# VU INSTITUTE OF MATHEMATICS AND INFORMATICS

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**Director** – Prof. Habil. Dr. *Gintautas Dzemyda*

*STAFF*

92  research fellows (19 habilitated doctors and 67 doctors),
49 doctoral students

## DEPARTMENTS OF THE INSTITUTE

- Department of Informatics Methodology
- Department of Numerical Analysis
- Department of Probability Theory and Statistics
- Department of Recognition Processes
- Department of Software Engineering
- Department of Stochastic Processes
- Department of Systems Analysis

## RESEARCH AREAS

- Integrated Development of Mathematics, Informatics and Information Technologies for the Knowledge Society Advanced Products and Services

## DOCTORAL DISSERTATIONS MAINTAINED IN 2013

- Inga Žilinskienė. Adaptive Method for Personalization of Learning Units.
- Gražina Pyž. Analysis and Synthesis of Lithuanian Phoneme Dynamic Sound Models.
- Mindaugas Liogys. Heuristic Algorithms for Nurse Rostering Problem.
- Ramūnas Dzindzalieta. Development of a System for Monitoring of the Moving Objects by Using the Session Initiation Protocol.
- Mažvydas Mackevičius. Computer Modeling of Chemical Synthesis at High Temperatures.
- Julija Pragarauskaitė. Frequent Pattern Analysis for Decision Making in Big Data.

- Algirdas Lančinskas. Parallelization of Random Search Global Optimization Algorithms.
- Kristina Jakubėlienė. Solution of a Two-Dimensional Parabolic Equation with an Integral Condition by the finite-difference method.
- Justina Jachimavičienė. Solution of a Pseudoparabolic Equation with Nonlocal Integral Conditions by the Finite Difference.
- Silvija Sėrikovienė. Research on Application of Learning Objects Reusability and Quality Evaluation Methods.
- Bronius Skūpas. A Method for Semi-Automatic Evaluation and Testing of Programming Assignments.

## *MAIN CONFERENCES ORGANIZED IN 2013*

- 5th International Seminar „Data Analysis Methods for Software Systems", December 5–7, 2013, Druskininkai, Lithuania

- 4th International doctoral Consortium „Informatics and Informatics Engineering Education Research: Methodologies, Methods and Practice", December 1–5, 2013, Druskininkai, Lithuania

- IX International Creative Seminar on Informatics Contest „Bebras", June 28–July 2, 2013, Torune, Poland

- International Seminar „Informatics Teacher Education", June 18–23, Klaipėda, Lithuania

## *MAIN SCIENTIFIC ACHIEVEMENTS IN 2013*

Bronius Grigelionis. Student's t-Distribution and Related Stochastic Processes (SpringerBriefs in Statistics). Heidelberg, etc. : Springer, 2013, 100 p.

Gintautas Dzemyda, Olga Kurasova, Julius Žilinskas. Multidimensional data visualization: methods and applications. New York : Springer, 2013, XII, 250 p.

Stasys Jukna, Igor Sergeev. Complexity of Linear Boolean Operators (Foundations and Trends(r) in Theoretical Computer Science). Now Publishers Inc., Vol. 9, No. 1 (2013) 1–123 p.

Remigijus Paulavičius, Julius Žilinskas. Simplicial Global Optimization (SpringerBriefs in Optimization). New York, etc.: Springer, 2014, X, 137 p.

# DEPARTMENT OF INFORMATICS METHODOLY

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**Head** – Prof. Valentina Dagienė

*STAFF*

**Professors**: Prof. dr. HP Valentina Dagienė
**Research fellows:** Dr. Tatjana Jevsikova, Dr. Eugenijus Kurilovas (part-time), Dr. Svetlana Kubilinskienė (part-time).
**Doctoral students:** Vladimiras Dolgopolovas, Anita Juškevičienė, Eglė Jasutė, Inga Žilinskienė, Jūratė Urbonienė

*RESEARCH INTERESTS*

Computer Science Education Research;
Technology Based Learning Research;
Localization of Digital Resources;
Models of Quality Evaluation of Educational System Components,
Adaptive Learning Research.

*RESEARCH PROJECTS CARRIED OUT IN 2013*

**Projects Supported by University Budget**

Theme: **Research on engineering decision makings for technology based education, as well as software localization.**

Main tasks and outcomes: 1) Derivation of basic informatics concepts and prove their appropriateness to use in contest; 2) Development of semi-automated system for evaluation programming assignments; 3) Analysis of peculiarities of localization digital resources, 4) development of methods and models for evaluation of the quality of education system components.

**Dagienė**, V., Jevsikova, T., Kubilinskienė, S. (2013) An Integration of Methodological Resources into Learning Object Metadata Repository // Informatica, 24 (1), p. 13–34.

**Dagiene**, V.; Skupas, B. (2013) Assessment of students' programs // In: D.M. Kadijevic, Ch. Angeli, C. Schulte (Eds.): Improving Computer Science Education. Routledge, Taylor & Francis Gr., p. 82–97.

Grabauskiene, V.; **Dagiene**, V. (2013) Use of UML for Modelling the Holistic Geometry in Primary Education // Journal of Information Technology and Application in Education (JITAE), Vol. 2, Iss. 1, p.23–32. Online: http://www.jitae.org/AllIssues.aspx

**International Research Projects**

**EU-funded project MASCIL ("Mathematics and science for life"), Grant Agreement No. 320693, funding line: FP7-SCIENCE-IN-SOCIETY-2012-1.**

MASCIL is organized as a European Consortium of 18 higher education institutions (from 13 countries) and coordinated by the University of Education Freiburg. In the framework of the MASCIL project and its activities the Consortium aspires to work closely with teachers and other key groups in the school system to improve mathematics and science lessons.

The aim of MASCIL is to effect changes in mathematics and science lessons cultures by more broadly implementing inquiry-based learning (in close connection to the world of work) in day-to-day teaching, and to scientifically evaluate the effectiveness of the interventions. To this end the MASCIL project (01/01/2013 – 31/12/2016) incorporates a continuous intervention and evaluation study. For the evaluation of the activities of the project we use a mixed-method design which includes summative elements to evaluate the success of the project as well as formative elements to allow a correction of strategies, if needed.

**„IGUANA – Improving School Governance using an Action Learning Approach", Nr. 527856-LLP-1-2012-1-PT-COMENIUS-CMP**

http://www.iguana-project.eu/

The aim of the project is to co-ordinate the validation of the IGUANA platform for emotional intelligence, tools and training programme by using high qualified national teacher network. The network is based on requirements and selected criteria.

Main activities:

1) School governance structures, approaches and models in Lithuania, Latvia and Estonia, identifying the obstacles to change, were reviewed. Literature review, interviews and questionnaires were used.

2) Iguana project website in Lithuanian language was developed.

3) The emotional intelligence assessment tool has been developed and validation process is started.


## Contractual Research

Operational programme for the Economical Growth for 2007–2013.
EU Structural fund.
**Localization of software relevant to the society, and development tools needed for programs. VP2-3.1-IVPK-12-K-01-004**


**The project "Promotion of students' research activity" by Operational Programme for the Development of Human Resources, priority 3 "Strengthening researchers abilities", measure "Improving of the researchers' qualification and competence and encouraging their mobility",**


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

Aalto university, Finland
Brunel University, Uxbridge, UK
University of the Basque Country, Spain
Ljubjana University, Slovenia
Frei University Berlin, Germnay

*OTHER SCIENTIFIC ACTIVITIES*

**Prof. V. Dagienė –**

- Editor-in-Chief of two international journals "Informatics in Education" (since 2002) and "Olympiads in Informatics" http://www.mii.lt/informatics_in_education/ and http://www.mii.lt/olympiads_in_informatics/index.html

- Representative of Lithuanian Education Committee TC3 under the International Federation for Information Processing (IFIP) http://ifip-education.ning.com/page/ifip-tc3-structure
- Vice chair of the Technical Committee of IFIP for Education (TC3) http://ifip-education.ning.com/page/ifip-tc3-structure
- Member of Steering Committee of the International Olympiads in Informatics
- Chair of the Annual International Workshop on Contest on Informatics and Computer Fluency, June, Torun, Poland)
- Chair of the 4th international doctoral consortium on informatics engineering education research: methodologies, methods, and practice, December 3-7, 2013, Druskininkai; http://ims.mii.lt/ims/renginiai/Consortium/consortium.htm
- Chair of the World Congress on Computer in Education (June 2-5, WCCE 2013)

## Dr. E. Kurilovas –

- Member of Steering Committee of European *Schoolnet* (or EUN, the network of 31 European Ministries of Education)
- Member of Lithuanian national CEDEFOP and *ReferNet* Committees
- Member of journal's editorial boards and reviewer: 1)"International Journal of Knowledge Society Research" (IJKSR, IGI Global) http://www.igi-global.com/journal/international-journal-knowledge-society-research/1180; 2) "Journal of Engineering and Computer Innovations" (JECI, Academic Journals). http://www.academicjournals.org/JECI/index.htm; 3) "International Journal On Advances in Software" (IARIA journal, USA). http://www.iariajournals.org/software/index.html; 4) "Informatics in Education" (Vilnius University, Lithuania). http://www.mii.lt/informatics_in_education/.

## Dr. T. Jevsikova –

- Junior member of International Federation for Information Processing (IFIP) TC 3 WG 3.1 (Informatics and ICT in Secondary Education)
- Member of Commission of the terms of informatics and information technologies

# DEPARTMENT OF NUMERICAL ANALYSIS

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**Head** – Prof. Dr. (HP) Artūras Štikonas

*STAFF*

**Principal researchers**:
Prof. Dr. Habil. Mifodijus Sapagovas; Prof. Dr. (HP) Stasys Rutkauskas;
**Senior researchers:** Doc. Dr. Olga Štikonienė
**Researchers:** Dr. Svetlana Roman
**Affairs manager:** Kristina Skučaitė-Bingelė
**Doctoral students:**
*Mathematics:* Aidas Balčiūnas; Agnė Skučaitė; Kristina Skučaitė-Bingelė
*Informatics:* Mažvydas Mackevičius; Liana Stonkienė

## *RESEARCH INTERESTS*

Differential equations and applications. Investigation of the spectrum and boundary value problems for differential and difference operators with nonlocal conditions.

## *RESEARCH PROJECTS CARRIED OUT IN 2013*

### Projects Supported by University Budget

**Differential equations and applications. Investigation of the spectrum and boundary value problems for differential and difference operators with nonlocal conditions**. Dr. A. Štikonas. 2011–2013.

> Formulation of the boundary problem with singular point when the system of eigenvectors of the matrix connecting the system is not complete. Investigate the existence and uniqueness of the solution.
> Investigation stability of finite difference scheme for pseudoparabolic equation with nonlocal boundary conditions and investigate teh convergence of iterative methods.
> Investigation complex characteristic functions of Sturm-Liouville problem with various nonlocal boundary conditions in the differential and discrete cases.

Iterative methods are considered for the system of difference equations approximating two-dimensional nonlinear elliptic equation with the nonlocal integral condition.

- R. Čiupaila, M. Sapagovas, O. Štikonienė. Numerical solution of nonlinear elliptic equation with nonlocal condition. Nonlinear Analysis: Modelling and Control, 2013, Vol. 18, No. 4, 412–426.
  http://www.mii.lt/na/issues/NA_1804/NA18402.pdf

The stability of an explicit finite-difference scheme for a linear hyperbolic equation with nonlocal integral boundary conditions was investigated.

- F. F. Ivanauskas, Yu. A. Novitski, M. P. Sapagovas**.** On the stability of an explicit difference scheme for hyperbolic equation with integral conditions. Differential Equations, July 2013, Vol. 49, No. 7, 849-856
  http://link.springer.com/article/10.1134%2FS0012266113070070 .


*OTHER SCIENTIFIC ACTIVITIES*
**Prof. A. Štikonas**
- Deputy-Editor-in-Chief of the journal "*Nonlinear Analysis: Modelling and Control*".
- Editorial board member of the journal "*Mathematical Modelling and Analysis*".
- Editorial board member of the "*Lithuanian Mathematical Journal*";

**Prof. M. Sapagovas –**
- Editorial board member of journal "*Lithuanian mathematical journal*";
- Editorial board member of journal "*Nonlinear Analysis: Modelling and Control*"..

**Doc. Dr. O. Štikonienė –**
- Managing Editor of the journal "*Lithuanian mathematical journal*".

# DEPARTMENT OF PROBABILITY THEORY AND STATISTICS

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**Head** – Prof. Habil. Dr. *Kęstutis Kubilius*

## STAFF

**Chief research fellows:** Prof. Habil. Dr. K. Kubilius, Prof. Habil. Dr. E. Manstavičius, Prof. Dr. S.  Norvidas, Prof. Habil. Dr. V. Paulauskas, Prof. Habil. Dr. J. K. Sunklodas.
**Affiliated chief research fellow:** Prof. Dr. J. J. Mačys.
**Senior research fellows:** Prof. Dr. O. Januškevičienė, Prof. Dr. M. Radavičius, Prof. Habil. Dr. R. Rudzkis
**Research fellow:** A. Bakšajevas, A. Čiginas.
**Technicians:** D. Dzindzalieta, L. Rybnikova, R. Šmėnas, P. Šarka.
**Doctoral students:**  Š. Germanas, K. Piaseckienė, T. Rudys.

## RESEARCH INTERESTS

Probability theory, random matrix theory, Statistical estimations of distributions, econometrics, **biostatistics, application of statistics in genetics and linguistics, s**urvey sampling
Probabilistic number theory, number theory, combinatorics, discrete mathematics
Extremal Problems in Harmonic Analysis
Statistics of random process

## RESEARCH PROJECTS CARRIED OUT IN 2013

### Projects Supported by University Budget

**Asymptotic analysis of linear and nonlinear statistics.** Prof. K. Kubilius 2013–2015.

The rate of convergence in the central limit theorem in various metrics for random sums was obtained. The goodness of fit test based on probability density estimates generated by kernel functions was considered. Zolotarev duality of the refined saddle point-type approximations for all members of the power-variance family was investigated. Asymptotic normality, exact confidence intervale for the Gaussian process with  the extended Orey index were obtained. The estimator of the  structural distributions of words in texts was made by using of a simple statistical model and empirical Bayes approach. A new method in problems where estimates are needed for finite population domains with small or even zero sample sizes are presented. The universal symbols for hermitian operator in Banach spaces were described in terms of positive definite functions.

### Governmental Science Programmes and Research Projects Ordered by the Branch Ministries

 Project: **Robust estimation in finite populations.** Prof. Dr. (HP) M. Radavičius, Dr. A. Čiginas.

Mobility of Scholars and Other Researchers and the Promotion of Student Research (VP1-3.1-ŠMM-01) of the Program of Human Resources Development Action Plan.

Main publications:

1. E.A Gorin, S. Norvidas, Universal symbols on locally compact Abelian groups. Funct. Anal. Appl., **47**, No. 1 (2013), 1–16.
2. D. Dzindzalieta, Extremal Lipschitz functions in the deviation inequalities from the mean, Electron. Commun. Probab. **18**, no. 66 (2013), 1–5.
3. A. Dubickas, T. Schoen, M. Silva, P. Šarka, Finding large co-Sidon subsets in sets with a given additive energy, European journal of combinatorics, **34**, no 7 (2013), 1144-1157.

### *MAIN R&D&I (RESEARCH, DEVELOPMENT AND INOVATION) PARTNERS*
Lille university (Frnace)
Moscow State University (Russia)
Bielefeld University Collaborative Research Centre *Spectral Structures and Topological Methods in Mathematics* (Germany)
Ohio University (USA)

## OTHER SCIENTIFIC ACTIVITIES
### Prof. K. Kubilius –

- editorial board member of the *Lithuanian Mathematical Journal*, http://www.springer.com/mathematics/journal/10986?detailsPage=editorialBoard;

- editorial board member of the *Mathematical Modelling and Analysis*, http://inga.vgtu.lt/~art/ ;

- member of **Organizing** committee of international conference *11th International Vilnius Conference on Probability Theory and Mathematical Statistics* http://www.vilniusconference2014.mif.vu.lt/organisation/;

- board member of the Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/index_en.html.


### Prof. E. Manstavičius –

- section editor of the *Lithuanian Mathematical Journal*, http://www.springer.com/mathematics/journal/10986?detailsPage=editorialBoard;

- editorial board member of the *International Journal of Number Theory*, http://www.worldscientific.com/page/ijnt/editorial-board;

- editorial board member of the *ISRN Combinatorics*, http://www.isrn.com/journals/combinatorics/editors/;

- editorial board member of the *International Journal of Number Theory, http://www.worldscientific.com/page/ijnt/editorial-board*;

- chairman of the Editorial Board of the *Lietuvos Matematikos Rinkinys* (*Proceedings of the Lithuanian Mathematical Society);*

- chairman of the Organizing Committee of the XLXIII Conference of Lithuanian Mathematical Society;

- member of the Organizing Committee of the 11<sup>th</sup> International Vilnius Conference on Probability Theory and Mathematical Statistics, http://www.vilniusconference2014.mif.vu.lt/organisation/;

- chairman of the Board of the Lithuanian Mathematical Society;

- member of  the Lithuanian Academy of Sciences, http://lma.lt/index.php?option=com_k2&view=item&layout=item&id=366&Itemid=230&lang=en

**Prof. S. Norvidas –**

- editorial board member of the *Lithuanian Mathematical Journal*, http://www.springer.com/mathematics/journal/10986?detailsPage=editorialBoard;

- scientific supervisor of doctoral student D. Dzindzalieta;

**Prof. V. Paulauskas –**

- member of the Lithuanian Academy of Sciences. http://lma.lt/index.php?option=com_k2&view=item&layout=item&id=366&Itemid=230&lang=en;

- Editor-in-Chief  of the *Lithuanian Mathematical Journal*, http://www.springer.com/mathematics/journal/10986?detailsPage=editorialBoard;

- member of the American Mathematical Society, http://www.ams.org/home/;

- editorial advisory board member of the *Central European Journal of Mathematics*, http://www.springer.com/mathematics/journal/11533?detailsPage=editorialBoard;

- board member of the Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/index_en.html;

- member of the International Statistical Institute, http://isi.cbs.nl;

- board member of the Lithuanian Statistical Society; http://www.statistikusajunga.lt/index.php?option=com_content&task=view&id=5&Itemid=7

**Doc. M. Radavičius –**

- scientific supervisor of doctoral students K. Piaseckienė, Agnė Reklaitė and Šarūnas Germanas

**Prof. R. Rudzkis –**

- editorial board member of the *Lithuanian Mathematical Journal*, http://www.springer.com/mathematics/journal/10986?detailsPage=editorialBoard;

- editorial board member of the journal *Прикладная эконометрика, http://www.appliedeconometrics.ru/r/board/;*

- editorial board member of the journal *Lietuvos statistikos darbai* (*Statistics Journal*);

- editorial board member of the journal *Pinigų studijos* (*Monetary Studies*), http://www.lb.lt/pinigu_studijos_redkolegija;

# DEPARTMENT OF RECOGNITION PROCESSES

Akademijos 4, LT-08663 Vilnius
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**Principal researchers**: Prof. Dr. (HP) Julius Žilinskas, Prof. Habil. Dr. Kazys Kazlauskas, Prof. Dr. (HP) Birutė Jasiūnaitė, Dr. Vytautas Kardelis

**Senior researchers:** Prof. Habil. Dr. Adolfas Laimutis Telksnys, Assoc. Prof. Dr. Rimantas Pupeikis, Assoc. Prof. Dr. Regina Kliukienė, Dr. Pijus Kasparaitis
**Researchers:** Dr. Margarita Beniušė, Dr. Angelė Pečeliūnaitė, Dr. Dmitrij Šešok, Dr. Gintautas Tamulevičius, Dr. Regina Venckutė, Dr. Eglė Gudavičienė, Dr. Rasa Lileikytė, Dr. Nijolė Linkevičienė, Dr. Vilma Zubaitienė, Jogilė Teresa Ramonaitė
**Junior researchers:** Dr. Algirdas Lančinskas, Nerijus Galiauskas
**Postdoctoral researcher:** Dr. Remigijus Paulavičius
**Specialists, engineering and expert staff:** Evaldas Robertas Ožeraitis, Gediminas Navickas, Jonas Kaukėnas, Dr. Audrius Valotka, Edvardas Kubilius, Ugnė Civilkaitė, Deimantė Krikštaponytė, Tomas Tarabilda, Eglė Babrovskė, Dr. Mark Filipovič, Dr. Sigitas Laurinčiukaitė, Dr. Gintaras Skersys, Dr. Irena Smetonienė, Tomas Anbinderis, Živilė Ringelienė, Laimonas Vėbra
**Affairs manager:** Joana Katina
**Doctoral students:** Gžegož Bedulskij, Agnė Dzidolikaitė, Deividas Eringis, Nerijus Galiauskas, Ana Krisiūnienė, Tatjana Liogienė, Vladislav Pnevski, Gytis Vaicekauskas, Eglė Zikarienė

*RESEARCH INTERESTS*
Random processes analysis and recognition.

*RESEARCH PROJECTS CARRIED OUT IN 2013*

**Projects Supported by University Budget**

*Project title:* **Analysis and Recognition of Random Signals.** Prof. Habil. Dr. A. L. Telksnys, Prof. Dr. (HP) J. Žilinskas
*Main results:*
1. Nonlinear regression using covering algorithms.
2. The problem of speech segmentation is analyzed. The relation of pitch trajectory and phoneme sequences was explored on purpose to implement ambiguous segmentation of speech signal. The change of pitch values helps detect some segments, but these regions don not coincide with phonemes. This implies the necessity to compose the set of acoustical units as the basis for speech segmentation.
3. Recognition of short-time specific elements in heart rate sequences. Speech signal segmentation based on fundamental and formant frequency analysis.

*Publications:*

- Greibus, M., Telksnys, L. (2013) Speech Keyword Spotting with Rule Based Segmentation *Information and Software Technologies* Vol. 403, p. 186-197 ISSN 1865-0929
- Lileikyte, R., Telksnys, L. (2013) Metrics Based Quality Estimation of Speech Recognition Features *Informatica* Vol. 24, No. 3, p. 435-446 ISSN 0868-4952
- Žilinskas A., Žilinskas J. (2013) A hybrid global optimization algorithm for non-linear least squares regression. Journal of Global Optimization, ISSN 0925-5001, 56(2), p. 265-277. Doi:10.1007/s10898-011-9840-9, http://link.springer.com/article/10.1007/s10898-011-9840-9

## National Research Projects

1. Research Council of Lithuania Project. **Development and Validation of Control by Lithuanian Speech Unit Model for the Disabled** (No. MIP-092/2012) Prof. Dalius Navakauskas)

    *Description:* The bidirectional Dynamic Time Warping (B-DTW) algorith was proposed for transient pulse interrupted speech recognition. The idea of the B-DTW algorithm is comparison of templates in two directions (from the beginning and the ending of the template) excluding noise interrupted speech region.

2. European Union Structural Funds project. **„Postdoctoral Fellowship Implementation in Lithuania" within the framework of the Measure for Enhancing Mobility of Scholars and Other Researchers and the Promotion of Student Research (VP1-3.1-ŠMM-01) of the Program of Human Resources Development Action Plan. Post doctoral researcher R. Paulavičius** (No. 004/18/ MTDS-580000-400). Prof. Dr. (HP) J. Žilinskas. 2012-2014.

    *Publication:*
    - Paulavičius R., Žilinskas J. (2014) Simplicial Global Optimization. Springer, ISBN 978-1-4614-9092-0. 10.1007/978-1-4614-9093-7, http://www.springer.com/mathematics/applications/book/978-1-4614-9092-0
    - Paulavičius, R., Žilinskas, J. () Simplicial Lipschitz optimization without the Lipschitz constant *Journal of Global Optimization* ISSN 0925-5001, in press. doi:10.1007/s10898-013-0089-3, ttp://link.springer.com/article/10.1007/s10898-013-0089-3

3. European Union Structural Funds project. **Services controlled by the Lithuanian Speech - The project LIEPA** (No. VP2-3.1-IVPK-12-K-01-001) Prof. Laimutis Telksnys. 2013-2015

    *Description:* The project LIEPA is aimed at developing tools which would open the possibilities of working and communicating with computers and smart things using the Lithuanian speech which presents numerous specific problems due to its abundant polysemy of inflection.

    The services developed will be conducive to fostering pupils' abilities to use speech technologies, will aid adults in various work by talking to computers in Lithuanian, will provide people with advice how to correctly pronounce words in Standard Lithuanian.

## International Research Projects

1. COST action **Mathematical Optimization in the Decision Support Systems for Efficient and Robust Energy Networks TD1207** Member of Managing Committee Prof. Dr. (HP) J.

Žilinskas. 2013-2017, http://www.cost.eu/domains_actions/ict/Actions/TD1207?management

2. COST action **Open European Network for High Performance Computing on Complex Environments IC0805** Member of Managing Committee Prof. Dr. (HP) J. Žilinskas. 2009-2013, http://www.cost.eu/domains_actions/ict/Actions/IC0805?management

> *Publication:*
> - Jeannot, E., Žilinskas, J. (Eds.) (2014) High-Performance Computing on Complex Environments. Parallel and Distributed Computing Series, Wiley, ISBN: 978-1-118-71205-4, http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1118712056.html

**Contractual Research**

1. Research **Modelling of the isolated word and phrase recognizer** according to instrument (No. VP2-1.3-ŪM-05-K) „InočekiaiLT". Customer – UAB „Inogama"

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

1. Hospital Kauno klinikos of Lithuanian University of Health Sciences (Lithuania)
2. UAB "Algoritmų sistemos" (Lithuania)
3. UAB "Inogama" (Lithuania)
4. Universidad de Almería (Spain)
5. Università della Calabria (Italy)

## *OTHER SCIENTIFIC ACTIVITIES*

**Prof. Dr. (HP) J. Žilinskas –**
- member of editorial boards of international journals:
  - Central European Journal of Computer Science (Springer/Versita), http://www.springer.com/computer/journal/13537?detailsPage=editorialBoard
  - Central European Journal of Engineering (Springer/Versita), http://www.springer.com/engineering/journal/13531?detailsPage=editorialBoard
  - Informatica (IOSPress/VU), http://www.mii.lt/informatica/editors.htm
  - Journal of Global Optimization (Springer), http://www.springer.com/business+%26+management/operations+research/journal/10898?detailsPage=editorialBoard
  - Mathematical Modelling and Analysis (Taylor&Francis/VGTU), http://www.tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=tmma20
  - Optimization Letters (Springer), http://www.springer.com/mathematics/journal/11590?detailsPage=editorialBoard
- nominated expert of Lithuania at COST domain Information and Communication Technologies, http://www.cost.eu/domains_actions/ict?dc_members
- member of managing board of Continuous Optimization Working Group of The Association of European Operational Research Societies (EURO), http://europt.iam.metu.edu.tr/h_contactyeni.html
- member of board of Lithuanian Operational Research Society (member society of EURO and IFORS), head of working group Optimization Methods and Applications, http://www.mii.lt/LitORS/

- Organizer
  - Workshop on High-Performance Computing and Optimization at 8th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing, Compiegne, France, October 28-30, 2013, http://web.vu.lt/mii/j.zilinskas/hpco-2013.html
  - Minisymposium Applications of Parallel Computation in Industry and Engineering at PPAM 2013: 10th International Conference on Parallel Processing and Applied Mathematics, Warsaw, Poland, September 8-11, 2013, http://www.techmat.vgtu.lt/ppam2013/
- Member of Program/Scientific Committees
  - Workshop on HPC for Scientific Problems at SYNASC 2013: 15th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, Timisoara, Romania, September 25-26, 2013, http://host.hpc.uvt.ro/events/hpcsp/
  - PPAM 2013: 10th International Conference on Parallel Processing and Applied Mathematics, Warsaw, Poland, September 8-11, 2013, http://www.ppam.pl/committee
  - DGA 2013: Workshop on Distance Geometry and Applications, Manaus, Brazil, June 24-27, 2013, http://dga2013.icomp.ufam.edu.br/index.php/committees
- Invited Speaker
  - "Optimization problems for efficient exploitation of high-performance computing systems", October 28-30, 2013: 8th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing, Compiegne, France, http://www.lsi.upc.edu/~net4all/3PGCIC-2013/keynotes.html
  - "Multidimensional scaling with city-block distances", 30 September-2 October, 2013: COST Workshop on Mixed Integer Nonlinear Programming, Paris, France, https://sites.google.com/site/cwminlp13/speakers
  - "Multi-objective combinatorial optimization", May 20-22, 2013: 3rd International Conference on Network Analysis, Nizhny Novgorod, Russia, http://nnov.hse.ru/en/latna/conferences/net2013
  - "Simplicial global optimization", "Optimization-based visualization of multidimensional data", May 15-18, 2013: Summer School on Operational Research and Applications, Nizhny Novgorod, Russia, http://nnov.hse.ru/en/latna/conferences/school2013

**Prof. Habil. Dr. A. L. Telksnys –**
- member of Council on Digitization of Lithuanian Cultural Heritage;
- member of the IEEE Technical Committee on eHealth;
- member of the Working group WG 7.1 Modeling and Simulation of the International Federation of Information Processing (IFIP),
- member of Lithuanian Academy of Sciences;
- member of Commission of the Seimas of the Republic of Lithuania on Lithuanian traditions and heritage actualization;
- editorial board member of the international journal Informatica, http://www.mii.lt/Informatica/editors.htm;
- editorial board member of the international journal Information Technology and Control, http://www.itc.ktu.lt/index.php/ITC/about/editorialTeam;
- editorial board member of the journal Informacijos mokslai, http://www.leidykla.vu.lt/lt/mokslo-darbai/informacijos-mokslai/informacijos-mokslai-2011-55-tomas/redaktoriu-kolegija/;

- editorial board member of the international journal Electronics and Electrical Engineering;
- editorial board member of the international journal Tamkang Journal of Science and Engineering, http://www2.tku.edu.tw/~tkjse/editorial_board-en.htm.

**Prof. Habil. Dr. K. Kazlauskas –**
- member of Lithuanian Computer Society, http://www.liks.lt;
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/;
- member of Lithuanian Scientific Society, http://www.lms.lt/?q=en/members.

**Assoc. Prof. Dr. R. Pupeikis –**
- reviewer for the international journal Informatica, http://www.mii.lt/Informatica/;
- member of Lithuanian Computer Society, http://www.liks.lt;
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/;
- member of Lithuanian Scientific Society, http://www.lms.lt/?q=en/members.

**Dr. G. Tamulevičius –**
- reviewer for the international journal Informatica, http://www.mii.lt/Informatica/;
- reviewer for the international journal Baltic Journal of Modern Computing, www.lu.lv/baltic-journal-of-modern-computing

**Dr. A. Lančinskas –**
- Affiliate member of European Network of Excellence on High Performance and Embedded Architecture and Compilation (HiPEAC), http://www.hipeac.net.
- Reviewer of international journals:
  - Journal of Global Optimization;
  - Central European Journal of Computer Science;
  - Informatica.

**Dr. R. Paulavičius –**
- Affiliate member of European Network of Excellence on High Performance and Embedded Architecture and Compilation (HiPEAC), http://www.hipeac.net.
- Reviewer of international journals:
  - Journal of Global Optimization;
  - Optimization Letters;
  - Information Technology and Control

**Dr. R. Lileikytė -**
- reviewer of the international journal Information Technology and Control, http://www.itc.ktu.lt/index.php/ITC/index

# DEPARTMENT OF SOFTWARE ENGINEERING

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**Head** – Prof. Dr. *Albertas Čaplinskas*
**Head of Mathematical Logic Sector at Software Engineering Department** – Assoc. Prof. Habil. Dr. *Regimantas Ričardas Pliuškevičius* (e-mail: Regimantas.Pliuskevicius@mii.vu.lt)

*STAFF*

**Chief research fellows:** Prof. Dr. A. Čaplinskas, Prof. Dr. D. Dzemydienė (part-time), Prof. Dr. Saulius Gudas (part-time, from 1 October)
**Senior research fellow:** Assoc. Prof. Dr. A. Lupeikienė.
**Research fellows:** Dr. S. Maskeliūnas, Dr. V. Paliulionis (from 1 October till 31 December).
**Assistant research fellow:** L. Paliulionienė.
**Engineer programmer:** J. Miliauskaitė (part-time).
**Doctoral students:** D. Drungilas (till 30 September), G. Gricius, M. Kurmis, J. Miliauskaitė, A. Miliauskas, S. Svanidzaitė, E. Žulkas.

*Sector of Mathematical Logic*

**Senior research fellow:** Assoc. Prof. Habil. Dr. R. Pliuškevičius.
**Research fellows:** Dr. R. Alonderis, Assoc. Prof. Dr. J. Sakalauskaitė.
**Doctoral students:** A. P. Girčys.
**Affiliated principal researcher:** Prof. Habil. Dr. S. Jukna.
**Affiliated senior researcher:** Assoc. Prof. Dr. A. Pliuškevičienė.

*RESEARCH INTERESTS*

Software engineering
Information system engineering
Software service engineering

*Sector of Mathematical Logic*

Proof theory of non-classical logics
Automated deduction
Decision procedures
Boolean function complexity
Lower bounds

*RESEARCH PROJECTS CARRIED OUT IN 2013*

**Projects Supported by University Budget**

**Methods and technologies to specify, model, and develop services-oriented software systems**. Prof. Dr. A. Čaplinskas (leader), Prof. Dr. D. Dzemydienė, Doc. Dr. A. Lupeikienė, Dr. S. Maskeliūnas, D. Drungilas, G. Gricius, M. Kurmis, J. Miliauskaitė, A. Miliauskas, L. Paliulionienė, S. Svanidzaitė. 2012-2014.

Main results obtained in 2013:
The analysis of current service-oriented requirement engineering approaches was performed, the obtained results were generalized, and recommendations how to improve requirements elicitation and formulation were prepared.
The methodology how to model and evaluate Cloud Interconnected Ambient Comfort Affect Reward Based Multi-Agent Sustainable House Controller was proposed and validated experimentally.
A robust ships systems integration and communication system concept for several normal and abnormal situations in the intelligent ship management systems was proposed.

Publications:

Dzemydienė, Dalė; Miliauskas, Arūnas. Possililities of automatic and semi-automatic end-user driven web service composition // Informacijos mokslai. Vilniaus universiteto leidykla. ISSN 1392-0561. 2013, vol. 65; p. 34-44.

Bielskis A. A., Guseinoviene E., D. Drungilas, Gricius G., E. Zulkas E. Modelling of Ambient Comfort Affect Reward Based Adaptive Laboratory Climate Controller // Elektronika ir elektrotechnika. Kaunas : Technologija. ISSN 1392-1215. 2013, vol. 19, no. 8, p. 79-82.

**Construction of deductive systems for non-classical logics; evaluation of lower bounds for algorithmic paradigms.** Assoc. Prof. Habil. Dr. R. Pliuškevičius (leader), Dr. R. Alonderis, Habil. Dr. S. Jukna, Assoc. Prof. Dr. J. Sakalauskaitė, A. Girčys. 2012-2014.

Main results obtained in 2013:
1. Two finite sequent calculi for propositional linear temporal logic were constructed.
2. The proof-search procedure for intuionistic propositional logic was constructed.
3. The optimality of the classical dynamic programming algorithm for the Knapsack problem was proved. New general lower bounds for additive circuits over the boolean OR and XOR semirings were derived.

Publications:

Alonderis, Romas; Pliuškevičius, Regimantas Ričardas. Sequent Systems for PLTL // Lietuvos matematikos rinkinys, Proc. of the Lithuanian Mathematical Society. Vilnius : Matematikos ir informatikos institutas. ISSN 0132-2818. 2013, ser. A, vol. 54., 5 p.

Alonderis, Romas. A proof-search procedure for intuitionistic propositional logic // Archive for mathematical logic. Heidelberg : Springer. ISSN 0933-5846. 2013, vol. 52, iss. 7-8, p. 759-778.

**National Research Projects**

European Social Fund Agency. **Theoretical and engineering aspects of e-service technology development and application in high-performance computing platforms** (No. VP1-3.1-ŠMM-08-K-01-010). Prof. Dr. A. Čaplinskas, Doc. Dr. A. Lupeikienė, J. Miliauskaitė, L. Paliulionienė.

Main results obtained in 2013:
1. A conceptual view-based framework for QoS modelling in web-based service-oriented enterprise systems (SoES) and balancing views on service quality, including views of different SoES stakeholders, was proposed. A mathematical model for view balancing was developed.
2. The notions of contract and agreement in SOA and properties of SLA languages were analyzed in the context of their legal aspects.

Publications:

Lupeikienė Audronė; Miliauskaitė, Jolanta; Čaplinskas, Albertas. A view-based approach to quality of service modelling in service-oriented enterprise systems // BSC 2013 : proceedings of the 2nd international business and system. Riga : Riga Technical University, 2013. ISBN 9789934104695. p. 7-19.

Lupeikiene Audrone; Miliauskaite, Jolanta; Caplinskas, Albertas. A Model of View-Based Enterprise Business Service Quality Evaluation Framework // Informatica. Vilnius : Vilnius University. ISSN 0868-4952. 2013, vol. 24, no. 4.

Paliulionienė, Laima. On description of contracts and agreements in the context of SOA // Computational science and techniques. Klaipėda: Klaipėdos universitetas. ISSN 2029-9966. 2013, vol. 1, no 2, p. 171-183.

**Ordered Research Projects**

Deutsche Forschungsgemeinschaft (DFD, German Research Foundation). **Limits of algorithmic paradigms** (Grant No. SCHN 503/5-1). Habil. Dr. S. Jukna. 2010-1013.

Main results obtained in 2013:
A model of dynamic branching programs to analyze the dynamic programming paradigm  was introduced. It was proved that the classical dynamic programming algorithm for the Knapsack problem is optimal. Using this approach, non-existence of efficient dynamic algorithms for some other optimization  problems were proved. The next row of obtained results concerns the limitations of additive algorithms over boolean OR and XOR semirings. New general lower bounds were proved for these classical models.

Publications:

Jukna, Stasys; Sergeev, Igor. Complexity of linear boolean operators // Foundations and trends in theoretical computer science. Hanover : Now Publishers Inc. ISSN 1551-305X. 2013, vol. 9, iss. 1, p. 1-123.

Jukna, Stasys. Limitations of incremental dynamic programming // Algorithmica, published online: January 2013, Springer-Verlag, 32 p. Available at http://link.springer.com/article/10.1007_s00453-013-9747-6

**International Science Programmes and Projects**

European joint programme Eurostars programme project **Production effectiveness navigator** (No. pen!6232 PEN; agreement No. 31V-20/LSS-580000-360 to fund the project by Agency for Science, Innovation and Technology). Prof. Dr. A. Čaplinskas, Doc. Dr. A. Lupeikienė. 2011-2014.

Main results obtained in 2013:
The requirement report and reference model of the PEN system have been corrected. Some heuristic rescheduling algorithms have been developed according to event driven views. They will be implemented in PEN prototype and will be used in order to identify, estimate and optimize the consequences of planned changes related to the products, resources and process. Deterministic algorithms, which could be implemented in the PEN system, are also reviewed.

Publications:

Čaplinskas, Albertas; Dzemyda, Gintautas; Kiss, Ferenc; Lupeikienė Audronė. Processing of undesirable business events in advanced production planning systems // Informatica / Matematikos ir informatikos institutas. Vilnius : Lietuvos mokslų akademijos leidykla. ISSN 0868-4952. 2012, vol. 23, no. 4, p. 563-579.

**Contractual Research**

**Transport optimisation software development** (No. APS-580000-1961, JSC „Inerta LT"). L. Paliulionienė, Dr. V. Paliulionis. 2013.

Main results obtained in 2013:
Methods and algorithms for the optimisation of transportation were analysed and a GIS software extension was developed to minimize the price of the transportion taking into account different parameters. The parameters include the geographical locations of suppliers and clients and pricelists of goods at different suppliers. The aim of the optimisation is to choose suppliers of goods ordered by a client so that the overall transportation price (that includes the price of the goods and carriage) would be minimized.

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

University of Latvia (Latvia)
Tallinn University of Technology (Estonia)
University of Maribor (Slovenia)
University of Geneva (Switzerland)
University of Frankfurt (Germany)

*OTHER SCIENTIFIC ACTIVITIES*

**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.lu.lv/baltic-journal-of-modern-computing/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 committee member of the annual East European Conference on Advances in Databases and Information Systems (ADBIS),
  http://adbis2013.disi.unige.it/index.php/steering-committee;

- steering committee member of the International Baltic Conference on Databases and Information Systems (BalticDB&IS), http://ati.ttu.ee/dbis2014/index.php?page=8;

- program committee member of the 11th International Conference on Software Engineering Research, Management & Applications (SERA), Prague, Czech Republic, August 7, 2013,
  http://d3s.mff.cuni.cz/conferences/sera2013/index.php?n=Main.Committees

- program committee member of the 17th East European Conference on Advances in Databases and Information Systems (ADBIS), Genoa, Italy, September 1-4, 2013,
  http://adbis2013.disi.unige.it/index.php/program-committees;

- program committee member of the Central and Eastern European Conference on Software Engineering Conference in Russia (CEE-SECR 2013), Moscow, Russia, October 23-25, 2013, http://2013.secr.ru/lang/en/about/program-committee;

- program committee member of the 5th International Conference on Advanced Cognitive Technologies and Applications COGNITIVE 2013, Valencia, Spain, May 27 - June 1, 2013, http://www.iaria.org/conferences2013/ComCOGNITIVE13.html;

- program committee member of the 3rd International Conference on Business Intelligence and Technology (BUSTECH  2013), Valencia, Spain, May 27 - June 1, 2013, http://www.iaria.org/conferences2013/ComBUSTECH13.html;

- program committee member of the 19th International Conference on Information and Software Technologies (ICIST 2013), Kaunas, Lithuania, October 10-11, 2013, http://isd.ktu.lt/icist2013/;

- program committee member of the 14th International Conference on Computer Systems and Technologies CompSysTech'13, Ruse, Bulgaria, June 28-29, 2013, http://www.compsystech.org/index.php?cmd=dPage&pid=pc;

- program committee member of the IADIS International Conference on Intelligent Systems and Agents 2013, Prague, Czech Republic, July 22-24, 2013, http://www.isa-conf.org/committees;

- program committee member of the 6th Workshop on Information Logistics and Knowledge Supply (ILOG 2013), Warsaw, Poland, September 23-25, 2013, http://www.informatik.uni-rostock.de/ilog2013.html;

- program committee member of the 25th International Conference on Advanced Information Systems Engineering (CAiSE'13), Valencia, Spain, June 17-21, 2013, http://www.pros.upv.es/index.php/en/committee-caise2013/program-caise2013;
- program committee member of the 22nd International Conference on Information Systems Development (ISD 2013), Sevilla, Spain, September 2-4, 2013, http://iwt2.org/isd2013/committee.php;
- program committee member of the International Workshop on Cyber-Physical Systems (IWCPS'13), Kraków, Poland, September 8-11, 2013, https://fedcsis.org/2013/iwcps/committees;
- program committee member of the 6th IFIP WG 8.1 Working Conference on the Practice of Enterprise Modeling (PoEM 2013), Riga, Latvia, November 6-7, 2013, http://poem2013.rtu.lv/committies;
- program committee member of the 16th International Scientific Conference of the multi-event "Computer Days – 2013", Šiauliai, Lithuania, September 19-21, 2013, http://www.liks.lt/en/modules/tinycontent/index.php?id=11.

### 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;
- program committee member of the 16th International Scientific Conference of the multi-event "Computer Days – 2013", Šiauliai, Lithuania, September 19-21, 2013, http://www.liks.lt/en/modules/tinycontent/index.php?id=11.

### Doc. Dr. A. Lupeikienė –
- editorial board member of the journal *Informatica*, http://www.mii.lt/informatica/editors.htm;
- 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 of the International Baltic Conference on Databases and Information Systems (BalticDB&IS), http://ati.ttu.ee/dbis2014/index.php?page=8;
- program committee member of the 2nd International Business and Systems Conference (BSC 2013), Riga, Latvia, November 5, 2013, http://poem2013.rtu.lv/2nd-international-business-and-system-conference;
- program committee member of the 16th International Scientific Conference of the multi-event "Computer Days – 2013", Šiauliai, Lithuania, September 19-21, 2013, http://www.liks.lt/en/modules/tinycontent/index.php?id=11.

### Dr. S. Maskeliūnas –
- program committee member of the 6th EuroSymposium on Systems Analysis and Design, Gdańsk/Sopot, Poland, September 26, 2013, http://eurosymposium.eu/?page=comit;
- program committee member of the 2nd International Business and Systems Conference (BSC 2013), Riga, Latvia, November 5, 2013, http://poem2013.rtu.lv/2nd-international-business-and-system-conference;

- program committee chair of the 16th International Scientific Conference of the multi-event "Computer Days – 2013", Šiauliai, Lithuania, September 19-21, 2013, http://www.liks.lt/en/modules/tinycontent/index.php?id=11.

**Prof**. **Habil. Dr. S. Jukna –**

- scientific board member of ECCC, Electronic Colloquium on Computational Complexity, http://eccc.hpi-web.de/colloquium/scientific_board/;
- editorial board member of the Lithuanian Mathematical Journal, http://www.mii.lt/index.php?siteaction=pages.browse&page=lmj_an&lang=en.

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

- editorial board member of the Lithuanian Mathematical Journal, http://www.mii.lt/index.php?siteaction=pages.browse&page=lmj_an&lang=en;
- reviewer of Mathematical Reviews (USA), http://www.ams.org/mr-database;
- reviewer of Computing Reviews (USA), http://www.computingreviews.com/.

# DEPARTMENT OF STOCHASTIC PROCESSES

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**Head** – Prof. Habil. Dr. Donatas Surgailis

*STAFF*

**Principal researchers:** Prof. Dr Liudas Giraitis (associated scientist)
Prof. Habil. Dr Remigijus Leipus
Prof. Dr Remigijus Mikulevičius (associated scientist)
Prof. Habil. Dr Rimas Norvaiša
Prof. Habil. Dr Alfredas Račkauskas
Prof. Habil. Dr Artūras Dubickas
**Senior researchers**: Dr Arvydas Astrauskas
Prof. Habil. Dr Bronius Grigelionis
Dr Martynas Manstavičius
Dr Marijus Vaičiulis
Prof. Dr. Jonas Šiaulys
**Researcher:** Dr Remigijus Petras Gylys
**Junior researcher:** Vaidotas Characiejus
Donata Puplinskaite
**Specialist:** Šarūnas Dirmeikis
Eglė Ignatavičiūtė
Rasa Mikalauskaitė-Arminienė
Gintaras Valiukevičius
Albertas Zinevičius
**Affairs manager:** Jurgita Zinkevičienė
**Doctoral student:** Ieva Grublytė
Vytautė Pilipauskaitė
Raimondas Malukas
Andrius Škarnulis
Šarūnas Dirmeikis


*RESEARCH INTERESTS*
statistical inference for long memory processes,
modeling financial data,
long range dependence,
heavy tails,
aggregation,
random fields,
self-similar processes,
Levy processes,
rough paths,
concrete functional calculus,
stochastic partial differential equations,

random Hamiltonians,
states on Girard algebras,
insurance mathematics.

## *RESEARCH PROJECTS CARRIED OUT IN 2013*

### Projects Supported by University Budget

Investigation of fractal properties of random proceses and random fields. R. Norvaiša,
D. Surgailis, 2012-2013.

Statistical techniques of detection of a nonconstant long memory parameter in time series are
developed. The null hypothesis presumes stationary or nonstationary time series with a
constant long memory parameter, typically an I (d) series with d > −.5. The alternative
corresponds to an increase in persistence and includes in particular an abrupt or gradual
change from I (d1) to I (d2), −.5 < d1 < d2. Several test statistics based on the ratio of forward
and backward sample variances of the partial sums are discussed. The consistency of the tests
is proved under a very general setting. A simulation study shows that our testing procedures
have good finite sample properties and turn out to be more powerful than the KPSS-based
tests considered in some previous works.

1. F. Lavancier, R. Leipus, A. Philippe, D. Surgailis. Detection of
non-constant long memory parameter. Econometric Theory, 29 (2013), 1009–1056.

2. J.-M. Bardet, D. Surgailis. Nonparametric estimation of the local Hurst function of
multifractional Gaussian processes. Stochastic Process. Appl., 123 (2013), 1004–1045.

### Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation
Project: Concrete functional calculus and probability theory: new methods and their
applications. R. Norvaiša, 2012–2014.

Project: Nonlinear long memory, heavy tails and aggregation. D. Surgailis, 2013–2015

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

Massachusets Institute of Technology (USA)
Michigan State University (USA)
Universite Paris 1 Sorbonne (France)
Universite de Nantes (France)
London University (United Kingdom)

## *OTHER SCIENTIFIC ACTIVITIES*

### A. Dubickas –
- Member of the editorial board of "Uniform Distribution Theory".
- Member of the editorial board of "Central European Journal of Mathematics".
- Member of the editorial board of the "Conference Papers in Mathematics".
- Member of the editorial board of the "Lithuanian Mathematical Journal".
- Member of the editorial board of "Šiauliai Mathematical Seminar".

- Member of the organizing committee of Palanga conference in combinatorics and number theory, Palanga, Lithuania, September 1-7, 2013.
- Speaker at 28th Journees Arithmetiques, Grenoble, France, July 1-5, 2013.

**R. P. Gylys –**
- Reviewer for Mathematical Reviews.

**B. Grigelionis –**
- Member of the editorial board of "Lithuanian Mathematical Journal"
- Member of the editorial board of "Nonlinear Analysis: Modeling and Control".

**R. Norvaiša –**
- Managing editor of the "Lithuanian Mathematical Journal"

**R. Leipus –**
- Editorial board of "Lithuanian Mathematical Journal".
- Editorial board of "Pinigų studijos (Monetary Studies)".
- 3rd Long-Memory Symposium, CREATES, Aarhus University, Aarhus (Denmark), June 26-28, 2013. Invited talk "Long memory and aggregation of autoregressive random fields".
- Conference "Nonstationarity and risk management", CIRM, Luminy (France), January 21-25, 2013, Invited talk "Detection of non-constant long memory parameter".
- 7th International Conference on Computational and Financial Econometrics (CFE 2013) and 6th International Conference of the ERCIM (European Research Consortium for Informatics and Mathematics) Working Group on Computational and Methodological Statistics (ERCIM 2013), University of London (UK), December 14-16, 2013.
- Invited talk "Partial-sum limits for linear processes with changing memory and applications".

**D. Surgailis –**
- Associate editor of the "Lithuanian Mathematical Journal".
- Invited speaker of the conference "Non-Stationarity in Statistics and Risk Managementa", Marseille, France, January 21-25, 2013.
- Invited speaker of the conference "Joint Statistical Meeting", Montreal, Canada, August 3-8, 2013
- Visiting professor at Department Statistics and Probability, Michigan State University, USA, April, 2013

**J. Šiaulys –**
- Member of the editorial board of "Lithuanian Mathematical Journal".Reviewer for Mathematical Reviews.
- Reviewer for Zentralblatt MATH.

# DEPARTMENT OF SYSTEMS ANALYSIS

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**Senior researchers:** Assoc. Prof. Dr. Olga Kurasova, Assoc. Prof. Dr. Saulius Minkevičius, Dr. Audronė Jakaitienė, Dr. Virginijus Marcinkevičius, Dr. Vytautas Čyras, Dr. Tadas Meškauskas, Dr. Mantas Puida

**Affiliated researchers:** Prof. Habil. Dr. Algis Garliauskas, Prof. Dr. Algirdas Pakštas, Dr. Audris Mockus

**Researchers:** Assoc. Prof. Dr. Igor Belov, Dr. Vaida Bartkutė-Norkūnienė, Dr. Jolita Bernatavičienė, Dr. Rasa Karbauskaitė, Dr. Viktor Medvedev, Dr. Povilas Treigys, Dr. Daniele Ettore Otera, Dr. Sigitas Dapkūnas, Dr. Kristina Lapin

**Junior Researchers:** Vytautas Jančauskas, Gediminas Bazilevičius, Aurimas Rapečka, Pavel Stefanovič, Dr. Aleksandr Igumenov, Mažvydas Mackevičius

**Postdoctoral researcher:** Dr. Juozas Gordevičius, Dr. Ernestas Filatovas, Dr. Audrius Voroneckas

**Specialists and engineering staff:** Gintautas Jakimauskas, Mikalojus Ramanauskas, Laura Ringienė, Vytautas Tiešis, Kiprianas Spiridonovas, Marius Girnis, Adelė Bučelienė, Karolis Urbanavičius, Laimutė Mikalauskienė

**Affairs manager:** Joana Katina

**Doctoral students:** Edgaras Artemčiukas, Gediminas Balkys, Rimantė Baltutytė, Gediminas Bazilevičius, Mykolas Jurgis Bilinskas, Albertas Gimbutas, Gražina Gimbutienė, Vytautas Jakštys, Vytautas Jančauskas, Joana Katina, Karolis Mikėnas, Olegas Niakšu, Kotryna Paulauskienė, Tomas Pranckevičius, Aurimas Rapečka, Martynas Sabaliauskas, Justas Stašionis, Pavel Stefanovič, Jevgenij Tichonov, Ingrida Vaičiulytė, Irina Vinogradova

*RESEARCH INTERESTS*
Analysis of large data sets; Medical data analysis and decision support; Data mining; Visualisation of multidimensional data; Operations research; Multiple criteria decision support; Artificial neural networks; Parallel computing; Global optimization methods; Local optimization methods; web service development; Internet data mining; Creation and computational realization of complex simulation models in epidemiology, education, economics, and energy supply systems and of various other origin with uncertainty; Optimal control applications; Image analysis, feature detection, image reconstruction, medical image processing; Epigenetic DNA alteration detection, epigenetic markers analysis; Developement of decision support systems; Geometric group theory and geometric topology.


*RESEARCH PROJECTS CARRIED OUT IN 2013*

**Projects Supported by University Budget**

*Project title:* **Decisions in optimization, modeling and visualization problems.** Prof. Habil. Dr. G. Dzemyda. 2011–2013

*Main results:*

1. An approximate method for mining frequent sequences based on $k$th order Markov models, which makes only several passes over the original database has been proposed.
2. Aproaches for text mining based on self-organizing maps are developed.
3. Comparative a nalysis of classification methods (C.4.5, kNN, SVM, Naïve Bayes) is accomplished in order to identify most accurate method for data of patients.
4. Data mining approach to predict BRCA1 gene mutation is developed.
5. Development and investigation of stock exchange model
6. Genetic algorithm based on insertion heuristics  for vehicle routing problems with constraints is  proposed  and investigated.
7. Multicriteria global optimization algorithm, having the worst condition in the optimality, has been proposed.
8. New version of Pareto-Lipschitzian optimization and new results on bimatrix games
9. The method of reduction of dimensionality using the exponential correlation function, taking into account that there are clusters in the analysed set of multidimensional data has been proposed.
10. The nonlinear neural network FitzHugh–Nagumo model with an expansion by the excited neuronal kernel function has been investigated.

*Publication:*

- Garliauskas A. (2013) Mean Field Modeling of the FitzHugh-Nagumo Neuronal Network Model with Kernel Functions and Time-Delayed Couplings *Informatica* Vol. 24, No. 3, p. 395-411 ISSN 0868-4952
- Pragarauskaite, J., Dzemyda, G. (2013) Markov Models in the Analysis of Frequent Patterns in Financial Data *Informatica* Vol. 24, No. 1, p. 87-102 ISSN 0868-4952
- Žilinskas A. (2013) On the worst-case optimal multi-objective global optimization *Optimization Letters* Vol. 7, p. 1921-1928 ISSN 1862-4472

*Project title:* **Study and application of statistical simulation and stochastic programming to computer network design.** Prof. Habil. Dr. L. Sakalauskas

*Description:* Big data are generated and stored in computer networks that are saving a lot of information which extraction and application is very important for gain of concurent ability in modern dynamic environment of research and business. Problems of computer network analysis, modelling and control are usually solved by methos of data mining and queueing theory.

*Main results:*

1. Create and study the methods of kriking with matrix of Euclidean distances.
2. Develop and study the methods and algorithms of stochastic linear and nonlinear programming for application of statistical simulation of computer networks.

*Publication:*

- Kaklauskas, L., Sakalauskas, L. (2013) Study of on-line measurement of traffic self-similarity *Central European Journal of Operations Research* Vol. 21, No. 1, p. 63-84 DOI: 10.1007/s10100-011-0216-5
- Sakalauskas, L. (2013) Locally Homogeneous and Isotropic Gaussian Fields in Kriging *Informatica* Vol. 24, No. 2, p. 253-274 ISSN 0868-4952

**National Research Projects**

1. **Research according Innovation voucher. Development of data mining methods for similarity estimation of streaming data (No. APS-580000-63, 31V-311) (Joint-stock company „Algoritmų sistemos", Agency for Science, Innovation and Technology (MITA)). Dr. J.Bernatavičienė. 2013-01-15 – 2013-04-25.**

   *Description:* **Four similarity measures Correlation Coeficient, Frobenius norm, Principal Component Analysis similarity factor, Multidimensional Dynamic Time Warping for comparison of medical streaming data (MSD are examined and the experiments of the comparison of these measures have been performed. In medicine, the comparison of patient physiological MSD data can be useful in disease detection.**

   *Publication:*
   - **Bernatavičienė, J., Bazilevičius, G., Dzemyda, G., Medvedev, V. (2013) Comparative analysis of similarity measures for medical streaming data** *Computer data analysis and modeling: theoretical and applied stochatics : proceedings of the 10th international conference, Minsk, September 10-14.* **Vol. 1, p. 17-20. ISBN 9789855531372**

2. **Research Council of Lithuania. Methods and algorithms of non-convec multi-objective optimization** (No. MIP-063/2012/ LSS-580000-444) Prof. Habil. Dr. A. Žilinskas. 2012-2014.

   *Description:* **New multi-objective optimization methods for non-convex objhectives are proposed and their efficiency evaluated by menas of solving test and practical problems.**

   *Publication:*
   - **Žilinskas, A. (2013) On two approaches to constructing optimal algorithms for multi-objective optimization** *Communications in Computer and Information Sciences*, **Vol. 403, p. 236-248. ISSN 1865-0929**
   - **Calvin, J., Žilinskas, A. (2013) On a global optimization algorithm for bivariate smooth functions** *Journal of Optimization Theory and Applications* **(įteiktas).**
   - **Jančauskas, V. (2013) Optimizing Neighbourhood Distances for Variant of Fully-Informed Particle Swarm Algorithm** *Studies in Computational Intelligence*, **Vol. 512, p. 217-229. ISSN 1860-949X**

3. **Research Council of Lithuania. European Union Structural Funds project "Postdoctoral Fellowship Implementation in Lithuania" within the framework of the Measure for Enhancing Mobility of Scholars and Other Researchers and the Promotion of Student Research (VP1-3.1-ŠMM-01) of the Program of Human Resources Development Action Plan. Post doctoral researcher J. Gordevičius** (No. 004/11/ MTDS-580000-401) Prof. Habil. Dr. G. Dzemyda. 2012-2014.

   *Description:* **Novel algorithmic methods are developed for analysis of human methylome datasets obtained from whole genome tiling arrays or next generation sequencing.**

   *Publication:*
   - **Kriukienė, E., Labrie, V., Khare, T., Urbanavičiūtė, G., Lapinaitė, A., Koncevičius, K., Li, D., Wang, T., Pai, S., Ptak, C., Gordevičius, J., Wang,**

S.C., Petronis, A., Klimašauskas, S. (2013) DNA unmethylome profiling by covalent capture of CpG sites. *Nature Communications* 4:2190. doi: 10.1038/ncomms3190

4. National Integrated Program of Information Technologies **Theoretical and Engineering Aspects of e-Service Technology Development and Application in High-performance Computing Platforms** (No. VP1-3.1-ŠMM-08-K-01-010). Prof. Habil. Dr. G. Dzemyda. 2012-2015.

*Publication:*

- **Kurasova, O., Marcinkevičius, V., Medvedev, V., Rapečka, A. (2013) Data mining systems, based on web services *Information Sciences* Vol. 65, p. 66-74. ISSN 1392-0561**
- **Stefanovič, P., Kurasova, O. (2013) Similarity analysis of text documents by self-organizing maps and k-means *Information Sciences* Vol. 65, p. 24-33 ISSN 1392-0561**
- **Čyras, V., Lachmayer, F. (2013) Situation versus case and two kinds of legal subsumption. *In: F. Kummer & W. Hötzendorfer (eds.) Abstraktion und Applikation: Abstraction and Application, Proceedings of the 16th International Legal Informatics Symposium IRIS 2013, 21-23 February 2013, Universität Salzburg*, pp. 347–354 ISBN 978-3-85403-292-2**

5. High technology development programmes for 2011-2013 research and experimental development project **Methods and software for modeling and visualization of business processes. PROMOS** (No. 31V-145). Prof. Habil. Dr. A. Žilinskas. 2011-2013.

*Description:* **A new algorithm is proposed and implemented for visualization of graphs used for business process management.**

*Publication:*

- **Žilinskas, A. (2013) On statistical models based multi-objective optimization *Proceedings of 10th International conference „Computer Data Analysis and Applied Stochastics* Vol.2, p. 90-94.**
- **Jančauskas, V. (2013) Web service for drawing BPMN diagram connections *Kompiuterininkų dienos*, p. 46-54 ISBN 978-9986-34-294-6**

6. Project of EU Structural funds economic growth action program's priority "Information Society for All" implementation tool "Lithuanian language in the information society" **Creation of the website providing integral resources, products and services of the Lithuanian language and its writing** (No. VP2-3.1-IVPK-12-K-01-003/ LSS-580000-2197). Dr. V. Marcinkevičius. 2012-2015.

*Description*: **In the project there will be developed the information system designated to store resources of Lithuanian language and to provide these resources to users through web browsers, web services and mobile applications.**

**International Research Projects**

1. "Eurostars" joint programme project **Production effectiveness navigator** (No. pen!6232 PEN implementation. No. 31V-20/LSS-580000-360), („Eurostars" programme). Prof. Habil. Dr. G. Dzemyda. 2011-2014.

*Description:* **The requirement report and reference model of the PEN system have been corrected. Some heuristic rescheduling algorithms have been developed according to event driven views. They will be implemented in PEN prototype and will be used in order to identify, estimate and optimize the consequences of planned**

**changes related to the products, resources and process. Deterministic algorithms, which could be implemented in the PEN system, are also reviewed.**

*Publication:*

- Caplinskas, A., Dzemyda, G., Kiss, F., Lupeikiene, A. (2012) Processing of Undesirable Business Events in Advanced Production Planning Systems *Informatica*. Vol. 23, No. 4, p. 563-579 ISSN 0868-4952

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

1. University College London, UK
2. Poznan Supercomputing and Networking Center, Poland
3. Middle East Technical University, Ankara, Turkey
4. UAB „Algoritmų sistemos"
5. Vilnius University Institute of Oncology

## *OTHER SCIENTIFIC ACTIVITIES*

**Prof. Habil. Dr. G. Dzemyda –**
- member of the Lithuanian Academy of Sciences http://lma.lt/index.php?option=com_k2&view=item&layout=item&id=235&Itemid=243&lang=lt
- Co-Editor-in-Chief of Baltic Journal of Modern Computing http://www.lu.lv/baltic-journal-of-modern-computing/
- editorial board member of the International Journal *Informatica* (IOSPress/VU), executive editor, http://www.mii.lt/Informatica/editors.htm
- editorial board member of Eastern and Central Europe Journal *Informatics in Education*, http://www.mii.lt/informatics_in_education/editors.htm
- editorial board member of the *Journal of Civil Engineering and Management*, http://www.jcem.vgtu.lt/en/?page=2&sub=RED_KOLEGIJA
- editorial board member of the *Nonlinear Analysis; Modelling and Control*, deputy-editor-in-chief, http://www.mii.lt/NA/
- member of Lithuanian Computer Society, http://www.liks.lt/
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/
- member of Lithuanian Operational Research Society, http://www.mii.lt/LitORS/
- member of IFIP Technical Committee 12 Artificial Intelligence, http://www.ifiptc12.org.uk/ifiptc12/members.php
- Leader of the projects in Vilnius University:
  - NKP – Project of the National Integrated Program of Information Technologies "Theoretical and Engineering Aspects of e-Service Technology Development and Application in High-performance Computing Platforms" (No. VP1-3.1-ŠMM-08-K-01-010),
  - MIDAS – National Open Access Research Data Archive (NO. VP2-3.1-IVPK-13-V-01-001),
  - PEN – „Eurostars" joint programme project "Production effectiveness navigator" (No. pen!6232 PEN implementation. No. 31V-27/LSS-580000-407), („Eurostars" programme),
- Chairman of the 5th International Seminar „Data Analysis Methods for Software Systems", Druskininkai, Lithuania, December 5-7, 2013, http://www.liks.lt/uploads/LIKS-MII_Drusk_2013_eng.pdf

- member of programme committees of the following International conf.erences:
  - 3th the International Conference on Operations Research and Enterprise Systems (ICORES 2014), www.icores.org,
  - International conference on Psychological Computing Systems (PhyCS 2014), www.phycs.org.

**Prof. Habil. Dr. L. Sakalauskas –**
- editorial board member of Journal *Technological and Economic Development of Economy* http://www.tandf.co.uk/journals/journal.asp?issn=2029-4913&linktype=145
- elected member of International Statistical Institute (2001) http://isi-web.org/
- member of European Working Group on Continuous Optimization http://www.iam.metu.edu.tr/EUROPT/
- President of Lithuanian Operational Research Society, http://www.mii.lt/LitORS/

**Prof. Habil. Dr. A. Žilinskas –**
- member of the Lithuanian Academy of Sciences http://lma.lt/index.php?option=com_k2&view=item&layout=item&id=235&Itemid=243&lang=lt
- member of editorial boards of international journals:
  - *Journal of Global Optimization* (Springer), http://www.springer.com/business+%26+management/operations+research/journal/10898?detailsPage=editorialBoard
  - *Control and Cybernetics*, http://control.ibspan.waw.pl:3000/mainpage/index
  - *Informatica* (IOSPress/VU), http://www.mii.lt/Informatica/editors.htm
  - *Journal of Intelligent Learning Systems and Applications*, http://www.scirp.org/journal/jilsa/
  - *International Journal of Grid and High Performance Computing*, http://www.igi-global.com/Bookstore/TitleDetails.aspx?TitleId=1105&DetailsType=ReviewBoard
  - *The Open Cybernetics and Systemics Journal*, http://www.bentham.org/open/tocsj/EBM.htm
- expert of EU Eurostars
- expert of Agency for Science, Innovation and Technology
- member of IFIP working group WG 7.6 Optimization-Based Computer Aided Modeling and Design, http://www.ifip.org/bulletin/bulltcs/memtc07.htm
- member of American Mathematical Society http://www.ams.org/cml

**Prof. Habil. Dr. J. Mockus –**
- member of the Lithuanian Academy of Sciences http://lma.lt/index.php?option=com_k2&view=item&layout=item&id=235&Itemid=243&lang=lt
- editor-in-chief of International Journal *Informatica* (IOSPress/VU), http://www.mii.lt/Informatica/editors.htm
- member of editorial board of International Journal *Journal of Global Optimization* (Springer), http://www.springer.com/business+%26+management/operations+research/journal/10898?detailsPage=editorialBoard
- member of editorial board of The Scientific World Journal (Hindawi), http://www.hindawi.com/journals/tswj/editors/operations.research/
- member of American Mathematical Society http://www.ams.org/cml

- member of IFIP Technical Committee WG 7.7 Stochastic Optimization,
  http://www.ifip.org/bulletin/bulltcs/memtc07.htm

**Prof. Habil. Dr. A. Garliauskas –**
- referee of international journals:
  - *Informatica* (IOSPress/VU)
  - *IEEE Transactions oh Neural Networks*
- member of Lithuanian Science Society Council, http://www.lms.lt/
- chair person of Informatics Department of Lithuanian Science Society,
  http://lms.lt/?q=en/society/browse/22
- member of Intelligent Systems Research Laboratory at the College of Engineering,
  http://www.engr.usask.ca/
- member of Special Interest Group on Nonlinear Dynamics (SIG/NL),
  http://www.acm.org/sigs
- member of Neuroscience Special Interest Group (SIG), http://www.inns.org/sig/
- member of ABI research advisory board, http://www.abiworldwide.com/

**Assoc. Prof. Dr. O. Kurasova –**
- member of editorial boards of international journals:
  - Nonlinear Analysis: Modelling and Control, http://www.mii.lt/NA/
  - Baltic Journal of Modern Computing, http://www.lu.lv/baltic-journal-of-modern-computing/editorial-board/
  - Computational Science and Techniques
    http://journals.ku.lt/index.php/CST/about/editorialTeam
- reviewer of international journals:
  - *Informatica* (IOSPress/VU)
  - *Mathematical Modelling and Analysis* (Taylor & Francis)
  - *Journal of Visualization* (Springer)
  - *Mechanical Systems and Signal Processing* (Elsevier)
  - *Informatics in Education* (VU)
  - *Central European Journal of Computer Science (Springer),*
  - *Neural Processing Letters* (Springer),
  - *Optimization Letters* (Springer),
  - *Information Technology and Control* (KTU),
  - *Neurocomputing* (Elsevier)
- member of Council of Lithuanian Computer Society,
  http://www.liks.lt/en/modules/tinycontent/index.php?id=3
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/
- member of Lithuanian Operational Research Society, http://www.mii.lt/LitORS/

**Assoc. Prof. Dr. I. Belovas –**
- reviewer of international journal *Mathematical Modelling and Analysis* (Taylor & Francis)
- member of *Lithuanian Mathematical Society*, http://www.mif.vu.lt/lmd/

**Assoc. Prof. Dr. S. Minkevičius –**
- reviewer of international journal Informatica (IOSPress/VU)
- reviewer of international journal *Nonlinear Analysis; Modelling and Control*
  http://www.mii.lt/NA/

**Assoc. Prof. Dr. Vaida Bartkutė-Norkūnienė** –
- Member of Lithuanian OR Society, http://www.mii.lt/LitORS
- Member of European Working Group on Continuous Optimization, http://europt.iam.metu.edu.tr/

**Dr. A. Jakaitienė –**
- o referee of the international journals: *Journal of Global Optimization* (Springer), *Optimization Letters* (Springer), *Lithuanian Mathematical Journal* (Springer), *Informatica* (IOSPress/VU)
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/
- member of Lithuanian Statistics Society, http://www.statistikusajunga.lt/index.php?option=com_content&task=view&id=10&Itemid=12

**Dr. V. Medvedev –**
- reviewer of international journals:
  - o *Informatica* (IOSPress/VU)
  - o *Mathematical Modelling and Analysis* (Taylor & Francis)
  - o *Journal of Global Optimization (Springer)*
  - o *Pattern Recognition Letters (Elsevier)*
  - o *The Baltic Journal of Road and Bridge Engineering (Technika/VGTU, Lithuania)*
  - o *Baltic Journal of Modern Computing*
- member of Council of Lithuanian Computer Society, http://www.liks.lt/en/modules/tinycontent/index.php?id=3
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/
- member SERVICE COMPUTATION 2014 Technical Program Committee, http://www.iaria.org/conferences2014/ComSERVICECOMPUTATION14.html

**Dr. Povilas Treigys –**
- reviewer of the international journals:
  - o *Informatica* (IOSPress/VU)

**Dr. J. Bernatavičienė –**
- reviewer of international journals:
  - o Informatica (IOSPress/VU)
  - o Baltic Journal of Modern Computing
- managing editor of Baltic Journal of Modern Computing
- member of Lithuanian Computer Society (Artificial Intelligence Section), http://www.liks.lt/
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/
- member of Lithuanian Operational Research Society, http://www.mii.lt/LitORS/

**Dr. R. Karbauskaitė –**
- managing editor of Informatica (IOSPress/VU)
  - o reviewer of international journal: Informatica (IOSPress/VU)

**V. Tiešis –**
- o reviewer of international journal: *Informatica* (IOSPress/VU)
- member of Lithuanian Mathematical Society, http://www.mif.vu.lt/lmd/