**Cyber-Social Systems Engineering Group**

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**Head** – Prof. Dr. *Saulius Gudas*

***STAFF***

**Principal researcher:** Prof. Dr. Saulius Gudas.

**Senior researcher:** Prof. Dr. Dalė Dzemydienė.

**Researchers:** Dr. Romas Alonderis, Assoc. Prof. Dr. Audronė Lupeikienė, Dr. Saulius Maskeliūnas.

**Junior researchers:** Dr. Jolanta Miliauskaitė, Dr. Haroldas Giedra.

**Affiliated researchers:** Prof. Dr. Albertas Čaplinskas, Prof. Habil. Dr. Stasys Jukna, Assoc. Prof. Habil. Dr. Regimantas Ričardas Pliuškevičius, Assoc. Prof. Dr. Aida Pliuškevičienė.

**Other Staff:** Prof. Dr. Olegas Vasilecas, Laima Paliulionienė.

**Doctoral students:** Audrius Šaikūnas, Andrius Valatavičius, Mindaugas Jusis, Edgaras Arbataitis, Vytautas Radzevičius, Aleksandr Širaliov, Karolis Noreika.

***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 2019***

**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, Affil. Assoc. Prof. Dr. A. Lupeikienė, Dr. S. Maskeliūnas, Dr. J. Miliauskaitė, L. Paliulionienė, Prof. Dr. O. Vasilecas, Affil. Prof. Dr. A. Čaplinskas, Affil. Assoc. Prof. Habil. Dr. R. Pliuškevičius, Affil. Assoc. Prof. Dr. A. Pliuškevičienė, Affil. Habil. Dr. S. Jukna, doctoral students A. Šaikūnas, A. Valatavičius, M. Jusis, E. Arbataitis, V. Radzevičius, A. Širaliov, K.Noreika. 2018–2020.

**Main results obtained in 2019:**

1. Domain causation modeling is applied a) for the analysis of a curriculum content; b) to create causal model frameworks – MODAF (UPDM) frameworks additions; c) for the analysis of the efficiency of shipping containers handling/loading control methods and procedures; d) to evaluate interoperability of applications. Domain causation modeling methodology included in a scientific project application: 4.1. Horizon2020 Project Application (Project Acronym DISC, Application No. 951700).
2. A general methodological framework of membership function development was designed for solving the fuzzification problem in the enterprise business service quality planning in service-oriented enterprise systems.
3. A cyclic sequent calculus for linear discrete temporal logic was constructed. It was proved that the rule of cut is admissible in this calculus.
4. An approach for provision of e-services based on multilayer system architecture was developed by using artificial intelligence methods such as knowledge-based production process management for control  of fabric manufacturing processes.

**Main publications:**

1. **Gudas, Saulius**; Tekutov, Jurij; Butleris, Rimantas; Denisovas, Vitalijus. Modelling subject domain causality for learning content renewal // Informatica. Vilnius : Vilniaus universitetas. ISSN 0868-4952. eISSN 1822-8844. 2019, vol. 30, no. 3, p. 455-480. DOI: 10.15388/Informatica.2019.214.
2. Eglynas, Tomas; **Jusis, Mindaugas**; Jakovlev, Sergej; Senulis, Audrius; Andziulis, Arūnas; **Gudas, Saulius**. Analysis of the efficiency of shipping containers handling/loading control methods and procedures // Advances in mechanical engineering. London : SAGE publications Ltd. ISSN 1687-8132. eISSN 1687-8140. 2019, vol. 11, iss. 1, p. 1-12. DOI: 10.1177/1687814018821229.
3. **Miliauskaitė, Jolanta**; Kalibatiene, Diana. On General Framework of Type-1 Membership Function Construction: Case Study in QoS Planning // International Journal of Fuzzy Systems, Springer, 2019. doi:10.1007/s40815-019-00753-4. <https://doi.org/10.1007/s40815-019-00753-4>.
4. **Alonderis, Romas; Giedra, Haroldas**. A proof-search system for the logic of likelihood // Logic journal of the IGPL. Oxford : Oxford University Press. ISSN 1367-0751. 2019, first on line, p. [1-21]. DOI: 10.1093/jigpal/jzz022.
5. **Dzemydienė, Dalė**; **Arbataitis, Edgaras**; Dzemyda, Ignas. The design approach of knowledge-based management system for control of manufacturing processes of woven fabrics. Baltic Journal of Modern Computing. Riga : Latvijas Universitate. ISSN 2255-8942. eISSN 2255-8950. 2019, vol. 7, no. 2, p. 211-223. DOI: 10.22364/bjmc.2019.7.2.03. <https://www.bjmc.lu.lv/fileadmin/user_upload/lu_portal/projekti/bjmc/Contents/7_2_03_Dzemydiene.pdf>

***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)

Hasselt University (Belgium)

***OTHER SCIENTIFIC ACTIVITIES***

**Prof. Dr. Saulius Gudas**

* reviewer for the *Baltic Journal of Modern Computing*, <http://www.bjmc.lu.lv/>;
* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>;
* 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/>
* program committee member of the 14th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2020), <https://dbis.ttu.ee/>
* program committee member of the 25th International Conference on Information and Software Technologies (ICIST 2019), <https://icist.ktu.edu/#Programme-Committee-members>;

**Prof. Dr. Dalė 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>;
* program committee member of the 14th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2020), <https://dbis.ttu.ee/>;
* program committee member of the Conference of the Lithuanian Computer Society LIKS, 2019, October, 3-4, Kaunas, Lithuania. <https://www.liks.lt/en/computer-days-2019/>;
* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>;
* reviewer for the International EURO Mini Conference “Modelling and Simulation of Social-Behavioural Phenomena in Creative Societies (MSBC-2019), September 18-20, 2019, Vilnius, Lithuania, <https://www.msbc2019.mii.vu.lt/>;
* member of the Council of the Lithuanian Computer Society, <http://www.liks.lt/en/modules/tinycontent/index.php?id=3>;
* member of the Council of the Lithuanian Operation Reasearch Society, <https://www.mii.lt/litors/index.php?page,council.en>;
* member of the Council of the National Digital Coalition, <http://www.skaitmeninekoalicija.lt/en/about/>.

**Dr. Haroldas Giedra**

* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>.

**Assoc. Prof. Dr. Audronė Lupeikienė**

* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://ortus.rtu.lv/science/en/series/16>;
* program committee member of the 14th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2020), <https://dbis.ttu.ee/>;
* program committee member of the 23nd European Conference on Advances in Databases and Information Systems (ADBIS 2019), <https://adbis2019.um.si/>;
* program committee member of the 12th International Conference on Agents and Artificial Intelligence (ICAART 2020), <http://www.icaart.org/>;
* reviewer for the *Baltic Journal of Modern Computing*, <http://www.bjmc.lu.lv/>;
* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>;
* reviewer for the *Applied Computer Systems* journal, <https://acs-journals.rtu.lv/index.php/ACS/>;
* reviewer for the *Complex Systems Informatics and Modeling Quarterly* journal, <https://csimq-journals.rtu.lv/>.

**Dr. Saulius Maskeliūnas**

* chairman of the Council of the Lithuanian Computer Society, <https://www.liks.lt/en/contacts/>;
* member of the Rules of Participation (RoP) working group of the European Open Science Cloud (EOSC), <https://www.eoscsecretariat.eu/working-groups/rules-participation-working-group>;
* program committee member of the 14th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2020), <https://dbis.ttu.ee/>;
* co-chair of the 11th International Workshop on Data Analysis Methods for Software Systems (DAMSS), Druskininkai, Lithuania, November 28-30 , 2019, <https://www.mii.lt/damss/index.php/organizers>;
* 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/>.

**Dr. Jolanta Miliauskaitė**

* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>;
* reviewer for the *International Journal of Computers Communications & Control*, <http://univagora.ro/jour/index.php/ijccc/>.

**Laima Paliulionienė**

* organizing committee member of the 11th International Workshop on Data Analysis Methods for Software Systems (DAMSS), Druskininkai, Lithuania, November 28 - 30, 2019, <https://www.mii.lt/damss/index.php/organizers>.

**Prof. Dr. Albertas 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 14th International Baltic Conference on Databases and Information Systems (BalticDB&IS 2020), <https://dbis.ttu.ee/index.php?page=65>
* program committee member of the 18th International Conference on Perspectives in Business Informatics Research (BIR 2019), Katowice, Poland, September 23-25, 2019, <https://bir2019.ue.katowice.pl/chairs>;
* program committee member of the 9th International Conference on Business Intelligence and Technology (BUSTECH 2019), Venice, Italy, May 5-9, 2019, <https://www.iaria.org/conferences2019/ComBUSTECH19.html>;
* program committee member of the 11th International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2019), Venice, Italy, May 5-9, 2019, <https://www.iaria.org/conferences2019/ComCOGNITIVE19.html>;
* program committee member of the 31th International Conference on Advanced Information Systems Engineering (CAiSE 2019), Rome, Italy, June 3-7, 2019, <https://www.caise19.it/caise-program-committee/>;
* program committee member of the 11th International Workshop on Data Analysis Methods for Software Systems (DAMSS 2019), Druskininkai, Lithuania, November 28-30, 2019, <https://www.mii.lt/damss/index.php/organizers>.

**Prof. Habil. Dr. Stasys 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. Remigijus Pliuškevičius**

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