**Cyber-Social Systems Engineering Group**

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**Head** – Prof. Dr. *Saulius Gudas*

***STAFF***

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

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

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

**Junior research fellows:** Dr. Jolanta Miliauskaitė, Arūnas Miliauskas.

**Assistant professors**: Dr. Asta Slotkeinė.

**Assistant research fellows:** Laima Paliulionienė.

**Specialists:** Prof. Dr. Olegas Vasilecas.

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

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

**Doctoral students:** Mindaugas Jusis, Vytautas Radzevičius, Aleksandr Širaliov, Karolis Noreika.

***RESEARCH INTERESTS***

Causality research in enterprise software engineering:

* Foundations of causality-based enterprise software engineering;
* Integration of causal models in the MDA / MDD process;
* Integration of causal models in business process and enterprise modeling;

Mathematical logic:

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

***RESEARCH PROJECTS CARRIED OUT IN 2020***

**Projects Supported by University Budget**

**Engineering research in cyber-social (enterprise) systems. 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. Assoc. Prof. Habil. Dr. R. Pliuškevičius, Affil. Assoc. Prof. Dr. A. Pliuškevičienė, Affil. Habil. Dr. S. Jukna, doctoral students M. Jusis, V. Radzevičius, A. Širaliov, K. Noreika. 2018–2020.

**Main results obtained in 2020:**

1. Domain causality modeling applied (S. Gudas, A. Valatavičius, A. Lupeikienė):
   1. Modified MDA / MDD process by adding a layer of causal models next to traditional (CIM, PIM, PSM) layers.
   2. A method and technology (prototype) for evaluating the interoperability of applications has been developed.
   3. The method of domain causal modeling is included in the research project: LMT research group project application (CAUSATEX), topic: “Integration of causal models in application engineering methods and tools” (evaluation stage) (S. Gudas, J. Miliauskaitė).
2. The study of the efficiency of the sea container loading synchronization method was performed (S. Gudas, M. Jusis).
3. An architecture of multilayer systems of e-services for monitoring of environment data has been developed (D. Dzemydienė, S. Maskeliūnas, V. Radzevičius, A. Miliauskas).
4. A general framework of membership function construction has been developed, a detailed example of the construction by modeling service quality characteristics has been provided (J. Miliauskaitė).
5. A complete and sound cyclic sequent calculus for common knowledge logic has been constructed. Based on the calculus, a decidability procedure for the mentioned logic has been presented (R. Alonderis, A. Pliuškevičienė, R. Pliuškevičius).

**Main publications:**

1. **Gudas, Saulius; Valatavičius, Andrius**. Extending model-driven development process with causal modeling approach // Data science: new issues, challenges and applications / Dzemyda, Gintautas, Bernatavičienė, Jolita, Kacprzyk, Janusz (Eds.). Cham : Springer, 2020. ISBN 9783030392499. eISBN 9783030392505. p. 111-143. (Studies in Computational Intelligence, ISSN 1860-949X, eISSN 1860-9503 ; vol. 869). DOI: 10.1007/978-3-030-39250-5\_7.
2. **Valatavičius, Andrius; Gudas, Saulius**. A deep knowledge-based evaluation of enterprise applications interoperability // Data science: new issues, challenges and applications / Dzemyda, Gintautas, Bernatavičienė, Jolita, Kacprzyk, Janusz (Eds.). Cham : Springer Nature, 2020. ISBN 9783030392499. eISBN 9783030392505. p. 279-296. (Studies in Computational Intelligence, ISSN 1860-949X, eISSN 1860-9503 ; vol. 869). DOI: 10.1007/978-3-030-39250-5\_15.
3. **Dzemydienė, Dalė**; Burinskienė, Aurelija; **Miliauskas, Arūnas**. An assessment of provision of heterogeneous services for sustainable cargo transportation process management by roads // Sustainability. Basel : MDPI AG. ISSN 2071-1050. eISSN 2071-1050. 2020, vol. 12, iss. 20, art. no. 8405, p. 1-20. DOI: 10.3390/su12208405. [DB: Scopus; Social Sciences Citation Index (Web of Science); Science Citation Index Expanded (Web of Science)] [Citav. rod.: 2.576 (2019, SCIE); 2.576 (2019, SSCI)]
4. **Dzemydienė, Dalė**; Dzemydaitė, Giedrė; Gopisetti, Dinesh. Application of multicriteria decision aid for evaluation of ICT usage in business // Central European journal of operations research. New York : Springer. ISSN 1435-246X. eISSN 1613-9178. 2020, first published online, p. [1-21]. DOI: 10.1007/s10100-020-00691-9.
5. **Dzemydienė, Dalė; Radzevičius, Vytautas**. An approach for networking of wireless sensors and embedded systems applied for monitoring of environment data // Data science: new issues, challenges and applications / Dzemyda, Gintautas, Bernatavičienė, Jolita, Kacprzyk, Janusz (Eds.). Cham : Springer, 2020. ISBN 9783030392499. eISBN 9783030392505. p. 61-82. (Studies in computational intelligence, ISSN 1860-949X, eISSN 1860-9503 ; vol. 869). DOI: 10.1007/978-3-030-39250-5\_4. [DB: SpringerLink]
6. Szelągowski, Marek; **Lupeikienė, Audronė**. Business process management systems: evolution and development trends // Informatica. Vilnius : Vilnius University Institute of Data Science and Digital Technologies. ISSN 0868-4952. eISSN 1822-8844. 2020, vol. 31, iss. 3, p. 579-595. DOI: 10.15388/20-INFOR429.
7. **Miliauskaitė, Jolanta**; Kalibatienė, Diana. On general framework of type-1 membership function construction: case study in QoS planning // International journal of fuzzy systems. Heidelberg : Springer. ISSN 1562-2479. eISSN 2199-3211. 2020, vol. 22, iss. 2, p. 504-521. DOI: 10.1007/s40815-019-00753-4. [DB: Scopus; Science Citation Index Expanded (Web of Science)] [Citav. rod.: 4.406 (2019, SCIE)]
8. **Alonderis, Romas; Pliuškevičius, Regimantas Ričardas; Pliuškevičienė, Aida**; Giedra, Haroldas. Loop-type sequent calculi for temporal logic // Journal of automated reasoning. Dordrecht : Springer. ISSN 0168-7433. eISSN 1573-0670. 2020, vol. 64, iss. 8, p. 1663-1684. DOI: 10.1007/s10817-020-09544-1.
9. **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. 2020, vol. 28, no. 3, p. 261-280. DOI: 10.1093/jigpal/jzz022.

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

Riga Technical University (Latvia)

University of Tartu (Estonia)

Warsaw University of Technology (Poland)

Systems Research Institute Polish Academy of Sciences

University of Geneva (Switzerland)

University of Frankfurt (Germany)

***OTHER SCIENTIFIC ACTIVITIES***

**Prof. Dr. Saulius Gudas**

* reviewer of the *Baltic Journal of Modern Computing*, <http://www.bjmc.lu.lv/>;
* reviewer of the journal *Informatica*, <https://www.mii.lt/informatica/>;
* member of the Technical Committee TK8 of the Lithuanian Standardization Department;
* member of the Council of the Lithuanian Computer Society (LIKS);
* IFIP TC8 Information Systems member;
* representative of the National Digital Coalition from LIKS.

**Prof. Dr. Dalė Dzemydienė**

* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://acs-journals.rtu.lv/>;
* 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 International conference ALTA’20 “Advanced Learning Technologies and Applications. Short Learning Programmes”, <https://ndma.lt/alta2020/en/programme-committee/>;
* member of the Council of the Lithuanian Computer Society (LIKS);
* 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/>.

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

* editorial board member of the *Scientific Journal of Riga Technical University: Applied Computer Systems*, <https://acs-journals.rtu.lv/>;
* 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 13th International Conference on Agents and Artificial Intelligence (ICAART 2021), <http://www.icaart.org/>;
* reviewer for the *Informatica* journal, <https://www.mii.lt/informatica/>;

**Dr. Saulius Maskeliūnas**

* program committee member of the 14th International Baltic Conference on Databases and Information Systems (Baltic DB&IS 2020), <https://dbis.ttu.ee/>;
* 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>;
* board member of the Technical Committee LST TK4 “Information technology”;
* member of the State Commission of the Lithuanian Language Sub-Commission of Language Technologies;
* member of the project "Development of New Generation Internet Access Infrastructure (RAIN-3)" steering committee.

**Dr. Jolanta Miliauskaitė**

* reviewer for the *Informacijos mokslai* journal, <https://www.zurnalai.vu.lt/informacijos-mokslai>;
* reviewer for the *International Journal of Computers Communications & Control*, <http://univagora.ro/jour/index.php/ijccc/>.

**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/>;

**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/>.