p>W3-3 A Study on Psychometric Assessment Data for Autonomous Dementia Detection (12+3 min) Chloe M Barnes</p> <p>W3-4 Determination of the healing corridor of patients with knee arthroplasty by a motor-powered rollator (12+3 min) Gerald Bieber, Dimitri Kraft, Bernd Hölle, Dennis Blenke, Rainer Bader and Peter Herrmann</p> <p>W3-5 Estimation of Affective States in Virtual Reality Environments using EEG. (12+3 min) Meghan Kumar, Connor Delaney and Dean Krusienski</p> <p>W3-6 Real-Time Gesture Recognition with Virtual Glove Markers. (12+3 min) Finlay Mckinnon, David Ada Adama, Pedro Machado and Isibor Kennedy Ihianle</p> <p>W3-7 Developing and Comparing Cloud-based Fuzzy Systems for Monitoring Health Related Signals in Assistive Environments (12+3 min) Bhavesh Pandya, Dhaval Shah, Amir Pourabdollah and Ahmad Lotfi</p>
Room 2	
10:00-11:45	<p>Workshop W4: <u>PriwAw Workshop</u> <i>Privacy aware and acceptable solutions for AA</i> Session Chair: Martin Kampel</p> <p>W4-1 Are Active and Assisted Living applications addressing the main acceptance concerns of their beneficiaries? Preliminary insights from a scoping review (12+3 min) Sara Colantonio, Mladjan Jovanovic, Eftim Zdravevski, Petre Lamesky, Hilda Tellioglu, Martin Kampel and Francisco Florez-Revuelta</p> <p>W4-2 On the nature of misidentification with privacy preserving algorithms (12+3 min) Sophie Noiret, Siddharth Ravi, Martin Kampel and Francisco Florez-Revuelta</p> <p>W4-3 Beyond Privacy of Depth Sensors in Active and Assisted Living Devices (12+3 min) Wiktor Mucha and Martin Kampel</p> <p>W4-4 Privacy-enhancing Technologies for Active and Assisted Living: What Does the GDPR Say? (12+3 min) Zhicheng He 🍷</p> <p>W4-5 Vicious or Virtuous Cycle? The Privacy Implications of Active Assisted Living Technologies for Older People (12+3 min) Ava Scott, Carolin Stellmacher, Jasmin Niess and Yvonne Rogers</p> <p>W4-6 Underneath Your Clothes: A Social and Technological Perspective on Nudity in The Context of AAL Technology (12+3 min) Caterina Maidhof, Kooshan Hashemifard, Julia Offermann, Martina Ziefle and Francisco Florez-Revuelta</p> <p>W4-7 Towards Private Medical Data Donations by Using Privacy Preserving Technologies (12+3 min) Arno Appenzeller, Nick Terzer, Erik Krempel and Jürgen Beyerer</p>

11:50-12:50	<p>Workshop W5: <u>NuComBHDA Workshop</u> <i>Advanced Numerical Computations for Big Human Data Analysis</i></p> <p>Session Chair: Ardelio Galletti</p> <p>W5-1 Social Data Assimilation of Human Sensor Networks for Wildfires. (12+3 min) Jake Lever, Rossella Arcucci and Jaiying Cai</p> <p>W5-2 Classification of Alzheimer's Disease via Vision Transformer (12+3 min) Yanjun Lyu, Xiaowei Yu, Dajiang Zhu and Lu Zhang</p> <p>W5-3 Towards a GPU parallel software for environmental data fitting (12+3 min) Pasquale De Luca, Diana Di Luccio, Ardelio Galletti, Giulio Giunta, Livia Marcellino and Raffaele Montella</p>	<p>Workshop W6: <u>DAEM 5 Workshop</u> <i>Designing Assistive Environments for Manufacturing and digital stress management solution for remote-working environments.</i></p> <p>Session Chair: Sebastian Büttner</p> <p>W6-1 Visualizing Maintenance Data to Support Decisions on Strategic Maintenance Planning (12+3 min) Maren Hinrichs and Loina Prifti</p> <p>W6-2 Designing Proactive Safety Systems for Industrial Workers Using Intelligent Mechanisms (12+3 min) Martin Schobesberger, Jaroslava Huber, Stefan Grünberger, Michael Haslgrübler and Alois Ferscha</p> <p>W6-3 We've never been eye to eye: A Pupillometry Pipeline for the Detection of Stress and Negative Affect in Remote Working Scenarios (12+3 min) Alexander Heimerl, Linda Becker, Dominik Schiller, Tobias Baur, Fabian Wildgrube, Nicolas Rohleder and Elisabeth Andre 🏆</p> <p>W6-4 CareCam: Towards user-tailored Interventions at the Workplace using a Webcam (12+3 min) Dimitri Kraft, Angelina Schmidt, Lea Büttner, Frederike Marie Oschinsky, Fabienne Lambusch, Kristof Van Laerhoven, Gerald Bieber and Michael Fellmann 🏆</p>
12:50-14:25	<p>Lunch Break & Doctoral Consortium Session 2 <i>(DC Students try to sit together to get to know each other)</i></p>	
14:30-16:00	<p>Workshop W7: <u>ENABLE Workshop</u> <i>Enabling Technologies for People with Disabilities</i></p> <p>Session Chair: Lucas Wohofsky</p> <p>W7-1 Lost in OCR-Translation: Pixel-based Text Reflow to the Rescue 0(12+3 min) Frode Eika Sandnes</p> <p>W7-2 The Perfect Musical Instrument Does Not Exist - Experience Reports for the Development of Accessible NIMES (12+3 min) Christine Steinmeier, Dominic Becking and Malte Kanders</p> <p>W7-3 Smartphone Based IoT-Controller Framework for Assisting the Blind in Human Robot Interaction (12+3 min) Harish Ram Nambiappan, Enamul Karim, Md Jillur Rahman Saurav, Anushka Srivastav, Nicholas Gans and Fillia Makedon</p> <p>W7-4 Enhancing Sleep Quality of People on the Autism Spectrum using Assistive Technology: A Concept. (12+3 min) Sascha H. Fink, Lukas Wohofsky and Daniela Krainer</p> <p>W7-5 Accessible Electrostatic Surface Haptics: Towards an Interactive Audiotactile Map Interface for People With Visual Impairments (12+3 min) Selina Feitl, Julian Kreimeier and Timo Götzelmann</p>	<p>Workshop W8: <u>EAT Workshop</u> <i>Ethical issues in AgeTech to support healthy ageing</i></p> <p>Session Chairs: Andrew Sixsmith</p> <p>W8-1 Key ethical challenges in the AgeTech sector (12+3 min) Judith Sixsmith</p> <p>W8-2 Future of AgeTech: Transdisciplinary Considerations for Equity, Intersectionality, Sustainability, and Social Justice (12+3 min) Mei Lan Fang</p> <p>W8-3 Complexity management as an ethical challenge for AI-based age tech (12+3 min) Giovanni Rubeis</p> <p>W8-4 Examining the technology-mediated cycles of injustice that contribute to digital ageism (12+3 min) Charlene Chu, Rune Nyrop, Simon Donato-Woodger, Kathleen Leslie, Shehroz Khan, Corinne Barnett and Amanda Grenier</p> <p>W8-5 Ethical challenges in aging and technology (12+3 min) Andrew Sixsmith</p> <p>W8-6 Culture Change, Human-Centered Design, and Ethical by Design as Transactional Cornerstone Concepts in the Development of Technology for Supporting Aging (12+3 min) Jennifer Boger</p>
16:00-17:00	<p>Coffee Break & Session P: Poster & Demo Presentations <i>(See Page 9 for list of Papers)</i> <i>Location: Nausica Room</i></p>	
20:30-22:30	<p>GALA Dinner, BBQ, Greek Folk Dancing and Entertainment <i>By Hotel Main Pool</i></p>	

**Note: Accompanying person tickets can be purchased online to receive gala dinner coupons*

CONFERENCE DAY 3: July 01

Room 1	
08:55-09:55	<p><u>Invited Talk</u> Presenter: <i>Ismini Lourentzou, Virginia Tech, USA</i> Title: <i>Supervision Signals for Machine Learning in Healthcare and Beyond</i> Session Chair: Anastasios Doulamis</p>
	Room 1
10:00-11:45	<p><u>Workshop W9: HFE-HMI Workshop</u> <i>Human Factors and Ergonomics for Human-Machine Interaction</i> Session Chair: Konstantinos Tsiakas</p> <p>W9-1 Towards FAIR Explainable AI: a standardized ontology for mapping XAI solutions to use cases, explanations, and AI systems (12+3 min) Ajaya Adhikari, Edwin Wenink, Jasper van der Waa, Cornelis Bouter, Ioannis Tolios and Stephan Raaijmakers</p> <p>W9-2 Automated System to Measure Static Balancing in Children to Assess Executive Function (12+3 min) Hamza Reza Pavel, Enamul Karim, Mohammad Zaki Zadeh, Ashish Jaiswal, Rithik Kapoor and Fillia Makedon</p> <p>W9-3 A data-driven dialogue system to enhance medical training with focus on comorbidity constructs (12+3 min) Dimitrios Zikos and Oliver Strong</p> <p>W9-4 GAN-based Face Reconstruction for Masked-Face. (12+3 min) Farnaz Farahanipad, Mohammad Rezaei, Mohammadsadegh Nasr, Farhad Kamangar and Vassilis Athitsos 🕒</p> <p>W9-5 Using human-in-the-loop and explainable AI to envisage new future work practices (12+3 min) Konstantinos Tsiakas and Dave Murray-Rust</p> <p>W9-6 Light-Weight Seated Posture Guidance System with Machine Learning and Computer Vision (12+3 min) Rithik Kapoor, Ashish Jaiswal and Fillia Makedon</p>
	Room 2
	<p><u>Workshop W10: PerInt Workshop</u> <i>Pervasive Intelligence in Engineering</i> Session Chair: Nikolaos Doulamis</p> <p>W10-1 A First Approach using Graph Neural Networks on Non-Intrusive-Load-Monitoring (12+3 min) Sotirios Athanasoulis, Stavros Sykiotis, Maria Kaselimi, Eftychios Protopapadakis and Nikolaos Ipiotis</p> <p>W10-2 Unsupervised diabetic foot monitoring techniques (12+3 min) Ioannis N. Tzortzis, Agapi Davradou, Eftychios Protopapadakis, Maria Kaselimi, Nikolaos Doulamis, Aikaterini Angeli and Andreas Lazaris</p> <p>W10-3 Evaluating Transferability for Covid 3D Localization Using CT SARS-CoV-2 segmentation models (12+3 min) Constantine Maganaris, Eftychios Protopapadakis, Nikolaos Bakalos, Nikolaos Doulamis, Dimitris Kalogeras and Aikaterini Angeli</p> <p>W10-4 A holistic monitoring scheme for road infrastructures (12+3 min) Charalampos Zafeiropoulos, Eftychios Protopapadakis, Akrivi Chatzidaki, Anastasios Doulamis, Dimitrios Vamvatsikos, Nikos Zotos, George Bogdos, Antonis Kostaridis, Franziska Schmidt, Silvia Ientile, Irène Sevilla, Sofia Tilon and Ioannis Rallis</p> <p>W10-5 Robotic Maintenance of Road Infrastructures: The HERON Project (12+3 min) Iason Katsamenis, Matthaïos Bimpas, Eftychios Protopapadakis, Charalampos Zafeiropoulos, Dimitris Kalogeras, Anastasios Doulamis, Nikolaos Doulamis, Carlos Martín-Portugués Montoliu, Yannis Handanos, Franziska Schmidt, Lionel Ott, Miquel Cantero and Rafael Lopez</p> <p>W10-6 Use of Photogrammetry in a Business Simulation Game (12+3 min) Ilias Kalisperakis, George Kopsiaftis, Ioannis Rallis, Christos Stentoumis, Anisa Kouka, Vivian Riga and Dimitris Koutsomitsos</p> <p>W10-7 A deep-learning based diagnostic framework for Breast Cancer (12+3 min) Stavros Sykiotis, Ioannis Tzortzis, Aikaterini Angeli, Nikolaos Doulamis and Dimitrios Kalogeras</p>

11:45-13:00	<p>Workshop W11: <u>AV-CULT Workshop</u></p> <p><i>Machine learning solutions for reducing exclusion of persons with hearing loss from cultural content</i></p> <p>Session Chair: Theodoros Giannakopoulos</p> <p>W11-1 Museum Guidance in Sign Language: the SignGuide project vision (12+3 min) Dimitrios Kosmopoulos, Constantinos Constantinopoulos, Maria Trigka, Dimitrios Papazachariou, Klimis Antzakas, Venetta Lampropoulou, Antonis Argyros, Iason Oikonomidis, Anastasios Roussos, Nikolaos Partarakis, Georgios Papagiannakis, Konstandinos Grigoriadis, Angeliki Koukouvou and Angeliki Moneda</p> <p>W11-2 Towards a DHH Accessible Theater: Real-Time Synchronization of Subtitles and Sign Language Videos with ASR and NLP Solutions (12+3 min) Grigoris Bastas, Maximos Kaliakatsos-Papakostas, Georgios Paraskevopoulos, Pantelis Kaplanoglou, Konstantinos Christantonis, Charalampos Tsiouostas, Dimitris Mastrogiannopoulos, Depy Panga, Evita Fotinea, Athanasios Katsamanis, Vassilis Katsouros, Konstantinos Diamantaras and Petros Maragos 🏆</p> <p>W11-3 Cross-linguistic speech emotion recognition using CNNs: a use-case in Greek Theatrical Data (12+3 min) Maria Moutti, Sofia Eleftheriou, Panagiotis Koromilas and Theodoros Giannakopoulos</p> <p>W11-4 ENORASI Assistive Computer Vision-based System for the Visually Impaired: A User Evaluation Study (12+3 min) Alexandros Mitsou, Dimitra-Christina Koutsiou, Dimitrios Diamantis, Theodoros Psallidas, George Dimas, Michael Vasilakakis, Panagiotis Kalozoumis, Evaggelos Spyrou, Stavros Perantonis, Artur Krukowski and Dimitris Iakovidis</p>	<p>Workshop W12: <u>QUESTION Workshop</u></p> <p><i>Quality of Life Support SysTEm for People sufferIng from COgNitive impairments or Intellectual Disabilities</i></p> <p>Session Chair: Vassilis Solachidis</p> <p>W12-1 Innovative Serious Games for People with Dementia developed through intergenerational interventions. (12+3 min) Marina Makri and Magda Tsolaki</p> <p>W12-2 Monitoring of motor function in the rehabilitation room (12+3 min) Jennifer Jiménez, Juan Mercado, Laura Carrasco, Verónica Ruiz, Vassilios Solachidis, Javier Serrano, Nicholas Vretos and Federico Álvarez</p> <p>W12-3 Virtual assistants and intelligent care environments for long-term patients: A Home set scenario. (12+3 min) Rodrigo Medina-García, Cristina María Lozano-Hernández, Juan Mercado Gómez, Jennifer Jiménez Ramos, Špela Glišović Krivec, Martina Steinböck, Agostino Chiaravalloti, Panagiotis Karkazis, Vassilis Solachidis, Nicholas Vretos, Javier Serrano and Federico Álvarez</p> <p>W12-4 A platform for health emergency warning and wandering behaviour detection supporting people with Intellectual Disability (12+3 min) Athina Grammatikopoulou, Nikos Grammalidis, Maria Papadogiorgaki and Michalis Zervakis</p> <p>W12-5 Quality of Life Assessment Methodology in TeNDER project (12+3 min) Maria Ricci, Andrea Cimini, Špela Glišović Krivec, Jennifer Jiménez Ramos, Rodrigo Medina-García, Martina Steinböck and Agostino Chiaravalloti</p>
13:00-14:30	<p>Lunch Break & Doctoral Consortium Farewell</p>	
14:30-15:35	<p>Session H: <i>Assistive Robotic Systems and HRI</i></p> <p>Session Chair: Vassilis Athitsos</p> <p>H-1 Multimodal Emotion Analysis of Robotic Assistance in Elderly Care (12+3 min) Annebeth Demaeght, Christina Miclau, Julia Hartmann, Janina Markwardt and Oliver Korn</p> <p>H-2 A Web-Based Analysis Toolkit for the System Usability Scale (12+3 min) Jonas Blattgerste, Jan Behrends and Thies Pfeiffer</p> <p>H-3 Leveraging Submovements for Prediction and Trajectory Planning for Human-Robot Handover (12+3 min) Kyle Lockwood, Yunus Bicer, Sadjad Asghari-Esfeden, Tianjie Zhu, Mariusz Furmanek, Madhur Mangalam, Garrit Strenge, Tales Imbiriba, Mathew Yarossi, Taskin Padir, Deniz Erdogmus and Eugene Tunik 🏆</p> <p>H-4 Causal Loop Mapping of Emerging Energy Systems in Project TwinERGY: Towards Consumer Engagement with Group Model Building (12+3 min) Theo Tryfonas, Sam Gunner, Ulas Baloglu, Patrick Tully, Stylianos Karatzas and Catherine Tryfona</p>	<p>Session I: <i>Accessibility Tools, Methods & Applications</i></p> <p>Session Chair: Timo Götzelmann</p> <p>I-1 Towards Automated Sign Language Production: A pipeline for creating inclusive virtual humans (12+3 min) Lucas Bernhard, Fabrizio Nunnari, Amelie Unger, Judith Bauerdiek, Christian Dold, Marcel Hauck, Alexander Stricker, Tobias Baur, Alexander Heimerl, Elisabeth André, Melissa Reinecker, Cristina España-Bonet, Yasser Hamidullah, Stephan Busemann, Patrick Gebhard, Corinna Jäger, Sonja Wecker, Yvonne Kossel, Henrik Müller, Kristoffer Waldow, Arnulph Fuhrmann, Martin Misiak and Dieter Wallach</p> <p>I-2 Haptic Wearable System to Assist Visually-Impaired People in Obstacle Detection (8+2 min) Barbara Leporini, Michele Rosellini and Nicola Forgione</p> <p>I-3 The Talking Books Web Library of the Lighthouse for the Blind of Greece (8+2 min) Apostolos Meliones, Greta Lami, Antonia Stouri and Georgia Mila</p> <p>I-4 Implementation and Evaluation of a Voice User Interface with Offline Speech Processing for People who are Blind or Visually Impaired (12+3 min) Christina Oumard, Julian Kreimeier and Timo Götzelmann</p> <p>I-5 Helping Those with Visual Impairments Read Mathematics: A Spatial Approach (12+3 mins) Joshua Howell, Angela Chan, Glen Hordemann and Francis Quek</p>
15:35-16:05	<p>Coffee Break & Conference Closing and Award Ceremony (Room 1)</p> <p>Session Chair: <i>Fillia Makedon</i></p>	

Accepted Posters and Demo Papers (Session P)

P1. Evaluating privacy, security and regulation concerns for sensory-based assistive technology.

Thijs Reuter, Hani Alers and Xiao Peng

P2. Evaluating Workload in One-to-Many Remote Collaboration. 🏆

Tzu-Yang Wang, Mai Otsuki and Hideaki Kuzuoka

P3. Large-Scale Self-Supervised Human Activity Recognition. 🏆

Mohammad Zaki Zadeh, Ashish Jaiswal, Hamza Reza Pavel, Aref Hebri, Rithik Kapoor and Fillia Makedon

P4. Towards A Traversability Estimation Framework for An Indoor Scenario Using Contrastive Learning.

Christos Sevastopoulos, Keshav Balaji, Shubhayu Shrestha and Fillia Makedon

P5. Investigation of On-Skin Electromagnetic Actuator for Signaling Direction via Tactile Cues.

Likun Fang, Dominik Flohs, Erik Pescara, Ting Zhu and Michael Beigl

P6. User-centred development of an information and documentation system in mobile care. Carina Hauser, Elisabeth Kupka-Klepsch, Elisabeth Haslinger-Baumann, Kathrin Mühlhauser, Doris Zeidler and Franz Werner

P7. Efforts to Improve Avatar Technology for Sign Language Synthesis.

Robyn Moncrief, Shatabdi Choudhury and Maria Saenz

P8. Sensing Visual Art by Relatable Music and Haptic Feedback for Individuals with Visual Impairments.

Manizheh Zand and Maria Kyrarini

P9. An e-learning platform for training on teaching English to people with mild cognitive impairment (M.C.I) with the use of songs. Marina Makri, Alexandra Christakidou and Magda Tsolaki

P10. The development of a blended learning course and Back-end as a Service System for educating university students on Genetic Counseling. Marina Makri and Magda Tsolaki

P11. The Ambient Assisted Working (AAW) concept. Arsénio Reis, João Barroso, Tânia Rocha and Diana Carvalho

Demo Paper (Session D):

D1. Play4Physio: Supporting Physical Therapy of Children with Hemophilia. Dragan Ahmetovic, Davide Bagnato, Alessandro

Frangiamone, Sergio Mascetti, Simone Passaro, Andrea Taroni, Stefano Di Terlizzi, Valentina Begnozzi, Elena Boccalandro, Roberta Gualtierotti and Flora Peyvandi

D2. Backpack Posture Classification for Elementary and Middle School Children Using Deep Learning. Saif Mustafa, Hsin-

Ya Hung, Garrett Millaway, John Raiti, Avi Geiger and Haonan Peng

D3. An Adaptive Tilting Interface to Alleviate Motion Sickness for Passengers in Vehicles. Soojin Hwang, Manasa Sama, Sebastian

Kuhn, Vinitha Erusu and John Raiti 🏆

D4. Stress Management through a Neuro and Biofeedback Meditation Virtual Reality Application. Szu Yun Wang,

Yiding Liu, Hyunsuk Bang, Minjee Kim and John Raiti

D5. Data Signal Processing and Machine Learning for Motion Detection; A Solution for Postoperative Breast

Cancer Rehabilitation. Tantai Davis, Carl-Michael Adams, Jiaxin Zhao, Yunfan Zhao, Niall O'Rourke, Haonan Peng, Avi Geiger and John Raiti

Organizing and Technical Arrangements Committee

Fillia Makedon (Conference Chair) – *University of Texas at Arlington, USA*

Anushka Srivastav (Conference Coordinator) – *University of Texas at Arlington, USA*

Gaurav Nale (Conference Coordinator) – *University of Texas at Arlington, USA*

Rohan Tipnis (Conference Coordinator) – *University of Texas at Arlington, USA*

Program Committee Chairs

Vassilis Athitsos (Chair) - *University of Texas at Arlington, USA*

Anastasios Doulamis (Associate Chair) - *National Technical University of Athens, Greece*

Ming Li (Associate Chair) - *University of Texas at Arlington, USA*

Workshops Committee Chairs

Maria Kyrarini - *Santa Clara University, USA*

Konstantinos Tsiakas – *TU Delft, Netherlands*

NSF Doctoral Consortium Chair

Ismini Lourentzou - *Director of DC (Virginia Tech, USA)*

Delia Valles-Rosales- *Co-Director of DC (New Mexico State University, USA)*

Program Committee

Maher Abujelala - *Exact Sciences Corporation, USA*

Stephanie Arevalo - *TU Dortmund University, Germany*

Ashwin Ramesh Babu - *Hewlett Packard Enterprise, USA*

Margrit Betke - *Boston University, USA*

Dinesh Bhatia - *University of Texas at Dallas, USA*

Bruno Bouchard – *University of Quebec at Chicoutimi, Canada*

Sanika Doolani – *Salesforce, USA*

Nikolaos Doulamis - *National Technical University of Athens, Greece*

Eleni Efthimiou - *Institute for Language and Speech Processing/ATHENA RC, Greece*

Randa Elanwar - *Electronics Research Institute, Egypt*

Theodoros Giannakopoulos - *NCSR Demokritos, Greece*

Nicholas Gans – *University of Texas at Arlington Research Institute, USA*

Timo Gotzelmann – *Nuremberg Institute of Technology, Germany*

Nikos Grammalidis - *CERTH, Greece*

Sarantos Kapidakis - *University of West Attica, Greece*

Vangelis Karkaletsis - *NCSR Demokritos, Greece*

Stasinou Konstantopoulos – *NCSR Demokritos, Greece*

Oliver Korn - *Offenburg University, Germany*

Dean Krusienski - *Virginia Commonwealth University, USA*

Maria Kyrarini - *Santa Clara University, USA*

Fotis Liarokapis - *Cyprus University of Technology, Cyprus*

Ahmad Lotfi - *Nottingham Trent University, United Kingdom*

Sergio Mascetti - *Università degli Studi di Milano, Italy*

Michalis Papakostas – *GN Group, USA*

Taskin Padir - *Northeastern University, USA*

Akilesh Rajavenkatanarayanan – *General Motors, USA*

Evaggelos Spyrou - *University of Thessaly, Greece*

Glenn Wylie - *Kessler Foundation, USA*

Dimitrios Zikos – *Central Michigan University, USA*

Conference Proceedings and Editorial Committee

Gaurav Nale – *University of Texas at Arlington, USA*

Anushka Srivastav – *University of Texas at Arlington, USA*

Rohan Tipnis – *University of Texas at Arlington, USA*

Best Paper Award Winners

Congratulations to the winners of PETRA 2022 Paper Awards! The PETRA 2022 Awards Committee awards the following papers:

Best Paper for Novelty Award:

Winner: **User Preferences in Occupational Sedentary Behaviour Digital Interventions: Design and Evaluation of a Low-Intrusive Software Tool** Bojan Simoski, Michel Klein, Aart Van Halteren and Henri Bal

Runner Up: **CareCam: Towards user-tailored Interventions at the Workplace using a Webcam** Dimitri Kraft, Angelina Schmidt, Lea Büttner, Frederike Marie Oschinsky, Fabienne Lambusch, Kristof Van Laerhoven, Gerald Bieber and Michael Fellmann

Best Student Paper Award:

Winner: **Leveraging Submovements for Prediction and Trajectory Planning for Human-Robot Handover** Kyle Lockwood, Yunus Bicer, Sadjad Asghari-Esfeden, Tianjie Zhu, Mariusz Furmanek, Madhur Mangalam, Garrit Strenge, Tales Imbiriba, Mathew Yarossi, Taskin Padir, Deniz Erdogmus and Eugene Tunik

Best Technical Paper Award:

Winner: **Determining Best Hardware, Software and Data Structures for Worker Guidance during a Complex Assembly Task.** Bernhard Anzengruber-Tanase, Michael Haslgruebler-Huemer, Georgios Sopidis and Alois Ferscha

Runner Up: **Conveying Procedural and Descriptive Knowledge with Augmented Reality** Clemens Hoffmann, Sebastian Büttner and Michael Prilla

Best Workshop Paper Award:

Winner: **We've never been eye to eye: A Pupillometry Pipeline for the Detection of Stress and Negative Affect in Remote Working Scenarios** Alexander Heimerl, Linda Becker, Dominik Schiller, Tobias Baur, Fabian Wildgrube, Nicolas Rohleder and Elisabeth Andre

Runner Up: **Towards a DHH Accessible Theater: Real-Time Synchronization of Subtitles and Sign Language Videos with ASR and NLP Solutions** Grigoris Bastas, Maximos Kaliakatsos-Papakostas, Georgios Paraskevopoulos, Pantelis Kaplanoglou, Konstantinos Christantonis, Charalampos Tsiouostas, Dimitris Mastrogiannopoulos, Depy Panga, Evita Fotinea, Athanasios Katsamanis, Vassilis Katsouros, Konstantinos Diamantaras and Petros Maragos

Best Workshop Student Paper:

Winner: **GAN-based Face Reconstruction for Masked-Face** Farnaz Farahanipad, Mohammad Rezaei, Mohammadsadegh Nasr, Farhad Kamangar and Vassilis Athitsos

Runner Up: **Privacy-enhancing Technologies for Active and Assisted Living: What Does the GDPR Say?** Zhicheng He

Best Poster Paper Award:

Winner: **Evaluating Workload in One-to-Many Remote Collaboration.** Tzu-Yang Wang, Mai Otsuki and Hideaki Kuzuoka

Best Poster Student Paper Award:

Winner: **Large-Scale Self-Supervised Human Activity Recognition** Mohammad Zaki Zadeh, Ashish Jaiswal, Hamza Reza Pavel, Aref Hebri, Rithik Kapoor and Fillia Makedon

Best Demo Paper Award:

Winner: **An Adaptive Tilting Interface to Alleviate Motion Sickness for Passengers in Vehicles** Soojin Hwang, Manasa Sama, Sebastian Kuhn, Vinitha Erusu and John Raiti

Please provide us with your feedback in our online survey:

www.petrae.org/survey

