IMEKO

IMEKO International Measurement Confederation

Technical Committee TC10 Technical Diagnostics

MTA SZTAKI
Hungarian Academy of Sciences
Computer and Automation Research Institute

15th IMEKO TC10 Workshop on Technical Diagnostics: "Technical Diagnostics in Cyber-Physical Era" to be held in Budapest, Hungary, on June 6-7, 2017.

Closing and Award Ceremony

Dr. Zsolt János VIHAROS

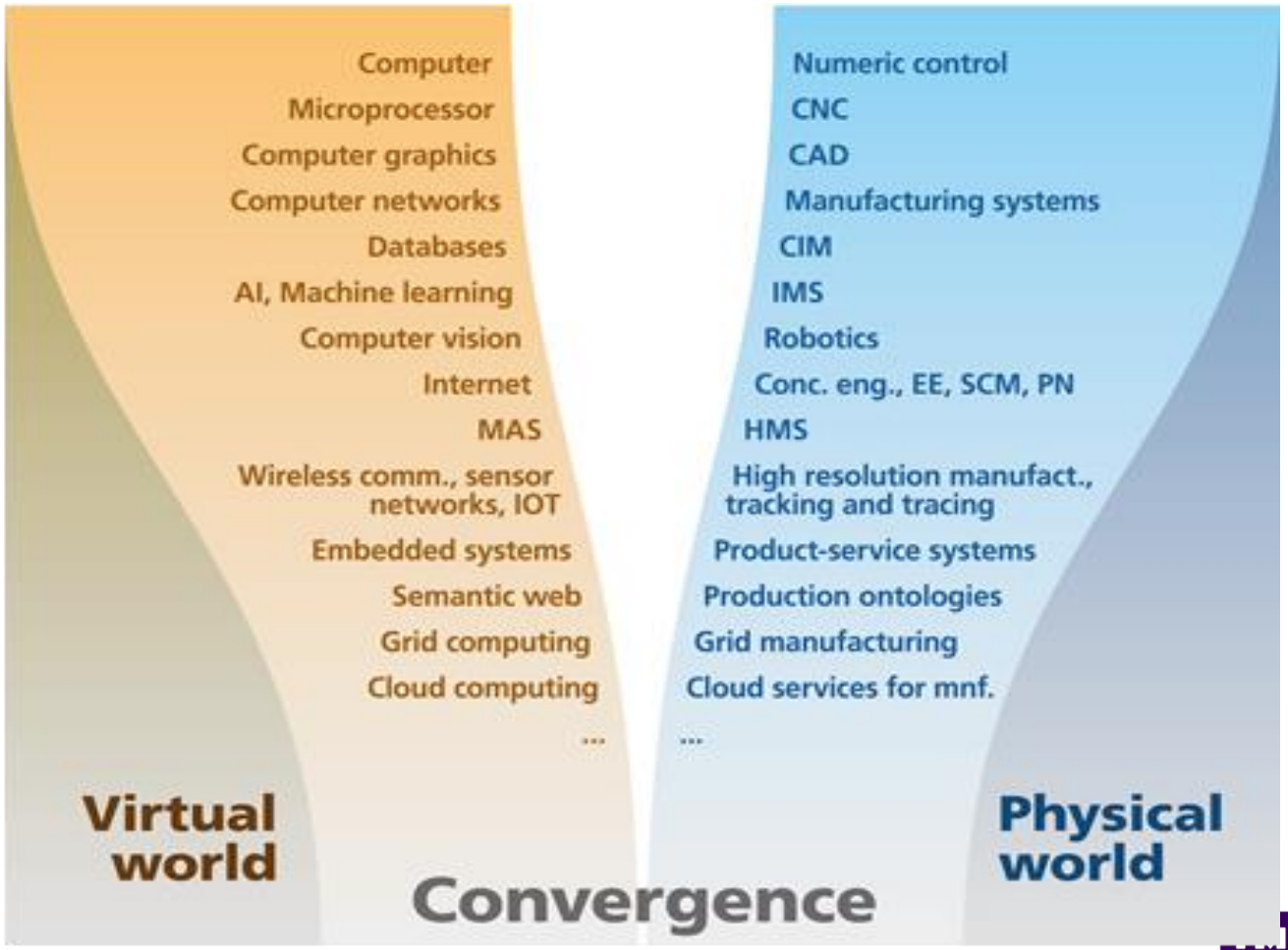
Senior research fellow, Institute for Computer Science and Control of the Hungarian Academy of Sciences

President of the Hungarian Member Organisation of IMEKO

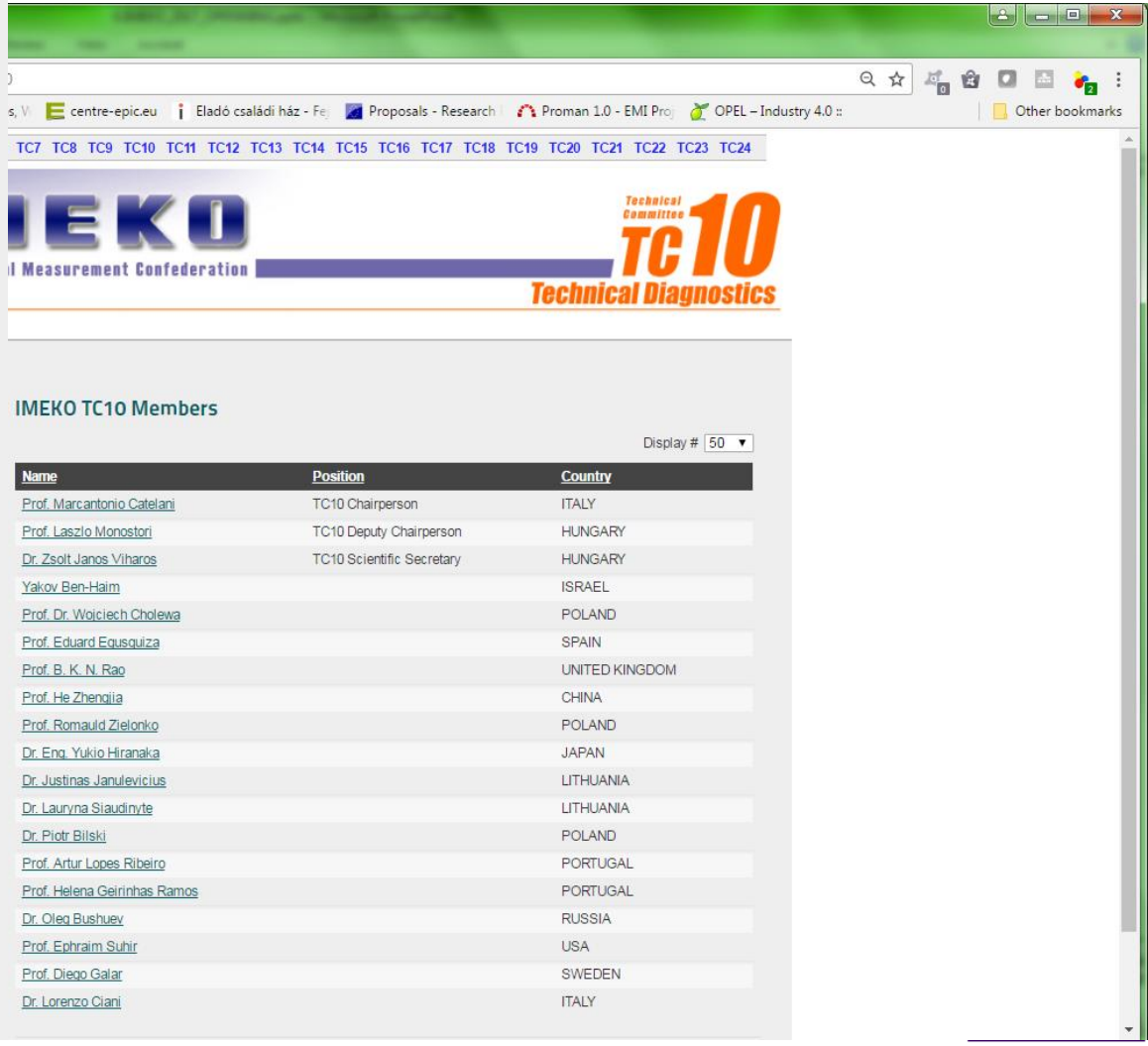
Scientific secretary, IMEKO TC10 on Technical Diagnostics

Towards cyber-physical production systems (CPPS)

- **New phase of interacting parallel developments**
  - Manufacturing science
  - Computer science, ICT
  - CNC, CAD, CAPP, PLM, MRP, ERP, BI, CRM, MES, SCM, MOM, EQMS, TQM, BPM, PSS, …
- **Key features**
  - Smart
  - Real and virtual coupled
  - Connected
- *Industrie 4.0*, *Industrial Internet*, *The Robot Revolution*, *Connected Smart Factory*, Ipar 4.0




TC10-Aims
www.imeko.org/index.php/tc10-homepage/aims-tc10
IMEKO TC1 TC2 TC3 TC4 TC5 TC7 TC8 TC9 TC10 TC11 TC12 TC13 TC14 TC15 TC16 TC17 TC18 TC19 TC20 TC21 TC22 TC23 TC24
IMEKO
International Measurement Confederation
Technical Committee TC10
Technical Diagnostics
You are here: IMEKO ▸ TC10 ▸ Aims & Objectives
TC10
About
Aims & Objectives
Members
Events
Links
Contact
Search
Log in / Log out
TC10 - Technical Diagnostics - Objectives
Objectives of IMEKO TC10 are to facilitate the exchange of scientific and technical information on diagnostic methods, instrumentation and systems by organizing symposia, discussion meetings and encouraging the publication of technical papers. Also, the co-operation between scientists and engineers in different subject areas in solving various technical and biomedical diagnostic problems is supported.
Keywords:
Electrical and mechanical systems;
Non-destructing, non-invasive testing using innovative sensor and signal processing concepts;
Signal and model based techniques;
Fuzzy- or AI-techniques, if no modeling is possible;
Automatic decisions, supervised by human experts;
Unified diagnostic methods and components of diagnostic systems.
Safe and reliable operation of complex systems
Contact
Search
Log in / Log out


centre-epic.eu
Eladó családi ház - Fe
Proposals - Research
Proman 1.0 - EMI Pro
OPEL – Industry 4.0 ::
Other bookmarks
TC7 TC8 TC9 TC10 TC11 TC12 TC13 TC14 TC15 TC16 TC17 TC18 TC19 TC20 TC21 TC22 TC23 TC24
Technical Committee TC10
Technical Diagnostics
IMEKO TC10 Members
Display # 50
Name | Position | Country
Prof. Marcantonio Catelani | TC10 Chairperson | ITALY
Prof. Laszlo Monostori | TC10 Deputy Chairperson | HUNGARY
Dr. Zsolt Janos Viharos | TC10 Scientific Secretary | HUNGARY
Yakov Ben-Haim | | ISRAEL
Prof. Dr. Wojciech Cholewa | | POLAND
Prof. Eduard Egusquiza | | SPAIN
Prof. B. K. N. Rao | | UNITED KINGDOM
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Prof. Romauld Zielonko | | POLAND
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Dr. Oleg Bushuev | | RUSSIA
Prof. Ephraim Suhir | | USA
Prof. Diego Galar | | SWEDEN
Dr. Lorenzo Ciani | | ITALY

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Organisers & Sponsors

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CENTRE OF EXCELLENCE EPIC
Production Informatics and Control

Sponsored by

aq ANTON

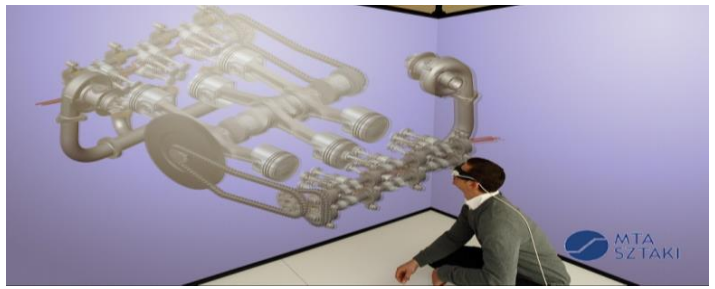
OPEL

IMEKO

Institute for Computer Science and Control
The organizer Institute

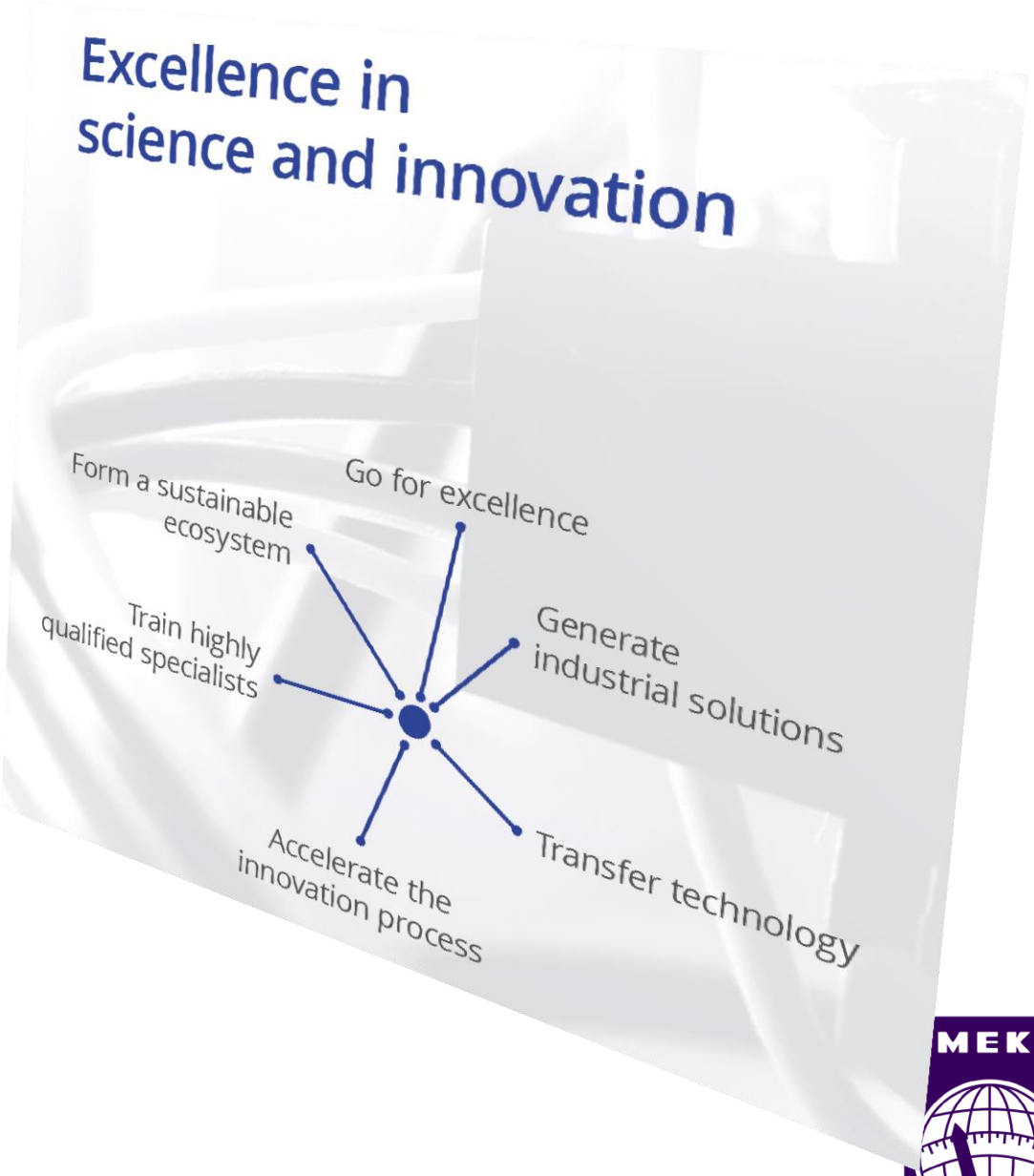
- Established in 1964
- EU **Centre of Excellence in IT**, Computer Science and Control
- **Basic** and **applied** research
- **Contract-based R&Đ&I** activity mainly on complex systems, turnkey realizations
- Transferring **up-to-date results to industry and universities**

- **Basic research**
  - Computer science
  - Systems- and control theory
  - Engineering and business intelligence
  - Machine perception and human-computer interaction
- **Applied research and innovation**
  - Vehicles and transportation systems
  - Production informatics and logistics
  - Energy and sustainable development
  - Security and surveillance
  - Networking systems and services, distributed computing



Goals of the EPIC project

The **overarching goal** of the project is to establish the **Centre of Excellence in Production Informatics and Control (EPIC CoE)** as a leading, internationally acknowledged and sustainable focus point in its field representing **excellence in research, development and innovation related to Cyber-Physical Production (CPP)**.



iKOMP

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)

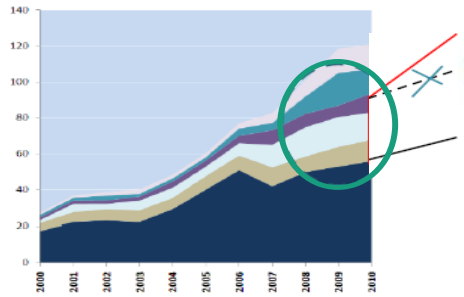
Problem description

- Highly industrialized region on the west part of Hungary with limited R&D capacity: Research and development programs related to strengthening the strategic future-oriented industries manufacturing technologies and products of regional competences carried out in comprehensive collaboration

Main Partners

- **OPEL Hungary (coord.),**
- **SZTAKI (Sci. Coord.)**, Széchenyi István University, University of West Hungary +FhA
- Delphi, jQor (Jabil), Europtec, Pylon-94, 3B Hungaria

Solution: Industry-driven R&D subprojects



Goals

- Basic research on
  - artificial and business intelligence
  - material technology solutions
  - construction solutions
- Technological competences for
  - machining segment
  - electro-technical segment
  - process-technologies
  - design-technologies
- R&D outputs with high added-value for the regional production industry
  - vehicle (electro-technical) segment
  - machining tools and equipment
  - production support solutions

Wir leben Autos.

OPEL Szentgotthárd Ltd.

- Founded in 1990, **350,000 m2 total site area**
- **2,300 employees on site**
- Total **investment of 1.4 billion euros**
- Profile
  - **engine production**
  - production of **engine components**
  - production of **automatic transmissions**
  - **transmission remanufacturing**
  - **spindle repair**

- **Flex engine plant**
  - **one of the most modern and flexible engine plants in the world**
  - production of **3 new engine families**: MGE, MDE, SGE

aq ANTON 25 Years

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WE ARE RELIABLE

Special Machining
2 800 m²
(2008-2014)

Plastic
2 400 m²
(2004)

Tooling
2 800 m²
(1999)

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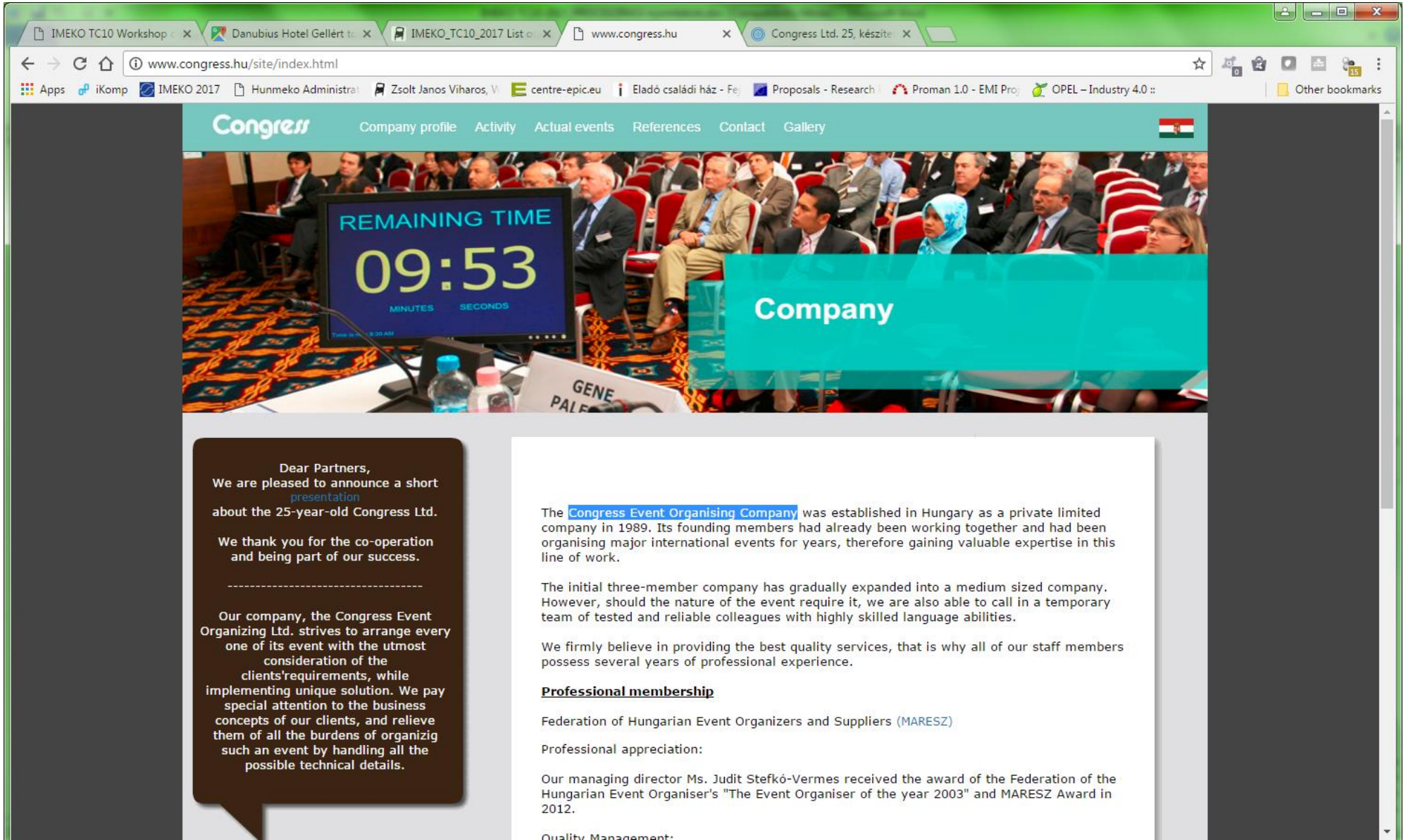
Support: Congress Ltd. Event Organising Company



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Support: Gusztáv Hencsey (MTA SZTAKI)

IMEKO

Venue

The workshop will be held in Danubius Hotel Gellért Budapest.
"Art-nouveau extravagance – the world's most famous spa"

- Noble hotel situated on the Danube riverbank, at the foot of Gellért Hill.
- Impressive Art-Nouveau building with large, light corridors and lots of character.
- Shares its building with the famous Gellért Spa, one of the city's most beautiful thermal bath.
- 10 minutes' walk from Great Market Hall and the downtown shopping area.
- Reach the city centre in the fastest way possible! The new Metro 4 station is just a few steps away from the hotel.
- Excellent business facilities, superb food in the brasserie and a charming coffee shop serving traditional pastries.

Budapest, Hungary

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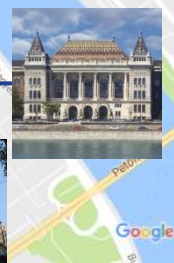


Invited Keynote Lecturers

INVITED KEYNOTE LECTURERS

Invited keynote lecturers´ presentations are available on the workshop website

(http://www.imekotc10-2017.sztaki.hu/invitedkl.php)

Industrial Keynote Lecturers

Jenő Csanaki

Unit manager, machining
OPEL Szentgotthárd Ltd., Hungary
Presentation title: ***Production control by Business Intelligence tools, dashboarding in manufacturing***

Jeno Csanaki was born in 1964 in Hungary. He graduated in heavy current electricity and studied engineering of digital systems. He joined to engine plant of OPEL (General Motors) at Szentgotthard, Hungary in 1991. He fulfilled several positions during his 25 years old employment, mainly at manufacturing and maintenance. Currently he is responsible for all machining lines at Szentgotthard as unit manager.

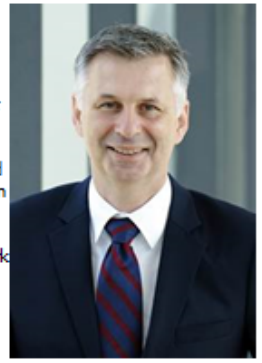
Lodovico Menozzi

Business Development Manager Europe - Condition Monitoring
National Instruments, Italy
Presentation title: ***Engineering The Industrial Internet of Things for Predictive Maintenance***

Lodovico has a Master's degree in Physics. He has been working for National Instruments for 17 years and he is currently covering the position of European Business Development Manager for Condition Monitoring Systems. In the 10 years prior to his current role, he worked in the field as a District Sales Manager and Field Application Engineer. In these roles he worked with customers, partners and research institutes operating in different industries like power generation, oil&gas and heavy machinery to develop on-line monitoring and advanced diagnostics applications.

Scientific Keynote Lecturers

Prof. Robert Schmitt



Director Lab. for Machine Tools and Production Engineering, Director of IPT
RWTH Aachen University, Fraunhofer Institute for Production Technology IPT, Germany
Presentation title: ***Reference Systems for a Free Float Assembly Setup***

Prof. Dr.-Ing. Robert H. Schmitt, born in 1961, completed his studies of Electrical Engineering with the specialisation on Communications Engineering at the Technical University of Aachen and became research associate at the Chair for Metrology and Quality Management. His work there focused on production-related Metrology and Communications Engineering in an automated environment.

In 1997 Professor Schmitt moved on to MAN Nutzfahrzeuge AG (commercial vehicles) in Munich where he took on leading positions in the fields of Quality and Production. In 2002 he assumed responsibility for the commercial vehicle production in Steyr, Austria.

On July 1st, 2004 he was appointed as professor at the Technical University of Aachen. As head of the Chair for Metrology and Quality Management at the Laboratory for Machine he serves as a member of the Board of Directors at the Laboratory for Machine Tools and Production Engineering (WZL) and the Fraunhofer Institute for Production Technology IPT.

Prof. Diego Galar

Professor of Condition Monitoring, Division of Operation and Maintenance Engineering
Luleå University of Technology, Sweden
Presentation title: ***Diagnosis and Virtual commissioning of manufacturing assets: A hybrid approach to condition monitoring***

Prof. Diego Galar holds a M.Sc. in Telecommunications and a PhD degree in Design and Manufacturing from the University of Saragossa. He has been Professor in several universities, including the University of Saragossa or the European University of Madrid, researcher in the Department of Design and Manufacturing Engineering in the University of Saragossa, researcher also in I3A, Institute for engineering research in Aragon, director of academic innovation and subsequently pro-vice- chancellor. He has authored more than two hundred journal and conference papers, books and technical reports in the field of maintenance, working also as member of editorial boards, scientific committees and chairing international journals and conferences. In industry, he has been technological director and CBM manager of international companies, and actively participated in national and international committees for standardization and R&D in the topics of reliability and maintenance.

Currently, he is Professor of Condition Monitoring in the Division of Operation and Maintenance Engineering at LTU, Luleå University of Technology, where he is coordinating several EU-FP7 projects related to different maintenance aspects and was also involved in the SKF UTC centre located in Lulea focused in SMART bearings. He is also actively involved in national projects with the Swedish industry and also funded by Swedish national agencies like Vinnova.

In the international arena, he has been visiting Professor in the Polytechnic of Braganza (Portugal), University of Valencia and NIU (USA), currently, University of Sunderland (UK) and University of Maryland (USA). He is also guest professor in the Pontificia Universidad Católica de Chile.

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Four Chairman: Thank you!

- **Prof. Marcantonio Catelani**, Department of Information Engineering, University of Florence, Florence, Italy

- **Dr. Lorenzo Ciani**, Department of Information Engineering, University of Florence, Florence, Italy

- **Prof. Yukio Hiranaka**, Yamagata University, Graduate School of Science and Engineering, Yamagata, Japan

- **Prof. Piotr Bilski**, Institute of Radioelectronics and Multimedia Technology, Warsaw University of Technology, Warsaw, Poland

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Contributors
30 papers, 5 posters, 4 keynote presenters

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JUNE 5 th 2017

18.00 – 19.00	Registration
18.00 – 19.00	Welcome cocktail, Hotel Gellért, Workshop venue

JUNE 6 th 2017

08.30 – 09.00	Registration
09.00 – 09.30	Opening Ceremony: Zsolt János Viharos, Workshop Chair, Research Laboratory on Engineering & Management Intelligence, Institute for Computer Science and Control, Hungarian Academy of Sciences
09.30 – 10.30	***Invited lecture, scientific: Prof. Robert Schmitt, Lab for Machine Tools and Production Engineering, WZL | RWTH Aachen University, Germany: "Reference Systems for a Free Float Assembly Setup"***
10.30 – 11.00	Coffee Break
11.00 – 13.00	*Oral Session, chairman: Marcantonio Catelani, Department of Information Engineering, University of Florence, Florence, Italy*
11:00	Patrick Scholz, Daniel Peters and Florian Thiel: Security Concepts for Software in Measuring Instruments
11:20	Domenico Capriglione, Marco Carratù, Paolo Sommella and Antonio Pietrosanto: ANN-based IFD in Motorcycle Rear Suspension
11:40	Zoltán Rózsás, Andrea [illegible] Variable Process Modell For Complex Vehicle Systems Under Extreme Load Environment
12:00	Imre Paniti and Zsolt János Viharos: Fracture diagnostics for Single Point Incremental Forming of thin Aluminium alloy foils
12:20	Zoltán Rózsás and Zsolt Szalay: Extension of telemetry system
12:40	Timotei István Erdei, Zsolt Molnár, Nwachukwu C. Obinna and Géza Husi: A Novel Design of an Augmented Reality Based Navigation System & its Industrial Applications
13.00 – 14.00	Lunch
14.00 – 15.00	***Invited lecture, industrial: Lodovico Menozzi, Business Development Manager Europe - Condition Monitoring, National Instruments, Italy: "Engineering The Industrial Internet of Things for Predictive Maintenance"***
15.00 – 15.30	Coffee Break & *Poster Session*
	Marcantonio Catelani, Lorenzo Ciani and Matteo Venzi: Maintainability Allocation assessment in complex systems
	József Szabó and Péter Bakucz: Embedded integer NARX identification of knocking combustion of large gas engine
15:30 - 17:30	*Oral Session, chairman: Lorenzo Ciani, Department of Information Engineering, University of Florence, Florence, Italy*
15:30	Vladimir V. Sinitsin: Roller bearing fault detection by applying wireless sensor of instantaneous accelerations of mechanisms moving elements
15:50	Gábor Kohlrusz, Krisztián Enisz, Dénes Fodor and Bence Csomós: Integrated model environment for digital controlled power converter analysis and [illegible]
16:10	Mónica Egusquiza, Carme Valero, Alex Presas, David Valentin, Matias Bossio and Eduard Egusquiza: Advanced condition monitoring of Pelton turbines
16:30	Bence Csomos, Gabor Kohlrusz and Denes Fodor: Model parameter estimation of lead-acid battery pack using current impulse excitation
16:50	Balázs Scherer: HIL test based non-intrusive diagnostics of cyber-physical systems
17:10	Giulio D'EMILIA, David di GASBARRO, Antonella GASPARI, Emanuela NATALE: About the role of uncertainty assessment in environmental testing
17:30 - 18:30	IMEKO TC10 Board Meeting
19.00 – 22.00	Workshop Dinner - Trip on a boat along the Danube in Budapest

JUNE 7 th 2017

09.00 – 10.00	***Invited lecture, scientific: Diego Galar, Division of Operation and Maintenance Engineering Luleå University of Technology, Sweden: "Diagnosis and Virtual commissioning of manufacturing assets: A hybrid approach to condition monitoring"***
10.00 – 10.30	Coffee Break
10.30 – 13.00	*Oral Session, chairman: Yukio Hiranaka, Yamagata University, Graduate School of Science and Engineering, Yamagata, Japan*
10:30	Tommaso Addabbo, Ada Fort, Rossella Marino, Carlo Michelassi, Marco Mugnaini and Valerio Vignoli: Modelling of Non-Monotonic Hazard Function for the Early Production Life of Oil and Gas Plants
10:50	Piotr Bilski: Unsupervised learning-based hierarchical diagnosis of analog circuits
11:10	Yi Huang and Clemens Gühmann: Wireless Sensor Network for Temperature Estimations in an Asynchronous Machine Using a Kalman Filter
11:30	Takao Mizusawa, Soichi Miura, Toshihiro Taketa and Yukio Hiranaka: Distributed Power [illegible] of Total Demand
11:50	Loredana Cristaldi and Giacomo Leone: A Statistical Algorithm for Photovoltaic Modules Reliability Assessment
12:10	Bartosz Polok and Piotr Bilski: Optimization of the neural RBF classifier for the diagnostics of electronic circuit
12:30	Marcantonio Catelani, Lorenzo Ciani and Matteo Venzi: Logic Solver Diagnostics in Safety Applications
12:50	János Dobránszky, Balázs Bebők, Balázs Varbai, Attila Szlancsik, Tibor Gerencsér and Árpád Németh: Modeling of welding distortions and flame straightening deformations
13.10 – 14.00	Lunch
14.00 – 15.00	***Invited Lecture, industrial: Jenő Csanaki, Unit manager, machining, OPEL Szentgotthárd Ltd., Hungary: "Production control by Business Intelligence tools, dashboarding in manufacturing"***
15.00 – 15.30	Coffee Break & *Poster Session*
	Ferenc Boronyák and András Háry: Research in the process of burr measurement of metal parts
	László Móricz, Zsolt János Viharos, András Németh and András Szépligeti: Efficient Ceramics Manufacturing through Tool Path and Machining Parameter Optimisation
	Zsolt János Viharos, Szilveszter Soós, Gábor Nick, Richárd Beregi: Non-comparative, Industry 4.0 Readiness Evaluation for Manufacturing Enterprises
15:30 - 17:30	*Oral Session, chairman: Prof. Piotr Bilski, Institute of Radioelectronics and Multimedia Technology, Warsaw University of Technology, Warsaw, Poland*
15:30	Attila Lukacs: Design, Fabrication and Testing of a Prototype Reflow Monitoring System (RMS)
15:50	D.J. Pasadas, A.L. Ribeiro and Helena Maria Geirinhas Ramos: ECT with Uniform Current Distribution for the Inspection of Sub-surface cracks in Conductive Plates
16:10	Kristina [illegible] material measu[illegible]ction
16:30	Zsolt Ferenc Kovács, János Kodacsy and Zsolt János Viharos: Determination of the optimal working gap of Pulse Magnetic Assisted Roller Burnishing tool
16:50	Szabolcs Szalai and Imre Czinege: Digital Image Analysis of Sheet Metal Testing and Forming
17:10	Tommaso Addabbo, Francesco Bertocci, Ada Fort, Marco Mugnaini, Valerio Vignoli and Chiara Cinelli: On-component multilayer tri-axial capacitive probe for clearance measurement
17:20	István Lakatos and Péter Őri: Diagnostic Measurement for the Effective Performance of Motor Vehicles with free acceleration
17:50	Dammika Senevitanet, Unai Martínez, Shi Boyang: Diagnosis of brakes system in rolling stock: A data driven approach
18:10	Asier Gonzalez, Tecnalia,Shi Boyang: Wind turbine diagnosis using O&M information
18.30 – 19.00	Closing and Award Ceremony

Vehicles

Classical diagnostics

Models

Applications

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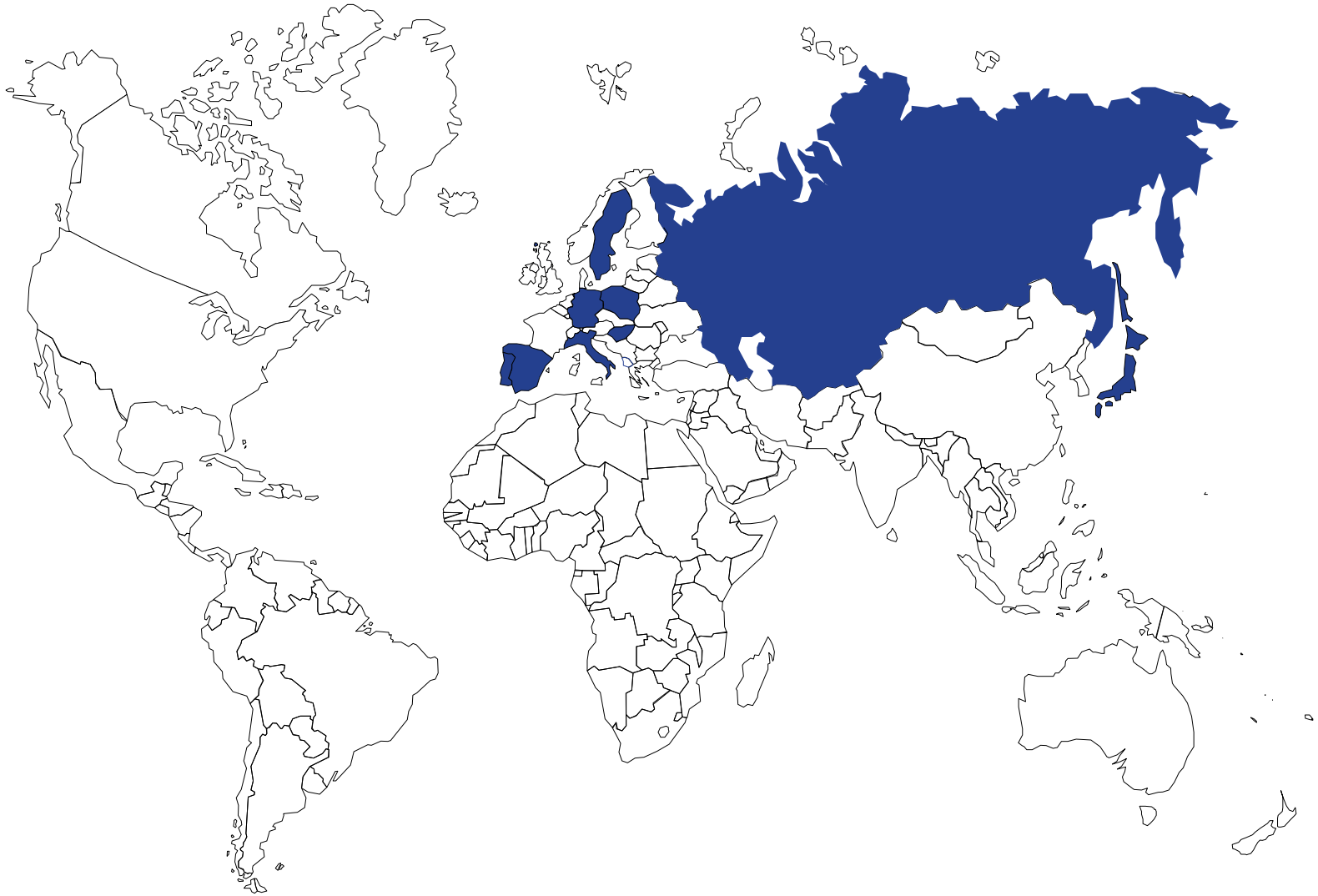
Participants' countries (9)



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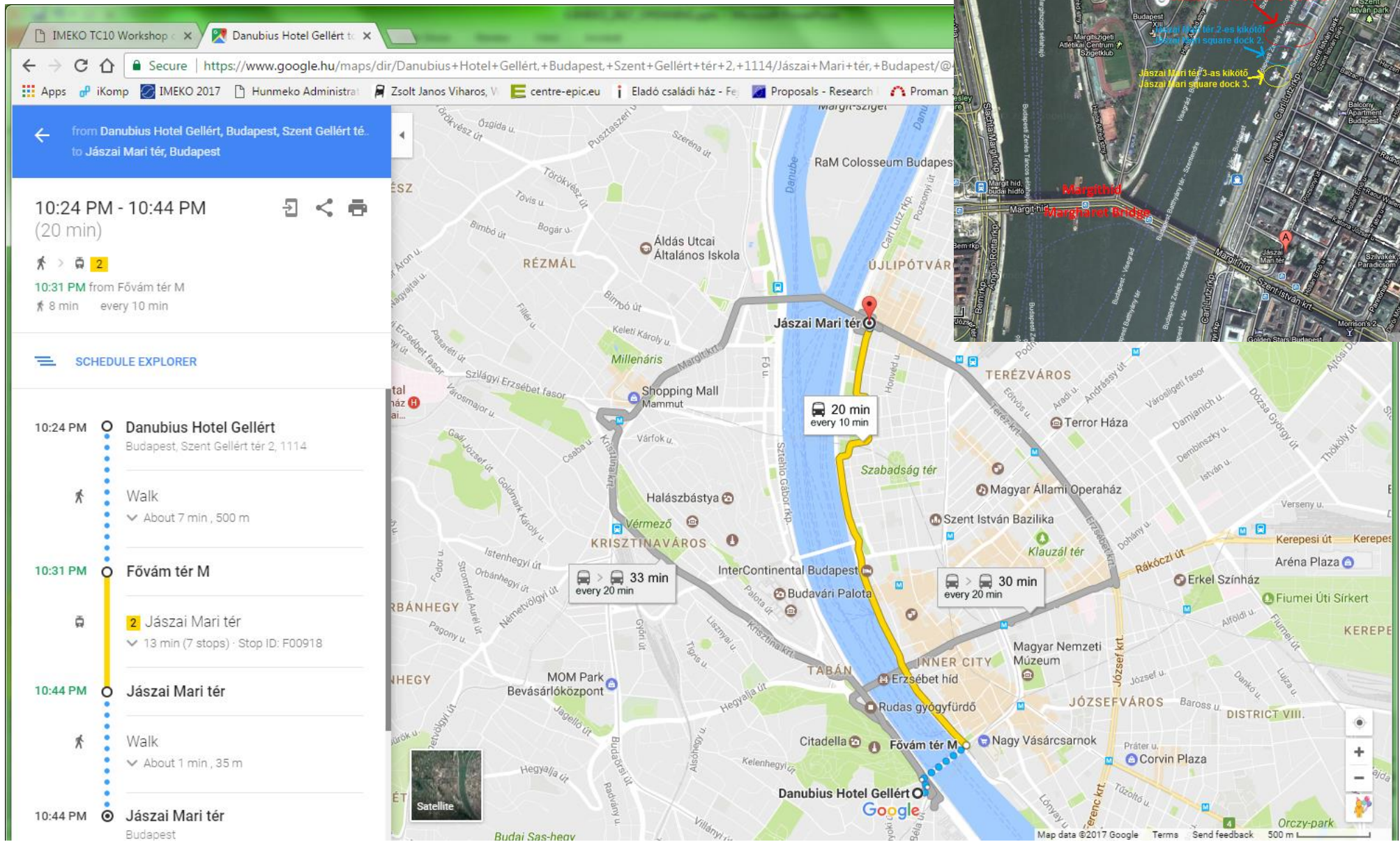
Thanks to the Presenters, Contributors!

Workshop Dinner 19:00-22:00

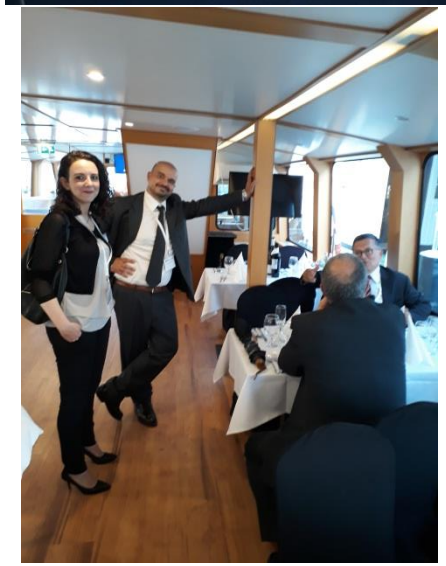
- Walking through the bridge
- **Tram 2**: until the end station (direction Jászai Mari Tér)
- Walking to the dock 1



Workshop dinner









Thank to IMEKO TC10 Organisation and PC Members!

IMEKO TC10 Workshop on Technical Diagnostics in Cyber-Physical Era

INVITATION

The International Measurement Confederation IMEKO, Technical Committee 10 on Technical Diagnostics, kindly invites you to attend the 15th IMEKO TC10 Workshop on Technical Diagnostics: "Technical Diagnostics in Cyber-Physical Era" to be held in Budapest, Hungary, on June 6-7, 2017. The Workshop is a forum for advancing knowledge and exchange ideas on methods, principles, instruments and tools, standards and industrial applications on Technical Diagnostics as well as their diffusion across the scientific community. Participants have an excellent opportunity to meet top specialists from industry and academia all over the world and to enhance their international co-operation. The programme will feature industry leading keynote speakers and selected presentations.

SPECIAL ISSUE

The presented papers at IMEKO TC10 are eligible for submission to the Measurement and ACTA IMEKO Special Issues. All submitted papers will undergo a regular peer review process. The manuscript MUST be significantly technically extended beyond the proceedings paper.

SCIENTIFIC TOPICS

- Technical diagnostics in the cyber-physical era and in industry 4.0 environment.
- Basic principles and development trends in technical diagnostics.
- Innovative sensors, data acquisition systems and signal processing.
- Condition monitoring and maintenance of industrial processes, plants and complex systems
- Diagnostics for Maintainability, Safety, Risk assessment and Management.
- Safety critical systems.
- System state modelling, change detection.
- Detection and prognosis of failures and damages.
- Artificial intelligence techniques and machine learning for diagnostics.
- Decision support and IT solutions for diagnostics.
- Industrial applications of monitoring and supervision systems, especially in transportation, mechatronics, avionics, automotive, biomedics, IT and in the improvement of quality of life and environment.
- Industrial standards.

Organisation

General Chairs

Zsolt János Viharos
IMEKO TC10 Scientific secretary
Research Laboratory on Engineering and Management Intelligence, Institute for Computer Science and Control of the Hungarian Academy of Sciences
viharos.zsolt@sztaki.mta.hu

Marcantonio Catelani
IMEKO TC10 Chairman
Information Engineering Department, University of Florence
marcantonio.catelani@unifi.it

International Programme Committee Chairs

Piotr Biski (Poland)
Lorenzo Ciani (Italy)

International Programme Committee Members

Jozsef Beinschróth (Hungary)
Oleg Bushuev (Russia)
Wojciech Cholewa (Poland)
Loredana Cristaldi (Italy)
Eduard Egusquiza (Spain)
Giulio D'Emilia (Italy)
Marco Faifer (Italy)
Diego Galar (Sweden)
Charaf Hassan (Hungary)
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Helena Geirinhas Ramos (Portugal)
Artur Lopes Ribeiro (Portugal)
Lauryna Siaudinyte (Lithuania)
Alexandros Soumelidis (Hungary)
Ephraim Suhir (USA)

WORKSHOP AWARDS

An award will be given for the **Best Scientific Paper & Presentation of the Workshop.**

To encourage the attendance of young researchers, an award will be given for the **Best Paper Authored and Presented by a Researcher Younger than 35 Years in Age.**

ISBN: 978-92-990075-5-6

http://www.imekotc10-2017.sztaki.hu/

Workshop awards

- An award will be given for the **Best Scientific Paper & Presentation of the Workshop**.
- To encourage the attendance of young researchers, an award will be given for the **Best Paper Authored and Presented by a Researcher Younger than 35 Years in Age**.

- To highlight the importance of the poster sessions, an award will be given for the **Best *Poster* Presented by PhD Students**.
- To highlight the importance of the poster sessions, an award will be given for the **Best *Poster* Presented by Master Students**.
- To highlight the importance of the live demonstration session, an award will be given for the **Best *Live Demonstration*** presented on the Workshop.

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presented at the
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The author(s) of this paper,

Monica Egusquiza, Carme Valero, Alex Presas, David Valentin, Matias Bossio, Eduard Egusquiza

are hereby congratulated and recognised for the excellent research work reported in the paper and presentation.

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are hereby congratulated and recognised for the excellent research work reported in the paper and in the presentation.

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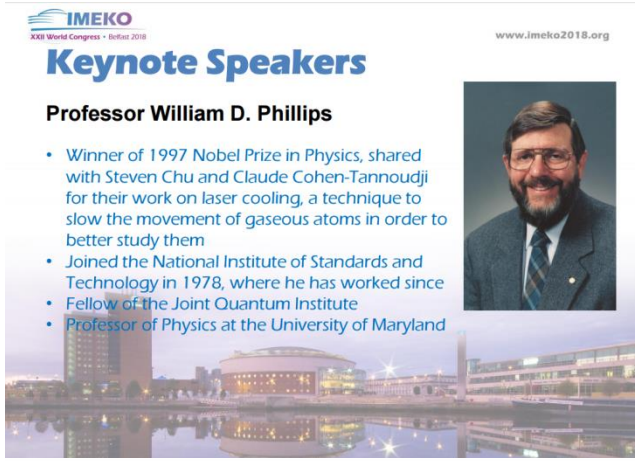


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Thank you for your participation!

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