

# INSTITUTE OF ROBOTICS AND CYBERNETICS

<http://www.urk.fei.stuba.sk/>

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	<b>Vice-Director for Science and Research,</b>	
	<b>Foreign Relations, and Industry Cooperation:</b> <i>prof. Ing. Peter Hubinský, PhD.</i>	
	<b>Vice- Director for Teaching:</b> <i>doc. Ing. Eva Miklovičová, PhD. (till February 28, 2015)</i> <i>doc. Ing. Jarmila Pavlovičová, PhD. (from March 1, 2015)</i>	
	<b>Secretary:</b> <i>Mgr. Alena Foltinová</i>	<b>Office:</b> <i>Beáta Hochschornerová</i>

## GENERAL INFORMATION:

The Institute of Robotics and Cybernetics (IRC) is one of the top university institutes in Slovakia in the field of automation and control, industrial informatics, cybernetics and robotics. The Institute was established on March 1, 2006 by the integration of the former Department of Automation and Control and Department of Automatic Control Systems.

Till October 2015 IRC was a guarantor of the accredited study programmes: Industrial Informatics (BSc), Applied Informatics – the application domain Information Technologies in Control (BSc, MSc), Cybernetics (MSc), Robotics (MSc), Automation and Control (PhD) and Cybernetics (PhD). Since October 2015 IRC is the guarantor of the accredited study programmes Robotics and Cybernetics in all grades of study (BSc, MSc and PhD) in Slovak and English languages.

The basic research at IRC has been oriented to adaptive, robust and predictive control of complex systems, nonlinear control systems, soft computing methods in control, and recently also to network and robust hybrid control approaches. The main application areas are industrial robotics, service robotics based on various mobile platforms, robot-human interface, bio-cybernetics, power engineering, manufacturing, and process engineering.

Individual research teams prove their expertise by a rich publishing activity including international journals, monographs, and proceedings of the important world-wide international conferences (IFAC, IEEE, ECC etc.).

## Departments of the Institute of Robotics and Cybernetics

### Department of Robotics

Head of department

prof. Ing. Peter Hubinský, PhD

### Department of Cybernetics

Head of department

prof. Ing. Ján Murgaš, PhD.

Department of Control Theory

Head of department

doc. Ing. Miroslav Halás, PhD.

Department of Information Technology

Head of department

Ing. Fedor Lehocki, PhD.

Department of Artificial Intelligence

Head of department

doc. Ing. Ivan Sekaj, PhD.

## I. STAFF

<b>Professors</b>	Peter Hubinský, Ján Murgaš, Vojtech Veselý, Anton Vitko, Milan Žalman
<b>Emeritus Professor</b>	Ladislav Jurišica
<b>Associate Professors</b>	František Duchoň, Peter Fodrek, Miroslav Halás, Ján Kardoš, Zdenka Králová, Eva Miklovičová, Jarmila Pavlovičová, Ivan Sekaj
<b>Assistant Professors</b>	Andrej Babinec, Michal Blaho, Jozef Dorner, Mária Dúbravská, Jozef Dúbravský, Martin Ernek, Jaroslav Hanzel, Ľuboš Chovanec, Slavomír Kajan, Ladislav Körösi, Fedor Lehocki, Leo Mrafko, Tatiana Mudráková, Jana Paulusová, Peter Pásztó
<b>Research Workers</b>	Martin Dekan, Juraj Hnát, Tomáš Murgaš, Jozef Rodina, Daniel Skalický, Juraj Slačka, Stanislav Števo, Marián Tárnik, Michal Tölgyessy, Jozef Vörös
<b>Technical Staff</b>	Radoslav Dibarbora, Alena Foltinová, Pavol Gašparovič, Beáta Hochschornerová (office), Katarína Horváthová, Andrea Semanová, Jozef Turčánik
<b>PhD. Students</b>	V. Bátora, P. Beňo, D. Quang Khanh, M. Florek, R. Goga, J. Kostroš, M. Loderer, Z. Mikulová, D. Pernecký, D. Rau, M. Rebro, M. Smolák, R. Spielmann, M. Szabová, J. Šovčík
<b>PhD. Students (external form)</b>	Sz. Balogh, M. Beniak, J. Dorner, D. Hromada, B. Kadlic, T. Kasanický, J. Korcová, J. Kurilla, M. Maťuga, M. Mydliar, M. Paulus, J. Pristach, S. Štulrajterová, S. Triaška, M. Urban, P. Varga, I. Vargha

## II. EQUIPMENT

### II.1 Teaching and Research Laboratories

The National Robotics Engineering Centre (NREC) was established on April 2014.

The Equipment of the Centre

- Industrial robots ABB IRB 120 and IRB 4600
- OJ-10 - prototype of Slovak industrial robot used for welding
- Prototype of Slovak service robot MRVK created in cooperation with ZŤS VVÚ Košice
- BIPED - walking robot of bipedal type
- QUADROTOR - various types of flying robots
- iROBOT CREATE - development kits
- BLACK METAL - prototype of service robot used in indoor created in cooperation with ATEC s.r.o.
- INDUSTRIAL ROBOT KR-16 - robotized workplace created in cooperation with Kuka and Mia Engineering s.r.o.

- HEXAPODs - hexapod type walking robots
- GULKO - prototype of Slovak spherical robot
- SEGWAY - prototype of Slovak segway type robot
- LASER RANGEFINDERS
- Geodetic localization system LEICA 1200+
- Various visual systems (TIM 160, HDR camera, stereo)
- Industrial robot Mitsubishi
- Humanoid robot NAO
- Robot LWA 4P 6KG 6DOF from company SCHUNK
- Robot Androver
- Force-torque sensors (OptoForce HEX-70-CE-2000N)

#### Other Laboratories

- Schneider-Electric Laboratory
- Continuous Process Control Laboratory
- Laboratory of Network Technologies
- Laboratory of Smart Rehabilitation Systems
- Laboratory of Cybernetics
- Multivariable Systems Laboratory
- Laboratory of Flying Devices
- Laboratory of Control Theory I, II
- Laboratory of Operating Systems
- Laboratory of Biocybernetics
- Laboratory of Smart Servosystems
- Laboratory of Motion Control Systems
- Visual Systems Laboratory
- Laboratory of Theoretical Robotics
- Joint Laboratory of Robotics
- Computational Laboratory of Artificial Intelligence

## II.2 Special Software, Equipment and Tools

### Special Software

- Schneider Electric PLC/HMI software: PL7 Pro, Unity Pro, Twido Soft, Vijeo Designer, XBTL 1000, Vijeo Citec
- Siemens PLC/HMI software: Simatic Step 7, Simatic Step 7 - Micro/WIN, TIA Portal, WinCC, WinCC Flexible
- MATLAB, Maple, MS Visual Studio
- Rockwell Automation (Allen-Bradley) PLC/HMI software: RSLogix 500, RSLogix5000, RSView, RSView Studio, RSEmulate 500, RSEmulate 5000, RSNetWorks (ControlNet, DeviceNet, EtherNet), RSSQL, RSTune, LogixArchitect, RsLinx
- Ubuntu Linux+Octave, Scilab, Open Modelica, gcc, LLVM
- Clinical Decision Intelligence for Mobile Devices, Mobile Diagnostic System
- Lanner Group simulation software Witness

### Special Equipment and Tools

- Schneider Electric control systems: TSX Premium, TSX Micro, Twido, M340, TSX Quantum Hot Standby System
- HMI: XBT-F. Fr. Inv.: ATV58, ATV71. Other: Inductel, Tego Power, Siemens HMI: Comfort panels.

- Fischertechnik industry models: 3-D-Robot TX, Conveyor belts, Indexed lines with two machining stations, Pneumatic Processing Centers, Punching machine with conveyor belt
- Laboratory models: thermal system, hydraulic systems, heat exchanger
- Siemens control systems: Siemens Simatic S7-200, S7-300, S7-400, S7-1200, S7-1500
- Sinamics S120, IWLAN Scalance W, Scalance X204IRT
- Lego NXT robot set, Building automation demonstration set (X10), Xbee communication set, Model of 2-axis positioner, Models of conveyors controlled over Profinet and IWLAN
- Rockwell Automation (Allen-Bradley) control systems: MicroLogix, CompactLogix, ControlLogix, SLC500, PLC5
- Allen Bradley Motor Drives, FLEX IIO Modules, Panel View Plus HMI
- Honeywell control systems: UDC3300, UDC2500
- Model of synchronous generator, ergometer, rehabilitation system based on linear motors, model of the plasma cutting machine
- Laboratory Models: Thermo-optical Model, Two-Tank System, DC Servo Drive System, Multivariable System with DC motors
- Helicopter Model, Thermo-Optical Model, Hydraulic systém
- Body Sensor Network, Universal Biosignal Monitoring System, Continuous Glucose Monitoring System
- HSM150+driver, DC motor+DCS600, AC motor+ACS800
- Portal crane, Tower crane, Juggler, Double Juggler, B&R APC 620 + ACOPOS 1016, Sinamics S 120, SIMOVERT
- iRobot Create robotic platforms, RPLIDAR 360° Laser Scanners, Single-board computers Raspberry Pi 2 Model B with display
- computer cluster

### III. TEACHING

#### III.1 Undergraduate Study (Bc.)

##### Study Programme Industrial Informatics (Summer Semester 2015)

Subject, semester, hours per week for lectures and for seminars or practical exercises, name of the lecturers.

Computer Architecture	(2nd sem., 3-2h)	P. Fodrek
Modeling and Simulation in MATLAB	(2nd sem., 3-2h)	E. Miklovičová, J. Paulusová
Automatic Control Theory 2	(4th sem., 2-3h)	J. Murgaš
Cybernetics 2	(4th sem., 2-2h)	J. Murgaš, J. Paulusová
Java – Object Oriented Computer Programming	(4th sem., 2-2h)	I. Sekaj, M. Blaho
Automation 2	(6th sem., 2-2h)	M. Žalman, J. Dúbravský
Continuous Processes	(6th sem., 3-2h)	E. Miklovičová
Robotics	(6th sem., 3-2h)	P. Hubinský

##### Study Programme Robotics and Cybernetics (Winter Semester 2015)

Applied Mathematics	(3 <sup>th</sup> sem., 2-2h)	M. Halás
Filtering and Signal Processing	(5 <sup>th</sup> sem., 2-2h)	J. Pavlovičová
Information Systems in Health Care	(5 <sup>th</sup> sem., 2-2h)	F. Lehocki
Control Systems	(5 <sup>th</sup> sem., 2-2h)	A. Vitko, L. Körösi
Automatic Control Hardware	(5 <sup>th</sup> sem., 2-2h)	M. Žalman, J. Dúbravský

Artificial Intelligence	(5 <sup>th</sup> sem., 2-2h)	I. Sekaj
Production Systems	(5 <sup>th</sup> sem., 2-2h)	F. Duchoň
Introduction to Automation	(5 <sup>th</sup> sem., 2-2h)	E. Miklovičová, L. Mrafko

### III.2 Graduate Study (Ing.)

#### Study Programmes Robotics, Cybernetics (Summer Semester 2015)

Adaptive Control	(2 <sup>nd</sup> sem., 2-2h)	J. Murgaš, M. Tárník
Network technology 1	(2 <sup>nd</sup> sem., 3-2h)	J. Murgaš, M. Blaho
Advanced Control Theory	(2 <sup>nd</sup> sem., 3-2h)	J. Kardoš, J. Paulusová
Control Methods and Algorithms	(2 <sup>nd</sup> sem., 3-2h)	J. Kardoš
Databases of Control Systems	(2 <sup>nd</sup> sem., 3-2h)	Z. Králová, L. Körösi
Event Systems	(2 <sup>nd</sup> sem., 3-2h)	A. Vitko
Evolutionary Algorithms in Management	(2 <sup>nd</sup> sem. 3-2h)	I. Sekaj
Evolutionary Computing	(2 <sup>nd</sup> sem., 3-2h)	I. Sekaj
Manufacturing Systems and CIM	(2 <sup>nd</sup> sem. 3-2h)	F. Duchoň
Nonlinear Systems: Algebraic Approach	(2 <sup>nd</sup> sem., 3-2h)	M. Halás
System Identification	(2 <sup>nd</sup> sem., 3-2h)	E. Miklovičová
Control of Intelligent Buildings	(4 <sup>th</sup> sem., 3-2h)	I. Sekaj
Intelligent Servosystems	(4 <sup>th</sup> sem., 3-2h)	M. Žalman

#### Study Programme Robotics and Cybernetics (Winter Semester 2015)

Advanced Control Theory	(1 <sup>th</sup> sem., 2-2h)	J. Kardoš, J. Paulusová
Artificial Intelligence 2	(1 <sup>th</sup> sem., 2-2h)	I. Sekaj
Bio cybernetics	(1 <sup>th</sup> sem., 2-2h)	Z. Králová, M. Tárník
Control of Mechatronic Systems	(1 <sup>th</sup> sem., 2-2h)	P. Hubinský
Databases of Control Systems	(1 <sup>th</sup> sem., 2-2h)	Z. Králová, L. Körösi
Event Systems	(1 <sup>th</sup> sem., 2-2h)	A. Vitko
Network Control Systems	(1 <sup>th</sup> sem., 2-2h)	J. Murgaš, L. Mrafko
Project Management	(3 <sup>rd</sup> sem., 2-2h)	F. Lehocki
Systems Identification	(1 <sup>th</sup> sem., 2-2h)	E. Miklovičová
Adaptive Control	(3 <sup>th</sup> sem., 2-2h)	J. Murgaš, M. Tárník
Control of Industrial Robots	(3 <sup>th</sup> sem., 2-2h)	A. Vitko
Embedded Control Systems	(3 <sup>th</sup> sem., 2-2h)	P. Hubinský, J. Rodina
Mobile Robotic Systems	(3 <sup>th</sup> sem., 2-2h)	F. Duchoň

### III.3 Undergraduate Study (Bc.) Distance Learning Method

#### Study Programme Industrial Informatics (Summer Semester 2015)

Subject, semester, hours per week for lectures and for seminars or practical exercises, name of the lecturers.

Computer Architecture	(2 <sup>nd</sup> sem.)	P. Fodrek
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Automatic Control Theory 2	(4 <sup>th</sup> sem.)	J. Murgaš
Java – Object Oriented Computer Programming	(6 <sup>th</sup> sem.)	I. Sekaj, P. Fodrek
Network Technologies	(6 <sup>th</sup> sem.)	E. Miklovičová, L. Mrafko
Robotics	(6 <sup>th</sup> sem.)	P. Hubinský
Continuous Processes	(8 <sup>th</sup> sem.)	E. Miklovičová
Industrial Communication Systems	(8 <sup>th</sup> sem.)	M. Žalman

### III.4 Graduate Study (Ing.) Distance Learning Method

#### Study Programme Robotics and Cybernetics (Winter Semester 2015)

Subject, semester, hours per week for lectures and for seminars or practical exercises, name of the lecturers.

Applied Mathematics	(5 <sup>th</sup> sem.)	J. Paulusová, M. Dúbravská
Automatic Control Hardware	(5 <sup>th</sup> sem.)	J. Dúbravský
Control Systems	(5 <sup>th</sup> sem.)	L. Körösi
Filtering and Signal Processing	(5 <sup>th</sup> sem.)	J. Pavlovičová
Information Systems in Health Care	(5 <sup>th</sup> sem.)	F. Lehocki
Manufacturing Systems	(5 <sup>th</sup> sem.)	F. Duchoň, A. Babinec

#### Study Programme Robotics (Winter Semester 2015)

Advanced Control Theory	(1 <sup>st</sup> sem.)	J. Kardoš
Artificial Intelligence 2	(1 <sup>st</sup> sem.)	I. Sekaj
Control of Mechatronic Systems	(1 <sup>st</sup> sem.)	P. Hubinský
Event Systems	(1 <sup>st</sup> sem.)	A. Vitko
Systems Identification	(1 <sup>st</sup> sem.)	E. Miklovičová

## IV. RESEARCH PROJECTS

### IV.1 National Scientific Projects

- Research centre for severe diseases and related complications. ITMS 26240120038. Duration: 2014-2015 (F. Lehocki)
- Research of technological hubs of CNC cutting machines based on energy beam technologies. 0691/2015. Duration: 2015-2018 (P. Hubinský)
- New generation of interface for service robots teleoperatoric control. APVV-14-0894. Duration: 2015-2017 (F. Duchoň)
- Advanced methods of image processing used in visual systems and their implementation to the educational process, 003STU-4/2014. Duration: 2014-2016 (F. Duchoň)
- Research in the advanced methods of intelligent multi-axis motion control systems, focusing on mobile robotic manipulators, VEGA 1/0178/13. Duration: 2013-2015 (P. Hubinský)
- Research of the service robot control with dual visual perception, APVV-0539-11. Duration: 2012-2015 (F. Duchoň)

- Control systems for energy beam cutting centres, APVV-0504-12. Duration: 2013-2015 (A. Vitko)
- Application of algebraic methods to nonlinear control systems, VEGA 1/0276/14. Duration: 2014-2017 (M. Halás)
- Education innovation in digital image processing, biometrics, machine learning and neural networks, 010STU-4/2014. Duration: 2014-2016 (J. Pavlovičová)
- Modern methods for network control systems, VEGA 1/2256/12. Duration 2012-2015 (J. Murgaš)
- Advanced methods of robust and optimal control. VEGA 1/1241/12 Duration 2012-2015 (V. Veselý)
- ClouDiaDAQ (Diabetic Data Acquisition via Cloud). 2014et004. Duration: 1.4.2015-31.12.2015 (M. Tárník)
- Localization of quadcopter using visual system. 2014et013. Duration: 1.1.2015-30.11.2015 (M. Florek)

## V. COOPERATION

### V.1 International Cooperation

- Czech Technical University in Prague, Czech Republic
- Brno University of Technology, Czech Republic
- Technical University of Ostrava, Czech Republic
- Humusoft Inc, Praha, Czech Republic
- Red Hat Czech, Brno, Czech Republic
- Chinese University of Hong Kong, People's Republic of China
- Institute of Cybernetics at Tallinn University of Technology, Tallinn, Estonia
- Institute de Recherché en Communications et Cybernétique, C.N.R.S., Nantes, France
- DLR – Institute of Robotics and Mechatronics, Germany
- Schneider Electric, Germany
- Budapest University of Technology and Economics, Budapest, Hungary
- Óbuda University, Hungary
- Technical University of Ancona, Italy
- Kyoto University, Kyoto, Japan
- InterOceanMetal, Poland
- Polytechnic University of Timisoara, Romania
- Arzamas Polytechnic Institute of Nizhny Novgorod, State Technical University, Russia
- Russian Academy of Sciences
- Texas Institute of Science, USA
- University of Houston, Texas, U.S.A.
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### V.2 Cooperation in Slovakia

- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Technical University of Košice
- University of Žilina
- Institute of Normal and Pathological Physiology, Slovak Academy of Sciences, Bratislava
- ControlTech, Trnava
- First Welding Company, Bratislava
- HMM, Bratislava
- Legrand, Slovakia
- MicroStep, Bratislava
- PPA Controll, Bratislava
- Rockwell Automation, Bratislava
- Samsung Electronics Slovakia, Galanta
- Schneider Electric Slovakia, Bratislava
- Siemens, Bratislava
- Slovak Electricity Transmission System, Bratislava
- Volkswagen Slovakia, Bratislava

- Vonsch, Brezno
- AerobTec, Bratislava
- AGI, Trenčín
- eTechnology, Hlohovec
- KUKA Roboter CEE GmbH
- Matador Industries, Dubnica nad Váhom
- MIA Engineering, Dubnica nad Váhom
- Mountain Rescue Service Slovakia, Centre for Avalanche Prevention
- Neulogy, Bratislava
- Research and Development Centre AUTOMOTIVE, Dubnica n. Váhom
- Robotika SK, Bratislava
- SCHUNK Intec, Nitra
- SICK, Bratislava
- SMC Industrial Automation, Teplička nad Váhom
- UAVONIC, Bratislava
- ZTS VVU, Košice
- Anext, Bratislava
- IBM Slovensko, Bratislava
- Medirex, Bratislava
- Novartis Slovakia, Bratislava

## **VI. THESES**

### **VI.1 Masters Theses**

Masters theses defended at the Institute of Robotics and Cybernetics. The names of supervisors are in brackets.

#### **Alumni Cybernetics, June 2015**

- Beňo Tomáš: Design of boiler control (A. Kozáková, Institute of Automotive Mechatronics)
- Dziač Lukáš: Process control with PLC Simatic (P. Drahoš, Institute of Automotive Mechatronics)
- Gubánová Katarína: Simulation Experiments for Diabetic Education (M. Tárník)
- Hrušovský Tomáš: Predictive PID control (E. Miklovičová)
- Morvay Michal: Service HMI (L. Körösi)
- Rebro Matúš: Automated insulin administration (M. Tárník)
- Vajs Tomáš: Predictive methods of control (J. Paulusová)
- Varga Štefan: Virtual laboratory of control dynamic systems (P. Bisták)
- Vaško Ján: Collection and visualization of data from sensor network (M. Blaho)

#### **Alumni Robotics, June 2015**

- Balogh Szabolcs: Simulated industrial regulator (L. Körösi)
- Bartusek Róbert: Technology of FDT/DTM (L. Körösi)
- Baxa Tomáš: Workplace design with 6 axis robot guided by 3D camera (T. Mudráková)
- Belica Peter: Multi-Axis positioning with Profinet (L. Mrafko)
- Benčíč Ján: Control of moving opened container with liquid (P. Hubinský)
- Blažeják Lukáš: Design of adaptive servo system with position control (M. Žalman)
- Bubniak Patrik: Optimal drive control with control systems (L. Körösi)
- Écsy Dávid: Electromechanical jack for automobiles (V. Goga)
- Gallo Vladimír: Assisting robots for intelligent buildings (F. Duchoň)
- Gašparovski Viktor: Control design of sphere robot (P. Hubinský)
- Gubán Andrej: Rotation speed measuring device (J. Dúbravský)
- Hammad Amir: Hand-tracking and gesture classification using Kinect (S. Kajan)



- Hlavatovič Marek: Exploitation of Force-Torque sensor for guidance and learning industrial manipulators (A. Babinec)
- Holka Peter: Modern methods used for control linear servodrive using elements of artificial intelligence (T. Mudráková)
- Hrmo Martin: The use of visual system in ROS (P. Pásztó)
- Ivančin Ivan: Biometric sensor system with wireless transfer of data (J. Murgaš)
- Jablonický Jozef: Control of hydraulic system (P. Ťapák, Institute of Automotive Mechatronics)
- Körmendy Peter: Parabolic solar collector with automatic inching towards sun (A. Babinec)
- Kusý Roman: Intelligent temperature control in the building (P. Drahoš, Institute of Automotive Mechatronics)
- Lietavec Lukáš: Model of spherical robot (P. Hubinský)
- Ližičiar Marek: Determining the location of mobile robots in formation (P. Hubinský)
- Lojek Tomáš: Remotely controlled exploratory robot system (J. Hanzel)
- Machovský Andrej: Linear autonomous control based on computed torque method (A. Vitko)
- Mikulová Zuzana: Localization of mobile robot using visual system (F. Duchoň)
- Pavlovič Peter: Cyber security (L. Körösi)
- Pavol Miroslav: Creating the control system by code generating (M. Blaho)
- Rafay Peter: Robust control of 2-DOF robot with VSS observer (J. Kardoš)
- Rajský Dominik: Navigation of mobile robot using visual system (P. Pásztó)
- Sliva Martin: Monitoring variables in the electric network (M. Ernek)
- Suchý Daniel: Robust controller design for 3D laboratory model of crane crab (M. Hypiusová)
- Szabová Martina: Localization of a mobile robot using GNSS systems by the means of artificial intelligence (F. Duchoň)
- Štipčák Peter: Use of industrial robot and camera system for sorting parts (A. Babinec)
- Trubač Ondrej: AMAV/Segway two-wheeled mobile robot (F. Rodina)
- Uhrín Matúš: Tracking antenna for unmanned aerial vehicles (R. Balogh, Institute of Automotive Mechatronics)
- Vívodík Martin: Wireless sensor network security (M. Blaho)
- Vondráček Martin: Multiagent system in mobile robotics (F. Duchoň)

#### **Alumni Robotics, June 2015 (Distance Learning Method)**

- Chovanec Jozef: Control of mobile robot with visual system (J. Hanzel)
- Pavelka Vladimír: Navigation of a mobile robot in a map created with RGBD camera (F. Duchoň)
- Rubint Stanislav: Automated measuring workplace with tensometers (J. Šturcel, Institute of Automotive Mechatronics)
- Vanko Miroslav: Position control design for linear servo drive Siemens (T. Mudráková)

## **VI.2 PhD Theses**

### **Automation and Control**

- Jarčuška M.: Positioning system design of the radial magnetic bearing (M. Žalman)
- Škrlec, I.: Nonlinear control of AC drives for energy-beam CNC cutting machines (M. Žalman)
- Slačka J.: Onboard computer of Slovak CubeSat satellite (M. Halás)

### **Cybernetics**

- Ottinger I.: Adaptive algorithms for artificial pancreas (J. Murgaš)
- Ludwig T.: Biocybernetic models of type 1 diabetes mellitus (E. Miklovičová)
- Ilka A.: Gain-scheduled controller design (V. Veselý)
- Ciba M.: Design of optimization algorithms on ant colony simulation basis (I. Sekaj)

## **VI.3 Achievements of students**

- Juraj Slačka - Commemorative sheet of Saint Gorazd for the doctoral dissertation "Onboard computer of Slovak CubeSat satellite". The award was granted by the Ministry of Education, Science, Research and Sport of the Slovak Republic
- Adrian Ilka - The best paper of the section Mechatronics and Automation at 17th Conference of Doctoral Students ELITECH '15, Bratislava

## VII. OTHER ACTIVITIES

### VII.1 Conferences and events organized or co-organized by the Institute, membership in committees

- Istrobot: Competition of Mobile Robots, Bratislava, April 2015 (P. Hubinský, M. Dekan, J. Rodina, J. Slačka - Jury members)
- 2nd IEEE EMBS Summer School on Emerging Technologies and Application in Telemedicine, Smolenice (F. Lehocki)
- 8th IFAC Symposium on Robust Control Design, Bratislava 2015 (V. Veselý - IPC member)
- IEEE Region 8 EuroCon – EUROCON 2015, Int. Conf. on Circuits and Systems, Multimedia, Information and Communication Technology and Power Systems (Pavlovičová-PC member)
- Redžúr 2015 – 9th International Workshop on Multimedia and Signal Processing, (Pavlovičová-PC member)
- CLAWAR Conference 2015, HangZhou, China (A. Vitko – PC member)
- 4th International Conference on Connected Vehicles and Expo 2015, Shenzhen, China (F. Lehocki - TPC member)
- ELOSYS 2015, Trenčín (J. Murgaš, M. Blaho - PC members)
- International Conference Technical Computing Bratislava 2015 (T. Mudráková, M. Blaho - PC members)
- 17th Conference of Doctoral Students ELITECH`15 (E. Miklovičová, I. Sekaj - PC members, M. Tárnik - OC member)

### VII.2 Membership in Editorial Boards and Committies

- AT&P Journal (L. Jurišica, J. Murgaš, V. Veselý, M. Žalman – Editorial Board members)
- Journal of Electrical Engineering (V. Veselý – member of Editorial Board)
- Selected Topics in Modeling and Control (V. Veselý – Editor, L. Jurišica – Editorial Board member)
- Transactions of the Institute of Measurement and Control (A. Vitko – associate editor)
- Cooperation with Encyclopaedic Institute of the Slovak Academy of Sciences on Encyclopaedia Beliana - Lexical Group Cybernetics: (L. Harsányi, L. Jurišica, M. Žalman)

### VII.3 Other Activities

- National Robotics Engineering Centre, civic assoc. (F. Duchoň, P. Hubinský, J. Murgaš, J. Rodina, M. Tölgyessy, Ľ. Chovanec, M. Dekan, P. Pászto, A. Babinec - members)
- The potential of cooperation with public research organizations - an invited lecture within a workshop System Support for Automation, Robotics and Digital Technologies at the Slovak Innovation and Energy Agency (F. Duchoň)
- Software developing for the first slovak satellite skCube (J. Slačka as a member of SOSA - Slovak Organization for Space Activities)
- Computer Viruses Analysis ESET Ltd. Bratislava (P. Hubinský)
- Administration of Shareware Archive of Slovak Antivirus Centre (P. Hubinský)
- Schneider-Electric Courses, Automation and Control Systems (L. Körösi)

## VIII. AWARDS, MEMBERSHIPS IN INSTITUTIONS AND COMMITTEES

### VIII.1 Awards

- F. Duchoň et al.: winner of the Tech Transfer Award Slovakia 2015 in the category The best innovator approach to technology transfer
- F. Duchoň et al.: TOP 3 in the category Innovation with the highest potential for the application in practice (within Tech Transfer Award Slovakia 2015)

### VIII.2 Membership in International Institutions/Committees

- Local Steering Committee within a project REinEU 2016 - Re-Industrialisation of the European Union (F. Duchoň)
- Association for Computing Machinery (P. Fodrek)
- IEEE Computer Society (P. Fodrek)
- IEEE Engineering in Medicine & Biology Society (F. Lehocki)
- IEEE Institute of Electrical and Electronics Engineers, Inc. (M. Žalman, J. Murgaš, V. Veselý)
- IEEE Robotics & Automation Society (A. Babinec, M. Blaho, F. Duchoň, P. Fodrek, P. Hubinský, Ľ. Chovanec, L. Körösi, E. Miklovičová, T. Mudráková, J. Murgaš, J. Rodina, M. Tárník – members)
- IEEE Young Professionals (A. Babinec - member)
- IEE Institute of Electrical Engineers, Inc. (M. Žalman, P. Hubinský)
- IFAC Technical Committee: TC 1.2 Adaptive and Learning Systems (J. Murgaš)
- IFAC Technical Committee: TC 2.3 Nonlinear Control Systems (M. Halás)
- IFAC Technical Committee: TC 2.5 Robust Control (V. Veselý)
- IFAC Technical Committee: TC 4.3 Robotics (P. Hubinský)
- IFAC Coordinating Committee CC4 Mechatronics, Robotics and Components (P. Hubinský)
- Association for Computing Machinery (P. Fodrek - member)
- CLAWAR – Climbing and Walking Robots Association (A. Vitko)
- IMEKO -International Measurement Confederation, TC 17 - Technical Committee on Robotics (A. Vitko)

### VIII.3 Membership in National Institutions/Committees

- Accreditation Commission - an advisory body to the Government, Working Group Research 16 (L. Jurišica, J. Murgaš)
- working group Information and communication technologies at the Ministry of Education, Science, Research and Sport of the Slovak Republic (F. Duchoň)
- Main Committee of the Slovak Society for Cybernetics and Informatics at the Slovak Academy of Sciences (V. Veselý – vice-chair, L. Jurišica, J. Murgaš, M. Žalman, I. Sekaj - members)
- Slovak Organization for Space Activities (J. Slačka)

## IX. PUBLICATIONS

### Books

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5. VESELÝ, Vojtech - HARSÁNYI, Ladislav. *Robust control. Applications*. 1. ed. Bratislava : STU Publishing house, 2015. 222 p. ISBN 978-80-227-4339-6. (in Slovak)
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3. KOHÚT, Miroslav - BARTOŠOVIČ, Matej - DOBIŠ, Michal - DUCHOŇ, František - BABINEC, Andrej. Starting with ROS (1). In *ATP Journal*. Vol. 22, Iss. 12 (2015), p. 32-35. ISSN 1335-2237. (in Slovak)
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