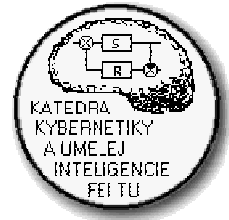


DEPARTMENT OF CYBERNETICS AND ARTIFICIAL INTELLIGENCE

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Tel./Fax: ++421 55 625 3574

Head of Department
prof. Ing. Ján Sarnovský, CSc.
E-mail: Jan.Sarnovsky@tuke.sk



1 DEPARTMENT'S PROFILE

The Department (DCAI) is responsible for education in the following bachelor study programs: Cybernetics, Intelligent Systems, and Business informatics; in the following master study programs: Cybernetics and Information-Control Systems, Artificial Intelligence, Business Informatics; and following PhD-study programs: Cybernetics and Information-Control Systems, Artificial Intelligence, and Business Informatics.

The main research topics at the Department are intelligent methods and algorithms for control and modeling of large-scale systems; risk-sensitive diagnosis of uncertain systems; computational intelligence techniques for modeling of intelligent systems and miscellaneous applications; intelligent decision support systems; pattern recognition; knowledge discovery; knowledge technologies for information retrieval and knowledge management; business information systems; and computational and cognitive neuroscience.



The predecessor of the Department was founded in 1964. Department of Cybernetics and Artificial Intelligence was adapted in 1989. Currently it has 21 staff members, 28 internal and 15 external Ph.D. students. There are 3 sections within the department: Cybernetics and Automation, Artificial Intelligence, and Business Informatics. Within the Department there are active two research Centers: Centre for Cybernetics (<http://cybernetics.fei.tuke.sk/cybervirtlab/>) and Centre for Intelligent Technologies (www.ai-cit.sk).

The Department is involved in a number of research and educational projects. The following types of projects were under way in 2011: 1 European IST project, 1 Socrates thematic network, 1 US National Institutes of Health research project, 3 grants awarded by the Science Grant Agency, 2 grants awarded by the Slovak Research and Development Agency, 5 grants awarded by Cultural and Educational Grant Agency, 3 other international grants and 1 project supported by the Research & Development Operational Programme funded by the ERDF.

2 STAFF

Professors: prof. Ing. Dušan Krokavec, CSc.
Dr.h.c. prof. Ing. Ladislav Maďarász, CSc.
prof. RNDr. Eva Ocelíková, CSc.
prof. Ing. Ján Paralič, PhD.
prof. Ing. Tomáš Sabol, CSc.
prof. Ing. Ján Sarnovský, CSc.
prof. Ing. Peter Sinčák, CSc.
prof. Ing. Iveta Zolotová, CSc.

Associate Professors: doc. Ing. Anna Filasová, CSc.
doc. Ing. Anna Jadlovská, PhD.
doc. Ing. Ján Jadlovský, CSc.
doc. Ing. Norbert Kopčo, PhD.
doc. Ing. Marián Mach, CSc.
doc. Ing. Kristína Machová, CSc.

Assistant Professors: Ing. František Babič, PhD.
Ing. Marek Bundzel, PhD.
Ing. Karol Furdík, PhD.
Dr. Ing. Vratislav Hladký
Ing. Rudolf Jakša, PhD.
Ing. Ján Liguš, PhD.
Ing. Martin Sarnovský, PhD.
Dr. Ing. Ján Vaščák

Researchers: Ing. Rudolf Andoga, PhD.
Ing. Ladislav Fözö, PhD.
Ing. Stanislav Laciňák, PhD.

Technical Staff: Mária Feješová
Tatiana Baňasová

Ph.D. Students:

1^{st.}

Internal

Ing. Vladimír Gašpar
Ing. Slávka Jadlovská
Ing. Lukáš Laciňák
Ing. Alexandra Lukáčová
Ing. Anton Molčan
Ing. Martin Paľa
Ing. Peter Papcun
Ing. Vladimír Serbák
Ing. Ján Štofa

External

Ing. Mousa Younes Alfitorey
Ing. Adrián Dringuš
Ing. Marek Duľa
Ing. Róbert Fónod
Ing. Nikola Kabakov
Ing. Jan Liguš
Ing. Peter Szabó

2^{nd.}

Internal

Ing. Matej Čopík
Ing. Štefan Jajčišin
Ing. Mgr. Peter Koncz
Ing. Roman Mihal
Ing. Adela Tušanová
Ing. Mária Virčíková

3^{rd.}

Internal

Ing. Daniel Gontkovič
Ing. Rastislav Hošák
Ing. Ján Ilkovič
Ing. Ján Kažimír
Ing. Tomáš Karol
Ing. Gabriel Lukáč
Ing. Miloš Pavlík
Ing. Martin Repka
Ing. Peter Šmolár
Ing. Peter Šuster
Ing. Beáta Tomoriová
Ing. Attila Török
Ing. Jaroslav Tuhársky

External

Ing. Stanislav Dvorščák
Ing. Peter Kubičko
Ing. Jaroslav Tuhársky

4^{th.}

External

Ing. Marián Stanislav

5^{th.}

External

Ing. Juraj Koščák
Ing. Jozef Kováč
RNDr. Marcel Kudláč
Ing. Viliam Ročkai

3 LABORATORIES

- Centre for Intelligent Technologies: Laboratory of Autonomous Systems (LAS-CIT), Laboratory of Humanoid Robots (LHR-CIT) <http://www.ai-cit.sk>
- Centre of Cybernetics (L-513) <http://cybervirtlab.fe.i.tuke.sk/CyberVirtLab/>, <http://web.tuke.sk/kybernetika/labaky/L513/>

- Laboratory of Intelligent Information and Control Systems (L-535), <http://web.tuke.sk/kybernetika/labaky/L535.html>
- Laboratory of Distributed Control Systems - ROCKWELL AUTOMATION LABORATORY (L-536), <http://web.tuke.sk/kybernetika/labaky/L536.html>
- Laboratory of intelligent control systems of aircraft engines (in cooperation with Faculty of Aeronautics) <http://lirslm.fe.i.tuke.sk>
- Laboratory of Knowledge Technologies (V-101a) <https://hi.fe.i.tuke.sk/portal/?q=node/100#v101a>
- Laboratory of Business processes (B11) <https://hi.fe.i.tuke.sk/portal/?q=node/100#b11>
- Laboratory of Intelligent Control Networks (L-509), <http://web.tuke.sk/kybernetika/labaky/L509.html>
- Laboratory of Computer Control Systems Design (V101b), <http://kyb.fe.i.tuke.sk/Laboratoria/miest/V101b.htm>
- Laboratory of Robotics (V134) <http://kyb.fe.i.tuke.sk/Laboratoria/miest/V134.htm>
- Laboratory of Mechatronics Systems (V142) <http://kyb.fe.i.tuke.sk/Laboratoria/miest/V142.htm>
- Laboratory of Process Control (V144) <http://kyb.fe.i.tuke.sk/Laboratoria/miest/V144.htm>
- Laboratory of Production Lines and Image Recognition (V147) <http://kyb.fe.i.tuke.sk/Laboratoria/miest/V147.htm>
- Perception and Cognition Laboratory (V-31) <http://pcl.tuke.sk>

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Computers and Algorithms	2 nd	2/2	Jadlovská, Jadlovský
Introduction to Business Informatics	2 nd	2/2	Paralič, J.
Elements of Control Systems	2 nd	2/2	Hladký
Artificial Intelligence	2 nd	2/2	Machová, Paralič
Simulation systems in Business Informatics	2 nd	2/2	Jadlovská, Hladký
Foundations of Automatic Control	3 rd	2/2	Madarász
Simulation Systems	3 rd	2/2	Jadlovská
Artificial Intelligence	3 rd	2/2	Sinčák, et al.
Knowledge-Based Systems	3 rd	2/2	Machová
Office Information Systems	3 rd	1/2	Zolotová
Applications of Operation Systems in Management	3 rd	2/2	Liguš
Application Programming	3 rd	2/2	Jakša
Analyses and design of Information Systems	4 th	1/1	Sarnovský M., Babič
Control of Technological Processes	4 th	2/2	Liguš
Control and Visualization Systems	4 th	2/2	Zolotová

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Identification and Modeling	4 th	2/2	Filasová
Linux I.	4 th	2/2	Jakša
Computer Tools for Technological Systems Control	4 th	2,2	Jadlovský
Applications of Artificial Intelligence	4 th	0/2	Sinčák
Scheduling and Logistics	4 th	2/2	Paralič
Application programming	4 th	0/2	Jakša
Computer (Based) Control	5 th	2/2	Krokavec
Database Management System Applications	5 th	2/2	Ocelíková
Protocols and Interfaces	5 th	2/2	Jadlovský
Project Management	5 th	2/2	Sabol
Introduction to Neurosciences	5 th	2/2	Kopčo
Cybernetics and Management	6 th	2/2	Sarnovský
System Analysis and Synthesis	6 th	2/2	Madarász
Effective and financial management	6 th	2/2	Babič
Heuristic Optimization Processes	6 th	2/2	Mach

4.2. Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Optimal and Nonlinear Systems	1 st	2/2	Jadlovská, A.
Computer Vision	1 st	2/2	Tomori
Intelligent Control Networks	1 st	2/2	Liguš
Knowledge Management	1 st	2/2	Paralič, J.
Information Systems for Business Processes	1 st	2/2	Zolotová
Discrete-time Systems	1 st	3/2	Krokavec, D.
Theoretical Foundations of Artificial Intelligence	1 st	2/2	Sinčák
Symbolic Artificial Intelligence	1 st	2/2	Mach
IT Environment Control	1 st	2/2	Sarnovský M., Furdík
Online Identification	1 st	2/2	Krokavec
Logic Control	1 st	2/2	Liguš
Distributed Control Systems	2 nd	2/2	Jadlovský
Control and Artificial Intelligence	2 nd	2/2	Jadlovská
Robust Control	2 nd	2/2	Filasová
Evolutionary Algorithms	2 nd	2/2	Mach
Multicriterial Decision Making	2 nd	2/2	Ocelíková
Machine Learning	2 nd	2/2	Machová
Logic Programming	2 nd	1/1	Paralič
Stochastic Systems	2 nd	2/2	Krokavec, D.
Fuzzy Decision	2 nd	2/2	Vaščák
Complexity and Decision Making	2 nd	2/2	Madarász
Engineering econometrics	2 nd	2/2	Krokavec
Speech Recognition	2 nd	2/2	Krokavec, D.
Intelligent Sensor Systems	2 nd	2/2	Krokavec, D.
Interactive Systems	2 nd	2/1	Jakša
Integrated manufacturing systems	3 rd	3/2	Madarász
Humanoid Technologies	3 rd	2/2	Jakša

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Dynamic Systems Diagnostics	3 rd	2/2	Krokavec, D.
Complex Systems Control	3 rd	2/2	Hladký
LISP Applications	3 rd	0/2	Mach
Management Information Systems	3 rd	2/2	Jadlovský
Complexity and Decision Making	3 rd	2/2	Madarász
Semantic Technologies	3 rd	2/2	Machová
Neuro-fuzzy Systems	3 rd	2/2	Vaščák
Cybernetics	3 rd	2/2	Sarnovský
Knowledge Discovery	3 rd	2/2	Paralič
Philosophic Problems of Cybernetics and AI	4 th	2/2	Sarnovský
Repetition of AI Foundations	4 th	0/2	Sinčák
AI Applications Seminar	4 th	2/2	Sinčák

5 RESEARCH PROJECTS

- Knowledge Practices Laboratory (KP-Lab)** is an integrated project funded by the European Commission within the IST Program (6th Framework Program) IST-2000-29207, coordinator: University of Helsinki. Duration: 2006-2011, Team members from DCAI: Ján Paralič (team leader), František Babič, Peter Bednár, Karol Furdík, Jozef Wagner, Gabriel Tutoky. Activity: KP-Lab is an ambitious project that focuses on developing a learning system aimed at facilitating innovative practices of sharing, creating and working with knowledge in education and workplaces. KP-Lab presents a unifying view of human cognition. It is based on the assumption that learning is not just individual knowledge acquisition or social interaction, but shared efforts of transforming ideas and social practices. The objective of the KP-Lab project is to develop theories, tools, and practical models to elicit deliberate advancement and the creation of knowledge, as well as the corresponding transformation of knowledge practices in education and workplaces. The essential way of developing the collaborative technologies is through a co-evolutionary process involving researchers, technological developers and users. Web page: <http://www.kp-lab.org>
- Prediction and detection methods of significant and hazardous meteorological phenomena based on meteorological data mining** (project lead by MicroStep_MIS, Bratislava). Slovak Research and Development Agency, project no. VMSP-P-0048-09, duration: 2009 – 2011, members: Ján Paralič (project leader for TUKE), Peter Bednár, František Babič, František Albert, Jozef Kováč, Karol Furdík. Activities: This project provided interesting, contributions to the research of parametrized models and methods for detection and prediction of significant meteorological phenomena, especially fog and low cloud cover. The project covered methods for integration of distributed meteorological data necessary for running the prediction models, training models and then mining the data in order to be able to efficiently and quickly predict even sparsely occurring phenomena. The detection and prediction methods are based on knowledge discovery – data mining of meteorological data using neural networks and decision trees. The mined data were mainly METAR aerodrome messages, meteorological data from specialized stations and cloud data from special

airport sensors – laser ceilometers. The business partner of this DMM consortium will use the generated models within already developed and operationally running products.

- ***Cognitive travelling in digital space of the Web and digital libraries supported by personalized services and social networks*** (project lead by FIIT STU Bratislava). Slovak Research and Development Agency, project no. APVV-0208-10, duration: 2011 – 2014, members: Ján Paralič (project leader for TUKE), Peter Butka, Peter Koncz, František Babič, Gabriel Tutoky. Activities: The metaphor of cognitive travelling in the digital space describes a (curious) user who moves in the web or libraries. Travelers leave traces in digital space – evaluations, recommendations, annotations etc. They communicate with others forming communities of shared interests. Users learn more if the information is suitably presented or visualized. Designed and implemented models and prototypes of web services will make use of descriptions of semantics of a given domain, documents and user profile (ontologies, folksonomies). Methods will include both targeted search (e.g. query enrichment or reformulation before submitting to search engines, discovering users' specific needs) and also an exploratory search (browsing information sources without having a precise goal). This research contributes to shifting from providing documents in response to a query to providing answers.
- ***Dynamic hybrid architectures in multiagent network control systems***, Scientific Grant Agency project No. 1/0286/11, duration: 2011 – 2013, members: Ján Sarnovský (project leader), Ján Liguš, Vratislav Hladký, Ján Jadlovský, Anna Jadlovská, Iveta Zolotová, Eva Ocelíková, Jana Ligušová, Marek Duľa, Peter Karch, Ján Kažimír, Stanislav Laciňák, Rastislav Hošák, Peter Šuster, Slávka Jadlovská, Peter Papcun, Anton Molčan and Lukáš Laciňák. Activities: The project aims to research methods and algorithms for decision making and management of automatic control systems using the paradigm of hybrid approaches to managing complex systems utilizing methods of artificial intelligence. A tighter focus of the project is research, development and implementation of algorithms and methods for managing multi-agent network management systems (MANMS), where particular agents of MASRS cooperate and communicate via Wifi stochastic communication network. Based on MASRS modeling and formalizing of control processes will be further developed specific algorithms for optimal reconfiguration of MASRS architecture, taking into account redundancy to achieve the best quality of control for the selected MANMS configuration. When designing the control algorithms theoretical knowledge of cybernetics and information theory will be used with application of Ashby's law of requisite Variety. The project is also intended to formalize the design of control algorithms and design of dynamic network architectures of industrial network management systems, which will be verified in the lab as well as in practice, in cooperation with the U. S. Steel Košice, Cybernetics Ltd., Košice and MDJ Ltd., Košice.
- ***Integrated design of reconfigurable control structures and embedded diagnostics***, Scientific Grant Agency project No. 1/0256/11, duration: 2011 – 2013, members: Dušan Krokavec (project leader), Filasová Anna, Hladký Vratislav, and Daniel Gontkovič. Activity: The project is focused on design of

fault-tolerant control systems (FTCS). The basic research is fundamental part of the project, which is driven for active FTCS with embedded diagnosis in suitable reconfigurable structures, undertaken in performance of the fault detector embedded in the control loop, and constructed in the framework of the integrated design. The focal scientific points of the project are dedicated to development of new design algorithms guarantying stability of fault-tolerant systems and optimized with respect to conflicting requirements among stability, redundancy, and graceful performance degradation; the terminal scientific objectives are dedicated to residual signals embedded in the control loop, with explicit consideration on residual decoupling and evaluation, reconfiguration control methods, as well as to appropriate procedures associated with decoupling of interacting multiple control structures.

- **Methods for identification, annotation, search, access and composition of services using semantic metadata in support of selected process types**, Scientific Grant Agency project No. 1/0042/10, duration: 2010 – 2011, members: Marian Mach (project leader), Paralič Ján, Babič František, Furdík Karol, Sarnovský Martin, Wagner Jozef, Machová Kristína, Lukáč Gabriel. Activities: The project is focused on using semantic metadata to describe services in a way suitable for semantic processing. Activities will target mainly the importance of semantics within different phases of service life-cycle – from identifying services in processes and describing them through searching and accessing services to composing services into workflows. Attention will be paid to different service types including web services, services provided by human actors or electronic devices, and grid services. In connection with services, the project focuses on specific process types. One of these process types is text mining remarkable by considerable time complexity and strong dependence on employed data sets. Another process type is represented by new knowledge creation processes characterised by an occurrence of implicit knowledge practices. The last type of processes, the realisation of workflows in a grid environment, strongly depends on a distribution of tasks among available processing nodes.
- **Utilisation of intelligent methods for control and modeling of aircraft engines in educational process**, Cultural and Educational Grant Agency project No. 001 – 010 TUKE4/2010, duration: 2010-2012, project leader: Ladislav Madarász. The aim of the project is to create a platform for the use of small turbojet engines in the Laboratory of Intelligent control systems of aircraft engines outside the frame of the ongoing research for educational purposes. This project will be oriented on the following areas of education: the area of digital acquisition of operating parameters of the engine in real-time, the area of basic analysis and visualization of the obtained data, visualization and creation of basic models and demonstration of control algorithms. Because the small turbojet engines have similar characteristics as normal engines they are appropriate objects for demonstration of characteristics of real engines, modern methods of measurement of extreme parameters, algorithms of modeling and control.
- **Cybernetic education center**. Cultural and Education Grant Agency Project No. 037-011TUKE-4/2010, duration 2010 – 2012, members: Iveta

Zolotová (project leader), Ján Sarnovský, Eva Ocelíková, Ján Jadlovský, Anna Jadlovská, Vratislav Hladký, Ján Liguš, Jana Ligušová, Stanislav Laciňák, Ladislav Takáč, Marek Duľa, Ľuboš Popovič, Oľga Duľová, Peter Karch, Richard Lonščák, Rastislav Hošák, Miloš Pavlík, Roman Mihaľ. Activities: The project focuses on creating cybernetic education center, which will promote research and development of education sphere in the Cybernetics and Automation section and related sections within the department, based on the latest technologies. The center will integrate and develop existing education and training portals and distributed laboratories with the objective to achieve synergy effect. It will include functionalities like a modeling and control of real and simulated dynamic systems, accessing electronic educational materials of selected courses from the Cybernetics section or e-testing of students' knowledge. Designed center, especially its brand new central portal, will include also features of adaptive web based on the neural networks with Hebbian learning rules. Project will be compatible with the European project Enhanc-Life-Long-Learning-EIE Community.

- ***Virtual laboratory for business information systems***, Cultural and Educational Grant Agency project No. 065TUKE-4/2011, duration: 2011 - 2013, members: Ján Paralič (project leader), František Babič, Kristína Machová, Martin Sarnovský, Karol Furdík, Peter Butka, Peter Bednár, Gabriel Tutoky, Jozef Wagner, Adela Tušanová, Peter, Koncz, Alexandra Lukáčová, Ján Štofa. Activity: This project focuses on development and implementation of supporting on-line tools for education of selected courses in Business information systems at the Technical University in Košice. For this purpose there will be designed and implemented electronic educational materials for particular courses, as well as suitable electronic services for active participation of students in virtual learning environment (including social network support and analysis), as well as methodology for Web based Training.
- ***Development of a Modern University Textbooks for a Core Units of the Newly Trasformed Study Programme Cybernetics and Information Control Systems***, Cultural and Educational Grant Agency project No. 034TUKE-4/2011, duration: 2011–2013, members: Anna Jadlovská (project leader), Ján Sarnovský, Iveta Zolotová, Ján Jadlovský, Zoltán Tomori, Vratislav Hladký, Ján Liguš, Stanislav Laciňák, Ľuboš Popovič, Ladislav Takáč, Peter Šuster, Matej Čopík, Štefan Jajčišin, Slávka Jadlovská, Anton Molčan. Activity: The objective of the project is the preparation, design and implementation of a number of modern university textbooks, the content of which will be methodically processed using the current level of knowledge in the discipline of "cybernetics" and oriented on the core units of the newly-transformed study program "Cybernetics and information-control systems" at the second (master) study degree. The project research team considers the existence of high-quality textbooks as an important basis for mastering the subjects at the second degree of studies. The textbooks will be accompanied by a set of solved and unsolved problems intended to be processed into functions, program modules and/or application libraries using an appropriately chosen programming environment (Matlab/Simulink, CPN Tools, Microsoft Visual Studio 2008 SQL Developer, Rockwell Automation software). The said problems can be addressed while solving individual tasks, assignments and semester projects, not least in the research, which

takes place at the workplace of the project research team.

- **Cognitive science – Middle European cross-disciplinary master study program**, Cultural and Educational Grant Agency project No. 3/7300/09, duration: 2009-2011, members: Norbert Kopčo, Beata Tomoriová; Jan Rybár, Igor Farkaš, Comenius University Bratislava, Peter Sýkora, University of Constantine and Methodus, Trnava activity: Creation of a joint interdisciplinary Masters program of Cognitive science in collaboration with universities in the central-European region (Vienna, Budapest, Ljubljana, Zagreb).
- **Perceptual, Contextual, and Cross-Modal Learning in Hearing and Vision**. The European Community's 7FP/2007-13 grant no GA-2009-247543 (Marie Curie program for Research Staff Exchange) PI Norbert Kopčo, staff Rudolf Andoga, Beáta Tomoriová. Collaboration with University of California, Boston University, Martinos Center/Harvard Medical School.
- **Co-funding grant for Perceptual, Contextual, and Cross-Modal Learning in Hearing and Vision**. Slovak Research and Development Agency Project, No. PP7RP-0027-09. PI Norbert Kopčo, staff Rudolf Andoga, Beáta Tomoriová. Reimbursement grant for the costs of grant preparation for successful applicants for EU research grants.
- **Development of the Centre of information and communication technologies for knowledge-based systems**, project No. 26220120030 supported by the Research & Development Operational Programme funded by the ERDF, duration: 2010 - 2013.

6 CO-OPERATION

6.1. Co-operation in Slovakia

- Department of Automatic Control Systems Bratislava, Slovak University of Technology, Bratislava
- Institute of Intelligent Systems, Faculty of Informatics, Slovak University of Technology, Bratislava
- Institute of Computer Science, Slovak Academy of Sciences in Bratislava
- Department of Biophysics IEP Slovak Academy of Science
- Institute of Computer Science, University of P.J. Šafárik, Košice
- Economic University, Faculty of Business Economics, Košice
- Institute of Experimental Physics, Slovak Academy of Sciences
- Department of applied informatics (Centre for Cognitive Science), Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava
- Košice self-governing region
- Local Authority City Ward Ťahanovce, Košice
- The City of Košice
- Tatrabanka, a.s.
- IT Valley Kosice

6.2. International Co-operation

- The Open University, Knowledge Media Institute, United Kingdom
- Helsinki University of Technology, Dipoli, Finland

- Department of Software Engineering and Interactive Systems, Vienna University of Technology, Austria
- University of Regensburg, Germany
- Hearing Research Center and Dept. of Cognitive and Neural Systems, Boston University, USA
- Center for Cognitive Neuroscience and Department of Psychology, Duke University
- Institute of Pathological Physiology, 1st Faculty of Medicine, Charles University, Prague
- Budapest Computational Neuroscience Group, Department of Biophysics, Hungarian Academy of Sciences
- Department of Psychology, University of California at Riverside
- Harvard Medical School – Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston, USA
- University of Dortmund, Germany
- Waseda University, Tokyo, Japan
- Technical University of Czeszochowa
- Tokyo Institute of Technology, Japan
- Kuysu Institute of Technology, Japan
- Université Joseph Fourier Grenoble, IUT 1 (Institut Universitaire de Technologie 1), Grenoble, France
- Heudiasyc UMR CNRS 6599, UTC, Compiègne, France
- Université Henri Poincaré, Laboratoire CRAN (Centre de Recherche en Automatique de Nancy), Nancy 1, France
- Department of Informatics, Technical University, Ostrava, Czech Republic
- Department of Control Systems and Instrumentation, Faculty of Mechanical Engineering Technical University of Ostrava, Czech Republic
- Department of Cybernetics, Czech Technical University Prague, Czech Republic
- Department of Control Engineering, Czech Technical University, Prague, Czech Republic
- Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, Prague, Czech Republic
- Department of Information Engineering, Faculty of Economics and Management, Czech University of Agriculture, Prague, Czech Republic
- University of Hradec Králové, Czech Republic
- Faculty of Mechanical Engineering, Department of Automation, Institute of Information, University of Miskolc, Hungary
- Óbuda University, Budapest, Hungary
- Budapest University of Technology and Economics, Hungary
- California Institute of Technology, Jet Propulsion Laboratory (Dr. Antal, K. Bejczy), USA, California
- Hungarian Academy of Sciences, Computer and Automation Research Institute, Hungary (prof. Gyorgy Kovács)
- Regional Association of the Hungarian Academy of Sciences, Miskolc, Hungary
- Austrian Academy of Sciences, Acoustics Research Institute (Bernhard Laback)
- Auditory Neuroscience Group, Department of Physiology, University of

Sydney

6.3. Membership in International Organizations and Societies

- Jakša, R.: IEEE, Computational Intelligence Society
- Karch, P.: EAEEIE – European Association for Education in Electrical and Information Engineering
- Kopčo, N.: Association for Research in Otolaryngology, Acoustical Society of America, Society for Neuroscience
- Krokavec, D.: Member of the International Federation of Automatic Control IFAC Technical Committee TC 1.4 Stochastic Systems
- Liguš, J.: EAEEIE – European Association for Education in Electrical and Information Engineering
- Madarász, L.: Doctor honoris causa, University of Miskolc (2009)
- Madarász, L.: Honorary professor, Óbuda University Budapest, Hungary (2009)
- Madarász, L.: Honorary Member of the Board of Hungarian Academy of Sciences (2000)
- Madarász, L.: Chairmanship member of the Technical Section, Association of Hungarian Professors (2001)
- Madarász, L.: Honorary Professor, Bánky Donát Polytechnic, Budapest, Hungary (1999)
- Madarász, L.: Membership of Associate Editors, Acta Polytechnica Hungarica, Budapest Tech, Hungary (2004)
- Madarász, L.: Honorary Membership in Hungarian Fuzzy Association, Budapest Hungary (2002)
- Madarász, L.: American Biographical Institute, Gold Record of Achievement, Control of Large Scale Systems, USA (1997)
- Madarász, L.: The American Biographical Institute, The Research Board of Advisors (1996)
- Madarász, L.: Honorary Fellow of microCAD The University of Miskolc (2005)
- Ocelíková, E.; Sinčák, P.; Zolotová, I.: CPRS - Czech Pattern Recognition Society
- Ocelíková, E.: CSSS - Czech and Slovak Society for Simulation
- Machová, K.: ACM – Association of Computer Machinery
- Paralič, J.: ACM – Association of Computer Machinery, IEEE
- Sabol, T.: Information Society Technologies Program Committee (IST PC), 5th Framework Program, Brussels
- Sarnovský, J.: IEEE
- Sarnovský, J.: INES - International Network of Engineers and Scientists for Global Responsibility
- Sarnovský, J.: Principia Cybernetica Web PRNCYB-L
- Sarnovský, J.: SWIIS - Supplementary Ways for Improving International Stability
- Sinčák P.: European Society of Neural Networks
- Sinčák P.: IEEE, Computational Intelligence Society
- Vaščák, J.: IEEE, Computational Intelligence Society
- Zolotová, I.: IEEE, Education Society
- Zolotová, I.: EAEEIE – European Association for Education in Electrical and

Information Engineering

6.4. Membership in Slovak Organizations and Societies

- The whole Department of Cybernetics and Artificial Intelligence is a team member of:
 - Slovak Society for Cybernetics and Informatics
 - Slovak AI Society
- Filasová, A.: Slovak Society for Cybernetics and Informatics
- Krokavec, D.: Slovak Electrical Engineering Society
- Krokavec, D.: Scientific Grant Agency of Slovak Republic
- Krokavec, D.: Member of the Editorial Board of the Journal AT&P, Bratislava
- Madarász, L.: Member of the Editorial Board of the Journal AT&P, Bratislava
- Madarász, L.: Slovak Society for Cybernetics and Informatics
- Madarász, L.: Member of the Editorial Board of the Journal Transfer Inovácií, Faculty of Mechanical Engineering (2006)
- Madarász, L.: Member of the Editorial Board of the Acta Polytechnica Hungarica, Budapest Tech, Hungary (2006)
- Jadlovská, A; Ocelíková, E.; Sarnovský, J.: Slovak Society for Cybernetics and Informatics
- Paralič, J.: Slovak Society for Computer Science
- Sabol, T.: Board of the Open Society Fund, Bratislava
- Zolotová, I.: Slovak Research and Development Agency

6.5. International Networks and Exchange Programs

- EIE-Surveyor, REFERENCE POINT FOR ELECTRICAL AND INFORMATION ENGINEERING IN EUROPE, Project Nr. ELLEIEC-1428414-LLP-1-2008-FR-ERASMUS-ENW, Project funded by the European Commission (SOCRATES Thematic Network), Contact person: Ján Liguš
- Socrates - Erasmus agreement between TU of Košice and Czech University of Life Sciences, Prague, Czech Republic. Contact person: Eva Ocelíková
- Socrates - Erasmus agreement between TU of Košice and Université Henri Poincaré, Nancy 1, France, Contact person: Ján Sarnovský
- Socrates - Erasmus agreement between TU of Košice and University Hradec Kralove, Czech Republic. Contact person: Ján Vaščák
- Socrates - Erasmus agreement between TU of Košice and Univesite de Technologie Compiègne, France, Contact person: Ján Liguš
- Socrates - Erasmus agreement between TU of Košice and Institut Universitaire de Technologie 1 de Grenoble 1, France, Contact person: Jana Ligušová

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	176	107	5

8 OTHER ACTIVITIES

- 8th Slovak – Hungarian Joint Symposium on applied Machine Intelligence (SAMI 2010 - <http://www.sami.tuke.sk/>) has been organized in Smolenice, Slovakia, January 27-29
- 6th Workshop on intelligent and knowledge oriented technologies (WIKT 2011 – <http://www.tuke.sk/fei-cit/wikt2011/>) has been organized in Herľany, Slovakia, November 24-25

9 PUBLICATIONS

9.1. Books

- [1] OCELÍKOVÁ, Eva: Multicriterial decision making (in Slovak). 1. reworked edition. Košice: FEI TU – 2011, 119 p. ISBN 978-80-553-0653-7
- [2] LAZAR, Tobiáš - MADARÁSZ, Ladislav - ANDOGA, Rudolf - BUČKO, Marián - FŐZŐ, Ladislav - HOCKO, Marián - JUDIČÁK, Jozef - KABÁT, Ján - KAROL, Tomáš - MODROVIČOVÁ, Jana - NOVÁK, Branislav: Inovative outputs from the transformed experimental laboratory with a small turbojet engine (in Slovak). Košice: elfa, 2011, 348 p. ISBN 978-80-8086-170-4
- [3] FILASOVÁ, Anna - KROKAVEC, Dušan: Design principles of active robust fault tolerant control systems. In: Robust Control, Theory and Applications. - Rijeca: InTech - Open Access Publisher, 2011, p. 309-338. ISBN 978-953-307-229-6
- [4] FURDÍK, Karol - SABOL, Tomáš - HREŇO, Ján - BEDNÁR, Peter - LUKÁČ, Gabriel - MACH, Marián: A Platform for Semantically Enhanced Business Collaboration of Networked Enterprises. In: Introduction to the Semantic Web: Concepts, Technologies and Applications. Hong Kong: iConcept Press, 2011 p. 121-144. ISBN 978-0-9807330-1-3
- [5] FILASOVÁ, Anna - KROKAVEC, Dušan: Partially decentralized design principle in large-scale system control. In: Recent Advances in Robust Control - Novel Approaches and Design Methods. Rijeka: InTech, 2011 p 361-388. ISBN 978-953-307-339-2
- [6] JADLOVSKÁ, Anna - KATALINIC, B. - HRUBINA, Kamil - MACUROVÁ, Anna - WESSELY, Emil: Optimal Control of Nonlinear Systems with Constraints. In: DAAAM International Scientific Book 2011: Vol. 10, Vienna: DAAAM International, 2011 p. 265-282, [2,3 AH]. ISBN 978-3-901509-84-1, ISSN 1726-9687
- [7] KOPČO, Norbert: Computational Neuroscience: Introduction to modeling of neurophysiological and behavioral data (in Slovak). 1st edition, Košice: TU - 2011. 66 p. ISBN 978-80-553-0816-6
- [8] SARNOVSKÝ, Ján: Cybernetic world (in Slovak). 4. reworked edition. Košice: Elfa, 2011, 180 p. ISBN 978-80-8086-183-4

9.2. Journals

- [1] VLADO, Martin - BIDULSKÝ, Róbert - GULOVÁ, Lucia - MACHOVÁ, Kristína - BIDULSKÁ, Jana - VALÍČEK, Ján - SAS, Ján: The Production of Cracks Evolution in Continuously Cast Steel. In: High Temperature Materials and Processes. Vol. 30, no. 1-2 (2011), p. 105-111, ISSN 0334-6455
- [2] JADLOVSKÁ, Anna - HRUBINA, Kamil: Algorithms of Optimal Control

- Methods for Solving Game Theory problems. In: *Kybernetes*. Vol. 40, no. 1-2 (2011), p. 290-299, ISSN 0368-492X
- [3] PARALIČ, Ján - RICHTER, Christoph - BABIČ, František - WAGNER, Jozef - RAČEK, Michal: Mirroring of knowledge practices based on user-defined patterns. In: *The Journal of Universal Computer Science*. Vol. 17, no. 10 (2011), p. 1474-1491, ISSN 0948-695X
- [4] BEST, Virginia - CARLILE, Simon - KOPČO, Norbert - VAN SCHAİK, Andre: Localization in speech mixtures by listeners with hearing loss. In: *Journal of the acoustical society of America*. Vol. 129, no. 5 (2011), p. EL210-EL215. ISSN 0001-4966
- [5] KOPČO, Norbert - SHINN-CUNNINGHAM, Barbara: Effect of stimulus spectrum on distance perception for nearby sources. In: *Journal of the acoustical society of America*. Vol. 130, no. 3 (2011), p. 1530-1541, ISSN 0001-4966
- [6] VAŠČÁK, Ján - HIROTA, Kaoru: Integrated Decision-Making System for Robot Soccer. In: *Journal of Advanced Computational Intelligence and Intelligent Informatics*. Vol. 15, no. 2 (2011), p. 156-163. - ISSN 1343-0130
- [7] PARALIČ, Ján - BABIČ, František: A new virtual environment for support and evaluation of various knowledge practices based on principles of dialogical learning. In: *International Journal of Technology Enhanced Learning*. - 2011 Vol. 3, no. 2 (2011), p. 162-175, ISSN 1753-5255
- [8] BABIČ, František - PARALIČ, Ján: Knowledge discovery and its potential for real applications. In: *Systems Integration*. Vol. 18, no. 2 (2011), p. 125-136, ISSN 1210-9479
- [9] TUŠANOVÁ, Adela - PARALIČ, Ján: Improving of company's competitiveness by means of Internet and social networks (in Slovak). In: *Systems Integration*. Vol. 18, no. 2 (2011), p. 137-145, ISSN 1210-9479
- [10] BABIČ, František - BEDNÁR, Peter - ALBERT, František - PARALIČ, Ján - BARTÓK, Juraj - HLUCHÝ, Ladislav: Meteorological phenomena forecast using data mining prediction methods. In: *Lecture Notes in Computer Science: Computational Collective Intelligence*. Vol. 6922, no. 1 (2011), p. 458-467, ISSN 0302-9743
- [11] MACHOVÁ, Kristína: Opinion Analysis from the Social Web Contributions. In: *Lecture Notes in Artificial Intelligence: Computational Collective Intelligence: Technologies and Applications: Part 1*. Vol. 6922 (2011), p. 356-365, ISSN 0302-9743
- [12] JADLOVSKÁ, Anna - HRUBINA, Kamil - MAJERČÁK, Jozef: Applications of Stability Theory of Nonlinear Systems and Lyapunov Transformation in Control of Artificial Pneumatic Muscle. In: *Annals of Faculty Engineering Hunedoara: International Journal of Engineering*. Vol. 9, No. 3 (2011), p. 97-102, ISSN 1584-2673
- [13] TUTOKY, Gabriel - PARALIČ, Ján: Time Based Modeling of Collaboration Social Networks. In: *Computational Collective Intelligence: Technologies and Applications: Part 1*. Vol. 6922 (2011), p. 407-418, ISSN 0302-9743
- [14] KOPČANSKÝ, Peter - TIMKO, Milan - HNATIC, Michal - VALA, Martin - ARZUMANYAN, G. M. - HAYRYAN, Edyk A. - VALOVÁ, Lucia - JADLOVSKÝ, Ján: Numerical modeling of magnetic drug targeting. In: *Physics of Particles and Nuclei Letters*. Vol. 8, no. 5 (2011), p. 502-505, ISSN 1531-8567
- [15] KOSTELNÍK, Peter - SARNOVSKÝ, Martin - FURDÍK, Karol: The semantic middleware for networked embedded systems applied in the internet of

- things and services domain. In: Scalable Computing: Practice and Experience. Vol. 12, no. 3 (2011), p. 307-315, ISSN 1895-1767
- [16] FILASOVÁ, Anna - SERBÁK, Vladimír - GONTKOVIČ, Daniel: Analysis of reconfigured control loop with a virtual actuator. In: Advances in Electrical and Electronic Engineering. Vol. 9, no. 2 (2011), p. 90-95, ISSN 1804-3119
- [17] KLIMEŠOVÁ, Dana - OCELÍKOVÁ, Eva: GIS and Image Processing. In: International Journal of Mathematical Models and Methods in Applied Sciences. Vol. 5, no. 5 (2011), p. 915-922, ISSN 1998-0140
- [18] FURDÍK, Karol - BEDNÁR, Peter - LUKÁČ, Gabriel - FRITSCH, Christoph: Support of Semantic Interoperability in a Service-based Business Collaboration Platform. In: Scalable Computing: Practice and Experience: Scientific International Journal for Parallel and Distributed Computing. Vol. 12, no. 3 (2011), p. 293-305, ISSN 1895-1767
- [19] FILASOVÁ, Anna - KROKAVEC, Dušan: Pairwise control principle in large-scale systems. In: Archives of Control Sciences. Vol. 21(57), no. 3 (2011), p. 227-242, ISSN 1230-2384
- [20] KONCZ, Peter - PARALIČ, Ján: Identification of School-Aged Children with High Probability of Risk Behavior on the Basis of Easily Measurable Variables. In: Lecture Notes in Computer Science. No. 7058 (2011), p. 625-634, ISSN 0302-9743
- [21] DOLINSKÝ, Kamil - JADLOVSKÁ, Anna: Application of results of experimental identification in control of laboratory helicopter model. In: Advances in Electrical and Electronic Engineering. Vol. 9, No. 4 (2011), p. 157-166, ISSN 1804-3119
- [22] JAJČIŠIN, Štefan - JADLOVSKÁ, Anna: Control of Laboratory Model of a Hydraulic System. In: ElectroScope. Vol. 2011, No. 3 (2011), 13 p., ISSN 1802-4564
- [23] MACHOVÁ, Kristína - FODOROVÁ, Dominika: Knowledge Discovery from Repository of Web Information. In: American Journal of Intelligent Systems. Vol. 1, no. 1 (2011), p. 37-42
- [24] ŠUSTER, Peter - JADLOVSKÁ, Anna: Tracking trajectory of the mobile robot Khepera II using approaches of artificial intelligence. In: Acta Electrotechnica et Informatica. Vol. 11, No. 1 (2011), p. 38-43, ISSN 1335-8243
- [25] HLADKÝ, Vratislav - POPOVIČ, Ľuboš - SARNOVSKÝ, Ján: Modeling of a System with Hybrid Dynamics. In: Acta Electrotechnica et Informatica. Vol. 11, No. 1 (2011), p. 14 – 19, ISSN 1335-8243
- [26] JADLOVSKÁ, Anna - JAJČIŠIN, Štefan: Generalized Predictive Control Design for a Nonlinear Hydraulic System. In: Acta Electrotechnica et Informatica. Vol. 11, No. 2 (2011), p. 26-32, ISSN 1335-8243
- [27] JAJČIŠIN, Štefan - JADLOVSKÁ, Anna: Simulated Verification of Predictive Control Techniques for Models of Dynamical Systems Using a Designed Graphical User Interface Tool In: Posterus.sk: Portal for Professional Publishing. Vol. 4, No. 5 (2011), p. 1-11, ISSN 1338-0087 (in Slovak)
- [28] POPOVIČ, Ľuboš - SARNOVSKÝ, Ján - HLADKÝ, Vratislav: Laws of information in decentralized control systems. In: Acta Electrotechnica et Informatica. Vol. 11, No. 2 (2011), p. 3-10, ISSN 1335-8243
- [29] ĎURČÍK, Zoltán - PARALIČ, Ján: Transformation of ontological represented web service composition problem into a planning one. In: Acta Electrotechnica et Informatica. Vol. 11, No. 2 (2011), p. 17-25, ISSN 1335-8243

- [30] JADLOVSKÝ, Ján - LACIŇÁK, Stanislav - ČOPÍK, Matej - ILKOVIČ, Ján: Technological level of flexible manufacturing system control. In: Acta Electrotechnica et Informatica. Vol. 11, No. 1 (2011), p. 20-24, ISSN 1338-3957
- [31] SARNOVSKÝ, Ján - LIGUŠ, Ján: Reliability of Networked Control System Using the Network Reconfiguration Strategy. In: Acta Electrotechnica et Informatica. Vol. 11, No. 2 (2011), p. 58-63, ISSN 1335-8243
- [32] SARNOVSKÝ, Ján: Theory of Crisis Control (in Slovak). In: ATP Journal. No. 10 (2011), p. 11-11, 1335-2237
- [33] GONTKOVIČ, Daniel - FÓNOD, Róbert: Control and Stability Analyzing of the Time-Delay Systems with Time-Varying Delays. In: Acta Electrotechnica et Informatica. Vol. 11, No. 3 (2011), p. 70-74, ISSN 1335-8243
- [34] VRANA, Jozef - MACH, Marián: Key concepts extended by vector descriptions to interpret the meaning of ontologies. In: Acta Electrotechnica et Informatica. Vol. 11, No. 3 (2011), p. 57-63, ISSN 1335-8243
- [35] JADLOVSKÁ, Anna: Algorithms of Optimal Control Methods for Nonlinear Systems with Constrains. In: Industrial Engineering. No. 4 (2011), p. 34-39, ISSN 1335-7972
- [36] FILASOVÁ, Anna - KROKAVEC, Dušan: Bounded real lemma improved forms. In: ATP Journal plus. Č. 2 (2011), p. 29-33, ISSN 1336-5010
- [37] KOCSIS, Pavol - FÓNOD, Róbert: Eigenstructure decoupling in state feedback control design. In: ATP Journal plus. No. 2 (2011), p. 34-39, ISSN 1336-5010
- [38] BABIČ, František - WAGNER, Jozef – BEDNÁR, Peter: Java framework for managing semantic repositories based on RDF standard. In: Acta Electrotechnica et Informatica, Vol. 11, No. 1 (2011), p. 33-37, ISSN 1335-8243

9.3. Other publications

Publication Type	Confereces		Other
	Foreign	Home	
Number	42	86	3