Tomsk State University of Control Systems and Radioelectronics

TUSUR UNIVERSITY

RITSUMEIKAN
Ritsumeikan University

University Technology Dialogue 2013

INNOVATIONS IN INFORMATION AND COMMUNICATION SCIENCE AND TECHNOLOGY
The Third Postgraduate Consortium International Workshop – IICST2013

September 2-5, 2013

OFFICIAL LANGUAGE: **ENGLISH**

http://iicst.net

University Technology Dialogue – Innovations should be in demand

Transportation similar to how we know it today could have come into existence as early as in the first millennium CE, when Heron of Alexandria invented the first steam engine. Given that railroad was known long before his time, historians sometimes speculate about how different the development of our civilization could be if only these two inventions were brought together. But the steam engine of Heron of Alexandria has never become one of the steps of the technological progress, and remained a useless albeit curious device – such is the fate of all innovations that suffer from isolation and exist in the environments that are not yet ready to accept them. The existence of the steam generator and railroad alone is not enough to ensure that a new means of transport will be invented – first of all, there must be understanding of the demand for the innovation, and the scientific community that is ready to develop the new technology.

The international scientific community is a living and active body with continuous interaction of all of its parts. This process is supported by scientific magazines, conferences and symposiums. Interaction in this case mainly focuses on the existing results and exchange of experience of the past research. At the same time there should be a venue that would make it possible to coordinate actions of the scientific community by identifying the perspectives for development; there must be a dialogue that would help understand the demand for any specific innovations. The University Technology Dialogue, a regular event of TUSUR University, is such a venue – it brings together young engineering researchers to discuss the possible directions for technological progress and identify the most promising of them.

The University Technology Dialogue means interaction of ideas and concepts that helps to remedy a certain isolation that Russian engineering universities find themselves in as a result (as is the case with TUSUR University) of their past association with the defense industry. Today transparency is a prerequisite for international competitiveness of universities. Detachment from the international scientific community has negative consequences: on the one hand, researchers invest time and effort in the discoveries that have long been made by their foreign peers, and on the other hand, we can't talk about high quality of research and innovation activities at a university if they do not result in its international recognition. International recognition is only achievable through presence in the international scientific and academic arena, including through cooperation with international leaders.

The idea of the University Technology Dialogue resulted from collaboration between TUSUR University and Ritsumeikan University. Through their joint projects it has become clear that in today's information space, oversaturated with ideas and concepts, it is vital that the trajectory that young researchers follow is not erratic – moving from one random invention to another, but focused on development of high-potential innovative projects. The event has generated great interest and its popularity keeps growing – in 2013 its delegates are representing 13 countries (US, Canada, Germany, etc.). Apart from universities, the delegates represent large international corporations seeking to expand their presence in the Russian market and working in the Special Economic Zone in Tomsk.

The University Technology Dialogue is one of the steps TUSUR takes to integrate into the international academic and scientific community. The goal is to make it possible for research at TUSUR to have global impact, developments to be commercialized, and inventions to not remain odd and useless devices, but find their international market. The University Technology Dialogue is a purely English-language workshop, which makes it a higher-profile and more accessible event for international delegations. Its agenda includes public lectures and presentations on the current affairs of science and technology business that will be interesting both to engineers and general public.

INNOVATIONS IN INFORMATION AND COMMUNICATION SCIENCE AND TECHNOLOGY

IICST2013 – The Third Postgraduate Consortium International Workshop

Day 1 — September 2, 2013

Location: House of Scientists, 45 Sovetskaya Street

09:30 - 10:00

Transfer to Tomsk Special Economic Zone

10:00 - 12:00

Introduction to Tomsk Innovation Infrastructure
by invitation only

13:00 – 14:00

Lunch Time

14:00 - 14:30

Registration

14:30 – 14:45

Opening
Prof. Alexander Uvarov , IICST General Co-Chair, TUSUR University Vice-Rector
Prof. Victor Kryssanov, IICST General Co-Chair, Ritsumeikan University
A. Knyazev, Vice Governor for Tomsk Region Administration, Russia (to be confirmed)

14:45 – 16:30

Plenary Discussion: Matching the University research with future industry needs
Moderator: *Prof. Eric Cooper, Ritsumeikan University, Japan*
Dr. Gennady Kobzev, TUSUR University, Russia
Discussion topics:
— Selection of the most promising research directions for international recognition and valorization
— Feedback from the most technologically advanced international corporations
— Foresights for future technology advancements
— University-Industry-Government interaction for technological innovation development
Participants:
— *A. Uvarov, TUSUR University, Russia*
— *I. Koutsaroff, Murata Electronics, Japan*
— *Y. Nakatani, Ritsumeikan University, Japan*
— *A. Pozdnyakov, Elecard Group, Russia*
— *A. Stukanov, Tomsk Region Administration, Russia*
— *A. Knyazev, Vice Governor for Tomsk Region Administration, Russia (to be confirmed)*
— *W. N. Mureithi, Polytechnique Montreal, Canada*
— *T. Whitaker, Motion Analysis Corporation, USA*
— *M. Pinotti, Federal University of Minas Gerais, Brazil*

16:30 – 18:00

Invited talk: Bioengineering: Engineering Knowledge and Solutions for life
Prof. M. Pinotti, Federal University of Minas Gerais, Brazil

Day 2 — September 3, 2013

Location: House of Scientists, 45 Sovetskaya Street

09:00 – 10:00

Invited Tutorial: Multi-sensory Brain Computer Interfaces: State of the Art and Future Challenges
Prof. Tomasz M. Rutkowski, University of Tsukuba, Japan

10:00 – 11:10

Session 1a: IT in Medicine and Healthcare
Moderator: Prof. F. Rinaldo, Ritsumeikan University, Japan
Commentators: H. Murao, Y. Izuno
Human Activity Recognition System, based on Acceleration Data Obtained from a Smartphone
— Miyamoto S., Ogawa H.
Morphometric test-system for outcome prediction of ischemic cardiomyopathy
— Gutor S.
Prediction of Protein Phosphorylation Sites by Support Vector Machine
— Ishino T., Nishikawa I., Tohsato Y., Fukuchi S., Nishikawa K.
Entropic methods in study of adaptation processes in the human body
— Murzina S.
Parallel Computing on GPU for Solving Computer Tomography Problems
— Martyushev A.P., Khandorin A.A.

11:10 - 11:20

Coffee Break

11:20 - 12:00

Session 1b: IT in Medicine and Healthcare (continued)
Moderator: Prof. F. Shibata, Ritsumeikan University, Japan
Commentators: J.-H. Lee, T. Rutkowski
Study on Human Attribute Recognition by Applying the LPC Cepstrum Analysis to Human Gait
— Su Y., Murao H.
The use of 3D-slicer for investigation of expansive processes in the brain
— Shchadenko S.
Construction of an Interactive Hepatectomy Supporting System
— Miyawaki K., Shindo T., Kaibori M., Matsui K., Tsuda T., Kwon A.-H., Chen Y.-W.

12:00 - 13:00

Invited talk: HEVC (High Efficiency Video Coding) upcoming standard for video compression
Dr. Andrey Pozdnyakov, Elecard Co-Founder, President

13:00 – 14:00

Lunch Time

14:00 – 15:00

Invited Talk: VIRTUAL VISTAS: Digital Training in the Virtual World
Tom Whitaker, Motion Analysis Corporation, President, CEO, USA

15:00 – 16:30

Session 2: Application Software
Moderator: *Prof. E. Cooper, Ritsumeikan University, Japan*
Commentators: *H.Ogawa, D.M. Marutschke*
Implementation of Element Model Libraries in the INDESYS Framework
— Salnikov A.S., Kalentyev A.A., Goryainov A.E.
Locking Dance Instruction Support Method for Teachers Inexperienced in Street Dance
— Takesue T., Izumi T., Nakatani Y.

Street Lighting Simulation
— Litvinova M.N., Malomuj P.V., Soldatkin V.S., Tuev V.I.
Efficiency and Sensitivity Analysis of Distributed Power Networks
— Suzuki M., Sakakibara K., Nishikawa I.
GRID: Building a BOINC-based Virtual Campus Supercomputer
— Naumenko R.I.
Increasing the Performance of Density-Based Clustering Technique for Rapid Analysis of Large Scale Datasets
— Axyonov S.V., Lycom D.N.

16:30 – 16:40

Coffee Break

16:40 - 17:40

Round table: Innovative Educational Technologies
Moderator: *Dr. Gennady Kobzev, TUSUR University, Russia*
Exploring Innovative Educational Technologies
— Amaldas C., Shankaranarayanan A., Rinaldo F., Gemba K.
Project-based group learning at TUSUR University
— Pavlova I.
Elite Engineering Education at Tomsk Polytechnic University
— Zamiatina O.
CDIO Implementation at TUSUR University
— Afanasyeva M.

18:00 – 20:00

Public Lecture: Bioengineering: New Science shapes the future
Prof. Marcos Pinotti, Federal University of Minas Gerais, Brasil
Title changes may occur
Location: *Tomsk Library, 14, Karl Marx Street*

Day 3 — September 4, 2013

Location: House of Scientists, 45 Sovetskaya Street

09:00 – 10:00

Invited talk: Waveguide Optical Devices & Systems for Information Processing
Prof. V.M. Shandarov, TUSUR University, Russia

10:00 – 11:20

Session 3: Nano and optoelectronics
Moderator: *Prof. V. M. Shandarov, TUSUR University, Russia*
Commentators: *F. Rinaldo, I. Koutsaroff*
Simulation of the PDLC Diffraction Structure Characteristics under the Influence of Spatially Non-uniform Control Field
— Semkin A.O., Sharangovich S.N.
Spatial Self-action of Light Field in a Nonlinear Fabry-Perot Interferometer
— Perin A.S., Shandarov V.M., Batrshin V.F.
Design of a 1.2-1.8 GHz MMIC Low Noise Amplifier using gMatch Synthesis Tool for Matching Networks
— Kalentyev A.A., Dobush I.M., Garays D.V., Goryainov A.E., Babak L.I.
A New Analytical Technique for Bias-Dependent Drain Resistance Extraction for HEMTs
— Kokolov A.A.

11:15 – 11:30

Coffee Break

11:30 - 12:30

Invited Talk: Total Quality and Risk Management in Microelectronic Production: Recent Developments of Advanced Process Control (APC) Techniques and toward Automatic Virtual Metrology (AVM) Systems
Dr. Ivo(yl) P. Koutsaroff, Murata Electronics, Japan

13:00 – 14:00

Lunch Time

14:00 – 15:00

Invited Talk: Hydrodynamics and Fluid-structure Interaction: Complex Flow Modeling and Control
Prof. N. Mureithi, Politechnique Montreal, Canada

15:00 – 16:50

Session 4: Robotics and AI
Moderator: *Prof. F. Rinaldo, Ritsumeikan University, Japan*
Commentators: *I. Nishikawa, Y. Nakatani*
A Solution for a Car Model for the FreeScale Smart-Car Cup
— Yakushin D.O., Pekarskih E.A., Shandarov E.S.
A Teleoperated Manipulator for Supporting Independent Living of People with Disabilities
— Morishita M., Miyoshi T., Ando N., Lee J.-H.
Robot-Assistant Behavior Analysis for Robot-Child Interactions
— Zimina A.N., Ermakova P.S., Shandarov E.S.
Preliminary Experiments with a Brain-Computer Interface to Control a Robot
— Koike T., Hayashi K., Ono K., Ogawa H.
Synchronization System for a Group of Robobuilder Robots
— Ushakov A.S., Shepeleva N.E., Shandarov E.S.
Adopting Scouting and Heuristics to Improve the AI Performance in STARCRAFT
— Wang Z., Nguyen Q.K., Thawonmas R., Rinaldo F.
Application of Gamification in Knowledge Economies
— Shankaranarayanan A., Amaldas C., Rinaldo F., Gemba K.

16:50 – 17:00

Coffee Break

17:00 – 18:45

Session 5: Simulation and Modeling
Moderator: *Prof. K. Nefedev, Far Eastern Federal University, Russia*
Commentators: *N. Mureithi, V. Kryssanov*
Continuous Multistep Methods for Solving First Order Ordinary Differential Equations
— Semenov D.E., Mohammed U., Semenov M.E.
Petri Net Modeling of Mass Service Systems in the MARS Simulation Environment
— Istigecheva E.V., Grigorieva T.E., Kornyushina A.I.
Brute-Force and Monte-Carlo Ground State Calculation Methods of 2D Dipolar Magnetics
— Shevchenko Y.A., Nefedev K.V.
Calculation of the Magnetoactive Elastomer Reaction on an External Magnetic Field
— Andriushchenko P.D., Nefedev K.V.
Monte Carlo Simulation of Long-Range Interaction between Ising Spins on Flat Lattice
— Nefedev K.V., Kapitan V.Yu.
Numerical Approach to Research of Magnetic States of Disordered Systems of Spherical Dipoles on Plane and in Volume
— Makarov A.G., Nefedev K.V
Education Technology in a Virtual Space with the Help of Avatars
— Kataev M.Yu., Korikov A.M., Mkrttchian V.S.

Day 4 — September 5, 2013

Location: House of Scientists, 45 Sovetskaya Street

09:00 – 10:00

Invited Video-Tutorial: Computational Intelligence Methods for Architectural Design
Prof. M. Zawidzki, University of Tokyo, Japan

10:00 – 11:45

Session 6a: Smart systems
Moderator: *Prof. H. Ogawa, Ritsumeikan University, Japan*
Commentators: *F. Shibata, D.M. Marutschke*
Linguistic Graph and its Application for Innovations
— Ikeda H.
A Recommendation System for Server Maintenance Work based on Metadata
— Takagi K., Ogawa H.
Clustering Words with Similar Sense using Information about their Syntactic Dependencies
— Klyshinsky E.S., Kochetkova N.A., Logacheva V.K.
Prototype Development of a Mixed Reality Order Picking System for Warehouse Storage
— Yamazaki K., Shibata F., Kimura A., Tamura H.
Synthesis of 3D Facial Expressions based on Statistical Learning of Two Subspaces
— Osawa S., Duan D., Seo M., Igarashi T., Chen Y.W.
Relationship of Emotional Speaker and Speech Signal Parameters
— Konev A.A., Meshcheryakov R.V.

11:45 - 12:00

Coffee Break

12:00 – 13:00

Invited Talk: Quality Control for Supply Chain Management — Omron Corporation Experience
Yuki Izuno, Omron Corporation, Japan

13:00 - 14:00

Lunch Time

14:00 – 15:00

Invited Talk: Collaboration between IT and the Humanities: Digital Humanities Center for Japanese Arts and Cultures
Prof. K. Hachimura, Ritsumeikan University, Japan

15:00 - 16:20

Session 6b: Smart systems (continued)
Moderator: *Prof. J.-H. Lee, Ritsumeikan University, Japan*
Commentators: *Y. Nakatani, H. Murao*
Forecasting the Evolution of Financial Time Series by using Filtration Methods
— Istigecheva E.V., Aspembitova A.T.
Self-Teaching of Elementary Motions for Street Dance Beginners using Light Rays
— Tange. Y., Izumi. T., Nakatani. Y.
Ubiquitous Display 2.0: Improvements in Consideration of Stability, Comfort, and Interactivity
— Maegawa K., Shiotani T., Iwamoto K., Kasetani M., Noguchi T., Lee J.-H.
Cultural Characteristics of Knowledge Propagation in Scientific Publications – Japan, China, and Worldwide
— Marutschke D.M., Murao H.
Locality-Constrained Linear Coding Based Image Super-Resolution
— Taniguchi K., Han X.H., Nojima Y., Chen Y.W.

16:20 - 16:30

Coffee Break

16:30 - 17:00

Introduction of the TUSUR-Ritsumeikan Dual Master Degree Program (DMDP)
Program outline
— Gennady Kobzev, TUSUR University, Russia
Reflection on the experience of the DMDP joint development
— V. Kryssanov, Ritsumeikan University, Japan

17:00 - 17:30

Signing ceremony
Welcome addresses by:
Prof. A. Uvarov, TUSUR University, Russia
Prof. K. Hachimura, Ritsumeikan University, Russia

Day 5 — September 6, 2013

Student Business Incubator ,147 Krasnoarmeyskaya Street

10:00 - 12:00

Technology Entrepreneurship Game

12:00 - 13:00

Meeting with TUSUR University PhD students and young researchers

13:00 – 14:00

Lunch Time

14:00 - 15:00

Round Table Discussion on Production Quality Control and Certification
Moderator: *Dr. E. Perevodchikov, TUSUR University, Russia*
Discussion topics:
— NQA Division for Cluster Certification
— International Laboratory at TUSUR for Production Quality Control
Participants:
Y. Izuno, Omron Corporation, Japan
I. Koutsaroff, Murata Electronics, Japan
F. Rinaldo, Ritsumeikan University, Japan
Y. Nakatani, Ritsumeikan University, Japan
A. Uvarov, TUSUR University, Russia
NQA members

For Notes

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