**Cyber-Social Systems Engineering Group**

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**Head** – Prof. Dr. *Saulius Gudas*

***STAFF***

**Chief research fellows:** Prof. Dr. S. Gudas.

**Senior research fellows:** Prof. Dr. D. Dzemydienė.

**Research fellows:** Dr. Romas Alonderis, Assoc. Prof. Dr. A. Lupeikienė, Dr. S. Maskeliūnas.

**Junior research fellow:** Dr. J. Miliauskaitė, Dr. H. Giedra.

**Chief Specialists:** Prof. Dr. O. Vasilecas.

**Assistant research fellow:** L. Paliulionienė.

**Afilliated professors:** Prof. Dr. A. Čaplinskas.

**Affiliated researchers:** Prof. Habil. Dr. S. Jukna, Assoc. Prof. Habil. Dr. R. Pliuškevičius, Assoc. Prof. Dr. A. Pliuškevičienė.

**Doctoral students:** A. Šaikūnas, A. Valatavičius, M. Jusis, R. Savukynas, E. Arbataitis, V. Radzevičius, A. Širaliov.

***RESEARCH INTERESTS***

Software engineering for cyber-physical-social systems:

* Theoretical foundations of information systems;
* Domain causal dependencies modeling for software engineering;
* Model based applications development (MBD) for different types of domains (enterprises, Internet of Things, smart systems, etc.);
* Knowledge-based development of cyber-physical-social systems;
* Process mining.

Mathematical logic:

* Automated deduction;
* Knowledge analysis methods;
* Deductive systems.

***RESEARCH PROJECTS CARRIED OUT IN 2018***

**Projects Supported by University Budget**

**Research in the area of cyber-social systems engineering. Development of methods and technologies at the intersection of cyber-physical and cyber-social systems.**

Prof. Dr. S. Gudas (leader), Dr. R. Alonderis, Prof. Dr. D. Dzemydienė, Assoc. Prof. Dr. A. Lupeikienė, Dr. S. Maskeliūnas, Dr. J. Miliauskaitė, L. Paliulionienė, Prof. Dr. O. Vasilecas, Affil. Prof. Dr. A. Čaplinskas, Affil. Researcher Habil. Dr. S. Jukna, Affil. Researcher Habil. Dr. R. Pliuškevičius, Affil. Researcher Dr. A. Pliuškevičienė, doctoral students A. Šaikūnas, A. Valatavičius, M. Jusis, R. Savukynas, E. Arbataitis, V. Radzevičius, A. Širaliov. 2018–2020.

Main results obtained in 2018:

1. A model-based software development method using deep knowledge modeling was proposed. For this, the integration of the traditional MDA / MDD process with causal modeling has been used. The modified MDA scheme includes a new layer of domain knowledge discovery and causal modeling frameworks. The method is adapted to evaluate the interoperability of applications.
2. A requirements specifications (UML Use Case Diagram) generation algorithm was designed, and a prototype using domain causal dependency models was developed.
3. A component architecture for the provision of semi-automatically generated electronic services is designed, based on the principles of BDI intelligent agents.
4. The multilayered architecture of secure identification and interaction of objects in the wireless environment was analyzed, and partial cases of risk analysis and protection measures were identified.
5. A sound and complete sequent calculus for the logic of likelihood was constructed. A proof-search system for the logic of likelihood was developed based on this calculus.
6. Investigating the evolution of the concept of algorithm has resulted in a report containing about 60 pages, which will be used to prepare 2 or 3 publications.

Main publications:

1. **Valatavičius, Andrius; Gudas, Saulius**. Measuring Enterprise Application Software Interoperability Capability // *Baltic DB&IS 2018: Joint proceedings of the conference forum and doctoral consortium co-located with the 13th international Baltic conference on databases and information systems*, Trakai, Lithuania, July 1–4, 2018 / edited by: Audrone Lupeikiene, Raimundas Matulevičius, Olegas Vasilecas. Aachen : CEUR-WS, 2018. ISBN 9783319975702. p. 127-134. (CEUR workshop proceedings, ISSN 1613-0073; vol. 2158). Prieiga per internetą: <http://ceur-ws.org/Vol-2158/paper11.pdf>.
2. Tekutov, Jurij; **Gudas, Saulius**; Denisov, Vitalij. The formation of requirements engineering processes based on a problem domain model // *ICTIC : the 7th international virtual conference on Informatics and management sciences* : April 2-7, 2018, Slovakia. Zilina : EDIS - Publishing Institution of the University of Zilina, 2018. ISBN 9788055414362. ISSN 1339-231X. eISSN 1339-9144. 2018, vol. 7, iss. 1, p. 93-97.
3. **Miliauskas, Arūnas; Dzemydienė, Dalė**. An Approach to Designing Belief-Desire-Intention Based Virtual Agents for Travel Assistance. // *Baltic DB&IS 2018: Joint proceedings of the conference forum and doctoral consortium co-located with the 13th international Baltic conference on databases and information systems*, Trakai, Lithuania, July 1–4, 2018 / edited by: Audrone Lupeikiene, Raimundas Matulevičius, Olegas Vasilecas. Aachen : CEUR-WS, 2018. ISBN 9783319975702. p. 94-103. (CEUR workshop proceedings, ISSN 1613-0073; vol. 2158). Prieiga per internetą: <http://ceur-ws.org/Vol-2158/paper10.pdf>.
4. **Savukynas, Raimundas; Dzemydienė, Dalė**. Security means in multilayered architecture of Internet of Things for secure communication and data transmission // *Baltic DB&IS 2018: Joint proceedings of the conference forum and doctoral consortium co-located with the 13th international Baltic conference on databases and information systems*, Trakai, Lithuania, July 1–4, 2018 / edited by: Audrone Lupeikiene, Raimundas Matulevičius, Olegas Vasilecas. Aachen : CEUR-WS, 2018. ISBN 9783319975702. p. 127-134. (CEUR workshop proceedings, ISSN 1613-0073; vol. 2158). Prieiga per internetą: <http://ceur-ws.org/Vol-2158/paper13dc1.pdf>.
5. **Alonderis, Romas; Sakalauskaitė, Jūratė**. A labelled sequent calculus for half-order modal logic // *Journal of Applied Logics - IfCoLog journal of logics and their applications*. Milton : Lightning Source, 2018. ISBN 9781848902749. ISSN 2055-3706. eISSN 2055-3714. 2018, Vol. 5, No. 1, p. 121-163. Prieiga per internetą: <http://www.collegepublications.co.uk/journals/ifcolog/?00021>.
6. **Alonderis, Romas; Giedra, Haroldas**. A Proof-Search System for the Logic of Likelihood // *Logic Journal of the IGPL*, 2018.

***MAIN R&D&I (RESEARCH, DEVELOPMENT AND INNOVATION) PARTNERS***

Riga Technical University (Latvia)

University of Tartu (Estonia)

Warsaw University of Technology (Poland)

University of Geneva (Switzerland)

University of Frankfurt (Germany)

***OTHER SCIENTIFIC ACTIVITIES***

**Prof. Dr. S. Gudas**

* editorial board member of the journal *Transformations in Business and Economy*, <http://www.transformations.khf.vu.lt/about/board>;
* reviewer of the *Baltic Journal of Modern Computing*, <http://www.bjmc.lu.lv/>;
* reviewer of the journal *Informatica*, <https://www.mii.lt/informatica/>;
* program committee member of the 14th International Conference „Beyond Databases, Architectures and Structures“ (BDAS 2018) during IFIP World Computer Congress (IFIP WCC), Poznan, Poland, September 18-20, 2018, <http://bdas.polsl.pl/default.asp?service=opis&tekst=4>;
* program committee member of the 15th International Conference „Beyond Databases, Architectures and Structures“ (BDAS 2019) during IFIP World Computer Congress (IFIP WCC), Ustron, Poland, May 28-31, 2019, <http://bdas.polsl.pl/default.asp?service=opis&tekst=4>;
* program committee member of the 24th International Conference on Information and Software Technologies (ICIST 2018), <https://icist.ktu.edu/#Programme-Committee-members>;

**Prof. Dr. A. Čaplinskas**

* editorial board member of the journal *Informatica*, <http://www.mii.lt/informatica/editors.htm>;
* editorial board member of the *Baltic Journal of Modern Computing*, <http://www.bjmc.lu.lv/editorial-board/>;
* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://ortus.rtu.lv/science/en/series/16>;
* steering and program committee member of the 22nd East European Conference on Advances in Databases and Information Systems (ADBIS 2018), Budapest, Hungary, September 2-5, 2018, <http://www.adbis2018.org/committees/>;
* steering and program committee member of the 13th International Baltic Conference on Databases and Information Systems (BalticDB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>;
* program committee member of the 3rd Workshop on Managed Complexity (ManComp 2018), Stockholm, Sweden, September 24, 2018, <https://wwwswt.informatik.uni-rostock.de/ManComp2018/comm>;
* program committee member of the 8th International Conference on Business Intelligence and Technology (BUSTECH 2018), Barcelona, Spain, February 18-22, 2018, <https://www.iaria.org/conferences2018/ComBUSTECH18.html>;
* program committee member of the 10th International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2018), Barcelona, Spain, February 18-22, 2018, <https://www.iaria.org/conferences2018/ComCOGNITIVE18.html>;
* program committee member of the 30th International Conference on Advanced Information Systems Engineering (CAiSE 2018), Tallinn, Estonia, June 11-15, 2018, <https://caise2018.ut.ee/program-committee/>;
* program committee member of the 10th International Workshop on Data Analysis Methods for Software Systems (DAMSS 2018), Druskininkai, Lithuania, November 29 - December 1, 2018, <https://www.mii.lt/damss/index.php?page=organizers&lang=en>;
* program committee member of the 17th International Conference on Perspectives in Business Informatics Research (BIR 2018), Stockholm, Sweden, Septermber 24-26, 2018, <http://bir2018.dsv.su.se/organization>;
* program committee member of the Joint 38th IEEE Software Engineering Workshop (SEW-38) and 5th International Workshop on Cyber-Physical Systems (IWCPS-5) of the Federated Conference on Computer Science and Information Systems (FedCSIS 2018), Poznań, Poland, September 9-12, 2018, <https://fedcsis.org/2018/sew-iwcps>.

**Prof. Dr. D. Dzemydienė**

* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://ortus.rtu.lv/science/en/series/16>;
* editorial board member of the journal *Technological and Economic Development of Economy*, <https://journals.vgtu.lt/index.php/TEDE/editorialboard>;
* editorial board member of the *International Journal of Electronic Security and Digital Forensics*, <https://www.inderscience.com/jhome.php?jcode=ijesdf>;
* editorial board member of the *International Journal of Strategic Property Management*, <https://journals.vgtu.lt/index.php/IJSPM/editorialboard>;
* organizing and program committee member of the 13th International Baltic Conference on Databases and Information Systems (BalticDB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>;
* program committee member of the international conference „Advanced Learning Technologies and Applications. Games for Education” (ALTA’18), Kaunas, Lithuania, December 5, 2018, <https://ndma.lt/alta2018/en/programme-committee/>.

**Assoc. Prof. Dr. A. Lupeikienė**

* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://ortus.rtu.lv/science/en/series/16>;
* steering committee member and program committee co-chair of the 13th International Baltic Conference on Databases and Information Systems (BalticDB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>;
* doctoral consortium co-chair of the 30th International Conference on Advanced Information Systems Engineering (CaiSE’18), <https://caise2018.ut.ee/committees/>;
* program committee member of the 22nd East European Conference on Advances in Databases and Information Systems (ADBIS 2018), Budapest, Hungary, September 2-5, 2018, <http://www.adbis2018.org/committees/>;
* program committee member of the 10th International Conference on Agents and Artificial Intelligence (ICCART 2018), Funchal, Madeira, Portugal, January 16-18, 2018, <http://www.icaart.org/ProgramCommittee.aspx>.

**Dr. S. Maskeliūnas**

* chairman of the Council of the Lithuanian Computer Society, <http://www.liks.lt/en/modules/tinycontent/index.php?id=3>;
* organizing chair and program committee member of the 13th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>.
* co-chair of the 10th International Workshop on Data Analysis Methods for Software Systems (DAMSS), Druskininkai, Lithuania, November 29 - December 1, 2018, <https://www.mii.lt/damss/index.php?page=organizers&lang=en>;
* organizing committee member of the International Conference „Constructionism 2018“, Vilnius, Lithuania, August 21-25, 2018, <http://www.constructionism2018.fsf.vu.lt/committees/>;
* program committee member of the 14th International Conference „Beyond Databases, Architectures and Structures“ (BDAS 2018) during IFIP World Computer Congress (IFIP WCC), Poznan, Poland, September 18-20, 2018, <http://bdas.polsl.pl/default.asp?service=opis&tekst=4>;
* program committee member of the 15th International Conference „Beyond Databases, Architectures and Structures“ (BDAS 2019) during IFIP World Computer Congress (IFIP WCC), Ustron, Poland, May 28-31, 2019, <http://bdas.polsl.pl/default.asp?service=opis&tekst=4>.

**Dr. J. Miliauskaitė**

* organizing committee member of the 13th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>;
* organizing committee member of the 10th International Workshop on Data Analysis Methods for Software Systems (DAMSS), Druskininkai, Lithuania, November 29 - December 1, 2018, <https://www.mii.lt/damss/index.php?page=organizers&lang=en>.

**L. Paliulionienė**

* organizing committee member of the 13th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2018), Trakai, Lithuania, July 1-4, 2018, <https://www.mii.lt/balticDBIS2018/index.php?q=conference-organisation>;
* organizing committee member of the 10th International Workshop on Data Analysis Methods for Software Systems (DAMSS), Druskininkai, Lithuania, November 29 - December 1, 2018, <https://www.mii.lt/damss/index.php?page=organizers&lang=en>.

**Prof. Habil. Dr. S. Jukna**

* scientific board member of the *Electronic Colloquium on Computational Complexity* (ECCC), <http://eccc.hpi-web.de/colloquium/scientific_board/>;
* editorial board member of the *Lithuanian Mathematical Journal*, <https://www.mii.lt/lmj/>.

**Assoc. Prof. Habil. Dr. R. Pliuškevičius**

* editorial board member of the *Lithuanian Mathematical Journal*, <https://www.mii.lt/lmj/>.