



INSTITUTE OF RADIOELECTRONICS
WARSAW UNIVERSITY OF TECHNOLOGY
FACULTY OF ELECTRONICS AND INFORMATION TECHNOLOGY



ANNUAL REPORT

2007

Warsaw, February 2008

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From the Director

Welcome to the 2007 edition of our Annual Report!

Once again I have the pleasure to open the Annual Report of the Institute of Radioelectronics, Warsaw University of Technology, WUT. Our Institute places itself among the biggest units of the University, employing 90 persons (didactic, scientific and administrative) and has over 40 Ph.D. students under its guardianship. Among our teaching staff there are 14 Professors, 2 Docents and 44 Assistant Professors. The Institute enjoys good image not only at WUT, but also throughout the country and on the international arena.

The previous year was particularly productive and successful with regard to the number of international projects co-financed within the scope of the 6th European Framework Programme. The most spectacular was CODMUCA – *Core Subsystems for Delivery of MultiBand Data in CATV Networks* – the project realized by young teams from the Divisions of Television and Radiocommunications, coordinated by Dr Andrzej Buchowicz. It was the biggest (in terms of the amount of funds and the significance of the Polish team contribution) European project in which the workers of the Warsaw University of Technology were engaged. The new developed multiband technology allows for a significant acceleration of data transmission in cable television networks. The successful presentation at the Broadband World Forum Europe 2007 may result in the implementation of the project outcomes by leading CATV European operators. Another creditable example of an international co-operation is our long-term collaboration with the world-known physics laboratory CERN. Within the frame of the Compass experiment, the Division of Nuclear and Medical Electronics run by Prof. Krzysztof Zaremba has been constructing the softcomputing techniques for data analysis and detectors front-end electronics. Some of our teams can also pride themselves on important implementations on domestic market. The most significant was a project for Netia S.A. coordinated by Dr Wojciech Wojtasiak from the Division of Microwave and Radiolocation Engineering. Its main purpose was the frequency band conversion in point-to-multipoint radiocommunication systems, which resulted in the adjusting of their standards to the EU regulations.

Owing to all the teaching and scientific successes, a few of our teams are rated as the world's leading authorities in their disciplines. The prestige that the Institute has gained among the national and world academia as well as among the international research market is legitimated by the fact that we were entrusted with organizing or co-organizing many prominent conferences or workshops, such as the IEEE Instrumentation and Measurement Technology Conference, in May, and the IEEE EUROCON – International Conference on "Computer as a Tool", in September. The Institute can also vaunt significant number of Professors who have been serving on technical committees of many prestigious conferences, and are members of international prominent institutions.

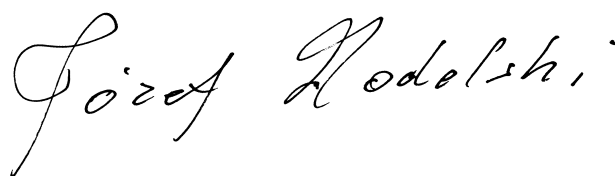
Last year also abounded in teaching achievements. First and foremost, this year a novel and precedent discipline has been launched in our Institute – the Biomedical Engineering. It is an interdisciplinary specialization, run in collaboration with the Faculty of Mechatronics, in a very interesting field of science and education, at the meeting of medicine, biology and technique. Comprehensive analyses of the current world science trends indicate that this relatively new branch of science will constitute a great challenge in the next several years. Another significant element in the Institute's educational accomplishments is the annually high number of the certified B.Sc. and M.Sc. graduates – nearly 200 every year. We were also successful in continuation of the evening and extra-mural courses, as well as the specialized in-house courses – RADEM, tailored to the needs of the companies' profiles.

Last year, our teaching staff received the highest academic positions. Two of our Professors – Wojciech Gwarek and Władysław Skarbek were appointed tenured professors. In 2007, the process of taking doctorates in our Institute was productive – 4 dissertations were defended, and there are many still under reviews. Last year, our staff, in particular its young representatives, were frequently awarded for their research and development achievements, both in the country and abroad.

Another Institute's strength is its laboratory base, which leading edge apparatus is an excellent grounds for educating future engineers and is essential in carrying out the research and development projects. The Institute tries its best to keep the instrumentation constantly modernized and grown. We can also count on the generosity of the Polish market key players, who believe in supporting the development of Polish science.

Lastly, I would like to thank all our Friends, Sponsors and Supporters who contributed to another successful year of our Institute – all our accomplishments could not have been gained if it had not been for Your sincere involvement and cordial support. I hope all of You will remain with the Institute and still play a significant role in its development and prosperity.

Warsaw, February 2008

A handwritten signature in black ink, reading "Józef Modelski". The script is cursive and elegant, with a large initial 'J' and a distinct dot over the 'i'.

Professor Józef Modelski

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This Annual Report summarizes the research activities of the Institute in 2007, as well as the teaching activities of the academic year 2006/2007

1 GENERAL INFORMATION

1.1 Mission of the Institute

In defining its mission, the Institute of Radioelectronics is amenable to contemporary needs of academia, industry, and society. Therefore, it aims at the three measurable objectives: to provide teaching of societal relevance; to seek excellence in scientific research; and to run projects meeting the international standards. Technically, we focus on the three well-defined specializations: radiocommunications, multimedia, and biomedical engineering. These are very well perceived by our students and partners in national and international activities.

As educators, our staff performs sterling work and exhibit immense stamina. The effects are directly measurable in terms of quality and numbers of supervised diplomas. Our graduates prove competitive on the demanding job market in Poland and abroad. They find employment in telecommunication services, mobile communications, information technology, television, and also in public services. We reach further into these sectors through the successful scheme of continuing education. The offer of courses including Radiocommunications and Multimedia Technologies attracts an increasing number of participants.

As researchers, we are faithful to the highest standards of the Faculty and the University. We also feel quite unique due to an extremely broad spectrum of addressed subjects, which comprise:

- electromagnetic and acoustic field theory, acoustic and electromagnetic wave generation and propagation,
- signal theory, processing, coding, transmission, with regard to electronic, electroacoustic, and TV signals,
- radio transmitting and receiving,
- radiocommunication terrestrial and satellite systems,
- physical phenomena in radio engineering, acoustic, nuclear engineering, and medical systems,
- biomedical signal analysis, medical imaging, medical informatics,
- X-ray, MR, and emission tomography,
- detection and spectrometry of radiation,
- analysis and synthesis of electronic systems,
- intelligent multimedia systems and multimedia converged (video, data, and voice),
- measuring methods and systems,
- analysis, measurement, and estimation of sound and image distortion.

It is also our ambition to implement the new scientific knowledge into a good engineering practice. The Institute covers the full process of technological development, from innovative ideas up to the construction of prototypes. The products are applicable in: radio communication systems, radio-location antennae, television equipment, radio-monitoring systems, high-efficiency energy sources, high-power radio engineering devices, equipment for time and frequency services, biomedical instrumentation, measurement systems involving industry, nuclear engineering for scientific research, medicine, and food industry.

The Foundation for Development of Radiocommunications and Multimedia Technologies plays a special role in perpetuating scientific research within our Institute and the whole Faculty. The Foundation subsidizes undergraduate and graduate scholarships. It monitors and awards the progress of young Polish researchers. Its generous support helps us face the socio-economical obstacles, and compete with commercial opportunities awaiting the young people on the open market.

1.2 Board of Directors

Director of the Institute

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1.3 Organization of the Institute

The Institute of Radioelectronics consists of the following research and teaching divisions:

- Electroacoustics Division;
- Microwave and Radiolocation Engineering Division;
- Nuclear and Medical Electronics Division;
- Radiocommunications Division;
- Television Division.

The structure of the Institute also includes Library, Financial Section, and Supply Section.

1.3.1 Electroacoustics Division

Head of Division

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Senior academic staff

Wiesław Winiecki, D.Sc., Professor
 Jan Żera, D.Sc., Associate Professor (0.5)
 Piotr Bobiński, Ph.D., Assistant Professor
 Ewa Kotarbińska, Ph.D., Assistant Professor (0.5)

Andrzej Leszczyński, Ph.D., Assistant Professor (0.5)
 Krzysztof Mroczek, Ph.D., Assistant Professor
 Maria Tajchert, Ph.D., Assistant Professor

Junior academic staff

Aleksandra Młyńska, M.Sc., Assistant (0.5)

Technical staff

Tomasz Daniluk, M.Sc., R&D Engineer (0.5)
 Robert Łukaszewski, Ph.D., Senior R&D Eng. (0.5)
 Piotr Nykiel, M.Sc., Senior Development Engineer (0.5)

Ph.D. students

Rafał Korycki, M.Sc., from Feb. 2007
 Aleksandra Młyńska, M.Sc., from Oct. 2004
 Marcin Stolarski, M.Sc., from Oct. 2004
 Aneta Świercz, M.Sc., from Oct. 2002
 Konrad Wojdan, M.Sc., from Oct. 2005

Retired:

Andrzej Aronowski
 Jerzy Narkiewicz-Jodko, Ph.D.

The activities of the Division concern electroacoustics and digital audio techniques including investigations, measurements and applications. They are focused on:

- digital audio;
- design and measurements of electroacoustic transducers;
- investigation and modeling of acoustic field distribution;
- noise control and active noise reduction;
- psychoacoustics;
- architectural and industrial acoustics;
- sound studio techniques;
- hearing protection.

Current research topics include:

- digital audio signal processing;
- low-level acoustic signals measurements and analysis;
- objective and subjective methods of sound quality evaluation;
- detection of auditory warning signals in the presence of industrial noise;
- elaboration of computation methods for acoustic field radiated in free space by surface acoustic sources and their implementation on a PC.

The other field of interest concerns fundamental and applied research associated with metrology, instrumentation and measuring systems. It is focused on design of automated computer-based measuring systems. Current research topics include:

- software environment for computer-aided design of measuring systems;
- virtual instrumentation, plug-in boards for data acquisition, IEEE-488 equipment;
- modern information technologies, e.g. LabVIEW, Java, XML, and modern communication technologies, e.g. the Internet, GSM, Bluetooth, in distributed control and measuring systems;
- distributed measuring systems.

GENERAL INFORMATION

The Division is equipped with an anechoic chamber and sound studio with two control rooms.

1.3.2 Microwave and Radiolocation Engineering Division

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Małgorzata Celuch, Ph.D., Assistant Professor
Daniel Gryglewski, Ph.D., Assistant Professor
Przemysław Miazga, Ph.D., Assistant Professor
Maciej Sypniewski, Ph.D., Assistant Professor
Andrzej Więckowski, Ph.D., Assistant Professor
Wojciech Wojtasiak, Ph.D., Assistant Professor
Jolanta Zborowska, Ph.D., Assistant Professor
Krzysztof Robaczyński, M.Sc., Senior Lecturer (0.5)

Technical staff

Krzysztof Robaczyński, M.Sc., Senior R&D Engineer (0.5)
Mirosław Lubiejewski, Foreman

Ph.D. students

Grzegorz Bernatek, M.Sc., from Feb. 2004
Andrzej Dominik, M.Sc., from Oct. 2004
Michał Grabowski, M.Sc., from Feb. 2007
Dawid Rosołowski, M.Sc., from Oct. 2005
Bartłomiej Salski, M.Sc., from Feb. 2006
Michał Sołtysiak, M.Sc., from Oct. 2007

The Microwave and Radiolocation Engineering Division conducts scientific and applied research in the area of electromagnetic field theory, microwave theory and techniques, measurement techniques for very high frequency range as well as computer-aided design, data acquisition and data processing. Specific research topics in 2007 included:

- design of high-frequency systems for radar techniques and radio-communications (oscillators, synthesizers, modulators, amplifiers, high-power noise sources, transmitter/receiver modules);
- methods of synthesis and computer-aided design of passive and active microwave circuits (couplers, power combiners and dividers, switches, transistor circuits);
- analysis and design of multi-element planar in-phase radar antenna arrays intended to work at high power level;
- methods for measurements of electric and magnetic properties of materials at microwave frequencies;
- development of numerical methods and implementation of computer programs for full-wave analysis and design of two- and three-dimensional microwave circuits (filters, periodic guiding structures, matching circuits, structures incorporating dispersive and anisotropic media, antennae);
- methods of coupled electromagnetic-thermodynamic simulations,

- design of microwave heating applicators;
- radio-frequency identification and wireless sensing;
- development of non-linear programming and artificial intelligence methods, and their application in the automated design of microwave circuits.

1.3.3 Nuclear and Medical Electronics Division

Head of Division

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Piotr Brzeski, Ph.D., Docent
Piotr Bogorodzki, Ph.D., Assistant Professor
Grzegorz Domański, Ph.D., Assistant Professor
Marian Kazubek, Ph.D., Assistant Professor
Bogumił Konarzewski, Ph.D., Assistant Professor
Robert Kurjata, Ph.D., Assistant Professor (from Oct. '07)
Lechisław Padée, Ph.D., Senior Lecturer (0.33, to Sept. '07)
Ewa Piątkowska-Janko, Ph.D., Assistant Professor
Dariusz Radomski, Ph.D., Assistant Professor
Waldemar Smolik, Ph.D., Assistant Professor
Roman Szabatin, Ph.D., Assistant Professor
Tomasz Jamrógiewicz, M.Sc., Senior Lecturer
Tomasz Olszewski, M.Sc., Senior Lecturer

Junior academic staff

Marcin Ziembicki, M.Sc., Assistant (0.5, from Dec. '07)

Technical staff

Andrzej Wasilewski, Worker
Joanna Witkowska, Senior Technician

Ph.D. students

Piotr Czarnecki, M.Sc., from Oct. 2007
Michał Dziewiecki, M.Sc., from Oct. 2005
Rafał Józwiak, M.Sc., from Oct. 2006
Wojciech Padée, M.Sc., from Oct. 2004
Lech Raczyński, M.Sc., from Oct. 2006
Tymon Rubel, M.Sc., from Oct. 2003
Krzysztof Woźniak, M.Sc., from Oct. 2006
Anna Wróblewska, M.Sc., from Oct. 2002
Marcin Ziembicki, M.Sc., from Mar. 2004

Retired:

Zdzisław Pawłowski, Prof. D.Sc.
Waldemar Scharf, Ph.D.

The research and teaching activities carried out in the Nuclear and Medical Electronics Division are concentrated on two areas: biomedical engineering and nuclear electronics. Research in the interdisciplinary area of biomedical engineering covers a broad range of topics and integrates sophisticated electronics and information technology with elements of medical knowledge. The activity in the area of nuclear engineering is concentrated on the design of electronics systems and data processing software for

high energy physics experiments. The Division's research is focused on the following topics:

- nuclear medicine (emission tomography: SPECT, PET);
- magnetic resonance imaging (MRI), functional MRI, advanced applications of MRI;
- quantitative computer-aided tomography;
- tomographic dynamic studies;
- process tomography, impedance tomography;
- analogue and digital radiography;
- medical image processing and recognition;
- methods and instrumentation for electrocardiography, high resolution electrocardiography and electroencephalography;
- medical applications of isotope techniques;
- telemedicine;
- biomedical accelerators;
- design of apparatus and software for high energy physics experiments;
- mathematical modeling of physiological and disease processes.

Areas of recent studies include:

- advanced applications of MRI and CT imaging systems, covering: dynamic tomographic studies, a new methodology and instrumentation developments for functional MRI, image analysis methods for fMRI;
- multi-modal imaging of topographic, tomographic and functional studies in medicine;
- electrical instability of heart study, high resolution ECG systems for electrical instability research;
- telecardiology, teleradiology, teleinformation medical systems;
- application of multi-scale transforms for data processing;
- image data compression, content-based indexing and retrieval; semantic descriptors;
- computer-aided diagnosis systems (mammography, CT, US);
- visualization and analysis of dynamic exams (contrast US and CT, bronchoscopy);
- digital structural radiography, modeling of radiographic imaging systems;
- optical tomography applications in medicine;
- algorithms for image reconstruction for electrical and process tomography;
- construction of capacitance tomographs and sensors for medical and industrial applications;
- methodology of study design and biostatistical models application for clinical data analysis; application of predictive models in algorithms of medical diagnosis;
- algorithms for the data analysis in genomics and proteomics;
- development of detectors and front-end electronics for high energy physics experiments; applications of "soft-computing" methods (neural networks, genetic algorithms, etc.) for data processing and optimization of the experimental setup in high energy physics experiments.

1.3.4 Radiocommunications Division

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 Yevhen Yashchyshyn, D.Sc., Associate Professor
 Tomasz Kosiło, Ph.D., Docent
 Tomasz Buczkowski, Ph.D., Assistant Professor
 Jacek Cichocki, Ph.D., Assistant Professor
 Krzysztof Czerwiński, Ph.D., Assistant Professor
 Krzysztof Derzakowski, Ph.D., Assistant Professor
 Wojciech Kazubski, Ph.D., Assistant Professor
 Tomasz Keller, Ph.D., Assistant Professor
 Jerzy Kołakowski, Ph.D., Assistant Professor
 Krzysztof Kurek, Ph.D., Assistant Professor
 Stanisław Maszczyk, Ph.D., Assistant Professor (to Sept. '07)
 Mirosław Mikołajewski, Ph.D., Assistant Professor
 Juliusz Modzelewski, Ph.D., Assistant Professor
 Karol Radecki, Ph.D., Assistant Professor
 Kajetana Snopek, Ph.D., Assistant Professor
 Zbigniew Walczak, Ph.D., Assistant Professor
 Henryk Chaciński, M.Sc., Senior Lecturer

Technical staff

Anna Czarnecka, M.Sc., Senior Devel. Engineer (0.6)
 Jacek Jarkowski, Ph.D., Senior R&D Engineer, (0.5 to Jun. '07)
 Marek Marcinkowski, Senior Foreman
 Stanisław Żmudzin, M.Sc., Senior R&D Engineer (0.25)

Ph.D. students

Paweł Bajurko, M.Sc., from Oct. 2004
 Grzegorz Bernatek, M.Sc., from Oct. 2004
 Kamil Bryłka, M.Sc., from Oct. 2006
 Marek Bury, M.Sc., from Oct. 2004
 Marcin Dąbrowski, M.Sc., from Oct. 2006
 Andrzej Dominik, M.Sc., from Oct. 2004
 Cezary Jezierski, M.Sc., from Oct. 2007
 Sebastian Kozłowski, M.Sc., from Oct. 2004
 Paweł Ziętek, M.Sc., from Oct. 2006

Retired:

Jan Ebert, Prof. D.Sc.
 Stefan Hahn, Prof. D.Sc.
 Waldemar Kielek, D.Sc.,
 Jacek Jarkowski, Ph.D.

The research and teaching activities of the Radiocommunications Division are related to radiocommunication systems and networks, antennas, signal processing and measurement techniques. Research is focused on digital radio transmission and radio system design using advanced CAD methods, particularly cellular and short range systems, radio transmitting and receiving, as well as some aspects of electromagnetic compatibility. Current research topics include:

- radiocommunication systems and networks – cellular networks (3G and beyond 3G), short range systems, ultra-wideband systems (UWB), methods and systems for radio positioning, systems for road safety, radio frequency identity devices (RFID), ad-hoc networks, satellite systems and broadband access networks,
- antennas and radio waves propagation – electrodynamic modeling and design of different types of microwave and mm-wave antennas, including electronically controlled beam steering and electronically reconfigurable antennas, as well as automatic near-field measurements of antennas characteristics and the modeling of propagation channel;
- radiocommunication measurements – spectrum monitoring methods and systems; automation of radiocommunication devices measurements;
- radio frequency power devices – class D, DE, E and C resonant power amplifiers, linear wide-band short-wave amplifiers, high-power amplitude modulators, high-efficiency power supplies, low-noise amplifiers, microwave filters and phase shifters;
- theory of signals and modulations – multidimensional Hilbert transform and its applications, "time-frequency" transformations for radio-frequency signal processing, applications of "time-frequency" techniques in audio watermarking;
- advanced numerical methods – circuits and systems design and optimization;
- environmental and biological problems – the influence of radio communication systems on a human health and environment as well as on electronic equipment, protection zones planning;
- fault diagnosis in analog systems.

1.3.5 Television Division

Head of Division

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 Andrzej Miękina, Ph.D., Assistant Professor
 Grzegorz Pastuszek, Ph.D., Assistant Professor
 Andrzej Podgórski, Ph.D., Assistant Professor
 Marek Rusin, Ph.D., Assistant Professor (0.5)
 Tomasz Krzymień, M.Sc., Senior Lecturer

Technical staff

Tomasz Smakuszewski, M.Sc., R&D Engineer (0.5)

Ph.D. students

Stanisław Badura, M.Sc., from Oct. 2004
 Marcin Jędryka, M.Sc., from Feb. 2007
 Agata Latała, M.Sc., from Oct. 2006
 Mariusz Leszczyński, M.Sc., from Oct. 2005
 Jacek Naruniec, M.Sc., from Oct. 2006
 Artur Nowakowski, M.Sc., from Feb. 2006

Michał Tomaszewski, M.Sc., from Mar. 2004

Television Division conducts scientific and applied research in multimedia technologies. The Division is also experienced in e-learning standards and platforms with a special emphasis on multimedia tools for collaborative e-learning using media streaming and searching techniques. The Division continues its efforts in the development of MPEG standards (MPEG-4 and MPEG-7). The staff of the division actively works in Multimedia Technical Committee no. 288 at Polish National Committee for Standardization. The Technical committee is hosted at the Institute of Radioelectronics.

Specific research topics in 2007 included:

- video and audio compression;
- intelligent multimedia systems;
- networked audiovisual systems for immersive environments;
- 3D object modeling;
- image processing, analysis and recognition;
- multimedia database indexing;
- object tracking and recognition;
- hardware architectures for video compression technologies;
- digital and interactive TV in the Internet;
- selected topics in the design of cable television networks.

The laboratory named *Digital Processing of Measurement Signals* (R. Z. Morawski, A. Miękina, and A. Podgórski) is active in the field of measurement science and technology. Its research activities are focused on improving the quality of measurements by means of digital signal processing; the current research topics include:

- general-purpose algorithms for reconstruction of measurands and for calibration of measuring channels;
- spectrophotometric analyzers for applications in industrial and environmental monitoring;
- portable sound-and-vibration analyzers for applications in technical diagnostics and in the environmental monitoring.

1.4 Evening Studies and Continuing Education

1.4.1 M.Sc. Evening Studies on Radiocommunications and Multimedia Technologies

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Board of Consultants

Tadeusz Morawski, Prof. D.Sc. (chairman),
Sławomir Kula, Ph.D.,
Waldemar Radzikowski, Ph.D.

1.4.3 Postgraduate Studies

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1.4.4 Studies on Radiocommunications, Multimedia Technologies and Biomedical Engineering "RADEM"

Head

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Program Board

Józef Modelski, Prof. D.Sc. (chairman),
Andrzej Buchowicz, Ph.D.,
Jacek Cichocki, Ph.D.,
Sławomir Kula, Ph.D.,
Marek Rusin, Ph.D.

1.4.5 Studies on Audiological Techniques

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Secretariat

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1.5 Other Institute's Units

1.5.1 Library

Curator

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1.5.2 Accounting Department

Head

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Staff

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Hanna Szot (em.)

1.5.3 Supply Section

Head

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1.5.4 Auxiliary Administrative Staff

Janina Chmielak (to Aug. '07),
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2 STAFF

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M.Sc. ('98), Ph.D. ('04); multimedia and measurement systems, distributed systems and web technology, digital audio signal processing, digital sound synthesis; **Assistant Professor**, Electroacoustics Division.

[Edu53], [Edu55];

[Pro24], [Pro39];

[MSc1];

[BSc40], [BSc53];

[Pub36], [Pub37], [Pub92].

Piotr Bogorodzki

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M.Sc. ('88), Ph.D. ('98); biomedical engineering; **Assistant Professor**, Nuclear and Medical Electronics Division.

Member of the Review Board of *IEEE Trans. on Medical Imaging* ('06-); Evaluator in the Seventh Research Framework Program (FP7) in the Information and Communication Technologies (ICT) Call ('07-); Member of Center of Excellence PROKSIM ('04-).

[Edu31], [Edu81];

[Pro8], [Pro12], [Pro27], [Pro37], [Pro51];

[MSc10], [MSc30], [MSc53];

[Pub93], [Pub196], [Pub197], [Pub198], [Pub199],

[Pub201], [Pub203], [Pub204], [Pub206], [Pub209],

[Pub211], [Pub212], [Pub213], [Pub214].

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M.Sc. ('70), Ph.D. ('82); biomedical engineering; **Docent**, Nuclear and Medical Electronics Division.

Deputy Director for Academic Affairs of the Institute of Radioelectronics ('93-); Member of the Faculty Council ('90-); Member of the Dean's Financial Committee ('93-); Member of the Faculty Council Committee on Education ('05-); Medal of National Education Commission ('07).

[Edu7], [Edu25], [Edu72], [Edu108], [Edu109];

[Pro19], [Pro27].

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M.Sc. ('88), Ph.D. ('97); television, digital signal and image processing, digital television systems; **Assistant Professor**, Television Division.

Member of the Multimedia Technical Committee no. 288 at Polish Committee for Standardization ('99-); Member of the Management Board of the Foundation for the Development of Radiocommunications and Multimedia Technologies ('02-); Bronze Order of Merit ('07).

[Edu22], [Edu113];

[Pro2], [Pro6], [Pro13], [Pro30];

[MSc17], [MSc20], [MSc56];

[BSc3], [BSc5], [BSc10], [BSc54];

[Pub40], [Pub43], [Pub53], [Pub95], [Pub110], [Pub134], [Pub192].

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M.Sc. ('67), Ph.D. ('78); electronics and telecommunications, environmental and health aspects of electronics; **Assistant Professor**, Radiocommunications Division.

Member of the Scientific Advisory Board, Polish Association for the Blind ('95-); Chairman of the ITU-R (CCIR) Study Group 7 "Time and Frequency" ('83-); Foresight Mazovia Project Expert ('06-).

[Edu74], [Edu122], [Edu125], [Edu145];

[Pro28];

[BSc32], [BSc43];

[Pub215], [Pub216], [Pub217], [Pub218], [Pub219].

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M.Sc. ('88), Ph.D. ('96); microwaves; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

Member of the Review Board of *IEEE Trans. on Microwave Theory and Techniques* ('96-), *IEEE Trans. on Antennas and Propagation* ('97-), *IEEE Microwave & Wireless Components Letters* ('00-), *Journal of Applied Computational Electromagnetics Society* ('06-); Member of the Technical Programme Committee of IEEE International Microwave Symposium ('02-); Vice-Chair of the IEEE AP/AES/MTT Joint Chapter, Poland Section ('07-).

[Edu29];

[Pro32], [Pro43];

[BSc62];

[Pub67], [Pub99], [Pub122], [Pub147], [Pub169], [Pub170], [Pub171], [Pub172].

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M.Sc. ('75); electronics and telecommunications; **Senior Lecturer**, Radiocommunications Division.

[Edu14], [Edu86], [Edu113], [Edu129];

[Pro11], [Pro28];

[BSc7], [BSc19], [BSc42], [BSc64];

[Pub38].

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[Edu46], [Edu62], [Edu114], [Edu117];

[Pro25], [Pro33], [Pro45];

[MSc5];

[Pub1], [Pub44], [Pub88], [Pub136].

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[Edu10], [Edu90], [Edu92], [Edu125];

[Pro28];

[MSc34], [MSc47], [MSc58];

[BSc41], [BSc70].

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M.Sc. ('84), Ph.D. ('91); radio-frequency engineering, microwave technique; **Assistant Professor**, Radiocommunications Division.

[Edu9], [Edu30], [Edu77], [Edu90];

[BSc60], [BSc66];

[Pub14], [Pub84].

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[Edu20], [Edu48];

[Pro9], [Pro10], [Pro27];

[MSc4], [MSc6], [MSc31], [MSc36], [MSc49], [MSc63];

[BSc15], [BSc49];

[Pub68], [Pub69], [Pub73], [Pub180].

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M.Sc. ('97), Ph.D. ('03); image and video processing, multimedia systems, multimedia indexing; **Assistant Professor**, Television Division.

Member of Multimedia Technical Committee no. 288 at Polish Committee for Standardization ('99-).

[Edu37], [Edu104];

[Pro2], [Pro6], [Pro13], [Pro30], [Pro41];

[MSc12], [MSc25], [MSc39], [MSc54];

[BSc1], [BSc2], [BSc48];

[Pub40], [Pub182].

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M.Sc. ('96), Ph.D. ('01); microwave technique; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

[Edu97];

[Pro5], [Pro17], [Pro18], [Pro32], [Pro42], [Pro44], [Pro52];

[BSc4];

[Pub41], [Pub109], [Pub146].

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M.Sc. ('70; '74 at MIT), Ph.D. ('77), D.Sc. ('88), Prof. Title ('00); electronics; **Tenured Professor**, Microwave and Radiolocation Engineering Division, Head ('06-).

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[Edu28], [Edu32], [Edu76];

[Pro3], [Pro32], [Pro43];

[Pub26], [Pub62], [Pub99], [Pub147], [Pub169], [Pub170], [Pub171].

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[Edu27], [Edu43], [Edu100], [Edu124];

[Pro2], [Pro6], [Pro30];

[BSc6], [BSc52], [BSc56];

[Pub112].

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M.Sc. ('72); nuclear and medical electronics; **Senior Lecturer**, Nuclear and Medical Electronics Division.

Member of Technical Committees for Standardization: TC 173 – Interfaces and Building Electronic Systems ('94-) the vice-chairman ('07-), and TC 302 – Using of Informatics in the Health Protection ('03-); Member of the Presidium of Polish CAMAC Committee ('89-); Member of the Committee of Auditors of the Warsaw Branch of the Polish Society of Medical Physics ('00-), Engineer Degree Evening Studies on Radiocommunications – tutorial assistance ('02-); Silver Order of Merit ('07).

[Edu15], [Edu103], [Edu119];

[Pro12], [Pro27], [Pro37], [Pro51];

[MSc21];

[BSc46].

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[Edu72], [Edu99];

[Pro12], [Pro16], [Pro27], [Pro37];

[MSc16];

[BSc8], [BSc26], [BSc39];

[Pub25].

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M.Sc. ('86), Ph.D. ('98); radio frequency engineering, radio receivers, RF measurement techniques, shortwave propagation; **Assistant Professor**, Radiocommunications Division.

[Edu4], [Edu60], [Edu116];

[Pro28];

[MSc66], [MSc67];

[BSc65], [BSc67], [BSc69], [BSc73].

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M.Sc. ('99), Ph.D. ('04); radiocommunications; **Assistant Professor**, Radiocommunications Division.

[Edu38], [Edu47];

[Pro2], [Pro11], [Pro31], [Pro46], [Pro50];

[BSc24];

[Pub54], [Pub134].

Jerzy Kołakowski*room: 27, phone: +48 22 2347635, fax: +48 22 8253759**e-mail: J.Kolakowski@ire.pw.edu.pl*

M.Sc. ('88), Ph.D. ('00); ultrawideband systems, cellular systems, measurement and instrumentation; **Assistant Professor**, Radiocommunications Division.

Member of the Management Board of the Foundation for the Development of Radiocommunications and Multimedia Technologies ('02-).

[Edu18], [Edu62];

[Pro1], [Pro25], [Pro45];

[MSc28], [MSc32], [MSc35], [MSc37], [MSc55], [MSc57];

[Pub1], [Pub44], [Pub65], [Pub120], [Pub130], [Pub135].

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M.Sc. ('91), Ph.D. ('98); nuclear and medical electronics; **Assistant Professor**, Nuclear and Medical Electronics Division.

[Edu2], [Edu9], [Edu20];

[Pro9], [Pro10]; [Pro27];

[MSc38], [MSc46];

[BSc27], [BSc36];

[Pub68], [Pub69], [Pub73], [Pub180].

Tomasz Kosilo*room: 434, phone: +48 22 2347576**e-mail: T.Kosilo@ire.pw.edu.pl*

M.Sc. ('70), Ph.D. ('77); radiocommunications; **Docent**, Radiocommunications Division.

Faculty Coordinator of the Engineer Degree Evening Studies on Radiocommunications ('05-); Member of the Polish National Committee of the URSI ('02-).

[Edu11], [Edu45], [Edu94], [Edu111], [Edu112], [Edu120],

[Edu126], [Edu129], [Edu145];

[Pro1], [Pro28];

[BSc55];

[Pub46], [Pub72], [Pub124], [Pub142].

Ewa Kotarbińska*room: 127, phone: +48 22 2347644**e-mail: E.Kotarbinska@ire.pw.edu.pl*

M.Sc. ('73), Ph.D. ('81); acoustics, noise control, environmental acoustics; **Assistant Professor**, Electroacoustics Division.

Expert of the Technical European Committee for Standardization CEN/TC/159, Hearing Protectors ('96-); Expert of Working Group WG5CEN/AC 159 ('96-); Member of the Polish Acoustics Society ('73-); Member of the European Acoustics Society ('02-).

[Edu1], [Edu147];

[Pro24];

[BSc75];

[Pub47], [Pub125], [Pub126], [Pub127], [Pub220].

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M.Sc. ('86); television; **Senior Lecturer**, Television Division.

[Edu10].

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M.Sc. ('67), Ph.D. ('80), D.Sc. ('96); analog electronics, a/d and d/a converters, digital audio; **Professor**, Electroacoustics Division, Head ('98-).

Secretary of the Board of the Foundation for the Development of Radiocommunications and Multimedia Technologies ('01-); Member of the Audio Engineering Soc. ('01-); Member of the Board of the Polish Section of the Audio Engineering Society ('01-); Member of the Scientific Council of the Soltan Institute for Nuclear Studies ('03-'07); Member of the Faculty Council Committee on Distinctions ('05-).

[Edu24], [Edu71], [Edu85], [Edu121], [Edu143], [Edu144];

[Pro24];

[BSc14], [BSc16];

[Pub49], [Pub100], [Pub132], [Pub155], [Pub187].

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M.Sc. ('96), Ph.D. ('02); radiocommunications, radio-frequency engineering, space technologies; **Assistant Professor**, Radiocommunications Division.

Tutorial assistance of Space Engineering Student Scientific Group ('04-); Member of the Committee on Space Research of Polish Academy of Sciences (PAN) ('07-); Bronze Order of Merit ('07).

[Edu51], [Edu91];
[Pro4], [Pro11], [Pro17], [Pro31], [Pro34], [Pro38], [Pro46];
[MSc15], [MSc26];
[BSc11];
[Pub50], [Pub61], [Pub88], [Pub106], [Pub128], [Pub177],
[Pub178].

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M.Sc. ('00), Ph.D. ('07); nuclear and medical electronics; **Assistant Professor**, Nuclear and Medical Electronics Division.

[Edu87], [Edu107];
[Pro9], [Pro10], [Pro12], [Pro27], [Pro51];
[Pub68], [Pub69], [Pub73], [Pub93], [Pub180], [Pub197],
[Pub204], [Pub206], [Pub209], [Pub211], [Pub212],
[Pub213].

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Head of the Studies on Audiological Techniques of the Institute of Radioelectronics ('96-); Member of the Equipment Acquisition Expert Commission at the Ministry of Health ('94-).

[Edu5], [Edu143], [Edu144];
[Pro24];
[MSc29];
[Pub131].

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M.Sc. ('75), Ph.D. ('83), D.Sc. ('03); nuclear and medical electronics, HEP detectors and front-end electronics; **Professor**, Nuclear and Medical Electronics Division.

Deputy Director for Research of the Institute of Radioelectronics ('05-); Member of the Faculty Council Committee on Research ('05-); Member of the University Disciplinary Committee ('05-); Vice Chairman of the Rector's Committee on University Health Service ('05-); Team award of the Rector ('07).

[Edu17], [Edu23], [Edu24], [Edu83];
[Pro9], [Pro10], [Pro27], [Pro35], [Pro40];
[MSc33], [MSc50];
[Pub2], [Pub3], [Pub4], [Pub5], [Pub6], [Pub32], [Pub68],
[Pub69], [Pub73], [Pub180];
[Pat1].

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[Edu62];

[Pro1], [Pro25], [Pro45];
[Pub44], [Pub51].

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M.Sc. ('80), Ph.D. ('89); microwaves, computer engineering, measurements; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

Tutorial assistance of Innovative Information Technologies Student Scientific Group ('05-).

[Edu19], [Edu78];
[Pro32];
[BSc31].

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M.Sc. ('85), Ph.D. ('98); measurement and instrumentation; **Assistant Professor**, Television Division.

Treasurer of the IEEE Poland Section ('99-).
[Edu33], [Edu40], [Edu41], [Edu73], [Edu105];
[Pro15], [Pro26];
[Pub137].

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M.Sc. ('87), Ph.D. ('93); radio-frequency engineering, power electronics, radio transmitters, switch-mode power supplies; **Assistant Professor**, Radiocommunications Division.

[MSc43];
[Pub145].

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M.Sc. ('73), Ph.D. ('78), D.Sc. ('87), Prof. Title ('94); radio-frequency engineering, microwave technique; **Tenured Professor**, Radiocommunications Division, Head ('03-).

Director of the Institute of Radioelectronics ('96-); Fellow Member of IEEE ('00-); President of the IEEE Microwave Theory and Techniques Society ('08); Director-Elect of the IEEE Region 8 ('08-'09); Corresponding Member of the Polish Academy of Sciences – PAN ('07-); Chairman of the Committee on Electronics and Telecommunications PAN ('07-); Member of the Committee on Space Research ('01-) – Head of Satellite Commission ('03-); Associated Member of the Ukrainian National Academy of Sciences ('99-); Member of Scientific Councils: Telecommunications Research Institute – PIT, Chairman ('07-), National Institute of Telecommunications ('03-); President of the Foundation for the Development of Radiocommunications and Multimedia Technologies ('00-); Member of Editorial Board of *IEEE Transactions on MTT* ('95-); Chairman of the Microwave and Radar Week in Poland ('04-); TPC Member of the IEEE MTT-S International Microwave Symposium ('95-); University Senate Elected Member ('05-); Chair of the Council of AZS PW (Academic Sports Association of Warsaw University of Technology) ('06).

[Edu23], [Edu51];

[Pro1], [Pro2], [Pro4], [Pro7], [Pro11], [Pro17], [Pro23], [Pro31], [Pro46], [Pro50];
[BSc25], [BSc59];
[Pub48], [Pub61], [Pub64], [Pub72], [Pub96], [Pub128], [Pub129], [Pub142], [Pub177], [Pub178], [Pub189], [Pub190], [Pub191], [Pub228].

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[Edu4], [Edu50], [Edu116];

[BSc9], [BSc74];

[Pub53], [Pub142], [Pub143], [Pub144], [Pub145], [Pub183].

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[Edu33], [Edu40], [Edu41], [Edu73], [Edu146];

[Pro15], [Pro26];

[PhD5];

[Pub18], [Pub136], [Pub227].

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[Edu25], [Edu28], [Edu77], [Edu98];

[Pro32];

[Pub41], [Pub109], [Pub146].

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[Edu8], [Edu26];

[Pro29];

[MSc18], [MSc24], [MSc58], [MSc60], [MSc61];

[BSc12], [BSc57].

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[Edu8], [Edu106];

[Pro19], [Pro27], [Pro47];

[BSc47].

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[Edu35], [Edu61];

[Pro27].

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[Pro2], [Pro13], [Pro30];

[Pub13], [Pub55], [Pub113], [Pub152], [Pub156], [Pub157].

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M.Sc. ('78), Ph.D. ('01); medical and nuclear engineering; **Assistant Professor**, Nuclear and Medical Electronics Division.

Member of Center of Excellence PROKSIM ('04-); Tutorial assistance of Biomedical and Nuclear Engineering Student Scientific Group ('06-), and Beskid Mountain Guides Student Circle (-'99).

[Edu34], [Edu72];

[Pro8], [Pro12], [Pro27], [Pro33], [Pro37], [Pro40], [Pro51];

[MSc3], [MSc23], [MSc45];

[BSc33];

[Pub23], [Pub71], [Pub82], [Pub93], [Pub114], [Pub115],
[Pub197], [Pub198], [Pub199], [Pub203], [Pub206],
[Pub211], [Pub212], [Pub213], [Pub214].

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M.Sc. ('75), Ph.D. ('83); measurement and instrumentation; **Assistant Professor**, Television Division.
[Edu10], [Edu33], [Edu40], [Edu73];
[Pro15], [Pro26];
[MSc2];
[BSc13];
[Pub158].

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M.Sc. ('90), Ph.D. ('95), D.Sc. ('04); signal & image processing, data compression, computer-aided diagnosis in medicine, telemedicine, imaging informatics; **Associate Professor**, Nuclear and Medical Electronics Division.
Member of the International Scientific Board of Advances in International Telemedicine and e-Health (06-).
[Edu67], [Edu70];
[Pro16], [Pro27];
[PhD1];
[MSc13], [MSc22];
[BSc18], [BSc28], [BSc35], [BSc37];
[Pub24], [Pub25], [Pub29], [Pub66], [Pub70], [Pub74],
[Pub76], [Pub77], [Pub78], [Pub79], [Pub83], [Pub118],
[Pub148], [Pub160], [Pub161], [Pub162], [Pub200],
[Pub210].

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M.Sc. ('70), Ph.D. ('78); radio-frequency engineering and measurement; **Assistant Professor**, Radiocommunication Division.
Member of the National Committee of URSI ('90-); Member of the Programme Committee of the National Symposium of Radio Science ('99-); National Chairman of URSI Commission of Electromagnetic Metrology ('90-); Member of the Scientific Advisory Board, Polish Association for the Blind ('95-).
[Edu58], [Edu101], [Edu115], [Edu125], [Edu129];
[Pro25];
[BSc58], [BSc61], [BSc63].

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M.Sc. ('96), Ph.D. (electronics '01), Ph.D. (medicine '06); mathematical modeling of physiological and disease processes, biostatistical methods, experiments design methods; **Assistant Professor**, Nuclear and Medical Electronics Division.
Rector's Deputy for Handicapped Persons at WUT ('05-).
[Pro14];
[Pub80], [Pub207], [Pub208].

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M.Sc. ('69); microwave technique; **Senior Lecturer** (0.5), Microwave and Radiolocation Engineering Division.
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[Edu89];
[Pro32], [Pro48];
[BSc71], [BSc72].

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M.Sc. ('72), Ph.D. ('76), D.Sc. ('91); Prof. Title ('01); microwave technique; **Professor**, Microwave and Radiolocation Engineering Division.
[Edu12], [Edu63];
[MSc14], [MSc64];
[Pub58].

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[Edu13], [Edu52].

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M.Sc. ('72), Ph.D. ('77), D.Sc. ('94); Prof. Title ('03); Informatics, Image Processing, Multimedia Techniques; **Tenured Professor**, Television Division, Head ('00-).
Head of Multimedia Technical Committee no. 288 at Polish Committee for Standardization ('99-); ISO /S.C.29/WG11 (MPEG) expert ('00-); Member of Advisory Board of: *Image Processing and Communications* ('95-), *Fundamenta Informaticae* ('06-), *Optoelectronics Review* ('06-).
[Edu80], [Edu82];
[Pro2], [Pro6], [Pro13], [Pro16], [Pro30], [Pro41], [Pro49];
[MSc42];
[BSc30];
[Pub16], [Pub17], [Pub19], [Pub20], [Pub27], [Pub28],
[Pub94], [Pub133], [Pub149], [Pub150], [Pub151],
[Pub153], [Pub154], [Pub167], [Pub168], [Pub173],
[Pub179], [Pub182].

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M.Sc. ('91), Ph.D. ('97); biomedical engineering, computer engineering; **Assistant Professor**, Nuclear and Medical Electronics Division.
[Edu42], [Edu56], [Edu66], [Edu102];
[Pro14], [Pro19], [Pro27], [Pro47];
[BSc23].

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[Edu54], [Edu115];

[Pro28], [Pro36];

[BSc17];

[Pub174], [Pub175].

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M.Sc. ('83), Ph.D. ('96); microwave technique; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

[Edu44];

[Pro32];

[BSc22];

[Pub101], [Pub102], [Pub103], [Pub104].

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M.Sc. ('70), Ph.D. ('82); biomedical engineering; **Assistant Professor**, Nuclear and Medical Electronics Division.

Associate Dean for Student Affairs ('05-); Member of the European Association of Nuclear Medicine ('89-); Treasurer of the Warsaw Branch of Polish Society of Medical Physics ('01-); Vice President of Polish Society of Process Tomography ('03-).

[Edu84];

[Pro19], [Pro27], [Pro47];

[MSc9];

[BSc20], [BSc38].

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M.Sc. ('69), Ph.D. ('78); electroacoustics, acoustic measurements, architectural acoustics; **Assistant Professor**, Electroacoustics Division.

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[Edu57], [Edu143], [Edu144];

[Pro24];

[MSc11].

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M.Sc. ('98), Ph.D. ('02); radio networks, heuristics methods, radiocommunications; **Assistant Professor**, Radiocommunications Division.

[Edu68], [Edu69];

[Pro1], [Pro28];

[MSc7];

[BSc68];

[Pub11], [Pub12].

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M.Sc. ('70), Ph.D. ('80); microwaves, computer engineering, measurements; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

[Edu44];

[Pro32];

[MSc52];

[Pub103].

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[Edu34], [Edu55], [Edu75], [Edu93];

[Pro22], [Pro29], [Pro39];

[PhD2], [PhD4];

[MSc27], [MSc40], [MSc41];

[Pub9], [Pub35], [Pub37], [Pub60], [Pub75], [Pub91], [Pub181], [Pub229].

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M.Sc. (electronics '66), M.Sc. (mathematics '75), Ph.D. ('76), D.Sc. ('89); Prof. Title ('02); telecommunications, teleinformatics, signals and systems, computer aided design, graphs and networks, mathematical methods in engineering; **Professor**, Radiocommunications Division.

Member of the Circuit Theory and Signal Processing Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('97-); Member of the Scientific Committees of: International Conference on Signals and Electronics Systems ('97-), Conference on Evolutionary Algorithms and Global Optimization ('97-); Coordinator of the cooperation agreement between WUT and University of Waterloo, Canada ('93-); Adviser to Wydawnictwo Komunikacji i Łączności – a publishing house in engineering ('97-); Associate Editor of *Journal of the Franklin Institute* ('07-).

[Edu21], [Edu54], [Edu58], [Edu69], [Edu79], [Edu121];

[Pro28];

[Pub10], [Pub11], [Pub12].

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M.Sc. ('84), Ph.D. ('98); microwave technique; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

[Edu38], [Edu118];

[Pro5], [Pro17], [Pro18], [Pro32], [Pro42], [Pro44], [Pro52];

[MSc8], [MSc44];

[BSc34], [BSc51];

[Pub164].

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M.Sc. ('79), Ph.D. ('86), D.Sc. ('06); antennae and antenna array; **Associate Professor**, Radiocommunications Division.

Member of the Organizing Committee of the International Conference TCSET ('98-); Reviewer of the *IEEE Transactions on MTT* ('04-), and *IEEE Microwave and Wireless Components Letters* ('04-); Member of the Microwave and Radiolocation Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('07-); Individual award of the Rector ('07).

[Edu3], [Edu64];

[Pro4], [Pro7], [Pro11], [Pro17], [Pro31], [Pro46];

[MSc48];

[BSc45];

[Pub48], [Pub59], [Pub63], [Pub64], [Pub96], [Pub97],

[Pub98], [Pub106], [Pub108], [Pub111], [Pub129],

[Pub189], [Pub190], [Pub191].

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e-mail: K.Zaremba@ire.pw.edu.pl

M.Sc. ('81), Ph.D. ('90), D.Sc. ('03); biomedical engineering, nuclear electronics; **Professor**, Nuclear and Medical Electronics Division, Head ('03-).

Member of CERN ('89-); Head of the Warsaw Branch of Polish Society of Medical Physics ('01-); Head of the Dean's Financial Committee ('02-); Member of the Faculty Council Committee on Faculty Organization ('05-); Member of the Faculty Accreditation Board ('07-); Member of the University Council Committee on Property and Finances ('05-); Member of the Board and Treasurer of the Polish Society of Medical Physics ('05-); Member of the Scientific Committee of the National Symposium on Biomedical Engineering and Telemedicine "IBITEL" ('06-), Member of the Programme Committee of the International Forum of Innovative Technologies for Medicine ITMED ('07), Co-Chair of IEEE International Workshop on Medical Measurements and Applications IEEE MeMeA ('07-), Member of the Editorial Advisory Board of the *Polish Journal of Medical Physics and Engineering* ('07-), Head of the Area of Concentration Electronics and Information Technology in Medicine ('06-); Team award of the Rector ('07).

[Edu20], [Edu49], [Edu65];

[Pro9], [Pro10], [Pro20], [Pro21], [Pro27], [Pro40];

[MSc51];

[Pub2], [Pub3], [Pub4], [Pub5], [Pub6], [Pub15], [Pub22], [Pub30], [Pub68], [Pub69], [Pub73], [Pub165], [Pub180]; [Pat1].

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M.Sc. ('74), Ph.D. ('83); microwave technique; **Assistant Professor**, Microwave and Radiolocation Engineering Division.

[Edu36];

[Pro32];

[Pub41], [Pub109], [Pub146].

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M.Sc. ('76), Ph.D. ('90), D.Sc. ('04); acoustics, electroacoustics, psychoacoustics, noise control; **Associate Professor**, Electroacoustics Division.

Member of the ISO Working Group – ISO/TC 159/S.C5/WG3 ('97-); Member of Polish Acoustical Society ('78-), European Acoustics Association ('01-), Acoustical Society of America ('90-); Member of the Committee on Acoustics, the Polish Academy of Sciences ('07-).

[Edu6], [Edu39];

[Pro24];

[Pub33], [Pub52], [Pub140], [Pub141], [Pub194],

[Pub195], [Pub202], [Pub205].

2.2 Junior academic staff

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Marcin Ziembicki, M.Sc., Assistant (0.5 from Dec. '07)

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Ph.D. Student	(tutor)
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Paweł Bajurko, M.Sc.	(Y. Yashchyshyn)
Grzegorz Bernatek, M.Sc.*	(J. Wojciechowski)
Kamil Bryłka, M.Sc.*	(J. Modelski)
Marek Bury, M.Sc.	(J. Modelski)
Piotr Czarnecki, M.Sc.	(K. Zaremba)
Marcin Dąbrowski, M.Sc.*	(Y. Yashchyshyn)
Andrzej Dominik, M.Sc.	(J. Wojciechowski)
Michał Dziewiecki, M.Sc.	(J. Marzec)
Michał Grabowski, M.Sc.	(S. Rośloniec)
Cezary Jezierski, M.Sc.*	(J. Modelski)
Marcin Jędryka, M.Sc.*	(W. Skarbek)
Rafał Józwiak, M.Sc.	(A. Przelaskowski)
Rafał Korycki, M.Sc.*	(Z. Kulka)
Sebastian Kozłowski, M.Sc.	(T. Morawski)
Agata Latała, M.Sc.*	(R. Z. Morawski)
Mariusz Leszczyński, M.Sc.*	(W. Skarbek)
Aleksandra Młyńska, M.Sc.	(Z. Kulka)

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 Artur Nowakowski, M.Sc.* (W. Skarbek)
 Wojciech Padée, M.Sc. (K. Zaremba)
 Lech Raczyński, M.Sc. (K. Zaremba)
 Dawid Rosołowski, M.Sc. (T. Morawski)
 Tymon Rubel, M.Sc.* (K. Zaremba)
 Bartłomiej Salski, M.Sc. (W. Gwarek)
 Michał Sołtysiak, M.Sc. (W. Gwarek)
 Marcin Stolarski, M.Sc.* (W. Winiecki)
 Aneta Świercz, M.Sc.* (J. Żera)
 Michał Tomaszewski, M.Sc.* (W. Skarbek)
 Konrad Wojdan, M.Sc.* (W. Winiecki)
 Krzysztof Woźniak, M.Sc.* (K. Zaremba)
 Anna Wróblewska, M.Sc. (A. Przelaskowski)
 Marcin Ziembicki, M.Sc. (J. Marzec)
 Paweł Ziętek, M.Sc.* (J. Modelski)

* – without scholarship

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3 TEACHING ACTIVITIES (academic year 2006/2007)

3.1 Regular studies – Areas of Concentrations:

Radiocommunications and Multimedia Technologies

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Electronics and Information Technology in Medicine

Head

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3.1.1 Basic Courses

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| <p>[Edu1] <i>Acoustic Protection of Environment</i> (Akustyczna ochrona środowiska – AOS); 3h/week; E. Kotarbińska.</p> <p>[Edu2] <i>Analysis of Measurement Data in Medicine</i> (Analiza danych pomiarowych w medycynie – ADP); 3h/week; Z. Pawłowski, B. Konarzewski.</p> <p>[Edu3] <i>Antennae and Radio-wave Propagation</i> (Anteny i propagacja fal – AIPF); 3h/week; Y. Yashchynshyn.</p> <p>[Edu4] <i>Basic Radio-frequency Circuits</i> (Podstawowe układy radioelektroniczne – PURAD); 3h/week; J. Modzelewski, W. Kazubski.</p> <p>[Edu5] <i>Basics of Electroacoustics</i> (Podstawy elektroakustyki – PEL); 3h/week; A. Leszczyński.</p> <p>[Edu6] <i>Basics of Hearing and Sound Perception</i> (Podstawy słyszenia i percepcja dźwięku – PSPD); 2h/week; J. Żera.</p> <p>[Edu7] <i>Basics of Medical Imaging Techniques</i> (Podstawy technik obrazowania w medycynie – PTOM); 4h/week; P. Brzeski.</p> <p>[Edu8] <i>Basics of Microelectronics – Lab.</i> (Podstawy Mikroelektroniki – PMK); 2h/week; T. Olszewski, K. Mroczek.</p> <p>[Edu9] <i>Basics of Microprocessor Technique</i> (Podstawy techniki mikroprocesorowej – TMIK); 4h/week; K. Czerwiński, B. Konarzewski, K. Derzakowski, T. Krzymień.</p> <p>[Edu10] <i>Basics of Programming</i> (Podstawy programowania – PRM); 4h/week; A. Podgórski.</p> <p>[Edu11] <i>Basics of Radiocommunications</i> (Podstawy radiokomunikacji – PR); 2h/week; T. Kosiło.</p> <p>[Edu12] <i>Basics of Radiolocation and Radionavigation</i> (Podstawy radiolokacji i radionawigacji – PRIR); 3h/week; S. Rośliniec.</p> <p>[Edu13] <i>Basics of Television</i> (Podstawy telewizji – POTE); 3h/week; M. Rusin.</p> <p>[Edu14] <i>Broadcasting Systems</i> (Systemy radiofoniczne – SYR); 3h/week; H. Chaciński.</p> | <p>[Edu15] <i>Computer Systems</i> (Systemy komputerowe – SYKO); 3h/week; T. Jamrógiwicz.</p> <p>[Edu16] <i>Construction of High Quality Audio Equipment</i> (Konstrukcja urządzeń audio wysokiej jakości – KUA); 2h/week; P. Nykiel.</p> <p>[Edu17] <i>Detection of Nuclear and Biomedical Signals</i> (Detekcja sygnałów biomedycznych i jądrowych – DSBJ); 4h/week; Z. Pawłowski, J. Marzec.</p> <p>[Edu18] <i>Digital Cellular Systems</i> (Cyfrowe systemy komórkowe – CSK); 3h/week; J. Kołakowski.</p> <p>[Edu19] <i>Digital Circuits – EDC1</i>; 2h/week; elective; P. Miazga (English-medium studies).</p> <p>[Edu20] <i>Digital Circuits – Lab.</i> (Układy logiczne; laboratorium – ULOGE); 2h/week; G. Domański, B. Konarzewski, K. Zaremba.</p> <p>[Edu21] <i>Digital Communications – EDICO</i>; 4h/week; J. Wojciechowski (English-medium studies).</p> <p>[Edu22] <i>Digital and Interactive Television</i> (Telewizja cyfrowa i interaktywna – TCI); 4h/week; elective; A. Buchowicz.</p> <p>[Edu23] <i>Diploma Seminar for Graduate Students 1</i> (Seminarium dyplomowe magisterskie 1 – SDM1); 2h/week; J. Modelski, J. Marzec.</p> <p>[Edu24] <i>Diploma Seminar for Graduate Students 1</i> (Seminarium dyplomowe magisterskie 1 – SDM2); 2h/week; Z. Pawłowski, Z. Kulka, J. Marzec.</p> <p>[Edu25] <i>Diploma Seminar for Undergraduate Students</i> (Seminarium dyplomowe inżynierskie – SDI); 2h/week; P. Brzeski, T. Morawski.</p> <p>[Edu26] <i>Digital Systems</i> (Układy cyfrowe – UCYF); 1h/week; K. Mroczek.</p> <p>[Edu27] <i>Event Driven Programming</i> (Programowanie zdarzeniowe – PZDT); 3h/week; K. Ignasiak.</p> <p>[Edu28] <i>Fields and Waves</i> (Pola i fale – POFAT); 3h/week; T. Morawski, W. Gwarek.</p> <p>[Edu29] <i>Fields, Waves and Antennae</i> – EFWA; 4h/week; elective; M. Celuch (English-medium studies).</p> <p>[Edu30] <i>Influence of Electromagnetic Waves on Living Organisms</i> (Oddziaływanie fal elektromagnetycznych na organizmy żywe – OFE); 2h/week; K. Derzakowski.</p> <p>[Edu31] <i>Information Technologies in Medical Image Diagnostics</i> (Techniki informacyjne w medycznej diagnostyce obrazowej – TIM); 4h/week; P. Bogorodzki.</p> <p>[Edu32] <i>Introduction to Electronics, Informatics and Telecommunications</i> (Wstęp do elektroniki, informatyki i telekomunikacji – WEIT); 1h/week; W. Gwarek.</p> <p>[Edu33] <i>Introduction to Numerical Methods</i> (Wstęp do metod numerycznych – WDMNM); 3h/week; R. Z. Morawski, A. Miękina, A. Podgórski.</p> |
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TEACHING ACTIVITIES (academic year 2006/2007)

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| <p>[Edu34] <i>Measurement Systems</i> (Systemy pomiarowe – SPOM); 2h/week; W. Winiecki, E. Piątkowska-Janko.</p> <p>[Edu35] <i>Medical Electronic Instrumentation</i> (Elektroniczna aparatura medyczna – EAME); 4h/week; L. Padée.</p> <p>[Edu36] <i>Microwave Technique</i> (Technika mikrofalowa – TMO); 4h/week; J. Zborowska, W. Wojtasiak.</p> <p>[Edu37] <i>Multimedia Standards and Algorithms</i> (Algorytmy i standardy multimedialne – ASM); 3h/week; G. Galiński.</p> <p>[Edu38] <i>Multi-service and Multimedia Networks</i> – EMSMN; 4h/week; T. Keller (English-medium studies).</p> <p>[Edu39] <i>Music Acoustics</i> (Akustyka muzyczna – AM); 2h/week; J. Żera.</p> <p>[Edu40] <i>Numerical Methods</i> – ENUME; 4h/week; R. Z. Morawski, A. Miękina, A. Podgórski (English-medium studies).</p> <p>[Edu41] <i>Numerical Methods for ATHENS</i>, 40h during one week; participants of the EU students' exchange programme ATHENS; R. Z. Morawski, A. Miękina.</p> <p>[Edu42] <i>Object-oriented Programming M</i> (Programowanie obiektowe M – PROBI); 4h/week; W. Smolik.</p> <p>[Edu43] <i>Object-oriented Programming of Multimedia Applications in Java</i> (Java – obiektowe programowanie aplikacji multimedialnych – OPA); 3h/week; K. Ignasiak.</p> <p>[Edu44] <i>Operating Systems</i> (Systemy operacyjne – SOE); 1h/week; M. Sypniewski, A. Więckowski.</p> <p>[Edu45] <i>Radiocommunication Systems</i> (Systemy radiokomunikacyjne – SRKO); 3h/week; T. Kosiło.</p> <p>[Edu46] <i>Radioelectronics Measurements</i> (Miernictwo radioelektroniczne – MR); 3h/week; J. Cichocki.</p> <p>[Edu47] <i>Radio Networks and Systems</i> (Systemy i sieci radiowe – SISR); 3h/week; T. Keller.</p> <p>[Edu48] <i>Radiological Apparatus in Medical Diagnostics</i> (Aparatura radiologiczna w diagnostyce – ARDM); 2h/week; G. Domański.</p> <p>[Edu49] <i>Radiology and Nucleonics</i> (Radiologia z nukleoniką – RN); 3h/week; K. Zaremba.</p> <p>[Edu50] <i>Radio Transmitting Technique and its Applications</i> (Technika nadawania radiowego i jej aplikacje – TNR); 4h/week; J. Modzelewski.</p> <p>[Edu51] <i>Satellite Communications</i> (Łączność satelitarna – ŁS); 3h/week; J. Modelski, K. Kurek.</p> <p>[Edu52] <i>Selected Problems of Modern Television</i> (Wybrane zagadnienia współczesnej telewizji – WZWT); 2h/week; M. Rusin.</p> <p>[Edu53] <i>Signal Processors in Audio Techniques</i> (Procesory sygnałowe w technice audio – PSTA); 3h/week; P. Bobiński.</p> <p>[Edu54] <i>Signals and Systems</i> (Sygnały i Systemy – SYST); 4h/week; J. Wojciechowski, K. Snopek.</p> | <p>[Edu55] <i>Software for Measuring Systems</i> (Oprogramowanie systemów pomiarowych – OSP); 4h/week; W. Winiecki, P. Bobiński.</p> <p>[Edu56] <i>Software for Medical Systems</i> (Oprogramowanie systemów medycznych – OSM); 3h/week; W. Smolik.</p> <p>[Edu57] <i>Recording and Forming of Sound</i> (Odbiór i kształtowanie dźwięku – OKD); 3h/week; M. Tajchert.</p> <p>[Edu58] <i>Signals and Modulations</i> (Sygnały i modulacje – SYGM); 3h/week; J. Wojciechowski, K. Radecki.</p> <p>[Edu59] <i>Study Audio Techniques – Lab.</i> (Dźwiękowa technika studyjna – DTS); 1h/week; R. Korycki.</p> <p>[Edu60] <i>Technique of Radio Signals Receiving</i> (Technika odbioru radiowego – TOR); 3h/week; W. Kazubski.</p> <p>[Edu61] <i>Ultrasonography Instrumentation</i> (Aparatura ultrasonograficzna – AUS); 3h/week; L. Padée.</p> <p>[Edu62] <i>UMTS System</i> (System UMTS – UMTS); 3h/week; J. Kołakowski, J. Cichocki, S. Maszczyk.</p> |
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3.1.2 Advanced courses

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| <p>[Edu63] <i>Analysis and Synthesis of Microwave Circuits</i> (Analiza i synteza układów mikrofalowych – ASUM); 3h/week; S. Rośliniec.</p> <p>[Edu64] <i>Antennae Theory and Design</i> (Teoria i projektowanie anten – TPA); 4h/week; Y. Yashchyshyn.</p> <p>[Edu65] <i>Artificial Neural Networks in Medicine</i> (Sztuczne sieci neuronowe w medycynie – SESN); 3h/week; K. Zaremba.</p> <p>[Edu66] <i>Computed Tomography</i> (Tomografia komputerowa – TOM); 4h/week; W. Smolik.</p> <p>[Edu67] <i>Computer Aided Medical Image Diagnostics</i> (Komputerowe wspomaganie obrazowej diagnostyki medycznej – KWOD); 3h/week; A. Przelaskowski.</p> <p>[Edu68] <i>Contemporary Heuristic Techniques</i> – ECOHT; 4h/week; Z. Walczak (English-medium studies).</p> <p>[Edu69] <i>Contemporary Heuristic Techniques</i> (Współczesne techniki heurystyczne – WMH); 4h/week; Z. Walczak, J. Wojciechowski.</p> <p>[Edu70] <i>Data Compression</i> (Kompresja danych – KODA); 3h/week; A. Przelaskowski.</p> <p>[Edu71] <i>Digital Audio Signal Processing</i> (Cyfrowe przetwarzanie sygnałów fonicznych – CPSF); 3h/week; Z. Kulka.</p> <p>[Edu72] <i>Digital Image Processing</i> (Cyfrowe przetwarzanie obrazów – CPOO); 2h/week; M. Kazubek, P. Brzeski, E. Piątkowska-Janko.</p> <p>[Edu73] <i>Digital Processing of Measurement Signals</i> (Cyfrowe przetwarzanie sygnałów pomiarowych – CPSP); 3h/week; R. Z. Morawski, A. Miękina, A. Podgórski.</p> <p>[Edu74] <i>Digital Transmission of Information</i> (Cyfrowa transmisja informacji – CTIN); 3h/week; T. Buczkowski.</p> | |
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TEACHING ACTIVITIES (academic year 2006/2007)

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| <p>[Edu75] <i>Distributed Measurement Systems</i> (Rozproszone systemy pomiarowo-kontrolne – RSPK); 3h/week; W. Winiecki, R. Łukaszewski.</p> <p>[Edu76] <i>Electromagnetic Compatibility</i> (Kompatybilność elektromagnetyczna – KE); 2h/week; W. Gwarek.</p> <p>[Edu77] <i>Electromagnetic Field Theory</i> (Teoria pola elektromagnetycznego – TPE); 4h/week; T. Morawski, K. Derzakowski.</p> <p>[Edu78] <i>Evolutionary Algorithms</i> – EEVAL; 4h/week; P. Miazga (English-medium studies).</p> <p>[Edu79] <i>Graphs and Networks</i> (Grafy i sieci – GIS); 2h/week; elective; J. Wojciechowski.</p> <p>[Edu80] <i>Image and Audio Semantic Analysis</i> (Analiza semantyczna obrazu i dźwięku – ASOD); 3h/week; W. Skarbek.</p> <p>[Edu81] <i>Magnetic Resonance Imaging</i> (Tomografia rezonansu magnetycznego – TRM); 3h/week; P. Bogorodzki.</p> <p>[Edu82] <i>Multimedia Indexing</i> (Indeksowanie multimediów – INM); 4h/week; W. Skarbek.</p> <p>[Edu83] <i>Noise and Electromagnetic Interference in Electronics Devices</i> (Szumy i zakłócenia w aparaturze elektronicznej – SZAE); 2h/week; J. Marzec.</p> <p>[Edu84] <i>Nuclear Medicine Techniques</i> (Techniki medycyny nuklearnej – TMN); 4h/week; R. Szabatin.</p> | <p>[Edu93] <i>Computer Control and Data Processing</i> (Komputerowe sterowanie i przetwarzanie danych – KSTM); 45h/sem.; semester 5; W. Winiecki.</p> <p>[Edu94] <i>Digital Signals Transmission</i> (Cyfrowa transmisja sygnałów – CTSM); 45h/sem.; semester 5; T. Kosiło.</p> <p>[Edu95] <i>Diploma Seminar</i> (Seminarium dyplomowe – SDM); 15h/sem.; semester 6; J. Ebert.</p> <p>[Edu96] <i>Diploma Seminar 2</i> (Seminarium dyplomowe 2 – SD2M); 15h/sem.; semester 7; J. Ebert.</p> <p>[Edu97] <i>Electronic Circuits</i> (Układy elektroniczne – UEM); 45h/sem.; semester 3; D. Gryglewski.</p> <p>[Edu98] <i>Fields and Waves</i> (Pola i fale – PFM); 60h/sem.; semester 2; T. Morawski.</p> <p>[Edu99] <i>Imaging Techniques</i> (Techniki obrazowe – TORM); 30h/sem.; semester 7; M. Kazubek.</p> <p>[Edu100] <i>Internet Techniques</i> (Techniki internetowe – TINM); 30h/sem.; semester 7; K. Ignasiak.</p> <p>[Edu101] <i>Materials and Elements</i> (Materiały i elementy – MEM); 15h/sem.; semester 4; K. Radecki.</p> <p>[Edu102] <i>Multimedia Applications</i> (Aplikacje multimedialne – AMRM); 15h/sem.; semester 5; W. Smoliak.</p> <p>[Edu103] <i>Multimedia Computer Systems</i> (Multimedialne systemy komputerowe – MSKM); 30h/sem.; semester 4; T. Jamróiewicz.</p> <p>[Edu104] <i>Multimedia Techniques</i> (Techniki multimedialne – TMM); 15h/sem.; semester 6; G. Galiński.</p> <p>[Edu105] <i>Numerical Methods</i> (Metody numeryczne – MNRM); 30h/sem.; semester 3; A. Miękina.</p> <p>[Edu106] <i>Programmable Digital Devices</i> (Programowalne układy cyfrowe – PUCM); 30h/sem.; semester 5; T. Olszewski.</p> <p>[Edu107] <i>Programming</i> (Programowanie – PMRM); 30h/sem.; semester 3; R. Kurjata.</p> <p>[Edu108] <i>Project 1</i> (Projekt 1 – PJUM); 30h/sem.; semester 5; P. Brzeski.</p> <p>[Edu109] <i>Project 2</i> (Projekt 2 – PSRM); 60h/sem.; semester 6; P. Brzeski.</p> <p>[Edu110] <i>Propagation of Waves</i> (Propagacja fal – PFAM); 15h/sem.; semester 4; J. Jarkowski.</p> <p>[Edu111] <i>Radiocommunication Systems 1</i> (Systemy radiokomunikacyjne 1 – SRKM); 60h/sem.; semester 6; T. Kosiło.</p> <p>[Edu112] <i>Radiocommunication Systems 2</i> (Systemy radiokomunikacyjne 2 – SRK2M); 30h/sem.; semester 7; T. Kosiło.</p> <p>[Edu113] <i>Radiodiffusion Systems</i> (Systemy radiodyfuzyjne – SRDM); 60h/sem.; semester 6; A. Buchowicz, H. Chaciński.</p> <p>[Edu114] <i>Radioelectronics Measurements</i> (Miernictwo radioelektroniczne – MRM); 45h/sem.; semester 5; J. Cichocki.</p> <p>[Edu115] <i>Signals and Modulations</i> (Sygnały i modulacje – SMRM); 60h/sem.; semester 3; K. Snopek, K. Radecki.</p> |
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3.2 Special courses

3.2.1 Engineer Degree Evening Studies on Radiocommunications and Multimedia Technologies

- [Edu85] *Acoustic Techniques* (Techniki dźwiękowe – TDRM); 30h/sem.; semester 7; Z. Kulka.
- [Edu86] *Antennae* (Anteny – ANM); 30h/sem.; semester 4; H. Chaciński.
- [Edu87] *Basics of Computer Techniques* (Podstawy techniki komputerowej – PKOM); 45h/sem.; semester 1; R. Kurjata.
- [Edu88] *Basics of Fiberglass Technique* (Podstawy techniki światłowodowej – PTSRM); 45h/sem.; semester 3; L. Lewandowski.
- [Edu89] *Basics of High-Frequency Techniques* (Podstawy techniki w.cz. – PTWM); 60h/sem.; semester 3; K. Robaczyński.
- [Edu90] *Basics of Logical Circuits and Microprocessor Technique* (Układy logiczne i podstawy techniki mikroprocesorowej – PULM); 60h/sem.; semester 4; K. Czerwiński, K. Derzakowski.
- [Edu91] *Basics of Satellite Communications* (Podstawy łączności satelitarnej – SATM); 15h/sem.; semester 4; K. Kurek.
- [Edu92] *Circuits and Signals* (Obwody i sygnały – OSRM); 45h/sem.; semester 2; K. Czerwiński.

[Edu116] *Technique of Emission and Receiving* (Technika emisji i odbioru – TEM); 45h/sem.; semester 4; J. Modzelewski, W. Kazubski.

[Edu117] *Transmitters and Receivers Measurements* (Pomiary nadajników i odbiorników – PNOM); 30h/sem.; semester 7; J. Cichocki.

3.2.2 M.Sc. Evening Studies on Radiocommunications and Multimedia Technologies

[Edu118] *Analysis and Synthesis of Microwave Units* (Analiza i synteza układów mikrofalowych – ASUMW); 60h/sem.; semester 2; W. Wojtasiak.

[Edu119] *Computer Systems* (Systemy komputerowe – SMKW); 30h/sem.; semester 2; T. Jamrógiewicz.

[Edu120] *Designing of Radiocommunication Systems* (Projektowanie systemów radiokomunikacyjnych – PSRW); 60h/sem.; semester 3; T. Kosiło.

[Edu121] *Digital Signals Processing* (Cyfrowe przetwarzanie sygnałów – CPSW); 75h/sem.; semester 1; J. Wojciechowski, Z. Kulka.

[Edu122] *Digital Transmission of Information* (Cyfrowa transmisja informacji – CTIW); 75h/sem.; semester 2; T. Buczkowski.

[Edu123] *Diploma Seminar* (Seminarium dyplomowe – SDMW); 30h/sem.; semester 4; J. Ebert.

[Edu124] *Programming in Java Language* (Programowanie w języku Java – PJJW); 45h/sem.; semester 1; K. Ignasiak.

[Edu125] *Radio Navigation Systems* (Radiowe systemy nawigacyjne – RSNW); 45h/sem.; semester 4; T. Buczkowski, K. Czerwiński, K. Radecki.

[Edu126] *Radiocommunication Systems Design* (Projektowanie systemów radiokomunikacyjnych – PSRW); 60h/sem.; semester 3; T. Kosiło.

3.2.3 Studies on Radiocommunications, Multimedia Technologies and Biomedical Engineering "RADEM"

[Edu127] *X-DSL Techniques* (Techniki x-DSL); 6h, once a year; S. Kula.

[Edu128] *SRRL Mobile Land Radiocommunications Systems* (Systemy radiokomunikacji ruchomej SRRL); 12h; once a year; M. Bromirski.

[Edu129] *Basics of Telecommunications* (Podstawy telekomunikacji); 36h; once a year, H. Chaciński, P. Dymarski, T. Kosiło, S. Kula, K. Radecki.

[Edu130] *New Generation Networks* (Sieci nowej generacji); 18h; once a year, M. Bromirski, S. Kula.

3.2.4 Studies on Audiological Techniques

Studies on Audiological Techniques offer a series of courses: 187h, twice a year.

[Edu131] *Anatomy and Physiology of Hearing* (Anatomia i fizjologia słyszenia); 12h.

[Edu132] *Audiometry* (Audiometria); 32h.

[Edu133] *Aural Rehabilitation* (Rehabilitacja); 7h.

[Edu134] *Basics of Acoustics* (Podstawy akustyki); 20h.

[Edu135] *Earmold Technics* (Wkładki douszne); 8h.

[Edu136] *Ear Pathology* (Patologia ucha); 9h.

[Edu137] *Elements of Psychology* (Elementy psychologii); 6h.

[Edu138] *Gesture Language* (Język gestów); 8h.

[Edu139] *Hearing Aid Fitting* (Dobór aparatów słuchowych); 41h.

[Edu140] *Hearing Aid Measurements* (Miernictwo aparatów słuchowych); 14h.

[Edu141] *Hearing Aid Technology and Elements of Electronics* (Technika aparatów słuchowych i elementy elektroniki); 30h.

[Edu142] *Sign Language* (Język znaków); 6h.

3.2.5 B.Sc. Level e-learning Special Courses

Warsaw University of Technology Distant Learning Center – OKNO (Ośrodek Kształcenia na Odległość Politechniki Warszawskiej – OKNO)

[Edu143] *Basics of Sound Technique* (Podstawy techniki dźwiękowej); 30h/sem.; Z. Kulka, A. Leszczyński, M. Tajchert.

[Edu144] *Systems and Devices of Sound Technique* (Urządzenia i systemy techniki dźwiękowej); 30h/sem.; Z. Kulka, A. Leszczyński, M. Tajchert.

3.3 International co-operation

[Edu145] **SOCRATES Program: Higher Education**
T. Kosiło, T. Buczkowski
1999 – 2007

Institute of Radioelectronics of the Warsaw University of Technology has a working bilateral SOCRATES agreement with Katholieke Hogeschool Sint-Lieven, Gent, Belgium and Instituto Superior Tecnico, Universidade Tecnica de Lisboa, Lisbon, Portugal. Student Mobility actions were realized within the framework of Electronics and Telecommunication Engineering (Socrates code 06.05). The aim of the program is to realize a student project at the partner University. This year three students from our Institute (Monika Ziółkowska, Piotr Makal and Michał Maćkowiak) had 6 months project at Universidade Tecnica de Lisboa, Lisbon, Portugal.

[Edu146] Within the Advanced Technology Higher Education Network **Socrates (ATHENS)**, the course **"Ethical Aspects of Research and Engineering"** was offered by **Roman Z. Morawski** in the period November 19-23, 2007;

27 students from the following EU institutions of higher education attended this course:

- *École Nationale des Ponts et Chaussées*, Paris, France (Remi Dupeuble, Thomas France, Christophe Lièvre, Nicolas Tournaud);
- *École Nationale Supérieure de Techniques Avancées*, Paris, France (Karine Ramaye);
- *École Nationale Supérieure de Mines de Paris*, Paris, France (Pierre Barrau, Maxime Coupeuz, Matthieu Philippiot, Aurélien Saussay);

- *École Nationale Supérieure des Télécommunications*, Paris, France (Karim Bentahar, Rémy Burel, Majdi Ghorbel);
- *Instituto Superior Técnico*, Lisbon, Portugal (Sergio Pequito);
- *Katholieke Universiteit Leuven*, Leuven, Belgium (Thomas de Clerck);
- *Warsaw University of Technology*, Warsaw, Poland (Marcin Frąckowiak, Piotr Górowski, Władysław Grzegorzewski, Łukasz Pytlarczyk, Piotr Szotkowski, Tadeusz Wójcicki);
- *Technische Universität Wien*, Vienna, Austria (Martin Bauer, Philipp Harms, Christoph Winkler);
- *Technische Universiteit Delft*, Delft The Netherlands (Eelke Bontekoe, Mark de Koe);
- *Universidad Politécnica de Madrid*, Madrid, Spain (Jorge González).

The course "Ethical Aspects of Research and Engineering" included 20 hours of lectures and 10 hours of class tutorials.

[Edu147] Within the frame of *Lille's Noise at Work 2007 Forum*, an advanced short course called: "**New Trends in Occupational Noise Management**" was proposed in the form of a series by distinguished specialists in their respective fields: **Ewa Kotarbińska** (gave a lecture: "*Hearing protectors, a 'last resort' but unavoidable solution*"), Jacques Malchaire, Pierre Canetto, Michael Bockhoff.

Aims and targets of this course:

The success of an occupational noise management policy asks for a strong involvement on the part of all involved actors from the industrial or tertiary sectors. In general, those who deal with occupational noise management have various domains of competence: occupational safety and health, medicine, ergonomics, regulation and standards, exposure, engineering. Engineers themselves are more than often specialized: mechanics, electronics, room acoustics, enclosures, hearing protectors, among others.

The aim of this advanced short course is to provide these diverse actors with an updated, "common ground", understanding of the issue of occupational noise as a global approach. Each lecture has been selected because of its innovative character and topicality, taking in account public expectations, while giving importance to practicality and technical added value. In their respective subjects, these four lectures pinpoint recent developments and present original point of views. They emphasize practical applications, thereby helping one manage occupational noise reduction policies on a day-to-day basis, be it in the industry or in the tertiary sector. Less common solutions, as well as most used ones, will thus be dealt with.

Participants to *Lille's Noise at Work 2007 Forum* coming from various countries, having a certain knowledge in acoustics, may be interested in attending this short course. They may be familiar with a specific topic connected to occupational noise (ear physiology, hearing protectors, exposure measurement, noise control in factories) but would be interested in learning about other topics that belong to the occupational noise sphere.

4 RESEARCH ACTIVITIES

4.1 International projects

4.1.1 European grants

- [Pro1] **Co-operative Systems for Road Safety "Smart Vehicles on Smart Road"**.
Tomasz Kosiło, J. Modelski, J. Kołakowski,
 S. Maszczyk, Z. Walczak;
 Jan. 1, 2006 – Dec. 31, 2009
SAFESPOT, EU Integrated Project (Partially funded by MSHE)

The key aspect of the project is to expand the time horizon for acquiring information relevant for safe driving, as well as to improve the precision, the reliability and the quality of the driver information, and to introduce new information sources. The time horizon of the SAFESPOT applications will allow an extension of the "Safety margin", namely the time in which a potential accident is detected before it can occur, from the range of "milliseconds" up to "seconds". This extension, called "green area" will, reduce the risk of the accident to happen as more time will be given to drivers to realize that there is a potential danger, and to undertake the appropriate manoeuvres.

- [Pro2] **Core Subsystem for Delivery of Multi-band Data in CaTV**.
Andrzej Buchowicz, T. Keller, J. Modelski,
 W. Skarbak, G. Galiński, K. Ignasiak, M. Mogoś,
 S. Badura, G. Pastuszek, M. Leszczyński, M. Tomaszewski, M. Piasecki, S. Wydra, M. Bury, A. Rudziński, D. Rosołowski;
 Jan. 1, 2006 – Dec. 31, 2007
CODMUCA, EU Specific Targeted Research Project (Partially funded by MSHE)

The CODMUCA project will accelerate the development of the technology needed to bridge the gap from 40 MBs to a gigabit delivery on Hybrid Fibre Coax (HFC) networks. It will allow broadband convergence of data, voice and video delivery on one protocol and access mechanism based on standard Internet Protocols (IP). CODMUCA will accomplish its goal by researching multiple-channel bonding methods to create virtual MultiBand data "pipes" that will carry very high-speed data streams to and from the consumer. Within CODMUCA IRE WUT team cooperates with eight European partners representing different areas of the industry (leading equipment producers, integrators and HFC operators).

- [Pro3] **Wireless Data Collecting**.
Wojciech Gwarek, P. Kopyt, P. Węgrzyniak,
 M. Krok;
 Jan. 1, 2005 – Dec. 31, 2007
WISE, EU Specific Targeted Research Project (Partially funded by MSHE)

Integrated Wireless Sensing (WISE) is a European Specific Targeted Research Project in the area of Aeronautics & Space. The project is coordinated by Dassault Aviation and engages 11 partners from 7 European countries. Our Institute is involved in Work Package 3 connected with the transmission of the sensor signals through the air medium. In particular, we design the high frequency part of a system for reception of information from sensors placed on moving parts of aircraft wings.

- [Pro4] **Reconfigurable Systems for Mobile Local Communications and Positioning**.

Józef Modelski, K. Kurek, Y. Yashchysyn,
 R. Szumny, S. Kozłowski, P. Bajurko, A. Cichecki,
 P. Służewski;

Jan. 1, 2006 – Jan. 31, 2009

RESOLUTION, EU Specific Targeted Research Project (Partially funded by MSHE)

The aim of RESOLUTION is developing a wireless 3D local positioning system with high accuracy and real time ability. The system is intended to work in an environment with strong multipath effects and fading, and will be implemented in advanced CMOS technology. Institute of Radioelectronics is responsible for Work Package 3 (antennas and propagation) that considers modelling of the indoor multipath propagation channel and design of smart antenna arrays for the system.

- [Pro5] **Integrating and Strengthening of the European Research Area**.

Jacek Jarkowski, W. Wojtasiak, D. Gryglewski,
 R. Michnowski;

Jan. 1, 2004 – Jan. 1, 2008

TARGET, EU Network of Excellence (Partially funded by MSHE)

The aim of TARGET is to overcome the fragmentation of European research in the field of microwave power amplifiers for broadband wireless access by creating a progressive and durable integration of research capacities of the network partners. Ultimately, European technology and research in the fields of active power devices beyond CMOS, the characterization and simulation of materials and devices, the amplifier design and linearisation, and in the field of broadband transmitter system design will attain a leading role in the world.

- [Pro6] **Networked Audiovisual Media Technologies**.

Władysław Skarbak, K. Ignasiak, A. Buchowicz,
 G. Galiński, K. Kucharski, K. Wnukowicz, M. Tomaszewski, M. Mogoś, S. Badura, M. Leszczyński;

Jul. 1, 2006 – Jun. 30, 2009

VISNET II, EU Network of Excellence (Partially funded by MSHE)

VISNET II builds on the success and achievements of the VISNET network of excellence to continue the progress towards achieving the NoE mission of creating a sustainable world force in Networked Audiovisual (AV) Media Technologies. VISNET II is a network of excellence with a clear vision for integration, research and dissemination plans. The research activities within VISNET II cover 3 major thematic areas related to networked 2D/3D AV systems and home platforms. These are: Video Coding, Audiovisual Media Processing, Audiovisual Media Security and Protection. VISNET II brings together 12 leading European organizations in the field of Networked Audiovisual Media Technologies. The consortium consists of the organizations known for their proved track record as well as both, national and international reputation in audiovisual information technologies. VISNET II integrates a number of researchers who have made significant contributions to the advance of this field of technology through standardization activities, international publications, conferences and workshops activities, patents as well as many other prestigious achievements. The 12 integrated organizations rep-

resent 7 European states spanning across a major part of Europe, thereby promising the efficient dissemination of resulting technological development and exploitation to larger communities.

[Pro7] **Antenna Centre of Excellence.**

Yevhen Yashchyshyn, J. Jarkowski, J. Modelski;
Feb. 27, 2007 – Dec. 31, 2007

ACE2, EU Network of Excellence (Partially funded by MSHE)

ACE2 is focused on the IST strategic objectives "Mobile and Wireless Systems beyond 3G" and "Broadband for All" which in future wireless world will converge and antennas will be ubiquitous in very advanced forms. Adaptive array antennas will be required by some future systems and small very efficient antennas by others. The small antennas, mounted on every electronic equipment, on the body or in the body for medical implant communications, for example, must be carefully designed, so special software programs and test beds must be developed. Institute of Radioelectronics (IR) is involved in Work Packages concerned with near-field measurement techniques, in particular different measurement procedures for specific antenna quantities. The network is coordinated by IDS Ingegneria dei Sistemi spa and SAAB Space AB. It engages 51 participants from 17 European countries.

[Pro8] **Screening of Cardiovascular Systems Based on Multi-Parameter Analysis.**

Ewa Piątkowska-Janko, P. Bogorodzki, T. Wolak, M. Orzechowski;

Jan. 1, 2003 – Jan. 12, 2007

EUREKA – CAVASCREEN, (Partially funded by MSHE)

The project includes a description, comparison with clinical data and clinical exploitations of a non-invasive and relatively inexpensive method for screening cardiovascular systems based on multi-parameter analysis of heart haemodynamics and vascular perfusion in selected areas of the body areas.

4.2 Projects granted by the Ministry of Science and Higher Education (MSHE)

4.2.1 MSHE international grants

[Pro9] **The COMPASS Experiment – the Research on the Spin Structure of Nucleon** (Eksperyment COMPASS – badanie spinowej struktury nukleonu).

Krzysztof Zaremba, J. Marzec, M. Dziewiecki, G. Domański, B. Konarzewski, R. Kurjata, R. Sulej, M. Ziembicki;

COMPASS, International project realized in collaboration with the Soltan Institute for Nuclear Studies and Faculty of Physics, Warsaw University;
Oct. 30, 2007 – Oct. 30, 2010

The project is a part of the long-term collaboration between the Institute of Radioelectronics and the international high-energy physics experiment COMPASS (Na58) at CERN (Geneva). Within the framework of a new program the team from the Institute of Radioelectronics is responsible (together with the teams from Soltan Institute of Nuclear Studies and Warsaw University of Technology) for the design of new methods of the experimental data analysis, including applications of the "soft computing" methods (neural networks, genetic algorithms etc.). The Insti-

tute is also involved in preparations of the hardware upgrade of the COMPASS experiment for the new physical program foreseen for years 2008-2012.

[Pro10] **The Research of the Neutrino Oscillations – the Second Generation Experiment – Design of the Detector and Participation in the Data Acquisition in the T2K Experiment** (Badanie oscylacji neutrin – eksperyment drugiej generacji – budowa detektora i udział w pomiarach przeprowadzanych w eksperymencie T2K).

Krzysztof Zaremba, J. Marzec, M. Dziewiecki, G. Domański, B. Konarzewski, R. Kurjata, R. Sulej, M. Ziembicki;

T2K, International project realized in collaboration with the Faculty of Physics, Warsaw University, Andrzej Soltan Institute for Nuclear Studies, Institute of Nuclear Physics, Polish Academy of Sciences, Faculty of Physics and Astronomy, University of Wrocław, Faculty of Mathematics, Physics and Chemistry, Silesian University;
Oct. 30, 2007 – Oct. 30, 2010

The project is a part of the collaboration with the T2K experiment in Japan. The T2K is a component of the second generation long-baseline neutrino-oscillation experiment intended for studies of the nature of neutrinos and the effect of their oscillations. Artificial neutrino beam generated in the proton accelerator in Tokai is shoot toward the 50-kT water Cherenkov detector, Super-Kamiomande, which is located about 1000 m underground in Kamioka mine and is 295 km away from Tokai. The Institute of Radioelectronics takes part in the design of SMRD (Side Muon Range Detector), which is the part of the near detector (ND280), located in Tokai, 280 m away from the target position, intended for measurements of the neutrino spectrum, contamination and interaction cross-sections before the oscillation.

4.2.2 Research grants

[Pro11] **New Type of an Electronically Reconfigurable Smart Antennae** (Nowe rodzaje anten inteligentnych o rekonfigurowanej elektronicznie aperturze).

Józef Modelski, Y. Yashchyshyn, P. Grabiec, J. Marczewski, T. Keller, K. Kurek, H. Chaciński, P. Bajurko;

May. 24, 2005 – Nov. 23, 2007

The general model of the reconfigurable aperture in the impedance approximation is described in this project. The integral equation for the magnetic currents being excited on a aperture with the variable surface impedance is formulated. A highly effective numerical algorithm is used to obtain the solution of the integral equation. The Genetic Algorithm is used in the optimization of the desired radiation pattern. The optimizer tries to determine the configuration of a conductive pattern on a semiconductor substrate to obtain the desired radiation pattern. The key element of the antenna will be a semiconductor chip that contains a set of individually controlled PIN structures. Electromagnetic waves propagate through the chip, which also serves as a planar dielectric waveguide. The PIN structures locally affect the wave propagation velocity and the antenna can form a beam in practically any direction within a wide steering angle (like a leaky-wave antenna).

[Pro12] **Development of Methodology and Instrumentation for Functional Magnetic Resonance Imaging (fMRI) of Auditory Cortex** (Opracowanie metodyki i aparatury do klinicznych badań czynnościowych kory słuchowej metodą funkcjonalnego rezonansu magnetycznego).

Piotr Bogorodzki, K. Kochanek, L. Śliwa, M. Gołębiowski, J. Walecki, W. Szeszkowski, M. Kazubek, E. Piątkowska-Janko, T. Wolak, T. Jamrógiwicz, M. Orzechowski, R. Kurjata;

May 24, 2005 – May 23, 2007

The aim of the project was to build and test new experimental procedures for functional assessment of the human auditory cortex (AC). Although functional MR (fMRI) and perfusion methods are well recognized as powerful tools in various clinical and neurological applications, they still suffer from the lack of accurate and repeatable quantitative measures of studied effects. In order to overcome these limitation, the following problems was studied:

- Design of the new pre-processing algorithms for the removal of physiological noise, motion correction and resolution improvement with shifted measurements. Software was written in MATLAB (MathWorks, USA) and the algorithms were tested in fMRI and perfusion studies.
- Design and testing of the novel techniques for generation of fMRI activation maps based on features derived from time-intensity curves in anatomically or functionally defined regions of interest (ROIs). Basing on the measures derived from the time-intensity curves, differences between groups of subjects will be highlighted allowing inference about group separation based on functional responses in chosen regions. Resulting measures can be used for higher level analysis, such as ANOVA, MANOVA etc. in order to show group effects. The new algorithms will be compared with the existing ones and with the gold standard provided by metabolic mapping, which is more sensitive by an order of magnitude.
- Design and evaluation of new algorithms for fMRI image analysis based on anatomical and functional knowledge. Functional connectivity between clusters of activated voxels will be estimated by structural equation modeling.

[Pro13] **Algorithms for Adaptive Video Transcoding and their Hardware Implementation** (Algorytmy adaptacyjnego transkodowania cyfrowego sygnału wizyjnego i ich implementacja sprzętowa).

Andrzej Buchowicz, W. Skarbek, G. Pastuszak, G. Galiński, K. Wnukowicz, S. Badura;

Jun. 4, 2006 – Jun. 4, 2008

The overall purpose of the project is to develop an effective adaptive video transcoding algorithms for bit rate reduction, spatial and temporal resolution down-sampling and transcoding between video coding standards. Special attention will be paid to the transcoding from the MPEG-2 standard to the H.264 standard. The selected algorithms will be implemented in hardware allowing real time processing.

[Pro14] **Iterative Algorithms for Tomograph Image Reconstruction with Modification of Sensitivity Matrix** (Iteracyjne algorytmy rekonstrukcji obrazów tomograficznych z modyfikowaniem macierzy czułości).

Waldemar Smolik, D. Radomski;

Oct. 9, 2007 – Jan. 8, 2009

The goal of this project is the development of iterative algorithms for image reconstruction. It is necessary to use such algorithms as: ART and SIRT. These algorithms will be implemented to improve the quality of object imaging.

[Pro15] **Methods and Algorithms of Measurement Data Processing for Applications in Spectrophotometric Analyzers** (Metody i algorytmy obróbki danych pomiarowych dla zastosowań w analizatorach spektrometrycznych).

Roman Z. Morawski, A. Miękina, A. Podgórski;

Nov. 30, 2006 – Oct. 30, 2009

Spectrophotometric analyzers are on the rise, both in terms of the growing number of their applications and in terms of the growing number of their models available on the market. Today, they are applied not only for qualitative and quantitative identification of (bio)chemical substances, but also for evaluation of the nutritional properties of food and beverages, as well as for testing commercial parameters of textiles, construction materials and paper products. Any spectrophotometric analyzer is composed of a spectrophotometric transducer, a source of optical radiation, an output interface and a digital signal processor. During last decade, many miniature spectrophotometric transducers have appeared on the market. Their availability and relatively low prices open the prospects for developing a new class of personal analyzers of food, water, gasoline, atmospheric conditions, etc. The key problems to be solved now are related to the methods and algorithms of spectrophotometric data processing. The project is aimed at the development of the complex methodology for spectrophotometric data processing dedicated to spectrophotometric analyzers, mainly to NIR analyzers of food and beverages.

[Pro16] **Acute Ischemic Stroke Detection based on Non-Contrast CT Examinations: Computer-based Methods of Hipodensity Processing, Extraction and Visualization** (Detekcja wczesnych udarów niedokrwiennych mózgu z wykorzystaniem komputerowych metod przetwarzania, ekstrakcji i wizualizacji informacji z badań anatomicznych TK).

Artur Przelaskowski, U. Fiszer, W. Skarbek, T. Bulski, K. Sklinda, M. Kazubek;

May 10, 2007 – Sept. 30, 2009

Ischemic stroke is the clinical syndrome of rapid onset of focal, or sometimes global, cerebral deficit with a vascular cause, lasting more than 24 hours or leading to death. Infarction may occur in any area of the brain following vascular territory or watershed distribution. Brain imaging is required to guide the selection of acute interventions to treat patients with a stroke, which is very important for the stroke emergency centers. The recent advent of thrombolytic therapy for acute stroke treatment makes as early as possible detection of areas of hypoattenuating ischemic parenchyma exceedingly important. For most cases, CT remains the most important brain imaging test. The most frequent and reliable signs of irreversible ischemic injury is a focal hypodense area (i.e. with density lower than normal brain tissues), in cortical, subcortical, or deep gray or white matter. However, on the initial CT-scan, performed during the hyperacute phase of stroke (0-6 h), the subtle hypodensity does not have to be seen because of artifacts, noise and other tissue abnormalities.

The purpose of our study is to improve the diagnosis of hyperacute ischemic brain parenchyma on emergency CT scans. The method is the enhanced visibility of more dis-

tinguished or extracted subtle and hidden hypodense signs. Multi-scale hypodensity modeling was based on the following data processing stages: the initial gray-to-white tissue segmentation; the next segmentation of potentially hypodense areas (e.g. sulci or the aged lesions); noise suppression in selected ROIs through the non-perfect signal reconstruction in successive scales, basing on middle band noise suppressing, adaptive signal modeling and extraction. Local contrast of the processed images was additionally improved by adaptive data visualization methods.

Realized concept of Stroke Monitor is a display of ischemic stroke as a kind of computer aided interpretation tool. Signal and noise separation based on spatially distributed properties over different scales and sub-bands is optimized. Lower frequency parts offer distinguished information about poor textures and mean value estimates in regions. A correlation of high frequency information across scales, portrays even very weak edges and region distinction. Therefore, noise and artifacts may effectively be reduced in multi-scale data processing. Post-processing in multi-scale domain (wavelets, curvelets) is less susceptible to local perturbations, and beneficial noise suppression and selective contrast enhancement is possible.

4.2.3 Development grants

[Pro17] **Multi-antenna Broadband Radiocommunication and Radiolocation Systems** (Wieloantenowe szerokopasmowe systemy radiokomunikacyjne i radiolokacyjne).

Józef Modelski, W. Wojtasiak, D. Gryglewski, K. Kurek, Y. Yashchyshyn, S. Kozłowski, M. Bury, P. Bajurko, D. Rosołowski;

Mar. 23, 2007 – Sept. 9, 2009

The main aim of the project is research and development process on the prototypes of multi-antenna transmitters and receivers constructions, for use in radiocommunication and radiolocation applications. For the project mainly MIMO (Multiple Input Multiple Output) techniques are used, in connection with multidimensional electrical and thermal modeling of the microwave semiconductor devices.

[Pro18] **Design of High Power Microwave Devices with SiC and GaN Components** (Projektowanie mikrofalowych urządzeń dużej mocy z elementami SiC i GaN).

Wojciech Wojtasiak, D. Gryglewski, M. Lubiejewski;

Oct. 2, 2007 – Oct. 1, 2010

The aim of the project is to design the high-temperature high-power microwave devices including DC supply blocks with use of SiC MESFET, GaN HEMT and low frequency SiC components such as MOSFET, and rectifying Schottky diodes. The design procedures will be supported by multidimensional electro-thermal modeling and measurement techniques to determine frequency characteristics and thermal response of active elements. Within the framework of the project there are intended tasks as follows:

- high-temperature AC-DC and DC-DC converters with efficiency more than 85%,
- high power microwave amplifiers of up to 100W output power level for L and S-band,
- the measurement systems of temperature response of SiC and GaN devices.

The results of project will be put into practice in telecommunication companies and by the producers of military equipments. The project is the joint venture of Institute of Radioelectronics WUT and Electronic Department of Technical University of Koszalin.

[Pro19] **Multi-plane Capacitance Tomograph for Flow Speed Measurement** (Wielopłaszczyznowy tomograf pojemnościowy do pomiaru prędkości przepływu).

Roman Szabatin, P. Brzeski, W. Smolik, T. Olszewski, J. Mirkowski, A. Płaskowski, P. Czarnecki;

Oct. 11, 2007 – Apr. 10, 2010

The aim of the project is to elaborate, construct and verify an electrical capacitance tomograph, of very high position resolution, which will be working in real time. As a result, images (2D or 3D) of gas and liquid flow will be presented.

4.2.4 Ph.D. grants

[Pro20] **Applications of the Neural Networks in Classification Tasks in the High Energy Physics Experiments** (Sztuczne sieci neuronowe w zadaniach klasyfikacji w eksperymentach fizyki wysokich energii).

Krzysztof Zaremba, R. Sulej;

Nov. 9, 2006 – May 8, 2008

The aim of this project is to establish the methods of event selection and interaction parameters estimation for the COMPASS experiment. Currently used techniques require manual tuning of the parameters and presumably do not guarantee the highest quality of results. The method of extracting information contained in higher number of parameters and their mutual correlations is needed. Potential solution is the application of the neural network. We propose also the new algorithm for automated control of the network size (constructive network) resistant to the local-minima and over-training problems.

[Pro21] **Development of Processing Methods for Quantitative Analysis of Proteomic Mass Spectrometry Data** (Rozwój metod przetwarzania danych w badaniach proteomicznych pod kątem analizy ilościowej).

Krzysztof Zaremba, T. Rubel;

Oct. 1, 2007 – Dec. 31, 2009

The aim of the project is to develop a mass spectrometry-based method for automated, label-free protein expression quantitation. The work covers all steps of the liquid chromatography-mass spectrometry (LC-MS) data processing, including MS/MS results collection and verification, raw MS spectra smoothing, model-based peak picking, normalization and multivariate statistical analysis. Special attention is paid on feature selection and classification algorithms, which are essential for medical diagnostic applications.

[Pro22] **The Use of Formal Methods in Measuring Systems Design** (Wykorzystanie metod formalnych w projektowaniu systemów pomiarowych).

Wiesław Winiecki, R. Łukaszewski;

May 4, 2006 – May 4, 2007

The projects applies to the use of the formal methods in the measurement systems design. The main area of interest is the distributed measurement systems (DMS). The subject matter of the DMS design are the methods of the measurement systems design (therein DMS), which enable the improvement of the systems reliability (therein

DMS) as a result of the allowance of the time conditions specific for such systems. The scientific aim of the design is the development of the new method of measurement systems design and analysis.

The detailed scientific aims are:

- Development of the time flow of DMS model enabling the support of the system design;
- Development of the methods of design of the measurement systems of time dependencies in the DMS, with the use of the developed DMS time flow model.
- Experimental verification of the design methods developed. The application purpose of the project is the development of the models of the standard functional blocks of the latest measurement systems. These models will primarily consider the aspects of the information flow within the system.

[Pro23] **Method of Localization of Radio Terminals Inside Buildings** (Metoda lokalizacji terminali radiowych wewnątrz budynków).

Józef Modelski, R. Szumny;

Nov. 9, 2006 – Dec. 31, 2007

This work concerns indoor positioning subject. It will contain deep analysis of multi-path propagation influence to localization accuracy and proposal of localization error mitigation method. Researches will be based on simulations and measurements.

4.3 Projects granted by the University

4.3.1 Statutory projects

[Pro24] **Design and Investigation of Electroacoustics Measuring Systems and Digital Audio Signal Processing Systems** (Projektowanie i badania systemów elektroakustycznych oraz systemów cyfrowego przetwarzania sygnałów fonicznych).

Zbigniew Kulka, P. Bobiński, E. Kotarbińska, A. Leszczyński, A. Młyńska, M. Tajchert, J Żera;

Jul. 18, 2006 – Dec. 31, 2007

The first subject of the work was to design and develop the directive sound source which can be used in fire alarm evacuation systems. The simulations of designed source's model were made and their results were compared with measured characteristics of developed sound source. The second subject was to design and build the computerized measurement system using the Audio Precision's System Portable One + as an acoustic signals analyzer. The intuitive graphical user interface enabling to control all the system was created. A series of acoustical measurements were performed to test the system. The last topic concerned about a computer simulation of chosen one- and few-bit digital sigma-delta ($\Sigma\Delta$) modulators of various order and their implementation in the FPGA. These modulators are destined for use in the digital-to-analog audio converters. The results of the computer simulation as well as results of the output signal measurements obtained from the implemented modulator structures were presented.

[Pro25] **New Techniques of Amplification and Reception of RF Signals – Components of UWB Receivers and Resonant Power Amplifiers** (Nowe techniki wzmacniania i odbioru sygnałów UWB i rezonansowe wzmacniacze mocy).

Jacek Cichocki, J. Kołakowski, K. Radecki, S. Maszczyk, W. Kielek, S. Żmudzin D. Kolmas, P. Ziętek;

Jul. 18, 2006 – Dec. 31, 2007

The project covered two distinct investigation areas: techniques of reception of UWB signals and methods for design of RF resonant power amplifiers. The UWB part of the project resulted in development of several modules: filters, mixers, tunnel diode detector and pulse integration circuit. All modules were designed, fabricated and investigated. Results of investigations proved that most of modules can be used in the design of an impulse UWB receiver. Within the frames of the second investigation topic a simplified method for design of resonant class AB, B and C power amplifiers with MOSFETs was formulated and experimentally tested. The method was used for development of four prototypes of amplifiers (1MHz/25W, 3MHz/25W, 13.5MHz/18W and 100MHz/5.5W). Results of their investigation enabled method verification and evaluation of its accuracy.

[Pro26] **Methodology for Interpretation of Measurement Data** (Metodyka interpretacji danych pomiarowych).

Roman Z. Morawski, A. Miękina, A. Podgórski;

Jul. 18, 2006 – Dec. 31, 2007

The primary objective of the project was related to the methodology of design and implementation of algorithms for calibration of measurement channels and reconstruction of measurands (*i.e.* generalised quantities to be measured); the project is also aimed at upgrading the corresponding research infrastructure. The results of the project include: a systematic approach of the design – and – implementation issues related to the applications of digital signal processing in measuring systems; a methodology for its implementation in the advanced instruction of graduate students; some new contributions to the development of logical and philosophical foundations of measurement theory; an original package of software for advanced USB controller to be applied in measurement instrumentation. The results of the research accomplished have been partially published in 4 papers.

[Pro27] **Modern Techniques in Nuclear and Medical Electronics** (Nowoczesne techniki elektroniki jądrowej i medycznej).

Krzysztof Zaremba, P. Bogorodzki, P. Brzeski, G. Domański, T. Jamróiewicz, M. Kazubek, B. Konarzewski, J. Marzec, T. Olszewski, Z. Pawłowski, E. Piątkowska-Janko, A. Przelaskowski, L. Padée, W. Smolik, R. Szabatin, P. Bargiel, P. Boniński, R. Kurjata, M. Orzechowski, A. Trybuła, T. Wolak, A. Wróblewska;

Jul. 26, 2006 – Dec. 31, 2007

Analysis of spatial resolution in optical coherence tomography.

The aim of the work was to make an analysis of spatial resolution in optical coherence tomography. Analytical theory of time domain optical coherence tomography was elaborated. The computer program was prepared for

Monte Carlo simulation of photon migration in turbid tissue.

AMR compatible Patient Response Pads (PRP).

The main subject of the project was to design a MR compatible Patient Response Pads (PRP) for functional Magnetic Resonance Imaging (fMRI) experiments. Presented PRP was designed for subject performance monitoring, and scanner synchronized stimuli presentation. The system was successfully tested on GE, Philips and Siemens scanners with several kinds of stimulation software: either commercial Presentation (Neurobehavioral Systems, Inc., USA), E-prime (Psychology Software Tools, Inc, USA) or home build Paradigm Designer (IR, Poland). The proposed system consists of the three major modules: control module (CM), which is closed in electromagnetically shielded aluminum profile, hand held response pads (RP) made of all nonmagnetic parts and scanner synchronizing module (SM) which can be located outside the Faraday cage, typically in technical room. The mentioned system was installed in NeuroSpinal Hospital (Dubai, UEA), Cliniques Universitaires Saint-Luc (Brussel, Belgium), Centre Hospitalier Universitaire de Liège (Liege, Belgium), Fundación Hospital Nacional de Paraplégicos (Toledo, Spain), Fondation Ophtalmologique Adolphe de Rothschild, (Paris, France) and Helimed Diagnostic Imaging (Katowice, Poland).

Content-based indexing of medical images: optimization.

Content-based image indexing was the subject of reported research. In details, diagnostic content indexes for mammography were optimized, verified and integrated to computer-assisted diagnosis system. The most important items of the index improvements were as follows: new numerical descriptors of masses and microcalcifications, enhanced diagnostic quality metrics and similarity measures, modified JPEG2000 fitted to diagnostic characteristics of the imaginary, development of ontology-based interpretation procedures and subjective quality assessment, design of pathology patterns based on formalized knowledge principles, CAD detection algorithms and consultations with specialists in mammography.

Electrical tomography techniques applied in medicine and industry.

In the current year, the works on the volume tomograph have been focused on refining and starting the 32-electrode version of ET3 tomograph. It required a complete change of the previous electronic modules software of both, the 16 signal cards and the measurements steering and data transmission card. Also, the adequate measurement probe with 32 electrodes and suitable screens has been developed and the first measurement tests have been done, which confirmed the high definition of the images received with the 32-electrode version ET3 tomograph. Moreover, full tests of ET3 tomograph in its double-plane 2x12 electrode version have been done. The received medium images (aluminum oxide – *alumina*) in two planes, have fully confirmed the usefulness of ET3 tomograph in the research of the volume flow in industrial installations. It has been proved by the preliminary results of the ET3 tomograph research, that has been done in the research-and-development centre C/O TUNRA Bulk Solids at the University of Newcastle, Australia.

[Pro28] Signals and Radiocommunication Systems (Sygnały i systemy radiokomunikacyjne).

Tomasz Kosiło, S. Hahn (em.), J. Wojciechowski, T. Buczkowski, K. Czerwiński, J. Jarkowski, H. Chaciński, W. Kazubski, Z. Walczak, K. Snoppek;

Jul. 26, 2006 – Dec. 31, 2007

This work covers theoretical and practical problems of modern radio communication systems. Cellular networks, wireless data networks and wireless access networks (last mile) have today important and growing position. Because of this it is necessary to develop new transmission algorithms, new methods of radio networks management, to solve problems of electromagnetic compatibility and analyze ecological problems concerned with old generation electronic components. In the frame of this contact we studied the following problems:

- new methods of signals and system analysis;
- problems of radio networks development and optimization;
- study of mobile wireless systems properties;
- ecological aspects of electronics.

[Pro29] Modern Methods of Computer Measuring Systems Designing (Nowoczesne metody projektowania komputerowych systemów pomiarowych).

Wiesław Winięcki, K. Mroczek, P. Biłski, R. Łukaszeński, T. Daniluk;

Jul. 26, 2006 – Dec. 31, 2007

The project concerns the distributed measuring systems (DMS). The results of the project include: the methodology of design of measuring systems with time limited data flow, the new method of describing measuring systems model based on Petri Nets with the use of CPN/Tools; a method of using web-services technology and also static and mobile agent technologies in DMS with experimental verification of measurement stations delays and data transfer rate; the method of designing the real-time virtual instrumentation using ETS configuration. The results of the research have been published in 4 conference papers.

[Pro30] Audiovisual Network Hybrid Systems (Audio-wizualne sieciowe systemy hybrydowe).

Krzysztof Ignasiak, W. Skarbek, A. Buchowicz, G. Galiński, K. Wnukowicz, S. Badura, K. Kucharski, M. Leszczyński, M. Morgoś, G. Pastuszek, M. Tomaszewski;

Jul. 18, 2006 – Dec. 31, 2007

The main aim of the project was to develop algorithms for intelligent multimedia interfaces. As the example of such an interfaces an intelligent cash machine has been chosen. The intelligence of the cash machine manifests in introducing new communications channels, improved, not only PIN based, authorization methods and introducing some elements of surveillance system: audiovisual sequences from sensors can be annotated automatically and stored in the database for further processing or for evidence of unusual user behavior. The architecture for simulator of the cash machine as well as a number of modules for the simulator have been developed, for instance authorization module using minutiae detection for fingerprints recognition. Furthermore, face detection and tracking algorithm has been developed using Discrete Gabor Jets. During the project lifetime the database of human faces in different lighting conditions has been created.

[Pro31] **Radio-Transmission Techniques in Applications of Localization, Navigation and Object Shape Recognition.** (Radiowe techniki transmisyjne w obrazowaniu, nawigacji i lokalizacji).

Józef Modelski, K. Kurek, Y. Yashchyshyn, T. Keller, R. Szumny, A. Kurek;

Jul. 18, 2006 – Dec. 31, 2007

The main aim of the project was to analyze the modern communication systems in a specific applications of localization, navigation and object shape recognition. Research work on optimization of the penetrating radar using the ultra-wide-band communication for recognition of the shape of objects have been done. Some mathematical models have been also defined in order to improve the resolution of the microwave imaging system. The ways of use different radio interfaces in localization techniques have been also analyzed.

[Pro32] **Methods of Electromagnetic Simulations and Design of Transmitters for Radiocommunication Systems** (Metody symulacji elektromagnetycznych i projektowania torów nadawczych dla systemów radiokomunikacyjnych).

Wojciech Gwarek, T. Morawski, M. Celuch, D. Gryglewski, M. Sypniewski, A. Więckowski, P. Miazga, W. Wojtasiak, J. Zborowska, R. Michnowski, K. Robaczyński, P. Kopyt, J. Rudnicki, A. Moryc, T. Ciamulski, W. Kijewska, M. Lubiejewski;

Jul. 18, 2006 – Dec. 31, 2007

The first sub-project has been concerned with new methods for the design of transmitter elements in point-point and point-multipoint radiocommunication systems. Linearisation and error correction techniques have been addressed. A measurement system has been proposed for testing transmission quality. The system includes a Base Band generator with a selection of modulation and access techniques, a converter to the transmission band, and a receiver, which allows analyzing error levels and constellations of transmitter states. In the second sub-project, electromagnetic simulation methods developed by the group have been adapted for microwave heating applications (food industry, household applications), analysis of EM hazards in a workplace, and full-wave analysis of optical problems. Coupling of electromagnetic and thermodynamic simulations has been pursued. Properties of multi-thread algorithms have been investigated on multiprocessor machines and clusters. Results of the project have been disseminated in 26 papers, including journals and international conferences of the IEEE series.

4.3.2 Projects granted by the Rector

[Pro33] **Development of Portable ECG in Telemedical Applications** (Opracowanie przenośnego aparatu EKG w zastosowaniach telemedycznych).

Ewa Piątkowska-Janko, P. Chmielewski, P. Kamiński, M. Raniecka, W. Obrębski, R. Rudowski, T. Cedro;

Apr. 16, 2007 – Dec. 31, 2007

The aim of the project is to design a portable electrocardiography system that would allow recording of a electrocardiography signal from moving subject. Additionally, designed device will have localization capability through GPS chip. Proposed device can be considered as a platform for future developments in the telemedicine.

[Pro34] **Project of Ground Station for Communication with LEO Satellites.** (Projekt stacji naziemnej do łączności z satelitami na orbitach LEO).

Krzysztof Kurek, M. Stolarski, R. Graczyk, G. Woźniak, K. Dąbrowska, A. Cichocki;

Apr. 16, 2007 – Dec. 31, 2007

The aim of this project was to build a ground station for communication with LEO satellites in radio amateur frequency bands. The station will be used in actual and future projects realized by Student Space Engineering Scientific Group. Design of antenna subsystem and implementation of software for distributed ground station system DGSS have been done in the project.

4.3.3 Projects granted by the Dean

[Pro35] **Application of the Diffusion Optical Tomography for Functional Examination of Tissue** (Zastosowanie dyfuzyjnej tomografii optycznej do badań funkcjonalnych narządów).

Janusz Marzec, A. Trybuła;

Apr. 24, 2007 – Dec. 31, 2007

Ph.D. grant

The goal of the grant was the implementation of the practical application of the diffusion optical tomography. Time-resolved photon migration theory has been verified by means of high speed photon counting system and Monte-Carlo model. The latter was used for generating data required to calculate fit parameters. Finite element method (FEM) was used for calculating in solid state model, which allowed for considerable saving in computation time. Eight channel device was built for optical signals measurements. Data aggregated in time series allow for the localization and quantification of tissue chromophore concentrations. Both systems can be combined to achieve high temporal resolution in the point interesting area, preserving good spatial resolution in the measured region

[Pro36] **Time-Frequency Schemes in Signal Detection and Recognition** (Czasowo-częstotliwościowe schematy w detekcji i rozpoznawaniu sygnałów).

Kajetana Snopek, S. Hahn, A. Dąbrowski, P. Dymarski, S. Kula;

Apr. 24, 2007 – Dec. 31, 2007

The grant has been realized in cooperation with the Institute of Telecommunications (Faculty of Electronics and Information Technology of the Warsaw University of Technology).

It was the continuation of the research concerning the elaboration of effective methods of audio watermarking basing on the time-frequency techniques. Firstly, the idea of applying the watermark simultaneously spread in time- and frequency domains has been studied. Secondly, the chirp-like watermark has been embed in the audio signal and its detection has been performed using the double-dimensional Wigner distribution. The resistance of the watermarked audio signal to the MPEG compression and the filtering has been verified. The tests of audibility has been performed.

[Pro37] **A Laboratory of Hyperpolarized Contrast Agents for Magnetic Resonance Imaging** (Stanowisko laboratoryjne do badania hiperpolaryzowanych środków cieniujących wykorzystywanych do obrazowania techniką rezonansu magnetycznego).

Piotr Bogorodzki, I. Wawer, M. Pisklak, W. Szeszkowski, J. Piotrowski, J. Skulski, E. Piątkowska-Janko, M. Kazubek, T. Wolak, T. Jamrógiwicz;
Apr. 24, 2007 – Dec. 31, 2007

The goal of the project is to design a instrumentation for polarization process of contrast media which can be used thereafter for magnetic resonance (MR) functional studies.

[Pro38] **Design of Antenna Positioning System for Ground Station for Communication with LEO Satellites** (Projekt systemu pozycjonowania anten stacji naziemnej do łączności z satelitami na orbitach LEO).

Krzysztof Kurek, M. Stolarski;
Nov. 5, 2007-Dec. 31, 2007

The aim of this project was to realize an antenna positioning system for the ground station that will be used by Student Space Engineering Scientific Group in its projects. The system consists of mechanical rotor and control software, and allows to pointing the antennas towards LEO satellite moving in the sky.

[Pro39] **Applications of Cryptographic Algorithms and Methods to Security Improvement of Distributed Measurement and Control Systems** (Zastosowanie metod kryptograficznych do podwyższenia bezpieczeństwa sieci typu RSPS).

T. Adamski, W. Winiecki, R. Łukaszewski, P. Bośniński, T. Owczarek;
Nov. 5, 2007-Dec. 31, 2007

The grant deals with information security of Distributed Measurement and Control Systems (DMCS). There are many examples of DMCS systems in which information security is a crucial problem. Well known examples are: electricity meter networks, networks of gas meters, environment contamination measurement networks and many kinds of mobile systems. Usually information security is composed of four elements: data confidentiality, data integrity, document authentication and entity authentication. The specific properties of DMCS like asymmetry of computational power (and asymmetry of memory capacity) of hosts, low channel capacity and (frequently) data transmission via open communication networks (as Internet) lead to the necessity of applying special algorithms and methods well suited to these specific requirements. The main aims of the grant were the following:

- analysis of all possible threats of information security in DMCS taking into account their specific properties;
- choosing appropriate cryptographic methods, techniques and algorithms to secure DMCS;
- tools for measurement systems community (for Lab View only at the moment) to design secured DMCS.

[Pro40] **Transductive Least-squares Support Vector Machine for Computer-aided Diagnosis of Heart Diseases based on Signal-averaged and Holter Electrocardiography** (Transdukcyjna średniokwadratowa maszyna wektorów nośnych do wspomagania diagnozy schorzeń serca na podstawie wysokorozdzielczej i holterowskiej elektrokardiografii).

Stanisław Jankowski (ISE), E. Piątkowska-Janko, A. Oręziak, Z. Szymański, K. Zaremba, J. Marzec;
Apr. 24, 2007 – Dec. 31, 2007

Transductive support vector machine (TSVM) is a statistical learning system that explores the information from the labeled data as well as unlabeled data distribution in the input space. It is the extension of supervised support vector machine. We compared the results obtained by the supervised SVM and the transducer TLS-SVM classifier. We obtained very high score of successful recognition 85% in case of small labeled data about 5 % for the transductive SVM (TSVM) classifier.

4.4 Other projects

[Pro41] **Development of Technology and Image Processing Tools for Management and Access to Video Contents** (Rozwijanie technologii i oprogramowania do zarządzania i dostępu do zawartości video).

Władysław Skarbek, G. Galiński, M. Leszczyński
Jul. 1, 2006 – Mar. 30, 2007
Funded by Mitsubishi Electronic Information Technology Center (UK).

The aim of this work was to develop an MPEG-2/MPEG-7 library of functions and GUI. The library allows MPEG-2 stream analyzing, extracting video frames into image files, and linking MPEG-7 meta-data to MPEG-2 stream.

[Pro42] **IRT 2000 Conversion System from 2.4 GHz to 3.5 GHz** (Wykonanie konwersji systemu IRT 2000 z pasma 2,4 GHz do pasma 3,5 GHz).

Wojciech Wojtasiak, D. Gryglewski, M. Lubiejewski;
Jan. 24 – May 4, 2007
Funded by NETIA S.A.

Details of the project cannot be published due to non-disclosure agreement with contractor.

[Pro43] **Resonator with the Instrumentation** (Rezonator wraz z oprzyrządowaniem).

Wojciech Gwarek, M. Celuch, P. Kopyt;
Feb. 6 – Sept. 30, 2007
Funded by PETE PESHECK (USA).

Details of the project cannot be published due to non-disclosure agreement with contractor.

[Pro44] **Test System for High-Frequency Power Amplifiers Acquisition** (System testowy do akwizycji wzmacniaczy mocy w.cz).

Wojciech Wojtasiak, D. Gryglewski, M. Lubiejewski;
Feb. 19 – May 31, 2007
Funded by ARTESYN (USA).

The goal of this project was to design the system for acquisition high-frequency power amplifiers. Application of new components required establishing method for project designing. It was the main subject of this work.

[Pro45] **Development of Research Programme and Measurements of 10 Repeaters** (Opracowanie programu badań oraz przeprowadzenie pomiarów 10 szt. repesterów).

Jacek Cichocki, J. Kołakowski, S. Maszczyk;
Mar. 15 – Apr. 11, 2007

Funded by Polish Cellular Telephony Centertel (Polska Telefonía Komórkowa – Centertel).

Details of the project cannot be published due to non-disclosure agreement with contractor.

[Pro46] **Radiocommunication Systems of the Future Generation** (Systemy radiokomunikacyjne przyszłych generacji).

Józef Modelski; Y. Yashchyshyn, T. Keller, K. Kurek, P. Bajurko, M. Bury, D. Kolmas, S. Kozłowski, A. Kurek, M. Stolarski, R. Szumny, P. Ziętek, M. Dąbrowski, K. Bryłka;
Jun. 8, 2005 – Jun. 8, 2008

Funded by the Foundation for Polish Science (Fundacja na Rzecz Nauki Polskiej).

In the project the research activities concentrate on: smart antennae (reconfigurable systems with electronic beam control, ferroelectric structures, multiple input, multiple output, MIMO systems, SAR/ISAR techniques); short range wireless systems (ultra wide-band UWB systems, compatibility WPAN and WLAN systems); radio navigation systems (Localization of radio terminal inside and outside buildings, navigation systems for urban areas with high buildings).

[Pro47] **Elaboration of 32-channel Capacitance Sensor and Designing ET3 Tomograph Algorithms** (Opracowanie czujnika pojemności 32-kanalów oraz opracowanie i zaprogramowanie algorytmów w części sprzętowej tomografu ET3).

Roman Szabatin, W. Smolik, T. Olszewski, J. Mirkowski;

Mar. 15 – Apr. 20, 2007

Funded by the Technical University of Lodz (Politechnika Łódzka).

The aim of this project was to elaborate 32-channel capacity sensor and design algorithms for ET3 tomograph hardware in order to confirm the suitable conditions of its work.

[Pro48] **Elaboration the Technical Conditions for AP4 Laboratory Unit** (Opracowanie założeń technicznych do badań zespołu AP4 na stanowisku laboratoryjnym).

Krzysztof Robaczyński;

Mar. 19 – Apr. 16, 2007

Funded by Military Institute of Armament Technology (Wojskowy Instytut Uzbrojenia).

The main goal of this project was to elaborate functional investigations and the analysis of results concerning specialized military unit.

[Pro49] **Development of Photo Player and Advanced Video Player Technologies** (Opracowanie technologii i oprogramowania dla Photo Player and Advanced Video Player Technologies).

Władysław Skarbek, K. Wnukowicz;

Feb. 1. 2007 – Mar. 31, 2008

Funded by Mitsubishi Electric Information Technology Center European B.V.

The project was a continuation of a previous work for development of MPEG-2 library of functions and Advanced

Video Player application. The objective of this project was to develop an Advanced Video Player which allows for fast shot/scene/chapter navigation and video browsing using pre-computed video meta-data. The project consisted of 2 work-packages: 1) the development of MPEG-2 library of functions and associated GUI; 2) the development Advanced Video Player. The functionality developed in the first work-package is "find matching frame/segment". In the second work-package the Advanced Video Player was extended by new functions and mobile version of AVP was developed. The additional objective of the project was the maintenance of the developed software modules and improvements according to user feedback.

[Pro50] **Analysis of the GSM/GPS Solutions for the Pilot Installations of the Rolling Stock Tracking System** (Ocena przedstawionych przez poszczególnych dostawców rozwiązań GSM/GPS, w ramach eksploatacji pilotażów do zabudowy w pojazdach trakcyjnych w ramach systemów śledzenia taboru).

Józef Modelski, T. Keller;

Jun. 10 – Jun. 15, 2007

Funded by PKP CARGO S.A.

The main aim of the work was analysis of the specially designed GSM/GPS solutions. The system was designed to control and track the rolling stock at the PKP CARGO, Polish national railway carrier. During the work some pilot installations were examined and based on this some additional requirements for this kind of system were prepared.

[Pro51] **Instrumentation for fMRI** (Zestaw do pobudzeń fMRI).

Ewa Piątkowska-Janko, P. Bogorodzki, R. Kurjata, T. Jamróiewicz, W. Obrębski, Ł. Kołaczewski;
Dec. 7 – Dec. 13, 2007

Funded by TMS Ltd. Company

It was the software and hardware tools designed for brain studies with the aid of functional Magnetic Resonance Imaging (fMRI) - a synchronizing module, response pads, sound delivery system, paradigm design software.

[Pro52] **Implementation of 2.45-1.25 GHz Transferter for WLAN System** (Wdrożenie transfertera 2,45-1,25 GHz do systemu WLAN).

Wojciech Wojtasiak, D. Gryglewski, M. Lubiejewski;

Oct. 3, 2007-Dec. 28, 2007

Funded by MEDIA COM S.A.

The main purpose of the project was to implement 2.45-1.25 transferter and make the measurements of its characteristics. The work focus is to develop WLAN system.

4.5 Other activities

4.5.1 Reviews of Projects

Reviews of Projects within the Frame of the EU Action (Recenzje projektów europejskich).

Jacek Wojciechowski

Reviews for the Center of Technology Transfer, Warsaw University of Technology.

- Implementation of new technologies and ERP software in the company Europa Systems;
- Integrated logistic system in container cooling storage, D.J.M. Chłodnia, Grudziądz;
- Software system DBT Studio, PARP;

- Implementation of Microsoft Dynamics – AX system in Terma Technologies;
- Server cluster for distributed systems. VSOFT Company;
- Identification system for containers', identification exploiting RFID techniques, "Siódemka", sp. z o.o. ("Siódemka" Ltd. Company).

4.5.2 Partnership

CC-Link

Since 12 May 2005 the Institute of Radioelectronics has been a formal member of the CC-Link Partner Association – the world-wide organization of industrial and research institutions working on the development and applications of CC-Link (Control & Communication Link) – a field network system that processes both the control and information data at high speed, to provide efficient integrated factory and process automation. The collaboration with the Association is realized by the Division of Nuclear and Medical Electronics.

4.5.3 Scientific networks

Polish Network of Neutrino Physics (Polska Sieć Neutrinowa)

In 2006 The Faculty of Electronics and Information Technology joined The Polish Network of Neutrino Physics. The network concentrates several institutes and laboratories working in the field of development of experimental neutrino physics. The Faculty is represented in the network by the Division of Nuclear and Medical Electronics, which has a long term experience in collaboration with high energy physics (NMC, SMC, COMPASS) and neutrino physics (ICARUS, T2K) experiments.

Polish Network of Particle Astrophysics (Polska Sieć Astrofizyki Cząstek)

In 2006 The Faculty of Electronics and Information Technology joined The Polish Network of Particle Astrophysics. The main goal of the organization is to create a frame for the research collaboration of several institutes and laboratories in the field of development of advanced experimental methods for particle astrophysics. The Faculty is represented in the network by two research groups: from the Institute of Electronics Systems and from Institute of Radioelectronics – namely from the Division of Nuclear and Medical Electronics.

4.5.4 Visitors

From June to October 2007 **Sergei Malyshev** and **Alexander Chizh**, from the Institute of Electronics, National Academy of Sciences (Belarus) visited the Institute of Ra-

dioelectronics. This visit included the following subject matters: design and develop the new type of photonic antenna, which consists of high-speed p-i-n photodiode matched with small patch antenna, and connected by means of fiber-optical cable and high-speed laser diode module with microwave oscillator. Proposed measurement solution allows to illuminate phase errors and consequently, to enhance measurement accuracy comparing with conventional near-field antenna measurements.

4.5.5 Students' research groups

Space Engineering Student Scientific Group

Krzysztof Kurek – tutor.

ESEO (European Student Earth Orbiter project) is designed within the frame of Student Space Engineering Scientific Group. It is an educational project of SSETI (Student Space Exploration and Technology Initiative). ESEO is a micro-satellite to Earth observation, designed, built and operated by the students from European Universities, and it has been launched in 2006. Students from Space Technology Student Group joined the project at the beginning of 2004. Main task of our team in this project is to design and realize core of the on-board data handling (OBDH) subsystem that allows to monitor and control the status and operations of all satellite subsystems. A PC/104 CPU board will be used as OBDH core computer that will communicate with other ESEO subsystems using Controller Area Network(CAN) bus. Software of the computer will be written in C++ and Linux with Real-Time Application Interface will be used as an operating system.

Biomedical and Nuclear Engineering Student Scientific Group

Ewa Piątkowska-Janko – tutor.

Biomedical and Nuclear Engineering Student Scientific Group was formed in Dec. 2005 by a group of students from biomedical engineering. It has eight members. In May and June 2006 they organized workshop on the basic features of construction and AutoCad. Current activity is focused on building of the mobile ECG equipment.

Innovative Information Technologies Student Scientific Group

Przemysław Miazga – tutor.

The scope of interest of the Students' Circle for Innovative Informatics Technologies was to design a web-service which might remote access to the linear/nonlinear optimization package (solver) Cplex from ILOG Ltd. The service consist of a client application with ASP interface and a server link. All parts have been designed with NET technology (VS.NET 2003) on 64 bit platform. This project has been worked out by the students from Innovative Information Technologies Circle (the Rector grant).

5 TITLES AND DEGREES AWARDED

5.1 Ph.D. Degrees

- [PhD1] Paweł Bargiel: *"Komputerowe metody poprawy jakości medycznych danych obrazowych"* (Computer methods for medical image data quality improvement), D.Sc. **A. Przelaskowski** (supervisor), Warsaw, Jun. 12, 2007.
- [PhD2] Marek Florczyk: *"Parametryczna metoda testowania funkcjonalnego wirtualnych przyrządów pomiarowych"* (The parametric method for functional testing of virtual instruments), D.Sc. **W. Winiecki** (supervisor), University of Zielona Góra, Dec. 12, 2007.
- [PhD3] Robert Kurjata: *"Rekonstrukcja obrazu tomografii optycznej przy wykorzystaniu informacji morfologicznej"* (Reconstruction of optical tomography image using morphological information), Prof. D.Sc. **Z. Pawłowski** (supervisor), Warsaw, May 8, 2007.
- [PhD4] Robert Łukaszewski: *"Wykorzystanie sieci Petriego do modelowania komputerowych systemów pomiarowo-sterujących"* (The use of Petri nets in modeling of computer-based measuring and control systems), D.Sc. **W. Winiecki** (supervisor), Warsaw, Nov. 13, 2007.
- [PhD5] Cezary Niedziński: *"Bayesowska metoda estymacji stężeń w spektrometrycznej analizie substancji wieloskładnikowych"* (A Bayesian method for estimation of concentrations in spectrophotometric analysis of multi-component substances), Prof. D.Sc. **R. Z. Morawski** (supervisor), Warsaw, Dec. 4, 2007.
- [MSc7] Artur Cieszkowski: *"Porównanie i symulacja protokołów kontroli topologii sieci radiowych"* (Comparison and simulation of radio network topology control protocols), Assist. Prof. **Z. Walczak** (supervisor), (4.5).
- [MSc8] Krystian Cieślak: *"Wysokosprawny wzmacniacz mocy z tranzystorem HJFET na pasmo L"* (Microwave high-efficiency amplifiers-design and realization), Assist. Prof. **W. Wojtasiak** (supervisor), (4.5).
- [MSc9] Piotr Czarnecki: *"Rekonstrukcja obrazów tomografii pojemnościowej"* (Image reconstruction in electrical capacitance tomography), Assist. Prof. **R. Szabatin** (supervisor), (4.5).
- [MSc10] Krzysztof Dąbrowski (co-author: Paweł Kłos): *"Zestaw doświadczalny do komputerowo wspomaganego eksperymentu z wykorzystaniem czujnika przyspieszenia"* (Experimental kit for computer-aided experiments with accelerometer), Assist. Prof. **P. Bogorodzki** (supervisor), (5).
- [MSc11] Konrad Drzymała: *"Zakłócenia akustyczne w obiektach sportowych"* (Noise in sports' areas), Assist. Prof. **M. Tajchert** (supervisor), (5).
- [MSc12] Łukasz Engel: *"Metody detekcji ruchu w sekwencjach obrazów"* (Methods of motion detection in image sequences), Assist. Prof. **G. Galiński** (supervisor), (5).
- [MSc13] Paweł Foryt: *"Metody poprawy percepcji zmian patologicznych w przestrzennym badaniu USG piersi"* (Methods of improvement of pathology perception within 3D USG breast study), Assoc. Prof. **A. Przelaskowski** (supervisor), (5).

5.2 M.Sc. Degrees

- [MSc1] Katarzyna Basaj: *"Falowodowe modelowanie dźwięku na przykładzie gitary klasycznej"* (Waveguides modeling of classic guitar), Assist. Prof. **P. Bobiński** (supervisor), (4).
- [MSc2] Michał Bartkiewicz: *"System stacji monitoringu"* (Monitoring station system), Assist. Prof. **A. Podgórski** (supervisor), (4.5).
- [MSc3] Anna Barwińska: *"Detekcja i analiza odstępów QT w przebiegu EKG"* (QT interval detection and analysis in ECG signal), Assist. Prof. **E. Piątkowska-Janko** (supervisor), (5).
- [MSc4] Paweł Błoński: *"System akwizycji sygnału do optycznego tomografu koherencyjnego"* (System for signal acquisition from optical coherence tomograph), Assist. Prof. **G. Domański** (supervisor), (5).
- [MSc5] Paweł Brejtfus: *"Generator bifazowych impulsów ultraszerokopasmowych UWB"* (The generator of bi-phase ultra wide-band impulses), Assist. Prof. **J. Cichoński** (supervisor), (5).
- [MSc6] Kaja Ceglińska: *"System rejestracji i weryfikacji dla akceleratora medycznego COLINE4"* (Record and verify system for COLINE4 medical accelerator), Assist. Prof. **G. Domański** (supervisor), (5).
- [MSc14] Ewa Frydlewicz: *"Dyskryminator kąta dla fazowego monoimpulsowego systemu radiolokacyjnego pracującego w paśmie L"* (Comparison circuit for the phase-type monopulse radar system operated at frequency of the L band), Prof. **S. Rośloniec** (supervisor), (5).
- [MSc15] Piotr Furtak: *"Analysis of channel models for wireless sensor networks"* (Analiza modeli kanałów dla bezprzewodowych sieci czujników), Assist. Prof. **K. Kurek** (supervisor), (3.5).
- [MSc16] Łukasz Gościński: *"Minirejestrator EKG z bezprzewodową transmisją danych"* (Minimized ECG monitor with wireless data transfer), Assist. Prof. **M. Kazubek** (supervisor), (5).
- [MSc17] Paweł Gronowski: *"Eksperymentalna weryfikacja miary jakości obrazu MSVD"* (Experimental verification of objective quality measure MSUD), Assist. Prof. **A. Buchowicz** (supervisor), (4).
- [MSc18] Mariusz Grzegorzczak: *"Sterownik mikroprocesorowy przyrządu pomiarowego z interfejsem SCPI IEC-625 zrealizowany w układzie FPQA firmy Altera"* (Microprocessor controller of measuring instrument with SCPI IEC-625 with interface realized in Altera's FPQA system), Assist. Prof. **K. Mroczek** (supervisor), (3.5).

TITLES AND DEGREES AWARDED

- [MSc19] Kjell Kristian Hageland: “*Autonomous configuration of network devices*”, Assist. Prof. **S. Kukliński** (supervisor), (5), English-medium-studies.
- [MSc20] Krzysztof Hebel: “*Cross-layer solution for robust transmission of H.264 encoded video*” (Wielowarstwowe rozwiązanie problemu odpornej na zakłócenia transmisji sekwencji zakodowanych w standardzie H.264), Assist. Prof. **A. Buchowicz** (supervisor), (5).
- [MSc21] Marek Hewelke: “*Rentgenowskie systemy bezpieczeństwa transportu – zastosowanie stereowizji rentgenowskiej*” (Roentgen system for transport safety – application of Roentgen stereo-vision), Senior Lecturer **T. Jamrógiewicz** (supervisor), (5).
- [MSc22] Piotr Jabłoński: “*Bezstratna kompresja danych – metody z rodziny PPM*” (Lossless compression – methods from PPM family), Assoc. Prof. **A. Przelaskowski** (supervisor), (4).
- [MSc23] Kamil Jakubiec: “*Baza danych kardiologicznych*” (Cardiological database), Assist. Prof. **E. Piątkowska-Janko** (supervisor), (5).
- [MSc24] Tomasz Jakubowski: “*Generator filtrów cyfrowych typu SOI optymalizowanych dla układów programowalnych firmy Altera*” (The generator of digital FIR filters optimized for programmable circuits of Altera Corporation), Assist. Prof. **K. Mroczek** (supervisor), (5).
- [MSc25] Alicja Janiec: “*System wideokonferencji w technologii Java Media Framework – badanie wpływu parametrów systemu na jakość odtwarzanego sygnału wideo*” (Video-conference system in Java Media Framework – testing influence of system parameters on video signal quality), Assist. Prof. **G. Galiński** (supervisor), (4.5).
- [MSc26] Cezary Jezierski: “*Projekt elementów nadajnika i odbiornika sygnałów cyfrowych do łączności satelitarnych z wykorzystaniem struktur FPGA*” (Design of elements of digital transmitter and receiver for satellite communications in FPGA structures), Assist. Prof. **K. Kurek** (supervisor), (5).
- [MSc27] Jan Kienig: “*Rozproszony wirtualny analizator widma czasu rzeczywistego*” (Distributed virtual real-time spectrum analyzer), Prof. **W. Winiecki** (supervisor), (5).
- [MSc28] Jan Kietliński-Zaleski: “*Analog front-end for an impulse ultra-wideband (I-UWB) receiver*”, Assist. Prof. **J. Kołakowski** (supervisor), (5).
- [MSc29] Adam Kliczek: “*Komputerowy model sali kongresowej przeznaczonej do koncertów muzyki orkiestrowej*” (A computer model of the concert hall destined for orchestra performances), Assist. Prof. **A. Leszczyński** (supervisor), (5).
- [MSc30] Paweł Kłos (co-author: Krzysztof Dąbrowski): “*Zestaw doświadczalny do komputerowo wspomaganych eksperymentów z wykorzystaniem czujnika przyspieszenia*” (Experimental kit for computer-aided experiments with accelerometer), Assist. Prof. **P. Bogorodzki** (supervisor), (5).
- [MSc31] Krzysztof Kostrzębski: “*Symulacja metodą Monte Carlo nieinwazyjnej techniki optycznej pomiaru stężenia glukozy we krwi*” (Monte-Carlo simulation of non-invasive optical technique of measurement of glucose concentration in blood), Assist. Prof. **G. Domański** (supervisor), (4).
- [MSc32] Michał Kościelak: “*Small micro-strip antennas for UWB applications*”, Assist. Prof. **J. Kołakowski** (supervisor), (4.5).
- [MSc33] Andrzej Kowalczyk: “*Cyfrowy procesor z detektorem półprzewodnikowym SiLi (Krzem dryfowany litem)*” (Digital pulse processor for X-ray spectrometer with Si(Li) detector), Prof. **J. Marzec** (supervisor), (5).
- [MSc34] Grzegorz Krośnicki: “*Internetowy system dystrybucji poprawek korekcyjnych w standardzie RTCM. Stacja referencyjna i serwer poprawek*” (Internet system for distribution of differential corrections in the RTCM standard. Reference station and corrections server), Assist. Prof. **K. Czerwiński** (supervisor), (4.5).
- [MSc35] Piotr Kręgielewski: “*Układ do detekcji i lokalizacji obiektów z wykorzystaniem odbitych sygnałów ultraszerokopasmowych*” (Development of a system intended for investigation of methods for positioning of object, with use of reflected UWB signals), Assist. Prof. **J. Kołakowski** (supervisor), (5).
- [MSc36] Agnieszka Maria Kuchcińska: “*Analiza i modelowanie optycznego tomografu koherencyjnego w odniamie czasowej*” (Theoretical model and analysis of time domain optical coherence tomograph), Assist. Prof. **G. Domański** (supervisor), (5).
- [MSc37] Michał Lipiecki: “*System korporacyjnego zarządzania zasobami i organizacji cyfrowych transmisji satelitarnych DVB-S*” (Enterprise resource planning system for organization of digital transmission in DVB-S standard), Assist. Prof. **J. Kołakowski** (supervisor), (5).
- [MSc38] Teresa Madej: “*Optymalizacja metod densytometrycznych*” (Optimization of densitometric methods), Assist. Prof. **B. Konarzewski** (supervisor), (4.5).
- [MSc39] Bartosz Malinowski: “*Porównanie metod segmentacji obrazów*” (Comparison of image segmentation methods), Assist. Prof. **G. Galiński** (supervisor), (5).
- [MSc40] Mariusz Mucha: “*Wykorzystanie technologii agentowych w rozproszonych systemach pomiarowo-kontrolnych*” (Using agent technologies in distributed measurement systems), Prof. **W. Winiecki** (supervisor), (5).
- [MSc41] Jakub Olszyna: “*Bezprzewodowy rozproszony system pomiarowy z wykorzystaniem technologii ZigBee*” (Wireless distributed measurement system utilizing ZigBee technology), Prof. **W. Winiecki** (supervisor), (5).
- [MSc42] Adam Ołdak: “*Color calibration and detection for 3D shape reconstruction using structured light*” (Kalibracja i detekcja kolorów na potrzeby rekon-

- strukcji kształtów trójwymiarowych za pomocą światła strukturalnego), Prof. **W. Skarbak** (supervisor), (5).
- [MSc43] Radosław Pacek: *“Wysokosprawny modulator amplitudy z rezonansowym wzmacniaczem mocy klasy E”* (High efficiency amplitude modulator with a resonant class E amplifier), Assist. Prof. **M. Mikołajewski** (supervisor), (5).
- [MSc44] Adam Paziewski: *“Projektowanie wysokosprawnych wzmacniaczy mocy z wykorzystaniem tranzystora SiC MESFET”* (The designing of microwave high efficiency power amplifiers on base of SiC technology), Assist. Prof. **W. Wojtasiak** (supervisor), (4.5).
- [MSc45] Maria Ewa Raniecka: *“Czasowo-częstotliwościowa analiza wysokorozdzielczego EKG”* (Analysis of high-resolution signal-averaged ECG in time-frequency domain), Assist. Prof. **E. Piątkowska-Janko** (supervisor), (5).
- [MSc46] Paweł Rzymkowski: *“Porównanie efektywności metod; najmniejszych kwadratów i największej wiarygodności w analizie widm rentgenowskiej analizy fluorescencyjnej”* (Comparison of the least squares and maximum like-hood methods for X-ray fluorescence), Assist. Prof. **B. Konarzewski** (supervisor), (5).
- [MSc47] Andrzej Semenik: *“Próba realizacji internetowego systemu dystrybucji poprawek różnicowych DQPS”* (Attempt of realization of an Internet system for distributing DQPS differential changes), Assist. Prof. **K. Czerwiński** (supervisor), (5).
- [MSc48] Sergei Serjant: *“Układ sterowania anteną inteligentną o rekonfigurowalnej aperturze”* (Reconfigurable smart antenna control unit), Assoc. Prof. **Y. Yashchyshyn** (supervisor), (5).
- [MSc49] Partyk Sielski: *“Bezprzewodowy rejestrator osobisty do zastosowań w biomechanice”* (Wireless personal data logger for bio-mechanical purposes), Assist. Prof. **G. Domański** (supervisor), (5).
- [MSc50] Jarosław Skaba: *“Modernizacja systemu do odbioru sygnału EKG”* (Modernization of electrocardiogram system), Prof. **J. Marzec** (supervisor), (5).
- [MSc51] Andrzej Smolnik: *“System pomiarowy do badania rozkładu dawki promieniowania jonizującego w osiach głównych pola radioterapeutycznego akceleratora biomedycznego”* (Dosimetric system for analysis of X-ray radiation fields of linear accelerator), Prof. **K. Zaremba** (supervisor), (5).
- [MSc52] Krzysztof Strużyna: *“Absorpcyjne dopasowanie wodne do falowodu prostokątnego na częstotliwość 2,45 GHz”* (High power water load for a rectangular waveguide working on 2.45 GHz), Assist. Prof. **A. Więckowski** (supervisor), (4).
- [MSc53] Marcin Wagner: *“Rękawice pacjenta do badań funkcjonalnych mózgu w technice obrazowej rezonansu magnetycznego”* (Patient's glove for brain functional magnetic resonance imaging), Assist. Prof. **P. Bogorodzki** (supervisor), (5).
- [MSc54] Marcin Wąsowski: *“Porównanie selektywności wielowymiarowych struktur indeksowych”* (Comparison the selectivity of multidimensional index structures), Assist. Prof. **G. Galiński** (supervisor), (5).
- [MSc55] Piotr Węgielewski: *“Układ do detekcji i lokalizacji obiektów z wykorzystaniem odbitych sygnałów ultraszerokopasmowych”* (Development of a system intended for investigation of methods for positioning of object, with use of reflected UWB signals), Assist. Prof. **J. Kołakowski** (supervisor), (5).
- [MSc56] Piotr Wieczorek: *“Rozproszone systemy wideo na żądanie”* (Distributed video on demand systems), Assist. Prof. **A. Buchowicz** (supervisor), (5).
- [MSc57] Przemysław Więclawek: *“Wyznaczanie charakterystyk częstotliwościowych czwórników na podstawie pomiarów w dziedzinie czasu”* (Evaluation of parameters of two-ports using time-domain measurements), Assist. Prof. **J. Kołakowski** (supervisor), (4.5).
- [MSc58] Bartłomiej Winiarek: *“Kontroler interfejsu IEEE 488.2 na karcie PCI”* (The IEEE 488.2 interface controller on the PCI card), Assist. Prof. **K. Mroczek** (supervisor), (5).
- [MSc59] Patryk Witkowski: *“Poprawa dokładności wyznaczonej pozycji przez popularne odbiorniki GPS dzięki wykorzystaniu połączenia pomiarów kodowych i fazowych”* (GPS position accuracy improvement on the basis of pseudo-range and phase measurement), Assist. Prof. **K. Czerwiński** (supervisor), (5).
- [MSc60] Łukasz Włostowski: *“Sterownik czujnikowy z interfejsem radiowym do zastosowań w systemach nadzoru”* (A sensor controller with wireless interface for use in the surveillance systems), Assist. Prof. **K. Mroczek** (supervisor), (4.5).
- [MSc61] Grzegorz Wnuk: *“Oprogramowanie kontrolera interfejsu IEEE 488,2”* (The software for IEEE 488.2 interface controller), Assist. Prof. **K. Mroczek** (supervisor), (5).
- [MSc62] Kamil Wrzosek: *“Implementacja algorytmów projektowania systemów komórkowych 3G na platformie QIS”* (3G cellular networks designing algorithms implementation with the use of QIS platform), Assist. Prof. **J. Jarkowski** (supervisor), (5).
- [MSc63] Sebastian Zdunek: *“Systemy do pomiaru zmian ukrwienia techniką optyczną”* (The systems for blood perfusion measurements by optical technique), Assist. Prof. **G. Domański** (supervisor), (5).
- [MSc64] Michał Żebrowski: *“Zestaw narzędzi programowych do interaktywnego projektowania regularnych szyków antenowych”* (Software toolkit for interactive design of regular multi-element antennas), Prof. **S. Rosłonec** (supervisor), (5).

5.3 B.Sc. Degrees

- [BSc1] Grzegorz Andrejczuk: *"Rozpoznanie obiektów przy pomocy deskryptorów kształtu standardu MPEG-7"* (Object recognition based on MPEG-7 shape descriptors), Assist. Prof. **G. Galiński** (supervisor), (4).
- [BSc2] Marcin Augustyniak: *"Osadzanie deskryptorów MPEG-7 w nagłówkach plików granicznych"* (Embedding MPEG-7 descriptors into graphics file headers), Assist. Prof. **G. Galiński** (supervisor), (4.5).
- [BSc3] Dariusz Baciński: *"Transkodowanie sekwencji wizyjnych"* (Digital video trans-coding), Assist. Prof. **A. Buchowicz** (supervisor), (4.5).
- [BSc4] Jan Belczewski: *"Tor nadawczy konwertera częstotliwości z pasma ISM 2,4 GHz na pasma 1,65 GHz (± 50 MHz) i 2,18 GHz (± 11 MHz)"* (Transmitting sub-circuits of frequency converter from ISM band 2,4 GHz to 1,65 GHz (± 50 MHz) and 2.18 GHz (± 11 MHz)), Assist. Prof. **D. Gryglewski** (supervisor), (5).
- [BSc5] Radosław Błaniarz: *"Multimedia home platform – otwarty standard multimedialnej platformy cyfrowej na przykładzie aplikacji programu TV"* (Multimedia home platform – an open standard of digital multimedia platform shown on the program TV application), Assist. Prof. **A. Buchowicz** (supervisor), (5).
- [BSc6] Szymon Bochniak: *"Mobilny system nawigacyjny z wykorzystaniem technologii Java™"* (Mobile navigation system using Java™ technology), Assist. Prof. **K. Ignasiak** (supervisor), (5).
- [BSc7] Paweł Borkowski: *"Projekt układu próbkowania i obróbki sygnałów analogowych ze złączem USB"* (Design of circuit for sampling analog signal and digital signal processing with USB port), Senior Lecturer **H. Chaciński** (supervisor), (4.5).
- [BSc8] Maciej Brylski: *"Detektor upadku do zastosowań w aplikacjach systemu "Man Down"* (Fall detector for "Man Down" applications), Assist. Prof. **M. Kazubek** (supervisor), (5).
- [BSc9] Jarosław Budzisz: *"Rezonansowy wzmacniacz mocy wielkiej częstotliwości klasy D do laboratorium studenckiego"* (Resonant high-frequency class-D tuned power amplifier for student's laboratory), Assist. Prof. **J. Modzelewski** (supervisor), (5).
- [BSc10] Nelly Chelstowska: *"Aplikacja multimedialna w standardzie DVB-MHP"* (An interactive application in the DVB-MHP standard), Assist. Prof. **A. Buchowicz** (supervisor), (5).
- [BSc11] Andrzej Cichecki: *"Szerokopasmowy przełączany szyk antenowy na pasmo 5,5 GHz"* (Wide-band switching antenna array for 5.5 GHz), Assist. Prof. **K. Kurek** (supervisor), (5).
- [BSc12] Łukasz Czyżewski: *"Rozproszony system pomiarowy oparty na sieci IP z wykorzystaniem dedykowanego kontrolera zbudowanego na strukturze FPGA"* (Diffused measurement system based on IP network which use dedicated controller build on FPGA structure), Assist. Prof. **K. Mroczek** (supervisor), (4.5).
- [BSc13] Tomasz Danielewski: *"Środowisko programowe do sterowania przyrządem pomiarowym za pomocą interfejsów szeregowych"* (Software environment managing remote control of measuring device using serial interfaces), Assist. Prof. **A. Podgórski** (supervisor), (5).
- [BSc14] Sebastian Denis (co-author: Tomasz Gałkowski): *"Wzmacniacz akustyczny o parametrach sterowanych cyfrowo"* (Acoustical amplifier with digitally controlled parameters), Prof. **Z. Kulka** (supervisor), (5).
- [BSc15] Marcin Andrzej Dębiński: *"Bezprzewodowe urządzenie do monitorowania stanu układu krążenia"* (Wireless circulatory system monitoring device), Assist. Prof. **G. Domański** (supervisor), (5).
- [BSc16] Tomasz Gałkowski (co-author: Sebastian Denis): *"Wzmacniacz akustyczny o parametrach sterowanych cyfrowo"* (Acoustical amplifier with digitally controlled parameters), Prof. **Z. Kulka** (supervisor), (5).
- [BSc17] Adam Grabowski: *"Wybrane metody opisu obrazów teksturowych"* (Some methods of texture description), Assist. Prof. **K. Snopek** (supervisor), (4).
- [BSc18] Magdalena Patrycja Jasionowska: *"Metody detekcji zaburzeń architektury w mammografii"* (Detection methods for architectural distortions in mammograms), Assoc. Prof. **A. Przelaskowski** (supervisor), (5).
- [BSc19] Wojciech Klepacki: *"Stanowisko do pomiaru fali elektromagnetycznej dla częstotliwości 225 kHz"* (Measurement site for an electromagnetic wave with frequency of 225 kHz), Senior Lecturer **H. Chaciński** (supervisor), (4.5).
- [BSc20] Marcin Knyps: *"Optymalizacja wybranych parametrów w elektrycznej tomografii pojemnościowej"* (Optimization of selected parameters in electrical capacitance tomography), Assist. Prof. **R. Szabatin** (supervisor), (5).
- [BSc21] Marcin Konczak: *"Internetowy system pomiarowy z wykorzystaniem karty akwizycji oraz środowiska LAB VIEW 8.0"* (Internet measurement system using acquisition card and graphical environment Lab VIEW 8.0), Assist. **R. Łukaszewski** (supervisor), (5).
- [BSc22] Paweł Konczak: *"Optymalizacja jądra algorytmu FDTD w asemblerze współczesnych procesorów x86"* (The optimization of FDTD algorithm using x86 assembler), Assist. Prof. **M. Sypniewski** (supervisor), (5).
- [BSc23] Adam Kopeć: *"Oprogramowanie do analizy obrazów z czujnika sił komórkowych"* (Software for image analysis data from sensor of cellular force), Assist. Prof. **W. Smolik** (supervisor), (4).
- [BSc24] Konrad Kosiorek: *"Serwer usług multimedialnych dla sieci domowej"* (Multimedia services server for home network), Assist. Prof. **T. Keller** (supervisor), (4).

TITLES AND DEGREES AWARDED

- [BSc25] Grzegorz Kwiatkowski: "*System modemów kablowych DOCSIS. Transmisja sygnałów cyfrowych w sieciach telewizji kablowej*" (DOCSIS cable modems systems. Digital signal's transmission in CATV networks), Prof. **J. Modelski** (supervisor), (5).
- [BSc26] Jarosław Leksiński: "*Moduł detekcji upadku*" (Man down detection module), Assist. Prof. **M. Kazubek** (supervisor), (4.5).
- [BSc27] Tomasz Leskier: "*Symulacja propagacji sygnału elektrycznego na komórkach serca z użyciem modelu Fitz-Hugh-Nagumo*" (Simulation of electrical impulse propagation in heart cells using the Fitz-Hugh-Nagumo model), Assist. Prof. **B. Konarzewski** (supervisor), (5).
- [BSc28] Joanna Łukasiewicz: "*Metoda detekcji zarysu guzków w obrazach mammograficznych*" (Mass margins detection algorithm in digital mammography), Assoc. Prof. **A. Przelaskowski** (supervisor), (5).
- [BSc29] Maciej Markowski: "*Projekt wielofunkcyjnej platformy mobilnej*" (Designing multi-functional mobile platform), Assist. Prof. **P. Tomaszewicz** (supervisor), (4.5).
- [BSc30] Paweł Nawrocki: "*System rozpoznawania twarzy (detekcja twarzy)*" (Face recognition system (face detection)), Prof. **W. Skarbek** (supervisor), (4).
- [BSc31] Karol Niewęglowski: "*Wykorzystanie algorytmu ewolucyjnego do projektowania filtrów mikrofalowych o strukturze drzewiastej*" (Design of a tree-shaped microwave filters by means of evolutionary algorithms), Assist. Prof. **P. Miazga** (supervisor), (3.5).
- [BSc32] Nguyen Minh Quoc: "*Układ do zapisywania danych z akcelerometrów na kartę pamięci*" (A system to write data from accelerometers on a memory card), Assist. Prof. **T. Buczkowski** (supervisor), (4.5).
- [BSc33] Ewa Protaś: "*System do klasyfikacji pacjentów na podstawie wysokorozdzielczego EKG i innych badań diagnostycznych*" (System for patients classification based on the high resolution ECG and other diagnostic tests), Assist. Prof. **E. Piątkowska-Janko** (supervisor), (5).
- [BSc34] Paulina Przybyszewska: "*Przełącznik torów stacji bazowej systemu NEC DRMASS*" (The switching circuit for the DRMASS system base station), Assist. Prof. **W. Wojtasiak** (supervisor), (5).
- [BSc35] Dominik Pytlewski: "*Webowy interfejs do optymalizacji kodeka JPEG2000*" (Web-based interface for JPEG2000 codec optimization), Assoc. Prof. **A. Przelaskowski** (supervisor), (5), Warsaw University of Technology Distant Learning Center (Ośrodek Kształcenia na Odległość PW).
- [BSc36] Paweł Pruszyński: "*Moduł obrazujący z interfejsem Ethernet*" (Imaging module with Ethernet interface), Assist. Prof. **B. Konarzewski** (supervisor), (5).
- [BSc37] Aleksandra Rachocka: "*Metody segmentacji mózgu w badaniach tomografii komputerowej*" (Segmentation of brain structures in computer tomography images), Assoc. Prof. **A. Przelaskowski** (supervisor), (5).
- [BSc38] Bartłomiej Radzik: "*Wzmacniacz spektrometryczny sterowany cyfrowo PANDORA – projekt i realizacja*" (Digitally controlled spectroscopy amplifier "PANDORA"), Assist. Prof. **R. Szabatin** (supervisor), (5).
- [BSc39] Piotr Radzymiński: "*Program for elastogram processing*", Assist. Prof. **M. Kazubek** (supervisor), (4), English-medium -studies.
- [BSc40] Martynian Rozwadowski: "*Bezprzewodowy system do pomiarów elektroakustycznych z wykorzystaniem terminala PDA*" (Wireless system for the electroacoustics measurements with use of PDA terminal), Assist. Prof. **P. Bobiński** (supervisor), (4.5).
- [BSc41] Bolesław Sawa: "*Badanie dostępności sygnału czasu wzorcowego DCF 77*" (Accessibility measurement of the legal time DCF 77), Assist. Prof. **K. Czerwiński** (supervisor), (4).
- [BSc42] Łukasz Sienica: "*Konwerter do odbioru sygnału radiofonii cyfrowej DRM*" (DRM signal down converter), Senior Lecturer **H. Chaciński** (supervisor), (4).
- [BSc43] Maciej Skarbowski: "*Konwerter formatu poprawek różniczkowych DGPS RASANT-RTCM-104*" (RASAN-to-RTCM-104 pseudo-ranges corrections format converter), Assist. Prof. **T. Buczkowski** (supervisor), (5).
- [BSc44] Grzegorz Skwarski: "*Mobilny system monitoringu wizyjnego pomieszczeń*" (Realization of mobile video monitoring system), Assist. **R. Łukaszewski** (supervisor), (4.5).
- [BSc45] Piotr Służewski: "*Mikropasmowy szyk antenowy na częstotliwości 5,5 GHz*" (Micro-strip antenna array operating at 5.5 GHz), Assoc. Prof. **Y. Yashchyshyn** (supervisor), (5).
- [BSc46] Witold Smoderek: "*System do zdalnego odbioru fali tętna*" (System for receiving remote pulse wave), Senior Lecturer **T. Jamrógielwicz** (supervisor), (5).
- [BSc47] Jacek Sputowski: "*Opracowanie interfejsu bezprzewodowego do tomografu pojemnościowego ET3*" (Wireless communication interface for capacitance tomography), Senior Lecturer **T. Olszewski** (supervisor), (4.5).
- [BSc48] Tadeusz Suchecki: "*System rozpoznawania obrazów z wykorzystaniem deskryptorów kolorów MPEG-7*" (Image recognition system using MPEG-7 color descriptors), Assist. Prof. **G. Gałiński** (supervisor), (5).
- [BSc49] Waldemar Sykacz: "*Program do symulacji metodą Monte Carlo propagacji światła w geometrii sferycznej*" (The program for Monte Carlo simulation of photon propagation in spherical objects), Assist. Prof. **G. Domański** (supervisor), (4).

TITLES AND DEGREES AWARDED

- [BSc50] Paweł Szlendak: *“Programmable Intercom”*, Assist. Prof. **T. Starecki** (supervisor), (5), English-medium studies
- [BSc51] Piotr Szmidt: *“Bezprzewodowy prędkościomierz do roweru”* (Wireless cyclo-computer), Assist. Prof. **W. Wojtasiak** (supervisor), (4).
- [BSc52] Dominik Walczak: *“Generator portali internetowych”* (Internet portal generator), Assist. Prof. **K. Ignasiak** (supervisor), (5).
- [BSc53] Tomasz Wierciński: *“System pomiarów akustycznych sterowanych przez sieć Internet”* (Internet-controlled acoustic measurement system), Assist. Prof. **P. Bobiński** (supervisor), (4).
- [BSc54] Jacek Wach: *“System-video-on-demand”*, Assist. Prof. **A. Buchowicz** (supervisor), (4), English-medium studies.
- [BSc55] Grzegorz Woźniak: *“Control software for the automatic controller of satellite antenna rotator”*, Assist. Prof. **T. Kosiło** (supervisor), (4), English-medium studies.
- [BSc56] Roman Woźniak: *“Modelowanie trójwymiarowe z wykorzystaniem kamery stereowizyjnej”* (3D modeling using stereo-vision camera), Assist. Prof. **K. Ignasiak** (supervisor), (5).
- [BSc57] Karol Wrona: *“Konwerter interfejsu RS232-IEC-625 zrealizowany na układzie programowalnym FPGA firmy Actel”* (The converter of IEC-625 to RS232 interface realized in Actel programmable logic), Assist. Prof. **K. Mroczek** (supervisor), (4).
- [BSc58] Krzysztof Zwoliński: *“Układ lokalizacji ścieżki metalowej na potrzeby osób niewidomych”* (Device detecting metal path for visually impaired person), Assist. Prof. **K. Radecki** (supervisor), (4).
- [BSc59] Łukasz Żukowski: *“System lokalizacji bezprzewodowych terminali WLAN wewnątrz budynków – WiFi lokalizator”* (An indoor WLAN terminals location system – WiFi), Prof. **J. Modelski** (supervisor), (5).
- [BSc60] Filip Achramowicz: *“Antena z prostopadłościennym rezonatorem dielektrycznym na pasmo 4 GHz”* (Cuboid dielectric resonator antenna for 4 GHz band), Assist. Prof. **K. Derzakowski** (supervisor), (4).
- [BSc61] Marcin Andrzejczak: *“Symulacja toru transmisji danych z modulacją DPSK i $\pi/4$ DQPSK w środowisku MATLAB”* (Simulation of data transmission with DPSK and $\pi/4$ modulations in MATLAB environment), Assist. Prof. **K. Radecki** (5).
- [BSc62] Leszek Bokuń: *“Opracowanie parametrycznych modeli człowieka do celów symulacji elektromagnetycznych”* (A study of parametric human models for electromagnetic simulations), Assist. Prof. **M. Celuch** (supervisor), (4.5).
- [BSc63] Jarosław Borowik: *“Symulacja toru transmisji danych z modulacją QPSK i OQPSK w środowisku MATLAB”* (Simulation of data transmission with QPSK and OQPSK modulations in MATLAB environment), Assist. Prof. **K. Radecki** (5).
- [BSc64] Janusz Dudziak: *“Antena paraboliczna 2,4 GHz”* (Parabolic antenna for 2.4GHz), Senior Lecturer **H. Chaciński** (supervisor), (4).
- [BSc65] Tomasz Lubiejewski: *“Modulator dla systemu DRM”* (Modulator for DRM radio system), Assist. Prof. **W. Kazubski** (supervisor), (5).
- [BSc66] Bartosz Mamczyc: *“Antena z cylindrycznym rezonatorem dielektrycznym na pasmo UMTS”* (Cylindrical dielectric resonator antenna for UMTS band), Assist. Prof. **K. Derzakowski** (supervisor), (4).
- [BSc67] Robert Miecznikowski (co-author: Łukasz Szewczyk): *“Odbiornik pomiarowy emisji DRM”* (DRM test emission receiver), Assist. Prof. **W. Kazubski** (supervisor), (4.5).
- [BSc68] Łukasz Morawski: *“Komunikator tekstowy na telefon komórkowy”* (Text communicator for mobile phones), Assist. Prof. **Z. Walczak** (supervisor), (3.5).
- [BSc69] Karolina Nachyła: *“Badanie właściwości intermodulacyjnych odbiorników radiotelefonów UKF FM”* (Investigation of inter-modulation UKF FM radio-receivers), Assist. Prof. **W. Kazubski** (supervisor), (4).
- [BSc70] Wojciech Olszewski: *“Opracowanie i realizacja odbiornika radiowego i dekodera sygnałów sterujących dla energetyki”* (Analysis and realization of the radio receiver and signal decoder for energy system), Assist. Prof. **K. Czerwiński** (supervisor), (5).
- [BSc71] Sergiusz Płachecki: *“Wykorzystanie łącza GSM do zdalnej komunikacji operatora z systemem dozoru”* (Remote communication with GSM transmission), Senior Lecturer **K. Robaczyński** (supervisor), (5).
- [BSc72] Rafał Starostka: *“Łącze na podczerwień do systemu zdalnego sterowania i kontroli”* (Infrared link for remote control and supervision system), Senior Lecturer **K. Robaczyński** (supervisor), (4.5).
- [BSc73] Łukasz Szewczyk (co-author: Robert Miecznikowski): *“Odbiornik pomiarowy emisji DRM”* (DRM test emission receiver), Assist. Prof. **W. Kazubski** (supervisor), (4.5).
- [BSc74] Rafał Wojda: *“Wysokosprawny zasilacz sterowany do modulacji amplitudy sygnałów w.cz”* (High-efficiency controllable voltage regulator for amplitude modulation of high frequency signals), Assist. Prof. **J. Modzelewski** (supervisor), (5).
- [BSc75] Arkadiusz Żyłowski: *“Badania właściwości akustycznych nauszników przeciwhałasowych laboratoryjną metodą subiektywną oraz metodą obiektywną w warunkach rzeczywistych”* (Investigation of acoustic properties of ear-muffs by dint of the laboratory subjective method in a real-world), Assist. Prof. **E. Kotarbińska** (supervisor), (4).

5.5 M.Sc. Evening Studies on Radiocommunications – M.Sc. Degrees

[MSc65] Maciej Dziadecki: *“Analiza rozwiązań komunikacji multimedialnej wykorzystujących protokół SIP”* (Analysis of multimedia communications solutions using SIP protocol), Assist. Prof. **S. Kuła** (supervisor), (4.5).

[MSc66] Sławomir Komarowski: *“Adaptacja scalonych układów kluczy tranzystorowych w realizacji mieszaczy sygnałów RF”* (Adaptation of CMOS multiplexers for realization of radio frequency mixers), Assist. Prof. **W. Kazubski** (supervisor), (5).

[MSc67] Piotr Pryt: *“Blok odbioru i wstępnego przetwarzania do odbioru sygnałów GPS”* (Receiver and pre-processing block for GPS signal receiving), Assist. Prof. **W. Kazubski** (supervisor), (4).

6 PUBLICATIONS

6.1 Scientific and technical books, chapters in books

- [Pub1] J. Kołakowski, J. Cichocki: "UMTS System telefonii komórkowej trzeciej generacji" (UMTS Third Generation Cellular System), *Wydawnictwa Komunikacji i Łączności*, (2007), ISBN 978-83-206-1670-5, 524 pp.

6.2 Scientific and technical papers in journals

6.2.1 JCR-ISI list journals

- [Pub2] P. Abbon, E. Albrecht, V. Yu. Alexakhin, (...), J. Marzec, A. Padée, R. Sulej, K. Zaremba, M. Ziembicki, et al.: "The COMPASS experiment at CERN", *Nuclear Instruments & Methods in Physics Research A*, vol. 577 (2007), pp. 455-518.
- [Pub3] E. S. Ageev, V. Yu. Alexakhin, Yu. Alexandrov, (...), J. Marzec, A. Padée, R. Sulej, K. Zaremba, et al.: "A New Measurement of the Collins and Sivers Asymmetries on a Transversely Polarised Deuteron Target", *Nuclear Physics B*, vol. 765 (2007), pp. 31-70.
- [Pub4] M. Alekseev, V. Yu. Alexakhin, Yu. Alexandrov, (...), J. Marzec, A. Padée, R. Sulej, K. Zaremba, et al.: "Double Spin Asymmetry in Exclusive p^0 Muoproduction at COMPASS", *The European Physical Journal C*, vol. 52 (2007), pp. 255-265.
- [Pub5] V. Yu. Alexakhin, Yu. Alexandrov, G. D. Alexeev, (...), J. Marzec, A. Padée, R. Sulej, K. Zaremba, et al.: "The Deuteron Spin-dependent Structure Function g_d^1 and its First Moment", *Physics Letters B*, vol. 647 (2007), pp. 8-17.
- [Pub6] V. Yu. Alexakhin, Yu. Alexandrov, G. D. Alexeev, (...), J. Marzec, A. Padée, R. Sulej, K. Zaremba, et al.: "Spin Asymmetry A_d^1 and the Spin-dependent Structure Function g_d^1 of the Deuteron at Low Values of x and Q^2 ", *Physics Letters B*, vol. 647 (2007), pp. 330-340.
- [Pub7] A. Ankowski, M. Antonello, P. Aprili, (...), R. Sulej, et al.: "Measurement of Through-Going Particle Momentum by Means of Multiple Scattering with the ICARUS T600 TPC", *European Physics Journal C*, vol. 48 (2006), pp. 667-676.
- [Pub8] A. Ankowski, M. Antonello, P. Aprili, (...), R. Sulej, et al.: "Characterization of ETL 9357FLA Photomultiplier Tubes for Cryogenic Temperature Applications", *Nuclear Instruments and Methods in Physics Research A*, vol. 556 (2006), pp. 146-157.
- [Pub9] P. Bilski, W. Winiecki: "A Low-Cost Real-Time Virtual Spectrum Analyzer", *IEEE Trans. on Instrumentation and Measurement*, vol. 56, no. 6 (2007), pp. 2169-2174.
- [Pub10] P. Bilski, J. M. Wojciechowski: "Automated Diagnostics of Analog Systems Using Fuzzy Logic Approach", *IEEE Trans. on Instrumentation and Measurement*, vol. 56, no. 6 (2007), pp. 2175-2185.
- [Pub11] A. Dominik, Z. Walczak, J. M. Wojciechowski: "Classification of Web Documents Using a Graph-Based Model and Structural Patterns", *Proc. 11th European Conference on Principles and Practice of Knowledge Discovery in Databases*, (Warsaw, Sept. 17-21, 2007), in: *Lecture Notes in Artificial Intelligence 4702*, Springer, pp. 67-78.
- [Pub12] A. Dominik, Z. Walczak, J. M. Wojciechowski: "Classifying Chemical Compounds Using Contrast and Common Patterns", *Proc. 8th International Conference – ICANNGA 2007* (Warsaw, Poland, Apr. 11-14, 2007), in: *Lecture Notes in Computer Science 4431*, Springer, pp. 772-781.
- [Pub13] M. Jakubowski, G. Pastuszak: "A New Multi-Path Scheme for Adaptive Computation-Aware Motion Estimation", *Opto-Electronics Review*, vol. 15, no. 2 (2007), pp. 118-124.
- [Pub14] J. Krupka, K. Derzakowski, T. Zychowicz, B. Givot, W. Egbert, M. David: "Measurements of the Surface Resistance and Conductivity of Thin Conductive Films at Frequency about 1GHz Employing Dielectric Resonator Technique", *Journal of the European Ceramic Society*, vol. 27 (2007), pp. 2823-2826.
- [Pub15] J. Lagoda, D. Kielczewska, M. Posiadala, R. Sulej, K. Zaremba, T. Kozłowski, K. Kurek, P. Mi-jakowski, P. Przewlocki, E. Rondio, J. Stepaniak, M. Szeptycka: "Polarization Effects in Tau Production by Neutrinos", *Acta Physica Polonica B*, vol. 38 (2007), pp. 2083-2103.
- [Pub16] M. Leszczyński, W. Skarbek: "Biometric Verification by Projections in Error Subspaces", *Proc. 2nd International Conference: Rough Sets, and Knowledge Technology: RSKT 2007* (Toronto, Canada, May 14-16, 2007), in: *Lecture Notes in Artificial Intelligence 4481*, Springer, pp. 166-173.
- [Pub17] M. Leszczyński, W. Skarbek: "On Design of Discriminant Analysis Diagram for Error based Pattern Recognition", *Proc. 4th International Conference – ICIAR 2007*, (Montreal, Canada, Aug. 2007), *Image Analysis and Recognition*, in: *Lecture Notes in Computer Science 4633*, Springer, pp. 342-351.
- [Pub18] R. Z. Morawski: "On Teaching Measurement Applications of Digital Signal Processing", *Measurement*, vol. 40, no. 6 (2007), pp. 213-223.
- [Pub19] J. Naruniec, W. Skarbek: "Face Detection by Discrete Gabor Jets and Reference Graph of Fiducial Points", *Proc. 2nd International Conference: Rough Sets, and Knowledge Technology: RSKT 2007* (Toronto, Canada, May 14-16, 2007) in: *Lecture Notes in Artificial Intelligence 4481*, Springer, pp. 187-194.
- [Pub20] A. Nowakowski, W. Skarbek: "Homography of Central Points for Optical Distortion Compensa-

- tion", *Opto-Electronics Review*, vol. 15, no. 4 (2007), pp. 202-209.
- [Pub21] J. Ostrowski, M. Mikuła, J. Karczmarski, T. Rubel, L.S. Wyrwicz, P. Bragoszewski, P. Gaj, M. Dadlez, E. Butruk, J. Reguła: "Molecular Defense Mechanisms of Barrett's Metaplasia Estimated by an Integrative Genomics", *International Journal of Molecular Medicine*, no. 85 (2007), pp. 733-743.
- [Pub22] A. Padée, K. Zaremba, K. Kurek: "Particle Detection Optimization by Means of a Distributed Evolutionary Algorithm", *Measurement Science and Technology*, vol. 18 (2007), pp. 2472-2476.
- [Pub23] E. Piątkowska-Janko, A. Oręziak, S. Jankowski, Z. Szymański: "Support Vector Machine for Recognition of Sustained Ventricular Tachycardia based on New Parameters of Signal-averaged Electrocardiogram", *Proc. 34th International Congress on Electrocardiology, 48th International Symposium on Vectorcardiography*, (Istanbul, Turkey, Jun. 30- Jul. 5, 2007), in: *Journal of Electrocardiology*, vol. 40, (2007), pp. 71-77.
- [Pub24] A. Przelaskowski, P. Bargieł, K. Sklinda, E. Zwierzyńska: "Soft Computing in Medical Image Processing – Ischemic Stroke Modeling: Multiscale Extraction of Hypodense Signs", *Proc. 11th Int Conf Rough Sets, Fuzzy Sets, Data Mining and Granular Computing*, (Toronto, Canada, May 14-16, 2007), in: *Lecture Notes in Computer Science 4482, Springer*, pp. 171-181.
- [Pub25] A. Przelaskowski, K. Sklinda, P. Bargieł, J. Walecki, M. Biesiadko-Matuszewska, M. Kazubek: "Improved Early Stroke Detection: Wavelet-based Perception Enhancement of Computerized Tomography Exams", *Computers in Biology and Medicine*, vol. 37, no. 4 (2007), pp. 524-533.
- [Pub26] B. Salski, W. K. Gwarek: "Near-to-Near Transformation in Axisymmetrical Antenna Problems", *IEEE Trans. on Antennas & Propagation*, vol. 55, no. 8 (2007), pp. 2157-2162.
- [Pub27] W. Skarbek: "On Generating All Binary Trees", *Fundamenta Informaticae*, vol. 75, no. 1-4 (2007), pp. 505-536.
- [Pub28] W. Skarbek: "Singular and Principal Subspace of Signal Information System by BROM Algorithm", *Proc. 2nd International Conference: Rough Sets, and Knowledge Technology: RSKT 2007* (Toronto, Canada, May 14-16, 2007), in: *Lecture Notes in Artificial Intelligence 4481, Springer*, pp. 157-165.
- [Pub29] K. Sklinda, P. Bargieł, A. Przelaskowski, T. Bulski, J. Walecki, P. Grieb: "Multiscale Extraction of Hypodensity in Hyperacute Stroke", *Proc. XXXVIII Congress of the Polish Medical Society of Radiology*, in: *Medical Science Monitor*, no. 13, suppl. 1 (2007), pp. 5-10.
- [Pub30] R. Sulej, K. Zaremba, E. Rondio: "Application of the Neural Networks in Events Classification in the Measurement of the Spin Structure of the Deuteron", *Measurement Science and Technology*, vol. 18 (2007), pp. 2486-2490.
- [Pub31] K. Wojdan, K. Świrski: "Immune Inspired Optimizer of Combustion Process in Power Boiler", *Proc. 20th International Conference on Industrial Engineering, and other Applications of Applied Intelligent Systems* (Kyoto, Japan, Jun. 26-29, 2007), in: *Lecture Notes in Artificial Intelligence 4570* (2007), pp. 1022-1031.
- [Pub32] M. Ziembicki, J. Marzec, M. Dziewiecki: "Monte Carlo Study of the Time Resolution of Scintillating Fibers Detectors", *Measurement Science and Technology*, vol. 18 (2007), pp. 2477-2485.
- [Pub33] J. Żera, R. Młyński: "Attenuation of High-Level Impulses by EarMuffs", *Journal of the Acoustical Society of America*, vol. 122, no. 4 (2007), pp. 2082-2096.

6.2.2 MSHE list journals

- [Pub34] P. Bilski, R. Łukaszewski: "Czasowy model bloku przetwarzania danych w systemie pomiarowym" (Time Model of Data Processing Block in Measurement System), *Pomiary Automatyka Kontrola*, vol. 53, no. 9 bis (2007), pp. 253-256.
- [Pub35] P. Bilski, W. Winiecki: "Rozproszony wirtualny przyrząd pomiarowy czasu rzeczywistego z wykorzystaniem sieci deterministycznej" (Distributed Virtual Real Time Instrument Using Deterministic Network), *Pomiary Automatyka Kontrola*, vol. 53, no. 9 bis (2007), pp. 702-705.
- [Pub36] P. Bobiński: "Elektroakustyczne metody detekcji żerujących w drewnie larw owadów" (Electroacoustic Methods of Wood Feeding Insects Larvae Detection), *Pomiary Automatyka Kontrola*, vol. 53, no. 9 bis (2007), pp. 361-363.
- [Pub37] P. Bobiński, W. Winiecki: "Środowisko do projektowania oprogramowania rozproszonych systemów pomiarowo-sterujących" (Development Environment for Distributed Measurement and Control Systems), *Pomiary Automatyka Kontrola*, vol. 53, no. 9 bis (2007), pp. 698-701.
- [Pub38] H. Chaciński, P. Jaros: "Heterodyna odbiornika cyfrowego DRM" (Heterodyne of digital receiver DRM), *Mat. II Konferencji Naukowej – Urządzenia i Systemy Radioelektrotechniczne* (Proc. II Scientific Conference – Radioelectronic Devices and Systems), (Soczewka k. Płocka, Poland, Jun. 13-15, 2007), in: *Biuletyn WAT*, Quarterly, vol. LVI, special issue 2 (2007), pp. 49-52.
- [Pub39] T. Daniluk: "Generator impulsów pikosekundowych na tranzystorach MESFET – projekt i realizacja praktyczna" (MESFET – Based Picosecond Pulse Generator – Project and Practical Design), *Elektronika*, no. 6 (2007), pp. 23-25.
- [Pub40] G. Galiński, A. Buchowicz: "Kompensacja ruchu w dziedzinie DCT w procesie transkodowania wideo" (Motion Compensation in DCT Domain for Video Transcoding), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT-*

- 2007, ISBN 978-83-60799-00-2, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 421-424.
- [Pub41] D. Gryglewski, T. Morawski, J. Zborowska, E. Sędek, P. Szymański: "Wielobitowe mikrofalowe przesuwniki fazy" (Multi-bit Microwave Phase Shifters), *Elektronika*, no. 11 (2007), pp. 61-65.
- [Pub42] S. L. Hahn: "The Recoil Nature of Electrostatic and Gravitational Forces", *Bulletin of the Polish Academy of Sciences, Technical Sciences*, Quarterly, vol. 55, no. 4, (2007).
- [Pub43] K. Hebel (graduated in Television Division, supervisor: A. Buchowicz): "Eksperymentalna analiza wydajności trybów predykcji międzyobrazowej zaimplementowanych w koderze H.264" (Experimental Analysis of the Inter-Frame Prediction Efficiency in the H.264 Video Coding Standard), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 425-428.
- [Pub44] J. Kołakowski, J. Cichocki, S. Maszczyk: "Zastosowanie odbiornika energetycznego w lokalizacyjnych systemach ultraszerokopasmowych" (Application of Energetic Receiver in Location Ultra-Broadband Systems), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 281-283.
- [Pub45] J. F. Kołodziejewski, T. Daniluk, M. Szermer, J. Szczęsny: "Badania odporności układów scalonych na zaburzenia elektromagnetyczne impulsowe" (Integrated Circuits Immunity to Electromagnetic Pulse Disturbances), *Przegląd Elektrotechniczny*, no. 9 (2007), pp. 18-20.
- [Pub46] T. Kosiło, K. Płatek: "Zwiększenie efektywności wykorzystania pasma 3,4-3,8 GHz, dzięki terminalom pracującym w trybie punkt-punkt" (Point to point terminals can improve effectiveness of spectral usage in 3.4 – 3.8 GHz frequency band), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 351-354.
- [Pub47] E. Kozłowski, E. Kotarbińska: "Laboratory Objective Method for Noise Reduction Measurements of Ear-Muffs", *Archives of Acoustics*, Quarterly, vol. 32, no. 2 (2007), pp. 287-292.
- [Pub48] S. Kozłowski, Y. Yashchysyn, J. Modelski: "Phased Array Antennas in MIMO Receiver", *Journal of Telecommunications and Information Technology*, no. 1 (2007), pp. 26-29.
- [Pub49] Z. Kulka: "Application of Pulse Modulation Techniques for Class-D Audio Power Amplifiers", *Archives of Acoustics*, Quarterly, vol. 32, no. 3 (2007), pp. 683-706.
- [Pub50] K. Kurek: "Technologies for Low Cost Small Satellites", *Journal of Telecommunications and Information Technology*, no. 1 (2007), pp. 45-49.
- [Pub51] S. Maszczyk, M. Kretkiewicz: "Programowalne źródło UWB" (UWB Programmable Source), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 489-491.
- [Pub52] R. Młyński, J. Żera: "Effect of Measurement Method on an Earmuff's Frequency Response", *Archives of Acoustics*, vol. 32, no. 4 (supplement), pp. 3-8.
- [Pub53] J. Modzelewski: "Uproszczona metoda projektowania rezonansowych wzmacniaczy mocy wielkiej częstotliwości z tranzystorami MOSFET" (Simplified Design Method of High-Frequency Tuned Power MOSFET Amplifiers), *Elektronika*, no. 11 (2007), pp. 51-53.
- [Pub54] M. Morgoś, A. Buchowicz, T. Keller: "Realizacja usługi Video on Demand z wykorzystaniem transmisji danych w standardzie DOCSIS" (Video on Demand Service based on the DOCSIS Data Transmission), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 473-476.
- [Pub55] G. Pastuszek: "Sprzętowe architektury koderów binarnych w kompresji danych wizyjnych" (Hardware Architectures of Binary Coders in the Compression of Visual Data), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 429-432.
- [Pub56] R. Podraza, A. Dominik: "Credibility Coefficients for Objects of Rough Sets", *Studia Informatica*, no. 1, vol. 7 (2007), pp. 93-104.
- [Pub57] R. Podraza, M. Walkiewicz, A. Dominik: "Credibility Coefficients Based on Frequent Sets", *Annales UMCS Informatica AI 5* (2007), pp. 69-77.
- [Pub58] S. Rosłonec: "Analiza wpływu wewnętrznych sprzężeń elektromagnetycznych na charakterystyki promieniowania nierezonansowych anten falowodowych" (An Influence of Internal Mutual Couplings on a Radiation Pattern of Non-resonant Slotted Array Antenna), *Prace Przemysłowego Instytutu Telekomunikacji*, z. 139 (2007), pp. 1-24.
- [Pub59] P. Służewski, Y. Yashchysyn: "Szerokopasmowy szuk antenowy z przełączaną wiązką" (Broadband Phased Array Antenna with Switched Beam), *Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej, Seria: Radiokomunikacja, Radiofonia i Telewizja, Mat. KKRRiT2007*, (Gdańsk, Poland, Jun. 13-15, 2007), pp. 299-302.

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7 RESEARCH REPORTS

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- [Rep15] Z. Kulka, P. Bobiński, E. Kotarbińska, A. Leszczyński, A. Młyńska, M. Tajchert, J. Żera: *“Projektowanie i badania systemów elektroakustycznych oraz systemów cyfrowego przetwarzania sygnałów fonicznych”* (Design and Investigation of Electroacoustics Measuring Systems and Digital Audio Signal Processing Systems), Final report for the statutory grant, Institute of Radioelectronics, WUT, Warsaw, Dec. 2007.
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- [Rep30] K. Snopek, S. Hahn, A. Dąbrowski, P. Dymarski, S. Kula: *"Czasowo-częstotliwościowe schematy w detekcji i rozpoznawaniu sygnałów"* (Time-Frequency Schemes in Signal Detection and Recognition), Final report for the Dean grant, Institute of Radioelectronics, WUT, Warsaw, Dec. 2007.
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- [Rep32] W. Winięcki, R. Łukaszewski: *"Wykorzystanie metod formalnych w projektowaniu systemów pomiarowych"* (The Use of Formal Methods in

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- [Rep35] W. Wojtasiak, D. Gryglewski, M. Lubiejewski: *"Wykonanie konwersji systemu IRT 2000 z pas-ma 2,4 GHz do pasma 3,5 GHz"* (IRT 2000 Con-verse System from 2.4 GHz to 3.5 GHz), Final report for NETIA S.A., May 2007.
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Patents

- [Pat1] M. Ziembicki, P. Żabowski-Żychowicz, J. Ma-rzec, K. Zaremba, A. Nawrot, A. Krypa: *"Sposób i urządzenie do łączenia włókien światłowodo-wych"* (Method and Device for Joining Light Fibers), Patent application P381128 to the Pat-ent Office of the Republic of Poland.

8 SCIENTIFIC EVENTS

8.1 Scientific events co-organized by the Institute

- [Con1] *MeMeA 2007" IEEE International Workshop on Medical Measurements and Applications* (Warsaw, Poland, May 4-5, 2007), K. Zaremba (co-chair), M. Ziembicki (local arrangement chair), G. Domański, B. Konarzewski, R. Kurjata, J. Marzec, Z. Pawłowski, A. Trybuła (participants).
- [Con2] *The IEEE Region 8 Conference Computer as a tool – EUROCON 2007* (Warsaw, Poland, Sept. 9-12, 2007), J. Modelski (general co-chairman), M. Bury I. Kula, R. Szumny, A. Wierzbńska (members of the Local Organizing Committee), M. Celuch, P. Kopyt, D. Radomski, W. Skarbek, K. M. Snopek, J. Wojciechowski, Y. Yashchyshyn (participants).

8.2 International scientific events

- [Con3] *IEEE MTT-S Winter Technical Meeting* (Long Beach, Pasadena, USA, Jan. 4-11, 2007), J. Modelski (member of the Program Committee), M. Celuch (participant).
- [Con4] *2007 Radio and Wireless Symposium* (Long Beach, USA, Jan. 9-11 2007) J. Modelski (participant).
- [Con5] *3 Workshop GENSO* (Nordwisk, the Netherlands, Feb. 18-22, 2007), M. Stolarski (participant).
- [Con6] *CADSM 2007* (Lviv, Ukraine, Feb. 19-24, 2007), Y. Yashchyshyn (speaker), S. Kozłowski (participant).
- [Con7] *2nd International Conference on Computer Vision Theory and Applications* (Barcelona, Spain, Mar. 7-11, 2007), M. Tomaszewski (participant).
- [Con8] *Second IASTED International Conference on Human-Computer Interaction* (Chamonix, France, Mar. 12-16, 2007), P. Boniński (speaker).
- [Con9] *Applied Computational Electromagnetics Society Conference* (Verona, Italy, Mar. 20-24, 2007), M. Celuch (speaker).
- [Con10] *XVIII International Fair on Electronic Communication* (Łódź, Poland, Apr. 17-19, 2007), J. Modelski (member of the Jury – Gold Medal of Inter-telecom Competition).
- [Con11] *IEEE Instrumentation and Measurement Technology Conference – IMTC'2007* (Warsaw, Poland, May 1-3, 2007), R. Z. Morawski (general chairman), A. Miękina (IT support chairman, speaker), W. Winiecki (member of the Technical Program Committee, session chairman), P. Bilski (speaker).
- [Con12] *Joint Rough Set Symposium – JRS 2007* (Toronto, Canada, May 12-16, 2007), W. Skarbek, A. Przelaskowski (speakers), J. Naruniec, M. Leszczyński (participants).
- [Con13] *The 12th Microcoll (Colloquium on Microwave Communications)* (Budapest, Hungary, May 14-16, 2007) J. Modelski (plenary session speaker).
- [Con14] *International Society for Magnetic Resonance in Medicine Conference – ISMRM-ESMRMB* (Berlin, Germany, May 19-25, 2007), E. Piątkowska-Janko, P. Bogorodzki, T. Wolak, W. Obrębski (speakers).
- [Con15] *International Forum on Innovative Technologies for Medicine* (Białystok, Poland, May 29-31, 2007), K. Zaremba (member of the Programme Committee).
- [Con16] *International Microwave Symposium - IMS 2007* (Honolulu, USA, Jun. 3-8, 2007), J. Modelski (chair of the session, member of the Program Committee), W. Gwarek, M. Celuch (speakers).
- [Con17] *12th International Symposium on Sound and Vision Engineering and Mastering - ISSVEM 2007* (Gdańsk, Poland, Jun. 15-16, 2007), Z. Kulka, (member of Scientific Committee), B. Bielawski, A. Młyńska, R. Korycki (speakers).
- [Con18] *International Workshop of Technical Universities from Kiev, St. Petersburg and Warsaw* (Kiev, Ukraine, Jun. 20-22, 2007), W. Winiecki (speaker).
- [Con19] *2007 IEEE International Communications Conference* (Glasgow, UK, Jun. 24-28, 2007), J. Wojciechowski (participant).
- [Con20] *First Forum on Effective Solutions for Occupational Noise Risks – Noise at Work 2007* (Lille, France, Jul. 2-20, 2007), E. Kotarbińska (speaker).
- [Con21] *IEEE International Conference on Signal Processing and Multimedia Applications* (Barcelona, Spain, Jul. 28-31, 2007), M. Morgoś (speaker).
- [Con22] *International Conference on Signal Processing and Multimedia Applications – SIGMAP 2007* (Barcelona, Spain, Jul. 28-31, 2007), W. Skarbek, K. Ignasiak, G. Pastuszak, J. Baszun, S. Badura, M. Leszczyński, K. Wnukowicz (speakers).
- [Con23] *EED 2007 Egyptian Engineering Day* (Cairo, Egypt, Jul. 29-30, 2007) J. Modelski (plenary session speaker)
- [Con24] *International Conference on Image Analysis and Recognition – ICIAR 2007* (Montreal, Canada, Aug. 22-24, 2007), M. Leszczyński (participant).
- [Con25] *46th European FITCE Congress: The Broadband Way to the Future* (Warsaw, Poland, Aug. 30-Sept. 1, 2007), J. Modelski (chairman of International Scientific Committee), T. Kosiło, G. Płatek (speakers).
- [Con26] *11th International Conference on Microwave and High Frequency Heating* (Oradea, Romania, Sept. 3-6, 2007), P. Kopyt (participant).
- [Con27] *15th European Signal Processing Conference* (Poznań, Poland, Sept. 3-7, 2007), K. M. Snopek, A. Nowakowski (participants).

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- [Con28] *49th Session of the General Council of International Measurement Confederation IMEKO (Paris, France, Sept. 5-8, 2007)*, R. Z. Morawski (representative of the Polish Member Organization POLSPAR).
- [Con29] *IEEE Fourth International Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Application: ID-AACS 2007* (Dortmund, Germany, Sept. 6-8, 2007), W. Winiński (co-chairman of the International Programme Committee, session chairman, speaker), P. Bilski (speaker).
- [Con30] *International Conference "Space for Humans – 50th anniversary of Space Age"* (Warsaw, Poland, Oct. 2-3 2007), K. Kurek, M. Stolarski (participants).
- [Con31] *European Microwave Conference – EuMC 2007* (Münich, Germany, Oct. 6-10, 2007), J. Modelski, Y. Yashchyshyn, K. Kurek, R. Szumny (speakers).
- [Con32] *European Conference on Wireless Technology ECWT 2007* (Münich, Germany, Oct. 6-10, 2007), J. Modelski (member of the Technical Program Committee).
- [Con33] *Broadband World Forum Europe, Estrel Convention Center* (Berlin, Germany, Oct. 9-11, 2007), A. Buchowicz (participant).
- [Con34] *PIKE 2007 XXXI International Conference and Exhibition*, (Zakopane, Poland Oct. 14-17, 2007), J. Modelski (chairman of the Programme Committee).
- [Con35] *IEEE Workshop on Signal Processing Systems - SiPS 2007* (Shanghai, China, Oct. 17-19, 2007), G. Pastuszek (speaker).
- [Con36] *Second European Conference Antennas and Propagation – EuCAP'2007* (Edinburgh, UK, Nov. 11-16, 2007), M. Bury, Y. Yashchyshyn (speakers).
- [Con37] *11th International Conference "Actual Problems of Biomedical Engineering, Informatics, Cybernetics and Telemedicine"* (Kiev, Ukraine, Nov. 15-17, 2007), W. Winiński (member of the International Organizing Committee).
- [Con38] *Warsztaty "Techniki Satelitarne dla Regionów" organizowane przez marszałka woj. mazowieckiego* (Satellite Technologies for Regions – Workshop organized by the Marshal of the Mazovia District), (Warsaw, Poland, Mar. 5, 2007), J. Modelski, T. Keller (speakers).
- [Con39] *VII Sympozjum Świata Telekomunikacji* (VIIth Symposium of Telecommunication World), (Warsaw, Poland, Mar. 28, 2007), T. Keller, J. Modelski (speakers).
- [Con40] *II Ogólnopolska Konferencja Studenckich Kół Naukowych* (IInd National Conference of Student Scientific Groups), (Warsaw, Poland, Apr. 20-22, 2007), participants: SKIK members.
- [Con41] *XXX Konferencja Polskiej Izby Komunikacji Elektronicznej* (XXX Conference of Polish Chamber of Electronics Communications), (Jachranka, Poland, May 7-9, 2007), J. Modelski (Chairman of the Programme Committee).
- [Con42] *Seminarium "Projektowanie układów zasilających"* (Seminar: Designing of Power Units), (Warsaw, Poland, May 25, 2007), T. Buczkowski (participant).
- [Con43] *Krajowa Konferencja Radiokomunikacji, Radiofonii i Telewizji - KKRRiT'2007* (National Conference on Radiocommunications, Broadcasting and Television), (Gdańsk, Poland, Jun. 12-15, 2007), J. Modelski, A. Buchowicz, J. Cichocki, J. Jarkowski, T. Keller, J. Kołakowski, T. Kosiło, S. Maszczyk, Y. Yashchyshyn (speakers), M. Bury, K. Bryłka, M. Dąbrowski, K. Hebel, G. Pastuszek, K. Płatek, P. Służewski, R. Szumny, P. Węgrzyniak, P. Ziętek (participants).
- [Con44] *VI Krajowa Konferencja Elektroniki – KKE 2007* (VIth National Conference on Electronics), (Dartowo, Poland, Jun. 10-13, 2007), T. Morawski, J. Modzelewski, J. Zborowska (speakers).
- [Con45] *II Konferencja Naukowa "Urządzenia i Systemy Radioelektroniczne" - UiSR 2007* (II Scientific Conference "Radioelectronics Devices and Systems"), (Soczewka k/Płocka, Jun. 13-15, 2007), H. Chaciński (participant).
- [Con46] *VI Ogólnopolska Konferencja Naukowo-Techniczna: Postępy w Elektronice Stosowanej – PES-6* (VIth National Conference – Advances in Applied Electrotechnics), (Kościelisko, Poland, Jun. 18-22, 2007), T. Morawski, J. Zborowska, S. Kozłowski (participants).
- [Con47] *Dni Technik Satelitarnych* (Warsaw Space Days), (Warsaw, Poland, Jun. 21-24, 2007), K. Kurek, M. Stolarski, C. Jezierski (speakers).
- [Con48] *VI Krajowe Warsztaty EMC* (VIth National Workshop EMC), (Wrocław, Poland, Jun. 28-29, 2007), T. Kosiło (participant).
- [Con49] *Sympozjum: Inżynieria Biomedyczna i Telemedycyna IBiTel w Warszawie* (Symposium: Biomedical Engineering and Telemedicine IBiTel in Warsaw), (Warsaw, Poland, Sept. 7, 2007), K. Zaremba (member of the scientific committee), A. Przelaskowski, D. Radomski (speakers).
- [Con50] *Kongres Metrologii – KM'2007* (Congress on Metrology), (Kraków, Poland, Sept. 9-13, 2007), W. Winiński (member of the Scientific Committee, session chairman, speaker), R. Łukaszewski, P. Bobiński (speakers).
- [Con51] *Krajowe Sympozjum Telekomunikacji: KST 2007* (National Symposium on Telecommunications), (Bydgoszcz, Poland, Sept. 12-14, 2007), S. Hahn J. Modelski, W. Skarbek (members of the Programme Committee).
- [Con52] *XV Krajowa Konferencja Naukowa : Biocybernetyka i Inżynieria Biomedyczna* (XVth National Scientific Conference: Biocybernetics and Biomedical Engineering), (Wrocław, Poland,

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- Sept. 12-15, 2007), A. Przelaskowski, D. Radomski, C. Mróz (participants).
- [Con53] *XXXIX Międzyuczelniana Konferencja Metrologów – MKM’2007* (Inter-University Metrologists’ Conference), (Łódź, Poland, Sept. 24 – 26, 2007), W. Winiecki (member of the Scientific Committee, participant).
- [Con54] *II Konferencja Naukowo-Techniczna Doktorantów i Młodych Naukowców: “Młodzi naukowcy wobec wyzwań współczesnej techniki”* (IInd Ph.D. Students’ and Young Scientists’ Scientific-Technical Conference: Young Scientists Towards the Challenges of Contemporary Technology), (Warsaw, Poland, Sept. 24-26, 2007), P. Bajurko, M. Bury, S. Kozłowski, I. Kula (participants).
- [Con55] *“Jakie nowe technologie zaskoczą nas w najbliższych latach?”* (“What Type of Modern Technologies will Astonish us within the Next Several Years?”) Debate of the Wall Street Journal and Telekomunikacja Polska, (Warsaw, Poland, Nov. 27, 2007), J. Modelski (speaker).
- [Con56] *VIII Seminarium: Radiokomunikacja i Techniki Multimedialne* (Proc. VIIIth Seminar: Radiocommunications and Multimedia Technologies), (Warsaw, Poland, Dec. 5, 2007), J. Kołakowski (chairman), E. Frydlewicz, R. Głogowski, C. Jezierski, P. Kręgielewski, M. Maćkowiak, P. Makal, A. Ołdak, T. Ostrowski, Ł. Rymaszewski, S. Rymaszewski, M. Stolarski, A. Wróblewska, M. Ziółkowska, M. Żebrowski (speakers).

9 AWARDS AND DISTINCTIONS

Membership of the Polish Academy of Sciences

Józef Modelski, Prof. D.Sc.,
Elected as a Corresponding Member

State Medals

Piotr Brzeski, Ph.D.,
Medal Komisji Edukacji Narodowej (Medal of National Education Committee)

Tomasz Jamrógiewicz, M.Sc.,
Srebrny Krzyż Zasługi (Silver Order of Merit)

Andrzej Buchowicz, Ph.D.,
Krzysztof Kurek, Ph.D.,
Brązowy Krzyż Zasługi (Bronze Order of Merit)

Awards of the Rector

Stanisław Rosłonec, Prof. D.Sc.,
Individual award for the book: *“Podstawy techniki antenowej”* (Basics of Antenna Techniques)

Yevhen Yaschyshyn, D.Sc.,
Individual award for D.Sc. dissertation: *“Electrically controlled beam-steering antennas”* (Anteny z elektrycznym kształtowaniem charakterystyki kierunkowej)

Krzysztof Zaremba, D.Sc.,
Janusz Marzec, D.Sc.,
Team award for the scientific achievements

Awards of the Polish Agency for Enterprise Development

Roman Szabatin, Ph.D.,
Piotr Brzeski, Ph.D.,
Tomasz Olszewski, M.Sc.,
Waldemar Smolik, Ph.D.,
Team prize for the elaboration of ET3 electrical capacitance tomograph.

Awards of the Warsaw University of Technology

Krzysztof Robaczyński, M.Sc.,
Warsaw University of Technology, Person of Merit (Zasłużony dla Politechniki Warszawskiej).

Awards of Foundation for the Development of Radiocommunication and Multimedia Technologies

Krzysztof Kucharski, M.Sc.,
The first award for the best Ph.D. thesis titled: *“Face indexing by image components method”*

Grzegorz Pastuszak, Ph.D.,
The first prize for Ph.D. thesis titled: *“Optimization of hardware architectures of binary coders in compression of visual data”*

Awards granted for the conference papers and posters

Piotr Służewski

The second prize in the contest for the Young Scientists for the paper: *“Szerokopaskowy szyk antenowy z przełączaną wiązką”* (Broadstrip Antenna Array with Switched Beam), *Krajowa Konferencja Radiokomunikacji, Radiofonii i Telewizji* (National Conference on Radiocommunications, Broadcasting and Television) (Gdańsk, Poland, Jun. 12-15, 2007),

T. Wolak, **P. Bogorodzki**, **E. Piątkowska-Janko**,
M. Orzechowski, **R. Kurjata**, **H. Skarżyński**, **L. Śliwa**,
K. Kochanek, **M. Gołębiowski**, **W. Szeszkowski**
The third prize in competition for the best poster: *“A Scanner Noise Impact on Functional Magnetic Resonance Imaging Studies”*, *Proc. 6th European Congress of Oto-Rhino-Laryngology Head and Neck Surgery (EUFOS)*, (Vienna, Austria, Jun. 30-Jul 4, 2007) .

Scholarships granted by Foundation for the Development of Radiocommunication and Multimedia Technologies

For preparing Ph.D. thesis

Anna Wróblewska, M.Sc.,
Marcin Stolarski, M.Sc.

Student scholarships

Krzysztof Hebel, M.Sc.
Ewa Frydlewicz, B.Sc.
Cezary Jezierski, M.Sc.
Jan Kietliński-Zaleski, B.Sc.
Piotr Kręgielewski, M.Sc.
Tomasz Ostrowski, B.Sc.
Adam Oldak, B.Sc.
Łukasz Rymaszewski, M.Sc.
Sławomir Rymaszewski, B.Sc.

For participation in international educational program

Rafał Głogowski
Michał Maćkowiak
Piotr Makal
Monika Ziółkowska
Socrates-Erasmus Program – Universidade Tecnica de Lisboa, Portugal

10 STATISTICAL DATA (for Dec. 31st of each year)

SPECIFICATION	2003	2004	2005	2006	2007
academic staff					
total	61.33	61.89	61.58	61.08	60.5
tenured professors	3.5	3.4	3.4	2.75	4
professors	5	6.6	7.6	9	7
associate professor	3	3	2.5	2.5	2.5
assistant professors	42	42.5	42.25	41.5	39.5
docents	-	-	-	-	2
senior lecturers	4.83	4.83	4.83	4.83	4.5
assistants	3	1.5	1	0.5	1
Ph.D. students					
total	39	43	38	44	34
regular, the third level studies	27	24	24	20	13
without scholarship	12	19	14	24	21
technical and administrative staff					
total	19	22.65	20.4	20.6	18.1
R&D associates	9	11.15	8.9	11.6	8.6
administrative associates	8	8.5	8.5	6	6.5
librarian	1	1	1	1	1
service workers	2	2	2	2	2
space					
total [m ²]	2592.1	3069.6	3069.6	3069.6	3069.6
laboratories	1279.8	1320.0	1320.0	1320.0	1320.0
library	71.2	81.1	81.1	81.1	81.1
offices of academic staff	1241.1	1355	1355	1355	1355
library resources					
books (number of volumes)	14756	15133	15344	15501	15530
books (number of titles)	8107	8262	8353	8459	8488
journals (number of titles subscribed to)	125	125	126	126	126
teaching activities					
basic courses	47	48	60	62	62
advanced courses	35	37	33	22	22
other courses	57	59	80	66	60
international projects	1	1	6	1	4
research projects					
total	56	58	41	51	52
International projects	7	11	6	10	8
granted by Ministry	16	12	11	13	15
granted by the University	24	20	15	17	17
other projects	9	15	9	11	12
research projects budget	2 828 000 zł + 13 000 €	3 806 000 zł + 228 000 €	4 397 000 zł + 331 000 €	5 020 000 zł + 323 000 €	4 833 000 zł + 495 000 €
titles and degrees awarded					
Prof. titles	1	0	0	0	0
D.Sc. degrees	3	2	0	1	0
Ph.D. degrees	1	6	5	9	5
M.Sc. degrees	91	85	50	64+3	63+3
M.Sc. Degrees (English-medium studies)	0	0	0	1	1
B.Sc. degrees	54+32	58+54	51+14	68+10	55+16
B.Sc. degrees (English-medium-studies)	0	4	7	3	4
B.Sc. degrees (Distant Learning Center)	0	0	0	2	1
publications					
total	185	222	224	235	229
sci.-tech. books and chapters in books	3	1	6	5	1
sci.-tech. papers in journals – total	59	52	65	61	82
JCR-ICI list			22	13	32
MSHE list			26	16	32
in other journals			17	32	18
sci.-tech. papers in conf. proceedings	110	145	131	149	131
other publications	13	19	19	22	15
research reports	37	43	27	35	38
conferences attended by the staff	47	39	48	50	56

EXPLANATORY NOTE ON POLISH ACADEMIC AND PROFESSIONAL TITLES, DEGREES AND POSTS

According to Polish law, the following terms are used for academic and professional titles, degrees and posts held by staff members at the Institute of Radioelectronics.

The academic title of *profesor (prof.)*, is conferred by the president of the Republic of Poland upon a motion of the Central Commission for Academic Degrees and Title.

This title may be awarded to a person who:

- has obtained a degree of *doktor habilitowany*;
- has scientific achievements, which fall far beyond the requirements for the candidates applying for the degree of *doktor habilitowany*;
- has remarkable didactic achievements, among other things, within the scope of training of academic staff.

Academic degrees awarded by the organizational unit entitled to confer such degrees, it means the respective Faculty Council or another organizational unit of a higher education institution or another scientific institution.

- *doktor (dr)*, translated here as **Ph.D.**, is conferred to a person who:
 - holds the professional title of *magister* or *magister inżynier*;
 - has successfully passed doctorate examinations covering the scope defined by faculty board; and
 - has submitted and successfully defended a doctoral thesis assessed favorably by two reviewers.

The doctoral dissertation, prepared under the supervision of a tutor, should provide an original solution of a scientific problem and present general theoretical knowledge of the candidate in a given discipline of science, as well as should confirm the candidate's skill to conduct scientific work independently

- *doktor habilitowany (dr hab.)*, translated here as **D.Sc.**, is conferred to a person who:
 - holds the academic degree of *doktor*;
 - has remarkable scientific achievements;
 - has submitted a habilitation dissertation which contributes significantly to the development of a given scientific discipline;
 - has received favorable assessment of his/her dissertation from four reviewers;
 - has passed a habilitation examination; and
 - has delivered a favorably assessed habilitation lecture.

The dissertation may constitute a work completed by candidate after he/she was awarded the degree of

doktor. This work should be also published as a whole or in its fundamental part.

The *doktor habilitowany* degree authorize the holder to promote doctoral theses.

Research and teaching posts:

- *asystent* – *magister* professional title is required;
- *adiunkt* – *doktor* degree is required;
- *profesor nadzwyczajny* – *doktor habilitowany* degree is required;
- *profesor zwyczajny* – *profesor* title is required.

Teaching posts:

- *wykladowca*, translated here as **Lecturer**;
- *starszy wykładowca*, translated here as **Senior Lecturer**;
- *docent* – *doktor* degree is required;

Professional titles:

- *inżynier (inż.)*, translated here as **B.Sc.**, are awarded to the graduates of higher vocational studies in the technical fields of study when the technical subjects constitute not less than 50% of the total of didactic activities included in the timetable for this fields of study;
- *magister (mgr)*, translated here as **M.Sc.**, are awarded to the graduates of master-level courses in such fields of studies as: natural sciences, mathematics etc.;
- *magister (mgr)*, translated here as **M.A.**, are awarded to the graduates of master-level courses in the arts and humanities fields of studies.
- *magister inżynier (mgr inż.)*, translated here as **M.Sc.**, are awarded to the graduates of master-level courses in the technical fields of studies.

The following English titles have been adopted here for Polish academic posts:

- **Assistant** – the holder of the *magister inżynier* professional title in the post of *asystent*;
- **Assistant Professor** – the holder of *doktor* degree in the post of *adiunkt*;
- **Docent** – the holder of *doktor* degree in the post of *docent*;
- **Associate Professor** – the holder of *doktor habilitowany* degree in the post of *adiunkt*;
- **Professor** – the holder of *doktor habilitowany* degree in the post of *profesor nadzwyczajny*;
- **Tenured Professor** – the holder of a *profesor* academic title in the post of *profesor zwyczajny*.

