

7th IEEE International Conference on Cognitive Infocommunications

CogInfoCom 2016

CONFERENCE PROGRAM

**October 16-18, 2016
Wrocław, Poland**

Welcome

It is our pleasure to welcome all of you to Wroclaw on behalf of the organizers of the **7th IEEE International Conference on Cognitive Infocommunications – CogInfoCom 2016**.

Cognitive Infocommunications (CogInfoCom) is a multidisciplinary research field that has emerged as a synergy between infocommunications and the cognitive sciences. A key observation behind CogInfoCom is that humans and ICT are becoming entangled at various levels through a convergence process between these disciplines, as a result of which new forms of cognitive capability are appearing. Importantly, these capabilities are neither purely natural (human), nor purely artificial; therefore, it is suggested that they should be treated in a way that unifies both engineering and human-oriented perspectives. As a result, CogInfoCom aims not only to provide analyses of emergent communicative phenomena, but also focuses on the development of new approaches and methodologies towards the synthesis of human-ICT capabilities based on engineering principles.

The aim of this conference is to help achieve these goals by bringing together researchers and practitioners from relevant areas of science and industry. We would like to thank the track and session organizers, as well as the many contributors for making this conference possible.

We would especially like to acknowledge the devoted support of the members of the CogInfoCom Technical Program Committee, and the work and effort of all members of the organization team, without whom this conference would not have been possible. We hope that all participants of CogInfoCom 2016 will find the conference to be an intellectually stimulating and enjoyable event.

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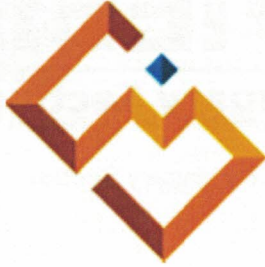
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General Information

Date and Place

CogInfoCom 2016 will take place between **16-18 October, 2016** at **Wrocław University of Science and Technology (WUST)** in **Wrocław, Poland** (Building D20, ul. Janiszewskiego 8, 50-372 Wrocław).

Official Language

The official language of the conference is English. All presentations, including theoretical talks and demos, will be held in the official language.

Proceedings

All accepted theoretical contributions will be available on the pendrive distributed to conference participants. Additionally, contributions will be uploaded to the IEEE Xplore database.

General regulations

We kindly ask all participants to observe the regulations of the host institution. All participants are kindly asked to refrain from smoking outside of the designated smoking areas.

Social events

Opening speech

Oct 16 Sunday, 10:00-10:30 – Wrocław University of Sci. and Tech.
Building D20
Room A

Welcome event

Oct 16 Sunday, 18:30-21:00 – Wrocław University of Sci. and Tech.
Building H14

Banquet

Oct 17 Monday, 18:00-22:00 – Stara Garbarnia Wrocław

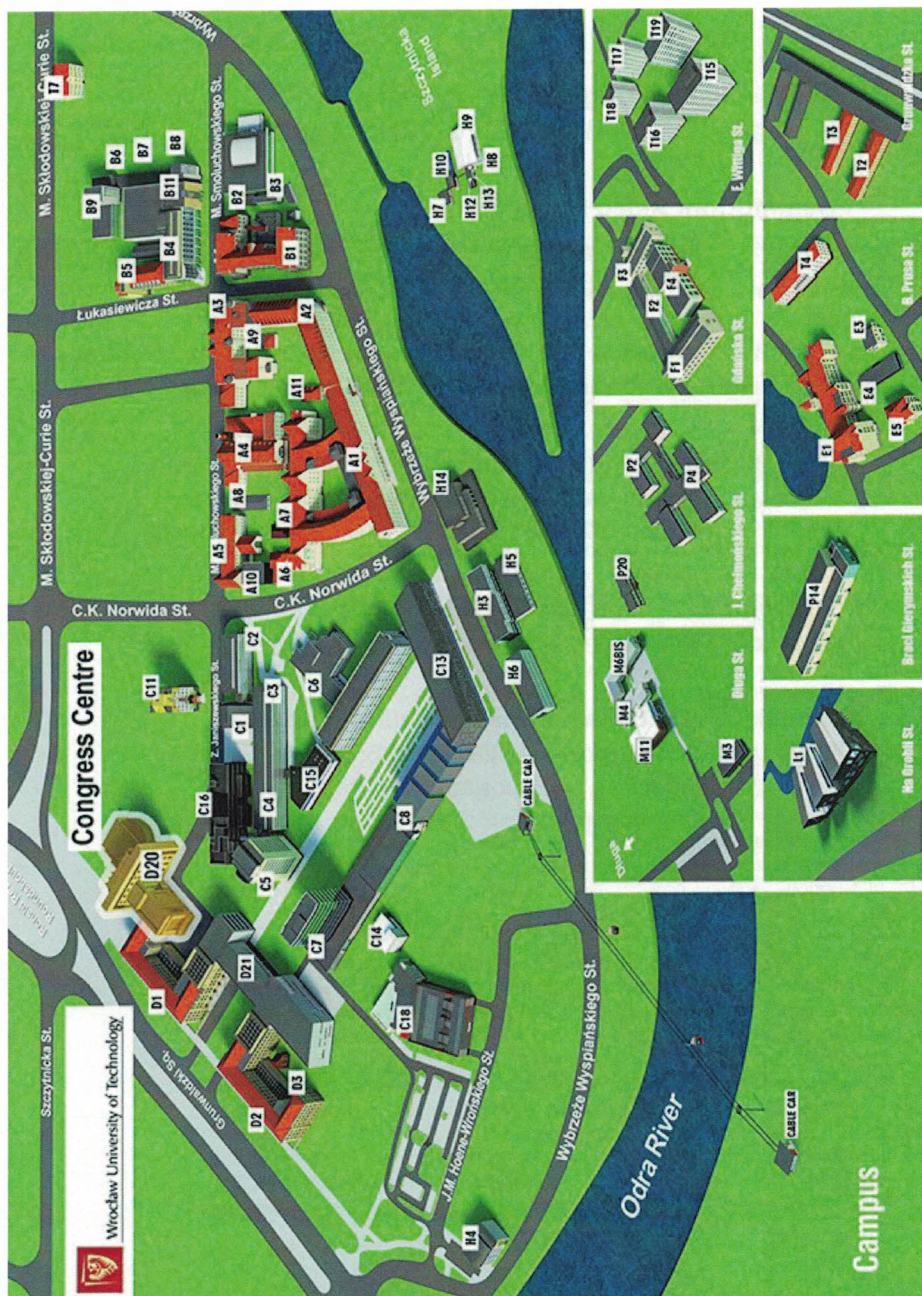
A shuttle bus will take participants from the conference venue to the restaurant (and back after the banquet). The bus will leave at 18:00, so please make sure you arrive to the meeting point earlier.

Closing event

Oct 18 Tuesday, 13:00 – Wrocław University of Sci. and Tech.
Building D20
Room A

Web: <http://www.coginfocom.hu/conference/CogInfoCom16/>

Venue



Tracks & Sessions

Accessibility of CogInfoCom Systems

Organizer: Zdenek Mikovec (CVUT, Czech Republic)

CogInfoCom Aided Enginnering

Organizers: Joni Jamsa, (Centria UAS, Finland)
Sakari Pieska (Centria UAS, Finland)

Cognitive Aspects of Human-machine Interface Systems

Organizer: Attila Kovari (University of Dunaujvaros, Hungary)

Customizable Cognitive Content Management

Organizers: Andras Hajdu, (University of Debrecen, Hungary)
Marianna Zichar (University of Debrecen, Hungary)

Infocommunication Based Education

Organizer: Ildiko Horvath (University of Pecs, Hungary)

Linguistic and Behavioural Interaction Analysis

Organizers: Anna Esposito (UNINA2/IIASS, Italy)
Antonietta M. Esposito (INGV, Italy)
Carl Vogel (Trinity College Dublin, Ireland)

Mathability

Organizers: Attila Gilanyi (University of Debrecen, Hungary)
Peter Baranyi (Szechenyi Istvan University, Hungary)

SocioCognitive-ICT

Organizer: Bertalan Forstner (BME, Hungary)

October 16

Sunday

9:00 – 11:00 REGISTRATION

10:00 – 10:30 OPENING

Room A

10:30 – 11:10 PLENARY LECTURE: Włodzisław Duch

Room A

„Communication as a resonance between cognitive systems”

Nicolaus Copernicus University, Poland

The value of information for a given cognitive system depends on the knowledge that cognitive system already has. Interactions that carry low value information may activate existing memory pattern leading to priming effects. Interactions that carry high value information create significant changes in the system, influencing its future behavior. All mental states result from highly non-linear neural dynamics of the brain. Top-down models of mind that try to describe mental processes in a conceptual way, without understanding of their underlying neurodynamics, will always be limited. In case of cognitive systems that share similar structures (such as animal brains) communication may be characterized in terms of resonance patterns, invoking functionally equivalent states in all communicating systems. Humanized interfaces or artificial infocommunication devices that provide information of high value for the user need to have some model of cognitive system they interact with, for example based on Brain-Inspired Cognitive Architecture (BICA) that represents concepts in a way roughly similar as in the human brain.

A brief review of neuroscience relevant to the representation of concepts in the brain will be presented. Functional neuroimaging techniques show brain processes during various mental tasks. The brain-computer interfaces learn to identify and assign meaning to spatiotemporal patterns of activity in the brain, translating such patterns into decisions and actions. Progress in this direction will eventually show how to transform brain activity into mental activity defined in psychological spaces based on dimensions that characterize subjective experiences. A computational model of word meaning based on spreading neural activation in layered networks will be used to visualize mental trajectories using novel technique based on fuzzy symbolic dynamics. Concepts are fluid, defined by dynamical attractor states oscillating around distributions of neural activity, as has been demonstrated in computational simulations and recent results of fMRI studies. BICA systems based on attractor states should allow for deep understanding of interactions with humans, creating resonant internal states. Symbolic interpretation of the sequence of transitions between internal states in such cognitive systems will be similar to verbal description of the stream of consciousness.

11:10-11:30 COFFEE BREAK

11:30-12:30 PANEL SESSION

Room A	Session Chair: Anna Esposito
Track	Linguistic and Behavioural Interaction Analysis I. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Anna Esposito and Alda Troncone	Differences between alcoholic and non alcoholic individuals in the recognition of vocal emotional stimuli
Duc-Canh Nguyen, Gerard Bailly and Frederic Elisei	Conducting neuropsychological tests with a humanoid robot: design and evaluation
Gyorgy Kovacs, Tamas Grosz and Tamas Varadi	Topical Unit Classification Using Deep Neural Nets and Probabilistic Sampling

Room B	Session Chair: Ryszard Klempous
Paweł Szczesny, Jan Nikodem and Konrad Kluwak	Visual Communication in Expanding of Human-Computer Interactions
Bertram Wortelen, Anirudh Unni, Jochem W. Rieger and Andreas Ludtke	Towards the Integration and Evaluation of Online Workload Measures in a Cognitive Architecture
Attila Gilanyi and Eszter Hidasi	Virtual Reality Systems in the Rehabilitation of Parkinson's Disease

12:30 - 13:20 BREAK

13:20 - 14:40 PANEL SESSION

Room A	Session Chair: Attila Kovari
Track	Cognitive Aspects of Human-Machine Interface Systems Invited session organized by University of Dunaújvaros Organizer: Attila Kovari
Jozsef Katona, Tibor Ujbanyi, Gergely Sziladi and Attila Kovari	Speed control of Festo Robotino mobile robot using NeuroSky MindWave EEG headset based Brain-Computer Interface

Gergely Sziladi, Tibor Ujbanyi and Jozsef Katona	Cost-effective hand gesture computer control interface
Tibor Ujbanyi, Jozsef Katona, Gergely Sziladi and Attila Kovari	Eye-Tracking Analysis of Computer Networks Exam Question Besides Different Skilled Groups
Mariann Varaljai	Establish innovative learning environment by virtual lab concept

Room B	Session Chair: Anna Esposito
Track	Linguistic and Behavioural Interaction Analysis II. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Firoj Alam, Morena Danieli and Giuseppe Riccardi	Can We Detect Speakers' Empathy? A Real-Life Case Study
Milan Rusko and Michael Finke	Using Speech Analysis in Voice Communication A new approach to improve Air Traffic Management Security
Olimpia Matarazzo, Barbara Pizzini, Claudia Greco and Michele Carpentieri	Effect of a Chance Task Outcome on the Offers in the Ultimatum Game: The Mediation Role of Emotions
Stanislav Ondas, Lenka Mackova and Daniel Hladek	Emotion Analysis in DiaCoSk Dialog Corpus

14:40 - 15:00 COFFEE BREAK

15:00 - 16:20 PANEL SESSION

Room A	Session Chair: Peter Baranyi
Andras Czebe and Gabor Kovacs	How Cognitive Infocommunications Play a Critical Role in Shaping the Future of Forensic Sciences
Anna Sudar	Face perception in autism spectrum disorders during a free browsing task using eye-tracking method
Aline Dobrovsky, Uwe M. Borghoff and Marko Hofmann	An Approach to Interactive Deep Reinforcement Learning for Serious Games
Grzegorz Bocewicz, Ryszard Klempous and Zbigniew Banaszak	Declarative Approach to DSS Design for Supervisory Control of Production Orders Portfolio

Room B	Session Chair: Adam Csapo
Track	Linguistic and Behavioural Interaction Analysis III. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Jan Staš, Daniel Hladek and Jozef Juhar	Adding Filled Pauses and Disfluent Events into Language Models for Speech Recognition
Giovanna Leone, Stefano Migliorisi and Isora Sessa	Detecting Social Signals of Honesty and Fear of Appearing Deceitful: A Methodological Proposal
Karolina Šcigala and Bipin Indurkha	The influence of verticality metaphor on social judgment
Costanza Navarretta	Predicting an Individual's Gestures from the Interlocutor's Co-occurring Gestures and Related Speech

16:20 - 18:00 PANEL SESSION

Room A	Session Chair: Zdenek Mikovec
Track	Accessibility of CogInfoCom Organizer: Zdenek Mikovec
Jan Balata and Zdenek Mikovec	Why Visually Impaired People Resist to Adopt Touchscreen Smartphones in the Czech Republic?
Ageliki Konstadinidou, Nikolaos Kaklanis, Ioannis Paliokas, Dimitrios Tzovaras	A unified cloud-based framework for AAL services provision to elderly with cognitive impairments
Akos Kovacs	Comparing the Aggregation Capability of the MPT Communications Library and Multipath TCP
Miroslav Macik, Ivo Maly, Eva Lorencova, Tomas Flek and Zdenek Mikovec	Smartphoneless context-aware indoor navigation
Adam Csapo, Arni Kristjansson, Hunor Nagy and Gyorgy Wersenyi	Evaluation of Human-Myo Gesture Control Capabilities in Continuous Search and Select Operations

Room B	Session Chair: Mariann Zichar
Track	Customizable Cognitive Content Management Organizers: Marianna Zichar
Istvan Boda, Erzsebet Toth, Istvan Csont and Laszlo T. Nagy	Developing a knowledge base of ancient literary texts in virtual space
Ildiko Papp, Robert Tornai and Marianna Zichar	What 3D technologies can bring into the education
Kornel Bertok and Attila Fazekas	Face Recognition on Mobile Platforms
Istvan Pentek, Attila Adamko and Abel Garai	Cognitive Telemedicine IoT Technology for Dynamically Adaptive eHealth Content Management Reference Framework embedded in Cloud Architecture
Agoston Torok	From human-computer interaction to cognitive infocommunications: a cognitive science perspective

18:30 – 21:00 WELCOME RECEPTION at WUST Campus, Building H14

October 17

Monday

09:00 – 09:40 **PLENARY LECTURE: Thorsten O. Zander** **Room A**

"Towards Neuroadaptive Technology: Symmetrical Human-Computer Interaction based on a cognitive user model generated by automatically probing the operator's mind"

Team PhyPA, Biological Psychology and Neuroergonomics, TU Berlin, Germany

Today's interaction with technology is asymmetrical in the sense that

- the operator has access to any and all details concerning the machine's internal state, while the machine only has access to the few commands explicitly communicated to it by the human, and
- while the human user is capable of dealing with and working around errors and inconsistencies in the communication, the machine is not.

With increasingly powerful machines this asymmetry has grown, but our interaction techniques have remained the same, presenting a clear communication bottleneck: users must still translate their high level concepts into machine-mandated sequences of explicit commands, and only then does a machine act. During such asymmetrical interaction the human brain is continuously and automatically processing information concerning its internal and external context, including the environment the human is in and the events happening there. I will discuss how this information could be made available in real time and how it could be interpreted automatically by the machine to generate a model of its operator's cognition. This model then can serve as a predictor to estimate the operator's intentions, situational interpretations and emotions, enabling the machine to adapt to them. Such adaptations can even replace standard input, without any form of explicit communication from the operator. I will illustrate this approach by several brief examples.

The above mentioned cognitive model can be refined continuously by giving agency to the technological system to probe its operator's mind for additional information. It could deliberately and iteratively elicit, and subsequently detect and decode cognitive responses to selected stimuli in a goal-directed fashion. Effectively, the machine can pose a question directly to a person's brain and immediately receive an answer, potentially even without the person being aware of this happening. This cognitive probing allows for the generation of a more fine-grained user model. It can be used to fully replace any direct input to the machine, establishing effective, goal-oriented implicit control of a computer system. I will give a more detailed example showing the potential of this approach.

These approaches fuse human and machine information processing, introduce fundamentally new notions of 'interaction', and allow completely new neuroadaptive technology to be developed. This technology bears specific relevance to auto-adaptive experimental designs, but opens up paradigm shifting possibilities for technology in general, addressing the issue of asymmetry and widening the above-mentioned communication bottleneck.

09:40 – 10:20 **PLENARY LECTURE: Attila Gilanyi**

Room A

“Mathability”

University of Debrecen, Hungary

10:20-10:40 **COFFEE BREAK**

11:40-12:00 **PANEL SESSION**

Room A	Session Chair: Agoston Torok
Track	Linguistic and Behavioural Interaction Analysis IV. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Alessandro Mecocci, Francesco Micheli, Claudia Zoppetti and Andrea Baghini	Automatic Falls Detection in Hospital-Room Context
Barbara Lewandowska-Tomaszczyk and Paul Wilson	Compassion, Empathy and Sympathy Expression Features in Affective Robotics
Jon Irastorza and M. Ines Torres	Analyzing the expression of annoyance during phone calls to complaint services
Branimir Dropuljić, Davor Petrinović and Krešimir Čosić	Novel Speech Features of Disturbances in Laryngeal Muscle Coordination

Room B	Session Chair: Bertalan Forstner
Track	Socio-Cognitive ICT I. Organizer: Bertalan Forstner
Atsushi Ito, Takuya Kato, Hiroyuki Hatano, Mie Sato, Yu Watanabe, Eiji Utsunomiya, Yuko Hiramatsu and Fumihiko Sato	A Study on Designing Ad Hoc Network Protocol using Bluetooth Low Energy
Attila Hideg, Laszlo Blazovics, Bertalan Forstner	Uniform Dispersal of Oblivious Mobile Robots

Laszlo Gazdi, Krisztian Daniel Pomazi, Bertalan Radostyan, Bertalan Forstner and Luca Szegletes	Experimenting with classifiers in biofeedback-based mental effort measurement
Manuela Meier, Michal Borsky, Eydis H. Magnusdottir, Kamilla R. Johannsdottir, Jon Gudnason	Vocal tract and voice source features for monitoring cognitive workload

12:00 - 13:00 BREAK

13:00 - 14:20 PANEL SESSION

Room A	Session Chair: Gyula Sallai
Christian Schenk, Sonja Schimmler and Uwe Borghoff	Video Content Abstraction as a Basis for the Specification of Video Communication Scenarios
Illes Nigicser, Balazs Szabo, Laszlo Jaksa, Denes Akos Nagy, Szilvia Barcza, Tivadar Garamvolgyi, Peter Galambos, Tamas Haidegger	Anatomically Relevant Pelvic Phantom for Surgical Simulation
Donny Hendrawan, Claudya Carolina, Fasya Fauzani, Hanifah Nurul Fatimah, Muhammad Azmi Malik Ariefa and Farida Kurniawati	The Construction of Android Computer-based Application on Neurocognitive Executive Function for Early Age Children

Wojciech Bozejko, Andrzej Gnatowski, Ryszard Klempous, Michael Affenzeller Andreas Beham	Cyclic scheduling of a robotic cell
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Room B	Session Chair: Bertalan Forstner
Track	Socio-Cognitive ICT II. Organizer: Bertalan Forstner
Attila Hideg, Laszlo Blazovics, Kristof Csorba and Marton Gotzy	Data Collection for Widely Distributed Mass of Sensors
Miroslav Macik, Anna Kutikova, Adam Sporka, Zdenek Mikovec	Coboard Flowers: An Interactive Installation for Prague Spring International Music Festival
Aron Toth and Sarolta Tóvolgyi	The Introduction of Gamification - A review paper about the applied gamification in the smartphone applications
Mate Koles and Zoltan Peter	"Learn to play, noob!" - The identification of ability profiles for different roles in an online multiplayer video game in order to improve the overall quality of the new player experience

14:20 – 14:40 COFFEE BREAK

14:40 - 16:00 PANEL SESSION

Room A	Session Chair: Anna Esposito
Track	Linguistic and Behavioural Interaction Analysis V. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Raffaele Sperandeo, Mauro Maldonato, Gesualda Baldo and Silvia Dell'Orco	Executive functions, temperament and character traits A quantitative analysis of the relationship between personality and prefrontal functions
Francesca D'Errico and Isabella Poggi	When the "truth" can (softly) hurt. Effects of political orientation on different forms of parody
Mate Akos Tundik, Branislav Gerazov, Aleksandar Gjoreski, Gyorgy Szaszak	Atom Decomposition Based Stress Detection and Automatic Phrasing of Speech

Adam Skowroński, Anna Sokoł and Kamila Skowrońska	Talk to cloud
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Room B	Session Chair: Joni Jamsa
Track	CogInfoCom Aided Engineering I. Organizers: Joni Jamsa, Sakari Pieska
Faramosh Rashid Izullah, Mika Koivisto, Artturi Aho, Teemu Laine, Heikki Hämäläinen, Pekka Qvist, Aapo Peltola, Paula Pitkäkangas and Mika Luimula	NeuroCar Virtual Driving Environment - Simultaneous Evaluation of Driving Skills and Spatial Perceptual-attentional Capacity
Natasha Bulatovic Trygg and Mika Luimula	Cultural Heritage in a Pocket - Case Study "Turku Castle in Your Hand"
Pekka Qvist, Natasha Bulatovic Trygg, Mika Luimula, Aapo Peltola, Taisto Suominen, Vesa Heikkinen, Pasi Tuominen and Ossi Tuusvuori	Demo: Medieval Gastro Box – Utilizing VR Technologies in Immersive Tourism Experience
Ferenc Fejes, Robert Katona and Levente Pusok	Multipath strategies and solutions in multihomed mobile environments

16:00 - 17:00 PANEL SESSION

Room A	Session Chair: Peter Baranyi
Track	Mathability Organizers: Attila Gilanyi and Peter Baranyi
Attila Gilanyi, Nelson Merentes and Roy Quinter	Mathability and an Animation Related to a Convex-Like Property

Katarzyna Chmielewska, Attila Gilanyi and Agnieszka Lukasiewicz	Mathability and Mathematical Cognition
Attila Gilanyi, Nelson Merentes and Roy Quintero	Presentation of an Animation of the m -Convex Hull of Sets

Room B	Session Chair: Joni Jamsa
Track	CogInfoCom Aided Engineering II. Organizers: Joni Jamsa, Sakari Pieska
Ayumi Shimada, Masato Oguchi, Saneyasu Yamaguchi, Heidi Kaartinen and Joni Jäms	Performance Evaluation of Transmission-Control Middleware in WLAN and LTE network
Heidi Kaartinen, Sakari Pieskä and Jouni Vähäsöyrink	Digital Manufacturing Toolbox for Supporting the Manufacturing SMEs
Sakari Pieskä, Mika Luimula, Heidi Kaartinen, Pekka Qvist, Taisto Suominen and Ossi Tuusvuori	Multidisciplinary Wow Experiences Boosting SMEs

18:00 – 22:00 BANQUET at Stara Garbarnia

A shuttle bus will take participants from the conference venue to the restaurant (and back after the banquet). The bus is scheduled to leave at 18:00, so please make sure you arrive to the meeting point on time.

October 18

Tuesday

10:00-11:20 PANEL SESSION

Room A	Session Chair: Peter Baranyi
Track	Infocommunication Based Education Organizer: Ildiko Horvath
Ildiko Horvath	Disruptive technologies in higher education
Ildiko Horvath	Digital Life Gap between students and lecturers
Ildiko Horvath	Innovative engineering education in the cooperative VR environment
Balazs Kosa, Norbert Sodar, Adrianna Barna	The Space of Intelligent Impressions* Smart technologies in the higher Engeneering education

Room B	Session Chair: Bertalan Forstner
Track	Socio-Cognitive ICT III. Organizer: Bertalan Forstner
Krisztian Daniel Pomazi, Laszlo Gazdi, Bertalan Radostyan, Bertalan Forstner and Luca Szegletes	Self-Standardizing Cognitive Profile Based on Gardner's Multiple Intelligence Theory
Bertalan Radostyan, Krisztian Daniel Pomazi, Laszlo Gazdi, Bertalan Forstner and Luca Szegletes	Adaptive Figural Abstraction Test with Generated Exercises
Hunor Nagy, Adam Csapo and Gyorgy Wersenyi	Contrasting Results and Effectiveness of Controlled Experiments with Crowdsourced Data in the Evaluation of Auditory Reaction Times
Mate Szabo, Krisztian Daniel Pomazi, Bertalan Radostyan, Luca Szegletes and Bertalan Forstner	Estimating Task Difficulty in Educational Games

11:20 - 11:40 COFFEE BREAK

11:40 - 12:40 PANEL SESSION

Room A	Session Chair: Anna Esposito
Track	Linguistic and Behavioural Interaction Analysis VI. Organizers: A. Esposito, A. M. Esposito, C. Vogel
Andrea Bulfone, Carlo Drioli, Giovanni Ferrin, Gian Luca Foresti	Video time lag analysis in a remote collaborative framework
Agata Wlaszczyck and Bipin Indurkha	On the use of metaphors in designing educational interfaces
Paolo Barsocchi, Monica Bianchini, Antonino Crivello, Davide La Rosa, Filippo Palumbo, Franco Scarselli	An unobtrusive sleep monitoring system for the human sleep behaviour understanding

Room B	Session Chair: Peter Baranyi
Peter Varlaki and Peter Baranyi	Jung and Pauli's Modelling of Psyche and Nature concerning the Aquarius Myth Part I: On the Last Chapter of Jung-Pauli Collaboration
Peter Varlaki and Peter Baranyi	Jung and Pauli's Modelling of Psyche and Nature concerning the Aquarius Myth Part II: Further Aquarius Patterns in Jung Dreams, Visions and Transference cases, in the Background with Pauli
Peter Varlaki and Peter Baranyi	Synchronistic Historical Background for Jung-Pauli's Modelling of Psyche and Nature concerning the Aquarius Myth Part I. The Aquarius mythologem in the "St John-St. Andrew" enamel picture of the Holy Crown of Hungary
Peter Varlaki and Peter Baranyi	Synchronistic Historical Background for Jung-Pauli's Modelling of Psyche and Nature concerning the Aquarius Myth Part II. The Aquarius mythologem and representation of St Andrew in the Hortus Deliciarum

13:00 – CLOSING**Room A**