19th International Conference on Information and Software Technologies

PROGRAMME
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Conference Organization

The International Conference on Information and Software Technologies is organized by Kaunas University of Technology. The annual conference takes place in the Lithuanian city of Kaunas and belongs to a group of events from the conferences series „Lithuanian Science and Industry“.

General Chair

Rimantas Butleris, Lithuania

Program Committee

Jan Aidemark, Sweden
Vassil Alexandrov, United Kingdom
Eduard Babkin, Russia
Marko Bajec, Slovenia
Rimantas Barauskas, Lithuania
Eduardas Bareisa, Lithuania
Ana Šaša Bastinos, Slovenia
Joerg Becker, Germany
J. A. Rodrigue Blais, Canada
Bernd Blobel, Germany
Albertas Caplinskas, Lithuania
Sven Carlsson, Sweden
Joanna Chimiak-Opoka, Austria
Robertas Damasevicius, Lithuania
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Kiss Ferenc, Hungary
Hamido Fujita, Japan
Anna Grabowska, Poland
Saulius Gudas, Lithuania
Remigijus Gustas, Sweden
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Mirjana Ivanovic, Serbia
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Jerzy Korczak, Poland
Tsvetanka Kovacheva, Bulgaria
Dieter Kranzmueller, Germany
Dejan Lavbic, Slovenia
Rob Mark, Northern Ireland
Lina Nemuraite, Lithuania

Dušica Novakovic, United Kingdom
Jyrki Nummenmaa, Finland
Toshio Okamoto, Japan
Stephan Olariu, USA
Tero Paivarinta, Norway
Algirdas Pakstas, UK
Marcin Paprzycki, Poland
Michael Petit, Belgium
Henrikas Pranevicius, Lithuania
Abhijit Ray, Singapore
Dalius Rubliauskas, Lithuania
Rok Rupnik, Slovenia
Giedre Sabaliauskaite, Singapore
Marco Sajeva, Italy
Rimantas Seinauskas, Lithuania
Darius Silingas, Lithuania
Kulwinder Singh, Canada
Ilmars Slaidins, Latvia
Janis Stirna, Sweden
Darijus Strasunskas, Norway
Giancarlo Succi, Italy
Aleksandras Targamadze, Lithuania
Laimutis Telksnys, Lithuania
Peter Thanisch, Finland
Babis Theodoulidis, United Kingdom
Sofia Tsekeridou, Greece
Raimund Ubar, Estonia
Olegas Vasilecas, Lithuania
Radu Adrian Vasiu, Romania
Damjan Vavpotic, Slovenia
Benkt Wangler, Sweden
Stanislaw Wrycza, Poland
Zheying Zhang, Finland
Antanas Zilinskas, Lithuania
Additional Reviewers

Linas Ablonskis, Lithuania
Tomas Blazauskas, Lithuania
Rita Butkiene, Lithuania
Lina Ceponiene, Lithuania
Kestutis Driaunys, Lithuania
Kestutis Kapocius, Lithuania
Antanas Lenkevicius, Lithuania
Virginija Limanauskiene, Lithuania
Audrius Lopata, Lithuania
Antanas Mikuckas, Lithuania
Gytenis Mikulenas, Lithuania
Alfonsas Misevicius, Lithuania

Local Organizing Committee

Rita Butkiene (Chair), Lithuania
Tomas Skersys (Co-chair), Lithuania
Rokas Bartkevicius (Industrial Tutorials Chair), Lithuania
Lina Nemuraite, Lithuania
Gintare Berntaityte, Lithuania
Tomas Danikauskas, Lithuania
Kestutis Kapocius, Lithuania
Jonas Ceponis, Lithuania

Sponsors

Research Council of Lithuania
Faculty of Informatics of Kaunas University of Technology
## Conference Sessions Map

**Thursday, 10th October, 2013**

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<th>Time</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
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<tr>
<td>08:30-11:00</td>
<td>“3-1” Hall Information Systems</td>
<td>“3-2” Hall Software Engineering</td>
<td>“SK” Room Information Systems</td>
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<tr>
<td>09:00-09:15</td>
<td>Openings</td>
<td>“3-1” Hall</td>
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<td>09:15-10:15</td>
<td>Key Note</td>
<td>“3-1” Hall</td>
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<tr>
<td>10:20-11:00</td>
<td>Session 4</td>
<td>Session 5</td>
<td>Session 6</td>
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<tr>
<td>11:00-11:20</td>
<td>Coffee Break</td>
<td>Session 7</td>
<td>“SK” Room Business Intelligence for Information and Software Systems</td>
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<tr>
<td>11:20-12:20</td>
<td>Session 8</td>
<td>Session 8</td>
<td>Session 9</td>
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<tr>
<td>12:20-13:30</td>
<td>Lunch</td>
<td>Session 9</td>
<td>“SK” Room Business Intelligence for Information and Software Systems</td>
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<tr>
<td>13:30-14:50</td>
<td>Session 10</td>
<td>Session 11</td>
<td>Session 12</td>
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<td>14:50-15:10</td>
<td>Coffee Break</td>
<td>Session 11</td>
<td>“SK” Room Information Systems</td>
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<tr>
<td>15:10-16:30</td>
<td>Session 12</td>
<td>Session 12</td>
<td>“SK” Room Information Systems</td>
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Note: “3-1” and “3-2” Halls are on the 3rd floor; “SK” room – on the 1st floor.
Thursday, October 10th

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>08:30-11:00</td>
<td>Registration</td>
</tr>
<tr>
<td>09:00-09:15</td>
<td>Opening</td>
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<tr>
<td>“3-1” Hall</td>
<td>Director of the Research Affairs Department</td>
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<tr>
<td>Assoc. Prof. Leonas Balaševičius</td>
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<tr>
<td>09:15-10:15</td>
<td>Key Note</td>
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<tr>
<td>“3-1” Hall</td>
<td>The Role of Synthesis in Composing Correct Systems</td>
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<tr>
<td>Speaker Prof. Paola Inverardi</td>
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<tr>
<td>10:20-11:00</td>
<td>Sessions</td>
</tr>
</tbody>
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**Session 1. Information Systems, “3-1” Hall**

Chaired by prof. Antanas Žilinskas

1. **ANALYSIS OF CONTROL SYSTEM WITH DELAY USING THE LAMBERT FUNCTION**
   Irma Ivanoviene and Jonas Rimas

2. **THE QUALITY MANAGEMENT METAMODEL IN THE ENTERPRISE ARCHITECTURE**
   Jerzy Roszkowski and Agata Roszkowska

**Session 2. Software Engineering, “3-2” Hall**

Chaired by prof. Robertas Damaševičius

1. **AUTOMATED METHOD FOR SOFTWARE INTEGRATION TESTING BASED ON UML BEHAVIORAL MODELS**
   Dominykas Barisas, Eduardas Bareiša, and Šarūnas Packevičius

2. **COMPUTATIONAL ALGORITHMIC GENERATION OF HIGH-QUALITY COLOUR PATTERNS**
   Alfonsas Misevičius, Evaldas Guogis, and Evelina Stanevičienė

**Session 3. Information Systems, “SK” Room**

Chaired by dr. Germanas Budnikas

1. **ONTОLOGY MATCHING USING TF/IDF MEASURE WITH SYNONYM RECOGNITION**
   Marko Gulic, Ivan Magdalenic, and Boris Vrdoljak

2. **MOVING AVERAGES FOR FINANCIAL DATA SMOOTHING**
   Aistis Raudys, Vaidotas Lenčiauskas, and Edmundas Malčius
11:00-11:20, **Coffee Break**

11:20-12:20, **Sessions**

**Session 4. Software Engineering, “3-1” Hall**

Chaired by **prof. Vacius Jusas**

1. **DESIGN OF VISUAL LANGUAGE SYNTAX FOR ROBOT PROGRAMMING DOMAIN**
   Ignas Plauska and Robertas Damaševičius

2. **TESTING STOCHASTIC SYSTEMS USING MOVOS TOOL: CASE STUDIES**
   Kenza Bouaroudj, Djamel-Eddine Saidouni, and Ilham Kitouni

3. **TWO SCALE MODELING OF HETEROGENEOUS SOLID BODY BY USE OF THICK SHELL FINITE ELEMENTS**
   Dalia Ėlnerytė and Rimantas Barauskas

**Session 5. Information Systems, “3-2” Hall**

Chaired by **dr. Raimundas Matulevičius**

1. **KNOWLEDGE TRANSFER IN MANAGEMENT SUPPORT SYSTEM IMPLEMENTATION**
   Bartosz Wachnik

2. **COLLECTIVE INTELLIGENCE UTILIZATION METHOD BASED ON IMPLICIT SOCIAL NETWORK COMPOSITION AND EVOLUTION IN THE SCOPE OF PERSONAL LEARNING ENVIRONMENT**
   Genadijus Kulvietis, Andrej Afonin, and Danguole Rutkauskiene

3. **AUTOMATION OF UPGRADE PROCESS FOR ENTERPRISE RESOURCE PLANNING SYSTEMS**
   Algirdas Laukaitis

**Session 6. Business Intelligence for Information and Software Systems, “SK” Room**

Chaired by **dr. Vytautas Rudžionis**

1. **SPEECH KEYWORD SPOTTING WITH RULE BASED SEGMENTATION**
   Mindaugas Greibus and Laimutis Telksnys

2. **BUSINESS INTELLIGENCE MATURITY MODELS: INFORMATION MANAGEMENT PERSPECTIVE**
   Alaskar Thamir and Babis Theodoulidis

3. **MODIFIED STOCHASTIC ALGORITHM FOR MINING FREQUENT SUBSEQUENCES**
   Loreta Savullioniene and Leonidas Sakalauskas

12:20-13:30, **Lunch**
13:30-14:50, Sessions

Session 7. Software Engineering, “3-1” Hall

Chaired by dr. Jerzy Roszkowski

1. NOVEL METHOD TO GENERATE TESTS FOR VHDL
   Vacius Jusas and Tomas Neverdauskas

2. EMPIRICAL ANALYSIS OF THE TEST MATURITY MODEL INTEGRATION (TMMI)
   Keri Rungi and Raimundas Matulevičius

3. MEASURING THE PERFORMANCE OF PROCESS SYNCHRONIZATION WITH THE MODEL-DRIVEN APPROACH
   Vladislav Nazaruk and Pavel Rusakov

Session 8. Information Systems, “3-2” Hall

Chaired by dr. Zheying Zhang

1. WEB-BASED ANALYTICAL INFORMATION SYSTEM FOR SPATIAL DATA PROCESSING
   Viacheslav Paramonov, Roman Fedorov, Gennagy Ruzhnikov, and Alexandr Shumilov

2. SYSTEM ARCHITECTURE MODEL BASED ON SERVICE-ORIENTED ARCHITECTURE TECHNOLOGY
   Tarkan Gurbuz, Daina Gudoniene, and Danguole Rutkauskiene

3. BUSINESS PROCESS FLOW VERIFICATION USING KNOWLEDGE BASED SYSTEM
   Regina Miseviciene, Germanas Budnikas, and Daliuus Makackas

Session 9. Business Intelligence for Information and Software Systems, “SK” Room

Chaired by dr. Algirdas Laukaitis

1. ON TWO APPROACHES TO CONSTRUCTING OPTIMAL ALGORITHMS FOR MULTI-OBJECTIVE OPTIMIZATION
   Antanas Žilinskas

2. RECOGNITION OF VOICE COMMANDS USING HYBRID APPROACH
   Vytautas Rudžionis, Kastytis Ratkevičius, Algimantas Rudžionis, Gailius Raškinis, and Rytis Maskeliūnas

3. ESTIMATION OF THE ENVIRONMENTAL IMPACT ON THE ACCURACY OF SIGNAL RECOGNITION
   Gintaré Ėidaitė and Laimutis Telksnys

14:50-15:10, Coffee Break

15:10-16:30, Sessions
Session 10. Software Engineering, “3-1” Hall
Chaired by prof. Alfonsas Misevičius

1. MINIMIZATION OF NUMERICAL DISPERSION ERRORS IN FINITE ELEMENT MODELS OF NON-HOMOGENEOUS WAVEGUIDES
Andrius Krisciunas and Rimantas Barauskas

2. EVALUATION OF OPEN SOURCE SERVER-SIDE XSS PROTECTION SOLUTIONS
Jonas Ceponis, Lina Ceponiene, Algimantas Venckauskas, and Dainius Mockus

3. BEHAVIOR ANALYSIS OF REAL-TIME SYSTEMS USING PLA METHOD
Dalius Makackas, Regina Miseviciene, and Henrikas Pranevicius

4. DEVELOPMENT IN AUTHENTICATION OF AODV PROTOCOLS TO RESIST THE ATTACKS
Ahmad Alomari

Session 11. Information Systems, “3-2” Hall
Chaired by dr. Viacheslav Paramonov

1. DEVELOPING SBVR VOCABULARIES AND BUSINESS RULES FROM OWL2 ONTOLOGIES
Gintare Bernotaityte, Lina Nemuraite, Rita Butkiene, and Bronius Paradauskas

2. SEMI-SUPERVISED LEARNING OF ACTION ONTOLOGY FROM DOMAIN-SPECIFIC CORPORA
Irena Markievicz, Daiva Vitkute-Adzgauskiene, and Minija Tamosiunaite

3. INCOMPLETENESS IN CONCEPTUAL DATA MODELLING
Peter Thanisch, Tapio Niemi, Jyrki Nummenmaa, Zheying Zhang, Marko Niinim¨aki, and Pertti Saariluoma

Session 12. Information Systems, “SK” Room
Chaired by dr. Tomas Skersys

1. PROCESS FOR APPLYING DERIVED PROPERTY BASED TRACEABILITY FRAMEWORK IN SOFTWARE AND SYSTEMS DEVELOPMENT LIFE CYCLE
Saulius Pavalkis and Lina Nemuraite

2. TOWARDS THE COMBINATION OF BPMN PROCESS MODELS WITH SBVR BUSINESS VOCABULARIES AND RULES
Eglė Mickevičiūtė and Rimantas Butleris

3. EXPLORING KEY FACTORS OF PILOT PROJECTS IN AGILE TRANSFORMATION PROCESS USING A GROUNDED THEORY STUDY.
Taghi Javdani Gandomani, Hazura Zulzalil, Abdul Azim Abd Ghani, Abu Bakar Md. Sultan, and Khaironi Yatim Sharif

19:00, Conference Dinner
Restaurant “Senieji Rūsiai”, Vilniaus st. 34
About Kaunas

Kaunas with more than 300 thousand inhabitants is one of the most significant cities of Lithuania. It is not only a city of old traditions, but also a large centre of business and industry. It can also lay claim to be a city of young people with over 35,000 students studying at one of the eleven universities here.

Kaunas was always fated to become an important historical and cultural city in Lithuania. In 1408, Magdeburg rights were granted to the city of Kaunas by the privilege of Vytautas the Great. During the early 20th century Kaunas was the home of the Lithuanian Government and the capital city; a period considered by many as the golden age of the city. However, history tells us that even before this date, the city, situated at the confluence of the rivers Neris and Nemunas, experienced many other periods of great prosperity and national importance.

It's hard to name the single most famous feature of Kaunas. From the historic 13th century Kaunas Castle to the romantic City Hall Square, from the macabre Devils’ Museum to the galleries of art varying from classic to avant-garde – Kaunas offers something for everybody. The cosy and enigmatic Old Town of Kaunas extends into a vibrant Laisves avenue, where visitors can enjoy the mix of modern and traditional shops, cafes and bars.

Also basketball is synonymous with Kaunas not only because we held the very first official basketball game in Lithuania in 1922, but also because of the famous Zalgiris team and its NBA superstar Arvydas Sabonis.

We are happy to welcome you in Kaunas and wish you a pleasant and fruitful stay!
About Kaunas University of Technology

Kaunas University of Technology, with its eleven faculties, a Division in Panevėžys, high school (gymnasium), and numerous research centers, is the second largest university in Lithuania. About 80% of Lithuania’s industrial engineers have graduated from KTU.

The present Kaunas University of Technology originated from the School of Higher Studies, which was established in 1920. Two years later this School was reorganized and became the University of Lithuania. In 1930 it was named Vytautas Magnus University, and in 1946 was renamed as the State University of Kaunas. After World War II, the Kaunas Polytechnic Institute (KPI) emerged as a successor to the State University. In 1990, KPI was restructured and brought into line with most Western universities. By Parliamentary decision, it was then granted its present university status and name.

The faculties of Kaunas University of Technology:

- Faculty of Chemical Technology
- Faculty of Civil Engineering and Architecture
- Faculty of Design and Technologies
- Faculty of Economics and Management
- Faculty of Electrical and Control Engineering
- Faculty of Fundamental Sciences
- Faculty of Humanities
- Faculty of Informatics
- Faculty of Mechanical Engineering and Mechatronics
- Faculty of Social Sciences
- Faculty of Telecommunications and Electronics
- International Studies Centre
- Division of Panevėžys, containing the Faculties of Technology, and Management and Administration

The full-time University staff includes of 1036 teachers (among them there are 106 professors and 321 associated professors) and 170 researchers. There are twelve thousand students including 2780 graduate, and 378 doctoral students.

Higher education in Lithuania is divided into undergraduate, graduate, and doctoral studies. Kaunas University of Technology awards Bachelor’s, Master’s and Doctor’s degrees. Undergraduate studies in four years lead to a Bachelor of Science degree (B.Sc.) and a Master's degree (M.Sc.) in two further years.

More information about Kaunas University of Technology can be found at http://en.ktu.lt/.
About the Faculty of Informatics

Faculty of Informatics of Kaunas University of Technology was established in 1977. However, the faculty got its current name in 1990 only as originally it was called the Faculty of Computation Technology. The faculty currently includes 5 departments:

- Information Systems,
- Computers,
- Multimedia Engineering,
- Software Engineering,
- Applied Informatics.

The faculty offers the choice of Informatics, Informatics Engineering, Multimedia Technologies, Information Systems, Software Systems, and E. learning Technologies Bachelor's degree programmes. Those pursuing the master’s degree can choose from five studies programmes:

- Informatics,
- Information and IT Security,
- Information Technologies of Distance Education,
- Software Engineering,
- Information Systems Engineering.

Each year the faculty of informatics accepts around 400 new students seeking bachelor’s or master’s degree. Graduates can also choose to pursue the academic career by choosing informatics or informatics engineering doctoral studies.
Helpful Information

Lithuanian Time and Date
Kaunas is located in the Middle European Time Zone, GMT+2.
In Lithuania all dates are written: year, month, day (thus 12-05-06 means 6th of May, 2012).

Currency
The local currency is called "Litas". Exchange rate: 3,45 LTL =1,00 EUR

Useful Phone Numbers
Emergency call: 112
Information: 118
Kaunas Airport (Karmėlava), www.kaunas-airport.lt
   Information: (+370 37) 399307
   (+370 37) 399396
Vilnius Airport, www.vilnius-airport.lt/en
   Information: (+370 5) 2306666
Kaunas Bus Station, tickets: www.autobusubilietai.lt
   Information: (+370 37) 40 90 60
   (+370 37) 40 90 61
Kaunas Railway Station, www.litrail.lt
   Information: (+370 37) 221093
Taxi Cabs
   "Žaibiškas taksi" (+370 37) 333111
       1422 (Omitel)
       1441 (Bitė GSM)