



INSTITUTE
OF MICROELECTRONICS
AND OPTOELECTRONICS



ANNUAL REPORT
2008

Edited by Agnieszka Mossakowska-Wyszyńska

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From the Director

This Annual Report summarizes the research activities of the Institute In 2008, as well as the teaching activities in the academic year 2007/2008. The activities of the Institute in the field of electronics and computer engineering are concentrated in the area of broadly defined microelectronics and optoelectronics. These include VLSI systems, microelectronic and nanoelectronic semiconductor devices, hybrid circuits (e.g. microwave, optoelectronic), sensors, microsystems, laser optoelectronics, electronic imaging and image processing. It is worth to emphasize that research activities of the Institute span modelling, CAD, manufacturing and diagnostics.

The Institute of Microelectronics & Optoelectronics (IMiO) was founded in 1970. It evolved from the Chair of Radio Engineering established by Professor Janusz Groszkowski in 1929. Our Institute is linked with the beginnings of the Faculty of Electronics and Information Technology through the person of Prof. Groszkowski, who worked in IMiO until his death, as well as the territory – half of the Institute is situated in the Building of Radio Engineering on the Warsaw University of Technology campus. Here the Institute's Technology Centre is located. It includes laboratories of silicon processing (clean-room), hybrid technologies and assembly techniques, fibre optic and integrated optoelectronic device fabrication, laser optoelectronics, characterization of new electronic and photonic materials and manufacturing processes. These laboratories developed their activities based on research projects financed by Polish government as well as those within 5th, 6th and 7th UE Framework Programme.

In the field of teaching (three-level structure – B.Sc., M.Sc. and Ph.D. studies) the Institute continued to improve its contribution in the Electronics and Computer Engineering area (led together with the Institute of Electronic Systems) for on-campus studies. The involvement of the Institute in distance learning studies of Electronics and Telecommunications is also worth mentioning, especially post-diploma studies in the domain of tools and techniques of virtual education that began in 2004. The Institute aims for its teaching activities to meet the challenge of the development of modern technology and information society.

I express my sincere appreciation to all colleagues for your achievements which determined the position of our Institute in the Faculty of Electronics and Information Technology. Thank you very much for your cooperation in the creative development of the Institute.

Warsaw, January 2009

Professor Paweł Szczepański, Prof., Ph.D., D.Sc.

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1. GENERAL INFORMATION

1.1. Organisation of the Institute and Areas of its Activities

The Institute of Microelectronics and Optoelectronics is a part of the Faculty of Electronics and Information Technology - the largest Faculty of the Warsaw University of Technology.

Our Institute consists of six divisions:

- Microelectronics and Nanoelectronics Devices Division;
- VLSI Engineering and Design Automation Division;
- Microwave Electronics and Photonics Division*;
- Microsystem and Electronic Material Technology Division;
- Optoelectronics Division;
- Image Processing Division*.

* At the end of 2008 these two divisions has been joined in one: Division of Image and Microwave Photonics. The Head of the newly constructed division is Professor Jerzy Woźnicki.

During the past thirty-three years of research in the area of microelectronics and optoelectronics the Institute has built its competence in:

- modelling of physical effects in modern semiconductor devices;
- silicon processing and its modelling, non-standard dielectric layer deposition techniques;
- developing methods and measurement systems to characterize electronic materials and devices;
- generation of microwaves, microwave measurement techniques, and numerical methods for electromagnetism;
- processing, designing, optimisation techniques and development of VLSI (very large scale integration of circuits) computer-aided tools;
- design and technology of thick-film hybrid circuits, fabrication of thick-film microsystems;
- modelling and design of sensors and optical-waveguide microsystems;
- laser physics (Fabry-Perot and distributed feedback lasers), laser spectroscopy of solid state active materials, and applications of lasers in medicine, manufacturing and telecommunications;

- fabrication and characterisation of optoelectronics elements and devices including fibre sensors, photovoltaics;
- silicon carbide processing for high-temperature, high-power and high-frequency electronics
- computer-aided design of photo electronic image devices, image processing and visualisation of results of experiments with image devices;
- vacuum science and technology - computer-aided design of vacuum systems, modelling of the gas flow in vacuum systems, studies of gas parameter distribution in calibration chambers (vacuum metrology).

The research activities are supported by projects financed by the State Committee for Scientific Research and those within 5th, 6th and 7th UE Framework Programme, e.g. REASON, TUF, SINANO, PULLNANO, EUROSOI, BIPV-CIC, NEMO, IDESA.

The results of our scientific activities were published in many papers submitted to prestigious international scientific journals and presented at national and mostly at international conferences in the form of communications as well as the invited lectures.

1.2. Board of Directors

Director of the Institute

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1.3. Microelectronics and Nanoelectronics Devices Division

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Bogdan Majkusiak, Ph.D., D.Sc.	Tenured Professor
Lidia Łukasiak, Ph.D., D.Sc.	Professor
Robert Mroczyński	Assistant Professor
Zbigniew Pióro, Ph.D.	Assistant Professor
Sławomir Szostak, Ph.D.	Assistant Professor
Jakub Walczak, Ph.D.	Assistant Professor
Agnieszka Zaręba, M.Sc.	Assistant Professor
Jan Gibki, Ph.D.	Senior Lecturer
Józef Maciak, M.Sc.	Senior Lecturer
Antoni Siennicki, Ph.D.	Senior Lecturer

Junior academic staff

Jarosław Grabowski, M.Sc.	Ph.D. Student
Marcin Iwanowicz, M.Sc.	Ph.D. Student
Jakub Jasiński, M.Sc.	Ph.D. Student
Arkadiusz Malinowski, M.Sc.	Ph.D. Student
Andrzej Mazurak, M.Sc.	Ph.D. Student
Piotr Pływaczewski, M.Sc.	Ph.D. Student
Michał Rakowski, M.Sc.	Ph.D. Student
Paweł Sałek, M.Sc.	Ph.D. Student
Jędrzej Stęszewski, M.Sc.	Ph.D. Student

Technical and administrative staff

Witold Ciemiewski,
Kazimierz Dalbiak,
Ksymena Firek,
Krzysztof Krogulski,
Małgorzata Trzaskowska.

The research carried out in the Microelectronics and Nanoelectronics Devices Division falls into three main areas, namely: technology, diagnostics and modelling of semiconductor structures, as well as applications of microelectronics in digital signal processing.

To name a few examples of its research topics:

- Modelling and investigation on kinetics of silicon oxidation (particularly of the beginning stages of the process);
- Diagnostics and characterisation of properties of single and double insulating layers (gate stack including ultra thin oxide layers) by means of electrical measurements analysis;
- Wear-out and degradation processes in MOS structures (breakdown of dielectrics layers, hot carriers effects, radiation damage effects);
- Transport mechanism and quantum effects in MOS structures (transistor, tunnel diode) with ultra thin oxide;
- New materials (semiconductors and dielectrics) for microelectronics applications (e.g.: silicon carbide, gallium nitride, silicon-germanium, germanium)
- Theoretical studies on MOS-SOI (silicon-on-insulator) and Si:Ge (silicon-germanium) MOS structure physics (modelling of devices behaviour and modelling for characterisation and diagnostics);
- Nanoelectronic phenomena and devices (e.g. tunnel and resonance tunnel diodes and transistors, Coulomb blockade diode, single-electron transistors, memories);
- PECVD deposition of ultra thin dielectric layers for MOSFET gate dielectric (SiO_2 , Si_3N_4 , SiO_xN_y);
- Ultra shallow implantation from r.f. plasma;
- Very low temperature processing of test structure;
- Fabrication of double barrier structures and devices;
- MEMS/MOEMS processing.

1.4. VLSI Engineering and Design Automation Division

Head of the Division

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Grzegorz Janczyk, Ph.D.	Assistant Professor
Zbigniew Jaworski, Ph.D.	Assistant Professor
Dominik Kasprowicz, Ph.D.	Assistant Professor
Marek Niewiński, Ph.D.	Assistant Professor
Witold Pleskacz, Ph.D.	Assistant Professor
Andrzej Wielgus, Ph.D.	Assistant Professor
Adam Wojtasik, Ph.D.	Assistant Professor

Junior academic staff

Tomasz Borejko, M.Sc.	Ph.D. Student
Michał Bryk, M.Sc.	Ph.D. Student

Alicja Droszcz, M.Sc.	Ph.D. Student
Arkadiusz Luczyk, M.Sc.	Ph.D. Student, Assistant
Michał Maciąg, M.Sc.	Ph.D. Student
Grzegorz Wąchała, M.Sc.	Ph.D. Student

Technical and administrative staff

Jerzy Gempel, M.Sc.
Stanisław Jeszka, M.Sc.

The research carried out in the division falls into several main areas: development of IC design methodologies and tools, design of digital and analog integrated circuits for nonstandard demanding applications and application of microelectronics in signal processing.

Current research projects in the Division include:

- methodologies of integrated circuit design for manufacturability: application of statistical process and device simulation in IC design, investigations of spatial on-chip correlation of random process disturbances, analysis of layout sensitivity to spot defects;

- design of analogue VLSI circuits: analogue implementations of fuzzy logic controllers for biomedical applications, methodologies of testing and design for testability of analogue VLSI integrated circuits;
- development of CAD tools for integrated circuit design and verification, with special emphasis on analogue full custom ASICs design;
- investigations of signal propagation and crosstalk in long

- interconnections in deep submicron VLSI circuits;
- design of digital and mixed VLSI circuits for special applications: CNN, data processing in physical experiments, etc.;
- modeling and control of leakage currents in nanometer CMOS digital circuits.

1.5. Microwave Electronics and Photonics Division

Head of the Division

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Agnieszka Szymańska, Ph.D.	Assistant Professor
Piotr Witoński, Ph.D.	Assistant Professor
Jerzy Skulski, M.Sc.	Senior Lecturer

Junior academic staff

Krzysztof Madziar, M.Sc.	Ph.D. Student, Assistant
Daniel Paluch, M.Sc.	Ph.D. Student, Assistant

Technical and administrative staff

Bożena Janus

The research activity of the Microwave Electronics and Photonics Division is concerned with propagative electronics and microwave photonics. The characteristic feature of the electronics branch is the comparability between the time of system state change and the time of signal propagation between particular system points.

The research activity of the Microwave Electronics and Photonics Division is concentrated on:

- an analysis of the oscillation conditions, frequency stabilisation and synthesis in microwave bands;
- measurement techniques of microwave circuits and devices parameters with emphasis on automation and computerisation of measurement methods;
- analysis methods of transmission lines for modern mm-wave microwave integrated circuits.

From the new topics of research activity we can mention:

- modelling and computer aided design of microwave devices and circuits;
- microwave sensors for industrial applications;
- controlling of microwave circuits parameters by means of optical signals;
- investigations and modelling of optical-microwave frequency conversion processes;
- modelling of optically controlled microwave devices, as photodiodes, photo-varactors, phototransistors;
- modelling of semiconductor optical devices for telecommunication;
- optoelectronic and microwave devices for data transmission networks.

1.6. Electronic Materials and Microsystem Technology Division

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Science research staff

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Senior academic staff

Jerzy Krupka, Ph.D., D.Sc.	Professor
Mikołaj Baszun, Ph.D.	Assistant Professor
Michał Borecki, Ph.D.	Assistant Professor
Jerzy Kalenik, Ph.D.	Assistant Professor
Ryszard Kisiel, Ph.D.	Assistant Professor
Zdzisław Mączyński, Ph.D.	Assistant Professor
Mateusz Śmietana, Ph.D.	Assistant Professor
Aleksander Werbowy, Ph.D.	Assistant Professor

Technical and administrative staff

Ryszard Biaduń.

The research activity of the Division concentrates on optoelectronic and hybrid devices. Fundamental and applied research are carried out. Research groups are organised for defined tasks.

The main research areas are as follows:

- fabrication and investigation of the following optoelectronic devices: integrated passive and active light wave guiding structures (modulators, bistable switches etc.) and fibre optic sensors;
- computer engineering for fibre optics;
- new techniques of surface mounted devices on PCB (printed circuit boards);

- application of thin and thick film technology in hybrid devices and thick film sensors fabrication;
- investigation of the electronic structure, stability and optical properties of amorphous silicon and its devices (thin film transistors, solar cells, etc.);
- research, design and monitoring of photovoltaic systems, strategy for development of photovoltaic solar energy;

- electronic packaging technology;
- plasma deposition of nanocrystalline diamond (NCD), diamond-like carbon (DLC) thin films and their application in fibre optic and waveguide sensing structures.

1.7. Optoelectronics Division

Head of the Division

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Ryszard Piramidowicz, Ph.D. Assistant Professor
Anna Tyszka-Zawadzka, Ph.D. Assistant Professor
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Junior academic staff

Krzysztof Anders, M.Sc. Ph.D. Student
Paweł Gdula, M.Sc. Ph.D. Student
Mariusz Klimczak, M.Sc. Ph.D. Student
Marcin Koba, M.Sc. Ph.D. Student
Kamila Leśniewska-Matys, M.Sc. Ph.D. Student
Adam Rudziński, M.Sc. Ph.D. Student

Technical and administrative staff

Wojciech Kamiński, Ph.D.

The activity of the Optoelectronics Division is concentrated on education as well as on various areas of optoelectronic research in the field of laser physics, laser spectroscopy, laser construction and laser applications in medicine and air pollution monitoring.

The academic staff of the Division gives lectures in photonics, laser physics, laser technology, laser applications, laser spectroscopy, integrated optoelectronics and optical computing, all of which are accompanied by appropriate laboratory class activities.

The main research activity of the Division comprises:

- solid state laser construction and their applications in materials processing;
- spectroscopic research of new laser materials, investigation of the excitation processes in rare earth doped dielectric materials, research of blue up-conversion laser structures, waveguide lasers;
- theoretical research of laser generation in planar, fibre and hollow waveguide gas lasers, analysis of light generation in DFB (distributed feedback) structures, photonic crystals structures and in lasers with non-linear optical elements, investigation of the statistical properties of the light generated in various laser structures;
- nano-optical structures and photonic band-gap materials;
- research of light generation in metal vapour gas lasers, measurement of laser parameters, investigation of light generation in hollow cathode lasers, analysis of plasma discharge processes, research of the opto-galvanic effect;
- optimisation of the construction of ion gas lasers, investigation of the processes in discharge tube ceramic ion laser and laser operation in various cavity geometry, investigation of light generation in ion gas lasers for medical applications.

1.8. Image Processing Division

Head of the Division

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Senior academic staff

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Technical and administrative staff

Jerzy Domański, M.Sc.

The main areas of activity of the Division are education and research, both in the field of the technology of electronic imaging devices and of digital image processing.

Members of the academic staff are involved in research and development works on:

- theoretical principles of image modelling;
- numerical methods of image analysis;
- implementation of digital image processing for detection, inspection and identification of objects;
- application of image processing methods for diagnostic control and measurement systems in industry, medicine, research and commerce;
- image acquisition in Polarization Difference Imaging systems with use of liquid crystal based filter and it's numerical analysis;
- optical image processing;
- electro optic effects in liquid crystals and their applications to LCD;
- photo refractive phenomena's in liquid crystals for dynamic holography and optical data storage.

1.9. Statistical Data

SPECIFICATION	2007	2008	DIFFERENCE
Academic staff	79	79	0
Tenured professors	8	8	0
Professors	6	5	-1
Docent	1	1	0
Assistant professors	31	31	0
Senior lecturers	4	4	0
Assistants and Ph.D. students	29	30	+1
Science research staff	3	2	-1
Technical staff	10	10	0
Administrative staff	5	5	0
Computers	345	308	-37
Library resources - Books (number of volumes)	3461	3473	+12
Teaching activities	59	57	-2
Basic courses	39	35	-4
Advanced courses	15	17	+2
Special courses	5	5	0
Research projects	32	34	+2
Granted by the University	10	9	-1
Granted by State Institutions	14	20	+6
Granted by International Institutions	5	5	0
Other projects	3	0	-3
Degrees awarded	82	78	-4
Ph.D. degrees	5	4	-1
M.Sc. degrees	38	40	+2
B.Sc. degrees	39	34	-5
Publications	166	129	-37
Sci.-tech. books	9	9	0
Sci.-tech. papers in journals	62	75	+13
Sci.-tech. papers in conference proceedings	95	45	-50
Reports	26	27	+1
Patents	2	3	+1
Conferences	30	32	+2
Awards	4	15	+11

2. STAFF

2.1 Senior Academic Staff

- Mikolaj Baszun**, M.Sc. ('69), Ph.D. ('77), Electronic Sensors, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, WUT Rector's Award ('06), President's of the Republic of Poland Gold Medal for Long-Term Service ('08) room # 371 GE
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- Romuald B. Beck**, M.Sc. ('76), Ph.D. ('82), D.Sc. ('96), Microelectronics, Electronics, Professor, full time, Head of Microelectronics and Nanoelectronics Devices Division ('04), Leader of the Technology, Diagnostics and Modelling Group ('85-), Vice President of the Microelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('93-), Member of Programme Committee of: Diagnostics & Yield Conference ('88-), Co-chairman ('03-), Chairman ('06); Member of Programme Committee of ELTE ('84, '04, '07), Member of Technical Programme Committee ESSDERC ('05-), Senior Member of IEEE ('97-), Member of Electrochemical Society ('98-), Head of CEZAMAT Project Office ('08), WUT Rector's Collective Award for Scientific Achievements ('08). room # 336 GR
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Academy of Sciences, Head of its Microelectronics Section ('88-03), Pożaryski Award for
Scientific Publications ('86, '96), Member of Programme Committee of ELTE ('84-),
MiEL ('94-), IWSPD ('96-), MIXDES ('97-), IEEE ICCDS ('02-), Chairman of
"Diagnostic and Yield" ('88-), Editor-in-chief of "Electron Technology" ('90-'94), WUT
Rector's Collective Award for Scientific Achievements ('08).
- Grzegorz Janczyk**: M.Sc. ('99) with honors, Ph.D. ('05), VLSI Engineering and Automation room # 353 GE
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3. TEACHING ACTIVITIES

3.1. Basic Courses

- [Edu1] **Algorithms and Data Structures** (Algorytmy i struktury danych), **AISDE**, Adam Wojtasik
- [Edu2] **Application of Matlab in Calculation Methods** (Matlab w zastosowanych metodach obliczeniowych) **MZMO**, Mikołaj Baszun
- [Edu3] **CAD and Fabrication of Microwave and Lightwave Circuits** (Komputerowe projektowanie i realizacja obwodów mikrofalowych i optofalowych), **KPROM**, Jerzy Skulski
- [Edu4] **Computer-Aided Design of Printed-Board Circuits** (Wspomaganie komputerowe projektowania obwodów drukowanych), **PADS**, Ryszard Kisiel, Jerzy Kalenik
- [Edu5] **Design of Analog Circuits for VLSI Systems** (Projektowanie układów analogowych dla systemów VLSI), **PUAV** Wiesław Kuźmicz
- [Edu6] **Electronic Elements and Circuits** (Elementy i układy elektroniczne), **ELIU**, Andrzej Pfizner
- [Edu7] **Equipment - Programming Synthesis of Digital Systems** (Synteza sprzętowo – programowa systemów cyfrowych), **SSP**, Elżbieta Piwowarska
- [Edu8] **Fields and waves**, (Pola i fale), **POFA**, Jerzy Piotrowski
- [Edu9] **Fundamentals of Circuit and System Technology** (Podstawy technologii układów i systemów), **PTUIS**, Romuald Beck
- [Edu10] **Fundamentals of Lasers** (Lasery - kurs podstawowy), **LKP**, Paweł Szczepański
- [Edu11] **Fundamentals of Microelectronics** (Podstawy mikroelektroniki), **PMK**, Wiesław Kuźmicz
- [Edu12] **Fundamentals of Microprocessor Techniques** (Podstawy techniki mikroprocesorowej), **TMIK**, Lidia Łukasiak
- [Edu13] **Fundamentals of Microwave Engineering** (Podstawy techniki w.cz.), **TWCZ**, Bogdan Galwas
- [Edu14] **Fundamentals of Photonics** (Podstawy fotoniki), **FOT**, Michał Malinowski
- [Edu15] **Fundamentals of Solid State Electronics** (Elektronika ciała stałego), **ELCS**, Jan Szmidt, Witold Pleskacz
- [Edu16] **Hybrid Systems** (Układy hybrydowe), **UKH**, Ryszard Kisiel
- [Edu17] **Integrated Optoelectronics** (Optoelektronika zintegrowana), **OZT**, Michał Malinowski, Agnieszka Mossakowska-Wyszyńska
- [Edu18] **Introduction to Numerical Methods** (Wstęp do metod numerycznych), **WDMNM**, Jerzy Krupka
- [Edu19] **Introduction to Microsystems** (Wstęp do mikrosystemów), **WMS**, Zbigniew Pióro
- [Edu20] **Introduction to Programming** (Podstawy programowania), **PRM**, Michał Borecki
- [Edu21] **Introduction to the UNIX System** (Użytkowanie systemu UNIX), **USUX**, Andrzej Wielgus
- [Edu22] **Laser Physics** (Fizyka laserów), **FLA**, Paweł Szczepański
- [Edu23] **Light wave Telecommunication** (Telekomunikacja optofalowa), **TEOP**, Bogdan Galwas
- [Edu24] **Logic Circuits** (Układy logiczne), **ULOGE**, Tadeusz Łuba
- [Edu25] **Models and Systems of Image Processing** (Modele i systemy przetwarzania obrazów), **MSPO**, Jerzy Woźnicki
- [Edu26] **Object Programming in Java** (Praktyka programowania obiektowego w Javie), **PPOJ**, Adam Wojtasik
- [Edu27] **Object Programming** (Programowanie obiektowe), **PROBI**, Adam Wojtasik
- [Edu28] **Operating Systems** (Systemy operacyjne), **SOE**, Andrzej Wielgus
- [Edu29] **Optoelectronic Devices and Systems** (Elementy i systemy optoelektroniczne), **ESO**, Michał Malinowski
- [Edu30] **Physical Fundamentals of Information Processing** (Fizyczne podstawy przetwarzania informacji), **FPPI**, Bogdan Majkusiak
- [Edu31] **Physics of Solid State** (Fizyka ciała stałego), **FCSR**, Jan Szmidt
- [Edu32] **Programming 8051 micro controller** (Programowanie mikrokontrolera), **PMIK**, Sławomir Szostak
- [Edu33] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PP**, Andrzej Jakubowski, Andrzej Pfizner

- [Edu34] **Standard cell based VLSI design e** (Projektowanie układów VLSI w stylu komórek standardowych), **PUVS**, Zbigniew Jaworski
- [Edu35] **Surface Mounting Technology** (Technologia montażu powierzchniowego), **TMP**, Ryszard Kisiel

3.2. Advanced Courses

- [Edu36] **Advanced Methods of Optical Information Processing** (Zaawansowane metody optycznego przetwarzania informacji), **ZMOPI**, Janusz Parka
- [Edu37] **Advanced Microelectronic and Optoelectronic Technologies** (Zaawansowane technologie mikroelektroniczne i optoelektroniczne), **ZTMO**, Romuald Beck
- [Edu38] **Advanced Physical Fundamentals of Optoelectronics** (Zaawansowane podstawy fizyczne optoelektroniki), **ZPFO**, Paweł Szczepański
- [Edu39] **Digital Image Processing** (Cyfrowe przetwarzanie obrazów), **CPOO**, Piotr Garbat
- [Edu40] **Electronic and Photonic Devices for Telecommunication** (Przyrządy elektroniki i fotoniki dla telekomunikacji), **PEFT**, Bogdan Galwas
- [Edu41] **Fundamentals of Photovoltaics** (Podstawy fotowoltaiki), **PFOT**, Stanisław Pietruszko
- [Edu42] **Integrated and Logic Circuits for Optoelectronics** (Zintegrowane układy optoelektroniczne i optyczne układy logiczne), **ZOUL**, Michał Malinowski
- [Edu43] **Lasers – Advanced Course** (Lasery - kurs zaawansowany), **LKZ**, Paweł Szczepański
- [Edu44] **Monte Carlo Methods - Fundamentals and Applications** (Metody Monte Carlo - podstawy i zastosowania), **MMC**, Piotr Szwemin
- [Edu45] **Nanotechnologies** (Nanotechnologie), **NAN**, Jan Szmidt
- [Edu46] **Optical Waveguide Lasers and Amplifiers**(Wzmacniacze i lasery światłowodowe), **WLS**, Ryszard Piramidowicz
- [Edu47] **Optoelectronics Techniques of Information Processing** (Optoelektroniczne techniki przetwarzania informacji) ,**OTZI**, Janusz Parka, Jerzy Woźnicki
- [Edu48] **Photovoltaic Systems** (Systemy fotowoltaiczne), **SFOT**, Stanisław Pietruszko
- [Edu49] **Physics Fundamentals of Nanoelectronics** (Podstawy fizyczne nanoelektroniki), **PFN**, Bogdan Majkusiak
- [Edu50] **Semiconductor Structures for VLSI and ULSI Circuits** (Struktury półprzewodnikowe dla układów VLSI i ULSI), **SPVU**, Andrzej Jakubowski
- [Edu51] **Video Surveillance Systems** (Systemy monitoringu wizyjnego), **SYMW**, Jerzy Woźnicki
- [Edu52] **VLSI System Design** (Projektowanie systemów scalonych w technice VLSI), **PSSV**, Wiesław Kuźmicz, Zbigniew Jaworski

3.3. Courses in English

- [Edu53] **Electronics 1, EELE1**, Bogdan Majkusiak
- [Edu54] **Laser physics**, Robert Paszkiewicz, Athens Programme course
- [Edu55] **Physics 3, EPHY3**, Bogdan Majkusiak
- [Edu56] **Fundamentals of Nanoelectronics**, Bogdan Majkusiak, Athens Programme course
- [Edu57] **Quality Management, EQUMA**, Zdzisław Mąceński

4. RESEARCH PROJECTS

Project definitions and descriptions - prepared by Project Leaders.

4.1. Projects Granted by the University

[Pro1] **The Development of Design, Processing and Testing Methods of the Electronic Devices and Materials for Microelectronics and Optoelectronics** (Rozwój metod wytwarzania i badania materiałów oraz modelowania i charakteryzacji przyrządów w dziedzinie mikroelektroniki i optoelektroniki), project leader: Paweł Szczepański, April 2007 - August 2008, **sub-projects:**

[Pro1.1] **Analysis, modelling and investigation of active waveguide photonic structures and characterization of active materials**, (Analiza, modelowanie i badanie warunków wzmocnienia i generacji w światłowodowych i fotonowych strukturach aktywnych oraz charakteryzacja materiałów aktywnych), sub-project leader: Michał Malinowski

[Pro1.2] **Investigations of magnitude-phase characteristics and parameters of optical transmitters and receivers** (Badania charakterystyk i parametrów amplitudowo-fazowych nadajników i odbiorników optycznych), sub-project leader: Bogdan Galwas, co-workers: Jarosław Dawidczyk, Jerzy Piotrowski, Jerzy Skulski, Agnieszka Szymańska.

Commonly applied techniques to design the analog fibre link are based on magnitude of the frequency response of the optoelectronic devices used in the link. Omission of the phase relations between microwave signal at the input of optical transmitter and detected modulation envelope at the receiver's output limits design accuracy of the analog fibre link.

The aim of this project is elaboration and verification of concept of the electro-optical twoport which enables determination of magnitude and phase frequency response of optical transmitter as well as optical receiver.

[Pro1.3] **Methods of simulation of processes and devices for nanometer integrated circuits** (Metody symulacji procesów i elementów nanometrowych układów scalonych), sub-project leader: Wiesław Kuźmicz, main co-workers: Andrzej Pfizner and Dominik Kasprowicz

The goal of this project is to perform simulation based studies of some novel device structures alternative to existing MOS devices, in particular devices with vertical channel regions. These devices are unipolar transistors but they are neither traditional MOSFET transistors nor junction gate (JFET) transistors and seem to have promising properties. Their characteristics will be evaluated and optimised using TCAD tools.

[Pro1.4] **Photonic devices and electronic materials investigation for sensors application**, (Konstrukcje foniczne dla techniki sensorowej i charakteryzacja materiałów elektronicznych), sub-project leader: Jan Szmidt, co-workers: M.Borecki, M.Bebłowska, P.Wrzosek, R.Biaduń

Optical capillaries are used in capillary gas and liquid chromatography, capillary electrophoresis, absorbance spectroscopy, Raman spectroscopy etc. The use of optical capillaries in these micro-fluidic methods has emerged in the 1990s and generated new applications in biotechnologies, medical diagnostic, drug discovery and environmental sciences. The wide range of possible capillary constructions allows them to be aimed advantageously at specific applications. In the presented work we discuss some aspects of integration of photonic heads that use optical capillaries in micro-fluidic systems. The field of research is multidisciplinary, comprising aspects of physics of micro fluid sample motion, the task of optical detection and integration of the technology with practical applications.

[Pro1.5] **3D Data precessing in visional monitoring system**, (Przetwarzanie danych 3D w systemach monitoringu wizyjnego), sub-project leader: Piotr Garbat, July 2007 – September 2008

[Pro2] **The Development of Design, Processing and Testing Methods of the Electronic Devices and Materials for Microelectronics and Optoelectronics** (Rozwój metod wytwarzania i badania materiałów oraz modelowania i charakteryzacji przyrządów w dziedzinie mikroelektroniki i optoelektroniki), project leader: Paweł Szczepański, April 2008 - December 2009, **sub-projects:**

[Pro2.1] **A photonic construction for sensors and electronic material examination**, (Charakteryzacja konstrukcji i materiałów dla techniki sensorowej), sub-project leader: Jan Szmidt, co-workers: M.Borecki, M.Bebłowska, P.Wrzosek

It is postulated that without optical capillaries, the microfluidic measuring methods known today could have not existed. However, optical capillaries are rarely used in the LoC photonic micro-systems. It is possible to build photonic sensor heads made of a relatively short optical capillary section, a heater and opto-electronic devices. Such hybrid structures offer new possibilities for testing very small fluid samples in an apparatus reduced in size and cost. We propose a method by which the light propagation in a short capillary section can be calculated from the capillary and light source parameters. We also propose a method of side light coupling into the optical capillaries. We suggest that the hybrid technology based on the silicon sandwiches approach makes it possible to fabricate exchangeable low cost photonic heads with optical capillaries. The proposed micro-litre photonic set-up with local heating and optical capillaries offers a new approach to liquid examination using the index of refraction, turbidity, surface tension, viscosity and vapor pressure information as the determining parameters. Therefore liquids with similar refraction coefficients can be recognized when they differ from one another by other parameters than the refraction index. The novelty of the

proposed approach lies in the use of time domain information and neural network processing which give more information about the liquid than the static head immersion approach.

- [Pro2.2] **Design methodology for RF integrated circuits**, (Metodologia projektowania układów scalonych RF), sub-project leader: Wiesław Kuźmicz
 The goal of this project is to extend the IMiOCAD toolset for IC design in order to make it suitable for design and simulation of radio frequency (up to several GHz) integrated circuits. Examples of RF functional blocks will be designed using our extended tools and commercial tools and results will be compared.
- [Pro2.3] **Hierarchical structures of 3D shape description applied to merging procedures of spatially uncorrelated fragments of 3D images**, (Wykorzystanie hierarchicznych struktur opisu kształtu powierzchni 3D w łączeniu nieskorelowanych przestrzennie fragmentów obrazów trójwymiarowych), sub-project leader: Piotr Garbat
 The project concerns investigations regarding application of iteration algorithms for minimalization of distances between characteristic points of 3D surfaces. Data for characteristic points determination is determined by the use of spatial (x, y, z) and texture (RGB) information. Proposed multi resolution approach methodology is based on feature points matching in curvature scale space (CSS).
- [Pro2.4] **Investigations of microwave devices containing liquid crystals**, (Badania własności mikrofalowych elementów zawierających ciekłe kryształy), sub-project leader: Bogdan Galwas, co-workers: Jarosław Dawidczyk, Jerzy Piotrowski, Jerzy Skulski, Agnieszka Szymańska
 Liquid crystals with unique anisotropic features controlled by the electric or magnetic field have been mostly utilized in devices dedicated to optical frequency range. Recently, much attention has been directed on microwave devices with liquid crystals.
 The aim of this project is elaboration and investigation of microwave phase shifters based on liquid crystals and verification of idea to apply these electrically tuned devices in modulation and generation circuits.
- [Pro2.5] **Modeling and investigation of lasing and amplifying micro-structures and characterization of the optically active materials**, (Modelowanie, opracowanie i badanie mikro-struktur wzmacniających i laserowych oraz charakteryzacja materiałów optycznie aktywnych), sub-project leader: Michał Malinowski, co-workers: P.Szczepański, R.Piramidowicz
 Active structures based on rare-earth doped fibers, planar structures, microdisk and spherical waveguides as well as photonic bandgap materials offer an attractive technology for micro-size lasers and amplifiers. In this work we present a general modeling of rare earth-doped fiber, planar, micro-disc and photonic bandgap laser. Approximate analytical results are derived for the threshold and the output intensities. Experimental work is oriented on the investigation of rare-earth doped dielectric glasses and crystals for fiber and planar lasers.
- [Pro2.6] **Modification of silicon surface by implanted from r.f. plasma fluorine ions**, (Modyfikacja powierzchni krzemu za pomocą jonów fluoru wprowadzanych z obszaru plazmy w.cz.), sub-project leader: Romuald Beck
 The project aims in experimental study of the consequences of exposure of silicon surface to r.f. fluorine containing plasma. The nature of the surface modification is complex and is of both, physical and chemical nature. From the physical point of view, one can expect ultra-shallow fluorine ions implantation, as well as substrate structure damage. From the chemical point of view, one can expect also formation of silicon-fluorine bonds and particles. In this work we will attempt to characterize the effects and find out the possibility to control them by plasma process parameters.
- [Pro3] **Development of a system for investigation of semiconductor sensing microstructures fabricated with novel plasma techniques**, (Konstrukcja systemu do badań półprzewodnikowych mikrostruktur sensorowych powstałych z wykorzystaniem nowoczesnych technik plazmowych), project leader: Mateusz Śmietana, April 2008 – December 2008.
 The purpose of the project is to combine capacity of the Institute of Microelectronics and Optoelectronics (IMiO) in field of designing, characterization and fabrication of semiconductor microstructures and devices, in particular utilizing thin sensing layers, with capacity of the Institute of Electronic Systems (ISE) in the field of design of analytic systems to examining microsystems for applications in biochemistry and medical diagnostics. The realization of the project will be based on already development analytic system designed in ISE in order to adopt it to constructional requirements of sensing devices fabricated in IMiO (e.g. field effect transistors with open gate, where gate area exhibits unique properties).
- [Pro4] **Development of broadband impedance spectrometer for tissue examination**, (Opracowanie modelu szerokopasmowego spektrometru impedancyjnego do badań tkanek), project leader: Tadeusz Pałko, co-workers: Krzysztof Lewenstein, Włodzimierz Łukasik, Andrzej Książkiewicz, Alicja Cicha-Mikołajczyk, Jerzy Piotrowski, Jerzy Skulski, April 2008 – December 2008.
 The aim of this work, realized in co-operation of Faculty of Mechatronics, Institute of Precision and Biomedical Engineering and Faculty of Electronics and Information Technology, Institute of Microelectronics and Optoelectronics, is to elaborate broadband specialized sensors as well as impedance spectrometer model for tissue investigations. Scope of work also covers development of tissue measurements methodology (in vitro and in vivo) in the frequency range from several kHz to GHz based on elaborated spectrometer model and probes.
- [Pro5] **Fiber lasers with Bragg gratings resonators**, (Lasery włóknowe z rezonatorami braggowskimi), project leader: Ryszard Piramidowicz, April 2008 – December 2008.
 Main goal of this work is designing, starting and characterization of a fiber laser with DBR (Distributed Bragg

Reflector) or DFB (Distributed FeedBack) resonator utilizing optically defined Bragg gratings.

Rare-earth doped fiber lasers activated with rare-earth ions have enjoyed particular attention over the last years, which stems from their applicability in high-power lasers, as well as optical amplifiers and lasers for telecommunication systems.

Realization of this project, which is focused on building and characterizing of a fiber laser with Bragg gratings defined resonator, would allow the applying research teams to obtain a domestically unique expertise, which additionally could present implementation and commercialization potential.

Motivation for this proposal is the increasing applicability potential of Bragg gratings in both fiber laser and amplifier systems with classic silica active fiber as the gain medium. Proposed project would specifically enable feasibility study of Bragg gratings application in fiber laser resonators for the NIR spectral range (with special attention given to the third telecommunication window), as well as in EDFA and TDFA type optical amplifiers.

It should be noted, that the technology of Bragg gratings inscription in optical active fibers, which is key in realization of the proposed work, has been developed in scope of previous Dean's Research Grant realized in collaboration of research teams from IMiO (Institute of Microelectronics and Optoelectronics) and ISE (Institute of Electronic Systems).

[Pro6] **Image analysis for definition of parameter of flow in ventilation**, (Analiza obrazu w określaniu parametrów wentylacyjnych strumieni nawiewnych), project leader: Piotr Garbat, April 2008 – December 2008.

Elaboration of functional method of computer image analysis fitted for determination of supply airflows parameters in ventilated spaces is the main aim of the project. The work will present interesting connection of laboratory measurements with analysis of image acquired during the tests. In addition, parallel conduction of computer image analysis and laboratory measurements will allow to optimize the algorithm of image processing for finding parameters of the air flow. The possibility of three-dimensional images acquisition and analysis method utilization will be also considered in the project.

[Pro7] **Investigation of diamond-like carbon (DLC) film properties deposited with plasma methods (RF PACVD) onto optical fibres**, (Badanie właściwości cienkich warstw diamentopodobnych (DLC) wytwarzanych technikami plazmowymi (RF PCVD) na włóknach światłowodowych), project leader: Mateusz Śmietana, April 2008 – December 2008.

The purpose of the project is uniform deposition (with RF PACVD method) of diamond-like carbon films (DLC) and studies on their properties directly on the optical fibre. Parameters of the deposition process have strong influence on obtained values of refractive index and thickness of the films, which are the most interesting parameter from point of view of their sensing applications. The films deposited onto quartz core of the optical fibres will be examined and compared to films simultaneously deposited onto silicon wafers.

Obtained analysis will allow to developing modern and highly sensitive optical fibre structures for investigation of chemical compound concentration in liquids.

[Pro8] **Microwave conductivity of conjugated polymers and their blends**, (Przewodnictwo mikrofalowe polimerów przewodzących i ich blend), project leader: Jerzy Krupka, co-workers: Zdzisław Mąceński, Mikołaj Baszun, Małgorzata Zagórska, Ireneusz Wielgus, Marcin Popis, April 2008 – December 2008.

Conjugated polymers are very attractive materials for micro-electronics since their electrical conductivity can easily be varied in a very wide range. This can be achieved through a careful design of their chemical structure and appropriate post-polymerization modification using selected do pants. In addition, these polymers can be formed in almost any desired shape. This makes conjugated polymers potential candidates for many technological applications, among other in microwave technology, for example in electromagnetic interference shielding. This project has been devoted to the study of microwave conductivity of selected conjugated polymers from the families of polyaniline, polythiophene and polypyrrole as well as their blends with conventional polymers. The single post and the split post dielectric resonator techniques were used for contact-less absolute resistivity measurements of these materials both in the semiconducting and in the conducting state.

[Pro9] **Remote optical power supply to elements of active fiber networks**, (Zdalne zasilanie mocą optyczną elementów aktywnych sieci światłowodowych), project leader: Ryszard Piramidowicz, April 2008 – December 2008.

Main goal of this proposal is designing and testing of an exemplary solution for optical power supply to active elements of a fiber optic network.

The past two decades observed a significant evolution of fiber -optic telecommunication systems, which main objective could be summarized as providing much more broadband services for much higher number of end-users. Initially, access networks employed mainly passive elements, however requirements of large throughputs of whole system as well as continuous deployment of new services necessitated implementation of some active elements (e.g. switches, tuneable filters, tuneable couplers, amplifiers etc.). All of them require electrical power, which had not been considered at first when planning development of optical access networks. Requirement of electrical power supply has always caused technical difficulties (additional copper wiring) and substantial increasing of costs, especially when new copper wiring is to be put along existing fiber -optic links.

A favourable solution to problem of power supply to active elements operating in optical networks (both FTTx and sensor networks) may be found in remote optical power supply. In brief the idea is based on delivering large optical power via fibre network and converting it to electrical energy by means of photovoltaic effects.

The proposed project assumes preparation of an optically-powered electronic sensor element with duplex transmission capability, prepared for integration with and an FTTH network. Depending on achieved results and disposed funding, development of an optically powered optic switching element is envisaged for application in optical network protection systems.

4.2. Projects Granted by the Ministry of Education and Science

- [Pro10] **Charge pumping as a tool for characterization of electrophysical parameters of new-generation MIS devices** (Metoda pompowania ładunku jako narzędzie do charakteryzacji parametrów elektrofizycznych nowych generacji przyrządów typu MIS), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: L. Łukasiak, co-workers: A. Jakubowski, S. Szostak, R.B. Beck, B. Majkusiak, J. Walczak, Z. Pióro, J. Gibki, D. Tomaszewski, A. Zareba, J. Maciak, A. Linkowski, May 2005 – May 2008.
The aim of this project is to adapt the charge pumping method for new-generation MIS devices (e.g. in the presence of strong coupling between front and back semiconductor-dielectric interfaces in SOI structures or in the presence of SiGe or strained Si layer in the MOS structure). The next step is to perform detailed characterization of these devices using this method to assess the quality of the dielectric-semiconductor interface which is very important, especially in view of new gate-stack materials.
- [Pro11] **Contact and assembly technologies for high temperature, high power and high frequency applications of SiC devices**, (Technologia kontaktów i montażu dla przyrządów z węgla krzemu do zastosowań wysokotemperaturowych, wysokomocowych i wysokoczęstotliwościowych) Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Ryszard Kisiel, co-workers: Zbigniew Szczepański, Marek Guzewicz, Norbert Kwietniewski, Ryszard Biaduń, April 2007 - March 2010
The aim of the project is to elaborate the ohmic contact technology for SiC devices as well as assembly technique for electrical and mechanical connection between SiC structure and package. An elaborated package shall be able to work in high temperature (up to 400°C), high power and high frequency application.
- [Pro12] **Deposition and measurements of thin metal and dielectric films intended for nanoelectronics and microwave technique**, (Wytwarzanie i charakteryzacja cienkich warstw metalicznych i dielektrycznych dla potrzeb nanoelektroniki i techniki mikrofalowej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jerzy Krupka, co-workers: Jan Szmidt, Marek Guzewicz, Zdzisław Mączyński, Mikołaj Baszun, Norbert Kwietniewski, April 2007 - April 2010
New nanotechnologies require not only high resolution photolithographic processes but also deposition of very thin (the order of few nanometers) metal and dielectric films having repeatable and electromagnetic properties. When film thickness becomes very thin their physical properties may be different than the properties of bulk materials or thin films having thickness in the range of microns. In the addition traditional measurements methods may be not adequate for very thin films characterization. The main goal of this project is deposition and characterization of extremely thin metal and dielectric films. Single post and split post dielectric resonator techniques will be used for measurements of the surface resistance of thin metal films deposited on low loss dielectric substrates. Al, Cu, Ag, Au, Fe, Mo, W, Pd, Pt and ITO films will be measured employing those resonators. For comparison DC and low frequency measurement techniques will be also employed.
- [Pro13] **Dielectric layers fabricated by means of plasma methods for AlN (GaN, AlGaIn) semiconductor structures' technology**, (Warstwy dielektryczne wykonane metodami plazmowymi na potrzeby technologii struktur półprzewodnikowych wytwarzanych w azotkach pierwiastków III grupy układu okresowego (GaN i AlGaIn)), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Artur Szczęsny, February 2007 – October 2008
The project focuses on Si₃N₄, AlN and diamond-like films, which are used as passivation or Schottky contacts underlying layers. Two types of devices are fabricated as test structures: GaN- based Schottky diodes and AlGaIn/GaN HEMTs.
- [Pro14] **Electrical characterization of dielectric-semiconductor interface in advanced MOS structures**, (Elektryczna charakteryzacja powierzchni granicznej dielektryk-półprzewodnik w zaawansowanych strukturach MOS), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Lidia Łukasiak, October 2008 – March 2010.
The aim of this project is to adapt the charge pumping method to advanced MOS structures, i.e. conditions of strong coupling between top and back interfaces and considerable leakage current.
- [Pro15] **Electronic detectors and chemical sensitive devices with diamond and diamond-like carbon (dlc) films**, (Elektroniczne detektory i przyrządy chemoczułe z warstwami diamentowymi i diamentopodobnymi), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, September 2006 – September 2009
The main goal of the project is designing the structure and subsequent fabrication of at least 3 prototypes of an ionizing radiation detector and chemical sensitive devices, where the role of active (i.e. detecting) regions play diamond and diamond-like carbon (DLC) films of varied phase composition, structure and surface morphology.
Diamond and DLC layers will be produced by means of radio frequency (RF) or/and microwave (MW) plasma chemical vapor deposition (CVD) techniques as well as using hot filament chemical vapor deposition (HF CVD) and impulse plasma deposition (IPD) methods.
Fabrication of optical fiber and planar waveguide-based detectors as well as microelectronic devices (open-gate field effect transistor, diamond film/metal or diamond film/silicon heterojunction structures) is anticipated.

- [Pro16] **Emission properties of the active oxide materials with periodic structure**, (Właściwości emisyjne aktywnych materiałów tlenkowych o periodycznym uporządkowaniu), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Marcin Kaczkan, May 2008 – November 2009
- The aim of the project is to investigate and analyze spectroscopic properties of optically active micro- and nano-materials with periodic structure. These type of structures are interesting as host materials, in which active ions may have different properties compared to those they have in bulk crystals. In particular, influence of the eutectic structure properties on the rare-earth ions behavior will be investigated. Emission properties of the spectrally selected groups of active ions in $Tb_3Sc_2Al_3O_{12}/TbScO_3$, $Tb_3Sc_2Al_3O_{12}/air$, $air/TbScO_3$, $(Yb_3Al_5O_{12}/Yb_4Al_2O_9):(1,5\%)Er$, and $(Yb_2O_3/Yb_4Al_2O_9):(1,5\%)Er$ oxide-oxide eutectic will be examined with the help of high-resolution laser spectroscopy. Additionally, the spectroscopic analysis for the bulk crystals with the same structures as constituents of eutectic will be perform. This analysis will enable determination of the influence of eutectic structure on the electron relaxation processes in the excited active ions. Results of the project will enhance the knowledge about processes occurring in solid-state active media which have never been investigated in this manner.
- [Pro17] **Ferroelectric smectic LC materials in holographic recordings**, (Ciekłokrystaliczne smektyczne materiały o właściwościach ferroelektrycznych do zapisów holograficznych), Military University of Technology, Faculty of Advanced Technologies and Chemistry, project leader: Janusz Parka, co-worker: Marek Sutkowski, October 2008 – October 2010.
- The goal of the project is to achieve holographic recordings in thin smectic ferroelectric liquid crystal layers. The optical recording of the gratings is performed with use of low-power coherent laser beams (with different wavelengths). Bistable SSFLC (Surface Stabilised Ferroelectric Liquid Crystal) effect should be used to allow possibility of re-writable properties of the recordings.
- [Pro18] **Modeling and characterization of semiconductor devices fabricated on silicon carbide cubic (3C-SiC) and hexagonal (4H-SiC) polytype substrates**, (Modelowanie i charakteryzacja przyrządów półprzewodnikowych wytworzonych na kubicznej (3C-SiC) oraz heksagonalnej (4H-SiC) odmianie węgla krzemu), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Andrzej Jakubowski, October 2008 – February 2010.
- The aim of the project is to develop a set of accurate models of the fundamental parameters and devices (VDMOSFET, MOSFET, MESFET, MIS capacitor, gate diode) fabricated on 3C-SiC and 4H-SiC.
- The models are verified by means of characterization of test structures manufactured by a foreign research partner - Acreo AB, Sweden.
- Charge pumping is a novel method used for characterization of silicon carbide. Two-level and three-level charge pumping methods are adapted to studying the interface traps of the 3C-SiC and 4H-SiC VDMOSFETs.
- [Pro19] **Modeling and characterization of multigate MOS SOI structures** (Modelowanie i charakteryzacja wielobramkowych struktur MOS SOI), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: A. Jakubowski, co-workers: B. Majkusiak, L. Łukasiak, R.B. Beck, J. Gibki, S. Szostak, J. Walczak, A. Zaręba, G. Głuszko, D. Tomaszewski, October 2007 – October 2010
- The aim of the project is analysis of electrical characteristics of multi-gate MOS structures and development of methods of characterization, as well as modeling of selected physical phenomena present in multigate MOS devices and their parameters and electrical characteristics.
- [Pro20] **Modeling of silicon structures with low-dimensional electron gas**, (Modelowanie struktur krzemowych z niskowymiarowym gazem elektronowym), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: J. Walczak, co-workers: B. Majkusiak, R.B. Beck, A. Mazurak, May 2007 – May 2010
- The project relates to modeling Si and also SiGe structures with 2DEG (two dimensional electron gas – quantum plane) and 1DEG (quantum wire). The main goal is the development and implementation of physical models of complex structures comprising a plurality of ultrathin semiconductor and dielectric layers, along with the analysis of obtained electrical characteristics of the modeled devices.
- [Pro21] **New possibilities of the UV generation in ion lasers in the noble gases and its mixtures** (Nowe możliwości generacji promieniowania UV w jonowych laserach pracujących na gazach szlachetnych i ich mieszaninach), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jerzy Kęsik, May 2005 – May 2008
- Significant progress observed in last years in structure and technology of ion laser discharge tubes created new possibilities of the continuous and multi-pulse generation of the ultraviolet radiation. The main goal of this project is optimization of laser tube construction and laser working conditions (discharge current, gas pressure, axial magnetic field intensity) to obtain maximum output power in a UV range. The measurements of active medium parameters (unsaturated gain coefficient, saturation parameter) and optimum mirror transmissions will be also executed. The investigations will be performed in a pure noble gases (Ar, Kr, Ne) and its mixtures. The significant part of investigations is determination of multi-pulse (quasi-continuous) operation on laser output power.
- [Pro22] **Next generation teleinformatics service and nets – technology, application and market aspects. Development of technology and algorithms for telemedicine services using of Internet and cell telephone nets**, (Usługi i sieci teleinformatyczne następnej generacji – aspekty techniczne, aplikacyjne i rynkowe. Rozwój technik i algorytmów telemedycyny z wykorzystaniem Internetu oraz sieci telefonii komórkowej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Mikołaj Baszun, January 2008 – December 2010.

The aim of the project is development of technology and algorithms for services with using of Internet and cell telephone nets for telemedicine applications. The project obeys the following tasks:

- Working out of new algorithms for classifications and/or categorizations of the physician tasks aspected from a remote outdoor patient, for application in server expert systems.
- Design of server services using secure and authenticated remote wireless communication of the physicians with the patients, based on uncertain data.
- Design and realizing of practical models of intelligent electronic modules for monitoric of the diagnostic data of an outdoor human being, without his engagement.
- Design of a specialized server databases for telemedicine applications, with communication history and secure access tools.
- Design data of new algorithms for classifications and/or categorizations of a physician tasks aspected from a remote outdoor patient.
- Software implementation of server services using secure and authenticated remote wireless communication of physicians with patients.
- Practical models of intelligent electronic modules for monitoric of the diagnostic data of an outdoor human being.
- Software implementation of secure server databases for telemedicine applications.

- [Pro23] **Optoelectronic mikrosystem to make research of samples about nano-liters volumes with using the optical capillaries**, (Mikrosystem optoelektroniczny do badania próbek o nanolitrowych objętościach z wykorzystaniem kapilar optycznych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Paweł Wrzosek, October 2007 – October 2010

The main aim the project is to study the new, original method to make research of liquid samples about 10 – 9 liters volume, it means possibility of the analysis physics-chemical drop.

Final measurable work effect will be laboratory computer system to analysis chosen liquid parameters together with software to visualization of measuring results.

- [Pro24] **Plasma Enhanced Chemical Vapor Deposition (PECVD) as a method of fabrication of ultrathin silicon oxynitride layers for CMOS-ULSI technology**, Chemiczne osadzanie z fazy lotnej wspomaganie plazmą (PECVD) jako metoda wytwarzania ultracienkich warstw tlenkowo-azotków krzemu dla technologii CMOS-ULSI (PROMOTORSKI), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: R.B. Beck, co-workers: R. Mroczyński, March 2007 – March 2008

- [Pro25] **Process of spontaneous emission in photonic crystals**, (Proces emisji spontanicznej w kryształach fonicznych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Paweł Szczepański, co-worker: Adam Rudziński, October 2008 – February 2011

The aim of this project is to develop an analytical model describing the process of spontaneous emission in structure of one-dimensional photonic crystal, that would account for parameters and defects of the structure, as well as spatial distribution of the active medium. The model will be based on quantum theory of interaction of light and matter, and the effective resonator model, used for the description of the photonic crystal's structure. Constructed model will allow to analyze many aspects of the phenomenon, but it could be also used as a tool for designers of modern optoelectronic devices, like distributed-feedback laser resonators, high efficiency light-emitting diodes or dielectric coatings.

- [Pro26] **The Electron Cold Emission from Carbon layers (technology and characterization)**, (Warstwy węglowe na potrzeby zimnej emisji elektronów (technologia i charakteryzacja)), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Ryszard Gronau May 2008 – November 2009

The aim of this work is to research correlations between the efficient electron cold emission and the parameters of plasma carbon layers deposition. The authors would like to present the influence of the choice of plasma methods process and process parameters on electron emission ability. The intention of this work is to analyse the conditions of effective electron cold emission from layers deposition in different plasma methods, thus layers with diverse physical, chemical (microstructure, phase composition, etc.), electro physical properties.

The layers were made by few plasma methods:

Radio Frequency Plasma Assisted Chemical Vapor Deposition (RF PA CVD),

Hot Filament Chemical Vapor Deposition (HF CVD),

Dual Frequency RF/MW Plasma Chemical Vapor Deposition (DF RF/MW PCVD),

Reactive Impulse Plasma Assisted Chemical Vapour Deposition IPD.

- [Pro27] **Thin barium titanate layers for microelectronics demand – technology, characterization and applications**, (Warstwy tytanianu baru na potrzeby mikroelektroniki- technologia, charakteryzacja i próby aplikacji), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Piotr Firek, October 2008 – March 2010.

The main goal of the project is development of the fabrication method of high-k and high-resistive BaTiO₃ thin films and investigation of its properties from the viewpoint of electronics applications.

Development of the fabrication technology (BaTiO₃ deposition, selective etching) will allow for producing of the test structures, like MIM, MIS capacitors, field-effect transistors (FETs) and ion sensitive field-effect transistors (ISFETs) with discussed layers as a gate insulator.

- [Pro28] **Unipolar devices and transistors for high-temperature electronics**, (Przyrządy unipolarne i struktury tranzystorowe na potrzeby elektroniki wysokotemperaturowej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Mariusz Sochacki. May 2007 – April 2010
Schottky diodes and field effect transistors (MOSFET and JFET) for high-temperature electronics have been designed, developed, measured and characterized. The abovementioned structures have been tested within temperature range from 20°C up to 400°C.
- [Pro29] **Vertical Slit Devices for Integrated Circuits**, (Technologia elementów z pionową szczeliną dla układów scalonych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, 7PR UE, project leader: Wiesław Kuźmicz, June 2008 – January 2009.
The objective of this project is to assess feasibility of a new paradigm of manufacturing and design of silicon integrated circuits that addresses several manufacturing and design bottlenecks and roadblocks recognized as major obstacles in nanometer scale (down to 22 nm and beyond) technologies.
A new semiconductor device structure, a new IC layout style as well as a new IC manufacturing technology have been conceived with a single common objective in view: to minimize IC design and manufacturing costs maintaining or even increasing their maximum complexity and performance. The new paradigm leads to highly regular IC structures making lithography much easier, possibly OPC-free. This in turn leads also to a new simple layout design style, thus dramatically reducing NRE costs of new products and reducing time to market. Contrary to other “beyond CMOS” concepts, the proposed manufacturing process is based on well industry proven and accepted elementary processes. Some of them, however, have to be applied in a nonstandard and nontrivial way.
The active devices manufactured in the new way are expected to have the following properties:
1. Both unipolar and bipolar devices are manufacturable in the same process.
 2. Devices of complementary types are available.
 3. All devices have four terminals and provide new possibilities for applications in digital and analog circuits; however, they can be also used in conventional ways.
 4. Small critical dimensions (channel length, base width) can be achieved with lithography of moderate resolution.
- The main goal of this project is to investigate the properties of the new devices and the circuits based on them, to estimate their performance limits and to assess their manufacturability, by means of TCAD-based simulations and manufacturing experiments.

4.3. Projects Granted by International Institutions

- [Pro30] **Controlling Leakage Power in NanoCMOS SoCs, European Commission 6 Framework Programme - Integrated Project CLEAN (FP6 – 4 – IST – 4 – 026980 – IP – CLEAN)**, Projekt zintegrowany w ramach 6-tego Programu Ramowego UE, project leader: Wiesław Kuźmicz, November 2005 – October 2008
Today's greater than ever functionality of electronic devices is possible only by integrating an increasing number of highly complex tasks into the so called embedded systems on chip (SoC). According to "Moore's Law" the complexity of hardware systems doubles itself exponentially over time. This trend is still holding on, already enabling chips integrating one billion transistors. The required technology shrink - now below 65nm - rises the problem of dramatically increasing power consumption, especially in consequence of so called leakage currents.
CLEAN is a project, in which the problem of leakage currents in the upcoming technologies (65nm and below) is addressed. Main targets of the CLEAN project are:
- analysis and development of design techniques for leakage reduction,
 - development of EDA tools for leakage aware design using the design techniques,
 - development of EDA tools for high level leakage prediction, supporting leakage aware design.
- [Pro31] **IC design skills for advanced DSM technologies, European Commission 7 Framework Programme – Project IDESA (contract No. 215180)**, Projekt 7 Programu Ramowego UE, project leader: Wiesław Kuźmicz, December 2007 – November 2009
The mission of this project is to bridge the gap between the industrial design flows, methodologies and tools that have already reached maturity for the 90 nm technology node and are being quickly extended to 65 nm, 45 nm and beyond, and the design knowledge, competences and skills at European universities, which are insufficient to introduce these industrial design methods and flows to university curricula. A European-scale supporting action will help to acquire quickly the necessary knowledge and skills, in this way reducing by many orders of magnitude the total efforts that would be needed if the European universities tried to cope with new design problems and master new design techniques and tools individually and independently.
- [Pro32] **Network of Excellence for Micro-Optics – NEMO, Network of Excellence within 2nd IST 6FP of UE** (Mikronowe i sub-mikronowe przyrządy dla fotoniki - NEMO), Sieć doskonałości w ramach 6-tego Programu Ramowego UE, project responsible person in IMiO: Paweł Szczepański, co-workers: Paweł Czuma, Piotr Firek, Marcin Kaczkan, Wojciech Kamiński, Mariusz Klimczak, Kamila Leśniewska-Matys, Michał Malinowski, Agnieszka Mossakowska-Wyszyńska, Robert Paszkiewicz, Ryszard Piramidowicz, Adam Rudziński, Jan Szmidt, Mateusz Śmietana, Paweł Śniecickowski, Anna Tyszk-Zawadzka, Piotr Warda, Aleksander Werbowy, Piotr Witoński, September 2004 – August 2008

NEMO is running since 1 September 2004 and aims at providing Europe with a complete Micro-Optics food-chain by setting up durable service and technology centres and long-term research centres. NEMO will be the networking platform of 30 European partners for the next 4 years and beyond. Each of the 30 institutes involved in NEMO is a key role player in micro-optics. NEMO's main objective is to structure and integrate the expertise and core-competences of its partners while strengthening their R&D activities in the emerging field of micro-optics.

The main types of activities in which the Institute of Microelectronics and Optoelectronics actively participates within this project are:

- Centre for Modelling and Design;
- Centre for Measurement and Instrumentation;
- Infra-Red Micro-Optics.

More information are at <http://consortium.micro-optics.org/>

[Pro33] **PULLing the limits of NANOCmos electronics - PULLNANO, Integrated Project 6FP UE**, project leader: Bogdan Majkusiak, co-worker: J. Walczak, A. Mazurak, June 2006 – November 2008

PULLNANO is a very powerful integrated project focussed on the advanced research and technology activities necessary to push forward limits of CMOS technologies. It focuses on RTD activities necessary to develop the 32nm and 22nm technoliges node and open the way to the long term future of CMOS based technologies. To help to achieve this objective, PULLNANO gathers the best competences existing in Europe: IC manufactureres, technological research institutes, equipment suppliers, and a large number of academic teams. The Warsaw team is engaged in quantum-mechanics based simulation of devices that contribute to prediction of CMOS limits, design of device and architecture solutions beyond traditional planar CMOS.

[Pro34] **Silicon-based nanstructures and naodevices for long-term nanoelectronics applications - NANOSIL, Network of Excellence within IST 7FP of UE**, (Przyrządy nano- oraz nanostruktury krzemowe dla zastosowań w nanoelektornice przyszłości), Sieć doskonałości w ramach 7-tego Programu Ramowego UE, project leader: Romuald Beck, co-workers: B.Majkusiak, L.Lukasiak, K.Dalbiak, W.Ciemiewski, R.Mroczyński, D.Tomaszewski, J. Gibki, J.Grabowski, G. Głuszko, A. Jakubowski, J. Jasiński, A. Mazurak, S. Szostak, J. Stęszewski, J. Walczak, January 2008 – December 2010

NANOSIL project is devoted to wide range of issues concerning silicon – based nanodevices. The main types of activities in which the Division actively participates within this project are:

- manufacturing of CMOS device based on classical approach, as well as on SOI, multigate or strained (SiGe) platforms, with particular attention to problems of mobility gain, leakage reduction, ... etc.;
- devices based on graphene on silicon;
- characterization of the manufactured test devices and diagnostics of problems that should be solved either by technology or device design modifications;
- modelling of all types of structures under investigation in this project.

5. DEGREES AWARDED

5.1. Ph.D. Degrees

- [PhD1] Paweł Czuma, **Semi-classical model of light generation in laser with photonic crystal active medium**, Półklasyczny model generacji promieniowania w laserach z ośrodkiem aktywnym w postaci kryształu fotonicznego, supervisor: Paweł Szczepański, 15 January 2008
- [PhD2] Włodzimierz Jońca, **Modeling of defects of arbitrary shape in interconnections in deep submicron integrated circuits**, Modelowanie defektów o dowolnym kształcie występujących w połączeniach w głęboko submikrometrowych układach scalonych, supervisor: Wiesław Kuźmierz, 8 April 2008
- [PhD3] Robert Mroczynski, **Plasma Enhanced Chemical Vapour Deposition (PECVD) of ultrathin silicon oxynitride layers for CMOS-ULSI Technologies**, Chemiczne osadzanie z fazy lotnej wspomaganie plazmą (PECVD) jako metoda wytwarzania ultracienkich warstw tlenko-azotków krzemu dla technologii CMOS-ULSI, supervisor: Romuald Beck, 17 June 2008
- [PhD4] Tomasz Zychowicz, **Investigations of the electromagnetic properties of ferroelectrics and metals at microwave frequencies**, Badanie elektromagnetycznych właściwości ferroelektryków i metali w paśmie częstotliwości mikrofalowych, supervisor: Jerzy Krupka, 12 February 2008

5.2. M.Sc. Degrees

- [MSc1] Krzysztof Anders, **Praseodymium doped fibre laser operating in the visible spectral range**, Prazeodymowy laser włóknowy na zakres widzialny, advisor: Ryszard Piramidowicz, excellent
- [MSc2] Michał Banach, **Gold wire bonding between contacts on silicon carbide and contacts on ceramic substrate. Testing usable proprieties**, Połączenia wykonywane drutem Au między SiC a kontaktami podłoża ceramicznego. Badanie właściwości użytkowych, advisor: Ryszard Kisiel, good
- [MSc3] Marcin Beresiński, **Design of Build-in Current Monitor for IDDDQ Technique in CMOS UMC 90 nm Technology**, Projekt wbudowanego monitora prądowego dla techniki IDDQ w technologii CMOS UMC 90 nm, advisor: Witold Pleskacz, very good
- [MSc4] Marcin Białecki, **Long term analysis of photovoltaic system with multijunction amorphous silicon modules**, Analiza wieloletniej pracy systemu fotowoltaicznego z wielołączowymi modułami z krzemu amorficznego, advisor: Stanisław Pietruszko, very good
- [MSc5] Michał Bryk, **Type-2 Fuzzy Logic System**, System wnioskowania rozmytego oparty na zbiorach rozmytych II rzędu, advisor: Andrzej Wielgus, very good
- [MSc6] Grzegorz Budzyn, **Cascade A/D converter implementation in CMOS technology**, Implementacja kaskadowego przetwornika A/C w technologii CMOS, advisor: Zbigniew Jaworski, very good
- [MSc7] Marcin Dąbrowski, **Investigations of twist elastic constant K22 of new nematic liquid crystal materials using threshold in-plane switching method**, Wyznaczanie stałej sprężystości K22 nowych nematycznych ciekłych kryształów w przetwornikach wykorzystujących efekt przełączania w płaszczyźnie, advisor: Janusz Parka, very good
- [MSc8] Marcin Dudek, **Using microsystem thermopiles as a radiation sensor**, Wykorzystanie mikrosystemowych, termoelektrycznych czujników promieniowanie, advisor: Zbigniew Pióro, very good
- [MSc9] Konrad Gurtat, **Measurement of electrons beamshape of medical accelerator**, Pomiar kształtu wiązki elektronów wyrzutni akceleratora medycznego, advisor: Ryszard Kisiel, good
- [MSc10] Oliwier Hawlicki, **Modeling and analysis of optical properties of self - organized eutectic microstructures**, Modelowanie i analiza właściwości optycznych samoorganizujących się eutektyków mikrostrukturalnych, advisor: Agnieszka Mossakowska-Wyszyńska, very good
- [MSc11] Anna Jusza, **Investigations of the shortwave emission properties of thulium ZBLAN glass**, Badania właściwości emisyjnych w zakresie krótkofalowych szkieł ZBLAN aktywowanych jonami tulu, advisor: Ryszard Piramidowicz, excellent
- [MSc12] Marcin Jusza, **Remote optical powering to active elements of optical sensing network**, Zdalne zasilanie mocą optyczną elementów aktywnych w sieciach czujnikowych, advisor: Ryszard Piramidowicz, excellent
- [MSc13] Krzysztof Kapel, **Wired and wireless telecommunications networks- analysis, application and comparison**, Bezprzewodowe i przewodowe sieci telekomunikacyjne - analiza, zastosowanie i porównanie, advisor: Agnieszka Szymańska, very good

- [MSc14] Piotr Kierejewski, **Electrooptic effects in liquid crystal cells with polymer conductive layers**, Efekty elektrooptyczne w przetwornikach ciekłokrystalicznych z polimerowymi warstwami przewodzącymi, advisor: Janusz Parka, very good
- [MSc15] Piotr Knyps, **Research of photovoltaic cells and modules parameters in solar simulators**, Badanie parametrów ogniw i modułów fotowoltaicznych z wykorzystaniem symulatorów promieniowania słonecznego, advisor: Stanisław Pietruszko, excellent
- [MSc16] Jerzy Kocerka, **Characterisation of MOS structures using charge pumping method**, Charakteryzacja struktur MOS metodą pompowania ładunku, advisor: Sławomir Szostak, very good
- [MSc17] Stanisław Korybut-Daszkiewicz, **Application properties analysis of vapor phase separation in optical capillaries**, Analiza właściwości aplikacyjnych separacji fazy gazowej w kapilarach optycznych, advisor: Michał Borecki, good
- [MSc18] Marcin Kruczyk, **Work optimization algorithm based on the social structure of insect colonies**, Algorytm optymalizacji pracy oparty na społecznej strukturze kolonii owadów, advisor: Mikołaj Baszun, very good
- [MSc19] Piotr Kucharski, **Optimizing structure of pipelined analog-to-digital converter in terms of sampling frequency**, Optymalizacja architektury kaskadowego przetwornika A/C pod kątem zwiększenia częstotliwości próbkowania, advisor: Zbigniew Jaworski, excellent
- [MSc20] Tomasz Małachowski, **I-V plots modelling of the PMOS transistor with exponential distribution of channel doping**, Modelowanie charakterystyk I-V tranzystora MOS z wykładniczym rozkładem koncentracji domieszek w kanale, advisor: Agnieszka Zaręba, good
- [MSc21] Tomasz Mężyński, **Searching of spectroscopic properties of Pr³⁺:YVO₄ crystal**, Badanie i analiza właściwości spektroskopowych kryształów Pr³⁺:YVO₄, advisor: Michał Malinowski, very good
- [MSc22] Tomasz Nowak, **Thin carbon layers in fibre optic techniques - technologies, characterizations**, Cienkie warstwy węglowe na potrzeby techniki światłowodowej - technologie, charakteryzacje, advisor: Jan Szmidt, good
- [MSc23] Marcin Osiniak, **Measurement of active medium parameters for ion gas laser operating in UV range**, Badanie parametrów ośrodka aktywnego jonowego lasera gaowego w zakresie promieniowania UV, advisor: Jerzy Kęsik, excellent
- [MSc24] Karolina Paciorek, **Optical capillaries analysis used to measurements of the micro - volumes liquid samples**, Analiza właściwości kapilar optycznych przeznaczonych do badania mikro-objętościowych próbek cieczy, advisor: Michał Borecki, very good
- [MSc25] Jarosław Pleskot, **The influence of lossy JPEG compression on image noise level in digital imaging systems**, Analiza wpływu kompresji stratnej typu JPEG na poziom szumów obrazowych w cyfrowych systemach obrazowania, advisor: Marek Sutkowski, very good
- [MSc26] Paweł Przychodzeń, **Exploitation properties of adhesive joints in Surface Mount Technology**, Właściwości eksploatacyjne połączeń klejowych w montażu powierzchniowym, advisor: Ryszard Kisiel, good
- [MSc27] Michał Rozenberg, **Analysis of the impact of vibrations in selected fiber sensor systems**, Analiza wpływu drgań w wybranych układach sensorów światłowodowych, advisor: Michał Borecki, good
- [MSc28] Marcin Rudnicki, **Microprocessor module for remote keyless entry system**, Układ do zarządzania bezprzewodowym systemem kontroli dostępu, advisor: Sławomir Szostak, good
- [MSc29] Dariusz Rybarczyk, **Modeling and analysis of thermally induced waveguides in microchip laser structures**, Analiza i modelowanie numeryczne zjawiska termicznie indukowanego kanału falowodowego w mikrolaserach dielektrycznych, advisor: Ryszard Piramidowicz, good
- [MSc30] Paweł Sałek, **Characterization and modeling of selected parameters of modern MOS transistors**, Charakteryzacja i modelowanie wybranych parametrów współczesnych tranzystorów MOS, advisor: Lidia Łukasiak, excellent
- [MSc31] Łukasz Stankowski, **Modeling of I-U characteristic of MOS transistor with graded SiGe channel technique**, Modelowanie charakterystyk I-V tranzystora MOS z gradientem składu SiGe w kanale, advisor: Agnieszka Zaręba, good
- [MSc32] Stanisław Stopiński, **Analysis of short-wavelength emission and ways of its excitation in KGd(WO₄)₂ matrix doped with trivalent holmium ions Ho³⁺**, Analiza emisji krótkofalowej i sposobów jej wzbudzenia w matrycy KGd(WO₄)₂ domieszkowanej trójdotatnimi jonami holmu Ho³⁺, advisor: Michał Malinowski, very good
- [MSc33] Michał Stybel, **Design and energy optimization of the address units for CACHE memory for a MOVE architecture microprocessor**, Opracowanie i optymalizacja poboru mocy układów adresowania pamięci podręcznej CACHE dla procesora o architekturze MOVE, advisor: Witold Pleskacz, very good
- [MSc34] Łukasz Tomala, **Structure design for measurement of elements and blocks in integrated circuit in nanotechnology**, Projekt układu do pomiaru elementów i bloków układu scalonego w technologii nanometrowej, advisor: Elżbieta Piwowska, good

- [MSc35] Leszek Tragarz, **Electrically conductive adhesives in high - temperature application**, Kleje elektryczne przewodzące w aplikacjach wysokotemperaturowych, advisor: Ryszard Kisiel, good
- [MSc36] Łukasz Usyduś, **The application of digital signal processing in PC vector network analyzer**, Wykorzystanie cyfrowej analizy sygnałów do wektorowego analizatora obwodów, advisor: Jerzy Skulski, very good
- [MSc37] Maciej Witkowski, **Amplifier- Discriminator circuit for high energy physics experiments**, Układ wzmacniacza - dyskryminatora dla eksperymentu fizyki wysokich energii, advisor: Elżbieta Piwowarska, very good
- [MSc38] Maciej Wojtowicz, **The design of analogue parts of the RF microtransmitter**, Projekt bloków analogowych mikronadajnika RF, advisor: Elżbieta Piwowarska, good
- [MSc39] Michał Zaremba, **Metropolitan Area Networks**, Sieci metropolitalne, advisor: Agnieszka Szymańska, very good
- [MSc40] Krzysztof Żdzarski, **Electro-optical properties of dual- frequency liquid crystal cells**, Charakterystyki elektrooptyczne przetworników ciekłokrystalicznych sterowanych dwiema częstotliwościami, advisor: Janusz Parka, good

5.3. B.Sc. Degrees

- [BSc1] Rafał Andrzejewski, **Project of a measuring station to explore m-line spectroscopy**, Projekt układu pomiarowego do badania spektroskopii M-line, advisor: Ryszard Piramidowicz, good
- [BSc2] Marcin Bogusławski, **Anisotropic conductive films (ACF) in flip chip technology**, Kleje anizotropowe w postaci folii (ACF) w połączeniach flip chip, advisor: Zbigniew Szczepański, good
- [BSc3] Kacper Borowski, **Investigation of the properties of joints made with the use of ultrasonic bonding**, Badanie właściwości połączeń lutowanych ultradźwiękowo, advisor: Jerzy Kalenik, good
- [BSc4] Wojciech Bryzek, **Mode structure in two-dimensional coupled waveguides**, Struktura modowa w sprzężonych dwuwymiarowych falowodach planarnych, advisor: Agnieszka Mossakowska-Wyszyńska, good
- [BSc5] Izabela Burska, **Application for management of the Remote Measurements Laboratory**, Aplikacja zarządzająca Laboratorium Pomiarów Zdalnych, advisor: Ryszard Piramidowicz, very good
- [BSc6] Rafał Felijakowski, **The management system of XGRID dispersed calculation environment**, System zarządzania środowiskiem obliczeń rozproszonych XGRID, advisor: Adam Wojtasik, very good
- [BSc7] Bartosz Fetliński, **Colour correction in home displaying devices**, Korekcja barw w domowych urządzeniach obrazowania, advisor: Piotr Garbat, good
- [BSc8] Michał Główka, **An Internet expert system for telemedicine applications**, Internetowy system ekspertowy do zastosowań telemedycznych, advisor: Mikołaj Baszun, good
- [BSc9] Marcin Głuszkowski, **The characteristic, scheme and evaluation of safety of optical fiber network**, Charakterystyka, schemat i ocena bezpieczeństwa sieci światłowodowej, advisor: Agnieszka Szymańska, good
- [BSc10] Paweł Hernik, **Construction and programming issues in communicating interfaces of fiber optical microsystem**, Zagadnienia konstrukcji i programowania interfejsów komunikacyjnych mikrosystemu, advisor: Michał Borecki, good
- [BSc11] Konrad Jaworski, **Application of diamond-like carbon films in optical fiber sensors based on Surface Plasmon Resonance phenomenon**, Zastosowanie warstw diamentopodobnych w czujnikach światłowodowych funkcjonujących w oparciu o zjawisko powierzchniowego Renonansu Plazmonowego, advisor: Mateusz Śmietana, good
- [BSc12] Maciej Karpiuk, **Graphical topography editor of integrated circuits working under Linux operating system**, Graficzny edytor topografii układów scalonych działający pod kontrolą systemu LINUX, advisor: Grzegorz Janczyk, good
- [BSc13] Łukasz Kasztelan, **Optical bullet velocity chronograph**, Optyczny miernik prędkości pocisków, advisor: Sławomir Szostak, good
- [BSc14] Dariusz Koc, **Direct Simulation Monte Carlo (DSMC) modelling of gas flow with use of intermolecular collision**, Modelowanie przepływu gazu metodą Monte Carlo z uwzględnieniem zderzeń międzycząsteczkowym, advisor: Marek Niewiński, good
- [BSc15] Michał Korniluk, **Pulse measurement using a GSM network**, Badanie tętna pacjenta z wykorzystaniem łącza GSM, advisor: Mikołaj Baszun, good
- [BSc16] Tomasz Krogulski, **Analysis of nanolayer resistivity for arbitrary electrode shapes**, Analiza rezystywności nanowarstw przy założonym kształcie elektrod, advisor: Mikołaj Baszun, good
- [BSc17] Łukasz Kuc, **Model of an internet system for patient state monitoring**, Model systemu internetowego monitorowania stanu pacjenta, advisor: Mikołaj Baszun, good

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- [BSc18] Jakub Kurowski, **Realisation of application for luminescence decay measurement in solid state laser materials in a function of temperature**, Wykonywanie aplikacji do pomiaru czasu zaniku luminescencji w dielektrycznych materiałach laserowych w funkcji temperatury, advisor: Marcin Kaczkan, good
- [BSc19] Daniel Marchewka, **Modeling of MOS GeOI structures**, Modelowanie struktur MOS GeOI, advisor: Andrzej Jakubowski, good
- [BSc20] Wojciech Nasilowski, **Modelling of m-line structure for measurements of optical planar waveguides - application in Java**, Modelowanie struktury m-line do pomiarów parametrów światłowodów planarnych aplikacja w języku Java, advisor: Piotr Witoński, very good
- [BSc21] Beata Ruszkarska, **Spontaneous emission in one-dimensional photonic crystals**, Zagadnienie emisji spontanicznej w jednowymiarowych kryształach fonicznych, advisor: Anna Tyszka-Zawadzka, good
- [BSc22] Daniel Rybak, **Methods of recognizing and creating graphic security codes**, Metody rozpoznawania i tworzenia graficznych kodów bezpieczeństwa, advisor: Piotr Garbat, very good
- [BSc23] Damian Rymuza, **Mode structure in 1D planar coupled waveguides**, Struktura modowa w sprzężonych jednowymiarowych falowodach planarnych, advisor: Agnieszka Mossakowska-Wyszyńska, good
- [BSc24] Michał Staniewski, **Subthreshold transfer characteristics of the junction field effect transistors**, Charakterystyki podprogowe tranzystorów polowych złączowych, advisor: Andrzej Pfitzner, good
- [BSc25] Grzegorz Stawski, **Image texture analysis and synthesis in nonphotorealistic rendering**, Analiza i synteza tekstur obrazu przy generowaniu efektu malarskiego, advisor: Bogdan Galwas, good
- [BSc26] Łukasz Stolarczyk, **Design a fuzzy-logic controller topography**, Projekt topografii sterownika rozmytego, advisor: Andrzej Wielgus, fairly good
- [BSc27] Michał Strzyga, **I-V characteristics of junction field effect transistor with non - uniform doping**, Charakterystyki złączowego tranzystora polowego ze zmiennym rozkładem domieszek, advisor: Andrzej Pfitzner, very good
- [BSc28] Kacper Szelażek, **Investigation of the electrical properties of lead-free thick film resistors**, Badanie bezołowiowych rezystorów grubowarstwowych, advisor: Jerzy Kalenik, good
- [BSc29] Agnieszka Szymczak, **Simulation of current - voltage characteristics of a double-gate SOI MOS transistor**, Symulacja charakterystyk prądowo - napięciowych dwubramkowego tranzystora MOS SCI, advisor: Lidia Łukasiak, good
- [BSc30] Bartłomiej Tabędzki, **Designs of selected combinational standard cells for CMOS 90 nm technology**, Projekt wybranych komórek kombinacyjnych w technologii CMOS 90 nm, advisor: Arkadiusz Łuczyk, very good
- [BSc31] Michał Wałęcki, **Control system of quadruped walking robot- design, construction and launch of motherboard**, System sterowania czworonożnym robotem krocącym - projekt, budowa i uruchomienie płyty głównej, advisor: Krzysztof Jasiński, very good
- [BSc32] Katrin Welikow, **Analysis of propagation parameters of microstructured index guiding fibers**, Analiza parametrów propagacyjnych światłowodów mikrostrukturalnych z rdzeniem dielektrycznym, advisor: Ryszard Piramidowicz, very good
- [BSc33] Krzysztof Włodarczyk, **Project of application for measurement of time resolved emission spectra of solid state laser materials**, Opracowanie aplikacji do pomiaru rozdzielczych w czasie widm emisyjnych dielektrycznych materiałów laserowych, advisor: Marcin Kaczkan, good
- [BSc34] Paweł Wujek, **Programming of measurement unit for obtaining characteristics of semiconductor diode**, Oprogramowanie stanowiska do pomiarów charakterystyk diody półprzewodnikowej, advisor: Jan Gibki, good

6. PUBLICATIONS

6.1. Scientific and Technical Papers published in Journals Included in the ISI¹ Database

Number	Journal	Authors	Title	Volume	Pages
[Pub1]	Applied Physics B Lasers and Optics	D.Piątkowski, K. Wiśniewski, Cz.Koepke, R.Piramidowicz, M.Klimczak, M.Malinowski	Initial state-resolved excited state absorption spectroscopy of ZBLAN:Ho ³⁺ glass	93	809-816
[Pub2]	Applied Physics Letters	J.M.le Floch, M.E.Tobar, D.Cros, J.Krupka	Low-loss materials for high Q-factor Bragg reflector resonators	92	032901-1 - 3
[Pub3]	Applied Surface Science	M.Ćwil, M.Kalisz. P.Konarski	Fluorine – doped SiO ₂ and fluorocarbon low-k dielectrics investigated by SIMS	255	1334- 1337
[Pub4]	Applied Surface Science	M.Kwietniewski, M.Sochacki, J.Szmidt, M.Guziewicz, E.Kamińska, A.Piotrowska	Influence of surface cleaning effects on properties of Schottky diodes on 4H-SiC	254	8106 - 8110
[Pub5]	Archives of Metallurgy and Materials	M.Lipiński, R.Mroczyński	Optimisation of multilayers antireflection coating for solar celles	Vol. 53	189 - 192
[Pub6]	Crystal Growth & Design	D.Pawlak, K.Kołodziejak, K.Roźniatowski, R.Diduszko, M.Kaczkan, M.Malinowski, M.Piersa, J.Kisielewski, T.Łukasiewicz	PrAlO ₃ – PrAl ₁₁ O ₁₈ Eutectic: Its microstructure and spectroscopic properties	Vol. 8, No. 4	1243 - 1249
[Pub7]	Crystal Research and Technology	K.Kołodziejak, W.Wierzchowski, K.Wieteska, M.Malinowski, W.Graeff, T.Łukasiewicz	Investigation of structural perfection and faceting in highly Er-doped Yb ₃ Al ₅ O ₁₂ crystals	Vol. 43, No. 4	369-373
[Pub8]	Diamond & Related Materials	M.Śmietana, J.Szmidt, M.L.Korwin-Pawłowski, N.Miller, A.A.Elmustafa	Influence of RF PACVD process parameters of diamond-like carbon films on optical properties and nano-hardness of the films	17	1655- 1659
[Pub9]	IEEE Sensors Journal	M.Borecki, M.L.Korwin- Pawłowski, M.Bebłowska	A method of examination of liquids by neural network analysis of reflectometric and transmission time domain data from optical capillaries and fibers	Vol. 8, No 7	1208- 1213
[Pub10]	IEEE Transactions on Industrial Electronics	W.Pleskacz, V.Stopjakova, T.Borejko, A.Jutman, A.Wałkanis	DefSim: A Remote Laboratory for Studying Physical Defects in CMOS Digital Circuits	Vol. 55 No 6	2405- 2415
[Pub11]	IEEE Transactions on Microwave Theory and Techniques	J.Krupka,D. Mouneyrac, J.G.Hartnett, M.E.Tobar	Use of whispering-gallery modes and quasi- $\{rm TE\}$. Modes for broadband characterization of bulk gallium gallium phosphide samples	Vol. 56 No5	1201 - 1206
[Pub12]	Journal of Alloys and Compounds	M.Nakielska, J.Sarnecki, M.Malinowski, R.Piramidowicz	Up-conversion and fluorecence quenching processes studies in highly Pr ³⁺ - doped YAG waveguides	451	190-193
[Pub13]	Journal of Applied Physics	J.G.Hartnett, D.Mouneyrac, J-M. Le Floch, J.Krupka, M.E.Tobar, D.Cros	Obesrvation of persistent photoconductivity in bulk gallium arsenide and gallium phosphide samples at cryonienic temperatures using the whispering gallery mode method	104	113714-1 - 113714-5
[Pub14]	Journal of Crystal Growth	P.Caban, K.Kosciewicz, W.Strupiński, M.Wójcik, J.Gaca, J.Szmidt, M.Ozturk, E.Ozby	The influence of subtrace surface preparation on LP MOVPE GaN epitaxy on differently oriented 4H-SiC substrates	310	4876- 4879
[Pub15]	Journal of Luminescence	R.Piramidowicz, K.Ławniczuk, M.Nakielska, J.Sarnecki, M.Malinowski	UV emission properties of highly Pr ³⁺ - doped YAG epitaxial waveguides	128	708-711

[Pub16]	Journal of Physics Condensed Matter	D.Piątkowski, K.Wiśniewski, M.Róžański, Cz.Koepke, M.Kaczkan, M.Klimczak, R.Piramidowicz, M.Malinowski	Excited state absorption spectroscopy of ZBLAN:Ho ³⁺ glass – experiment and simulation	20	155201-1 – 155201-11
[Pub17]	Materials Science - Poland	A.Jakubowski, L.Łukasiak	CMOD evolution. Development limits	Vol. 26, No 1	5 - 20
[Pub18]	Materials Science - Poland	M.Ćwil, P.Firek, P.Konarski, A.Werbowy	SIMS depth profiling of thin boron nitride insulating films	Vol. 26, No 1	135 -141
[Pub19]	Measurement Science and Technology	J.Krupka	Measurement of the complex permittivity of metal nanoislands and the surface resistance of thin conducting films at microwave frequencies	19	1-8
[Pub20]	Measurement Science and Technology	M.Śmietana, M.L.Korwin-Pawłowski, W.J.Bock, G.R.Pickrell	Refractive index sensing of fiber optic long-period grating structures coated with a plasma deposited diamond – like carbon thin film	19	1 - 7
[Pub21]	Measurement Science and Technology	B.Borecki, M.Korwin-Pawłowski, P.Wrzosek, J.Szmidt	Capillaries as the components of photonic sensor micro-systems	19	1 -9
[Pub22]	Molecular Crystals and Liquid Crystals	M.Sutkowski, P.Garbat, J.Parka, A.Walczak, E.Nowinowski-Kruszelnicki, J.Woźnicki	Polarization difference imaging system with LC filter	Vol. 495	51 - 59
[Pub23]	Molecular Crystals and Liquid Crystals	T.Grudniewski, M.Sutkowski, M.Lepkowski, J.Parka, E.Nowinowski-Kruszelnicki	Mechanisms of Re-writable hologram recordings in NLC cells	Vol. 494	309-319
[Pub24]	Optical Materials	M.Kaczkan, M.Borowska, K.Kołodziejak, T.Łukasiewicz, M.Malinowski	Intensity of optical transitions of Er ³⁺ in Yb ₃ Al ₅ O ₁₂	30	703-706
[Pub25]	Optical Materials	R.Piramidowicz, M.Klimczak, M.Malinowski	Short-wavelength emission analysis in Dy:ZBLAN glasses	30	707-710
[Pub26]	Optical Materials	M.Nakielska, J.Kosko, J.Sarnecki, M.Malinowski, R.Piramidowicz	Fluorescence properties in the visible of highly Pr ³⁺ doped YAG planar waveguides	30	759-762
[Pub27]	Opto-Electronics Review	M.Sutkowski, P.Garbat, E.Nowinowski-Kruszelnicki, A.Walczak, J.Parka, J.Woźnicki	Polarization difference image with LC filter	Vol. 16, No 4	53 - 58
[Pub28]	Opto-Electronics Review	P.Garbat, M. Kujawińska	Visualization of 3D variable in time object based on data gathered by active measurement system	Vol. 16, No 1	97 - 104
[Pub29]	Soldering & Surface Mount Technology	K.Bukat, J.Sitek, R.Kisiel, Z. Mosser, W.Gąsior, M.Kościelski, J.Pstruś	Evaluation of the influence of Bi and Sb additions to Sn-Ag-Cu and Sn-Zn alloys on their surface tension and wetting properties using analysis of variance - ANOVA	Vol. 20 No 4	9 - 19
[Pub30]	Transactions of the Institute of Metal Finishing	Z.Buczko, J.Krupka	Effective conductivity measurements of silver coatings employing sapphire dielectric resonator technique	Vol. 86, No. 5	286-288
[Pub31]	Vacuum	R.Mroczyński, N.Kwietniewski, M.Ćwil, P.Hoffmann, R.B.Beck, A.Jakubowski	Improvement of electro-physical properties of ultra-thin PECVD silicon oxynitride layers by high-temperature annealing	82	1013-1019
[Pub32]	Vacuum	M.Kalisz, R.B.Beck, M.Ćwil	Reactive-ion-etching (RIE) process in CF ₄ plasma as a method of fluorine implantation	82	1046-1050
[Pub33]	Vacuum	M.Kalisz, R.B.Beck, M.Ćwil	Fluorine-doped SiO ₂ and CF low-k dielectrics obtained during RIE process in fluorine plasmas	82	1040-1045
[Pub34]	Vacuum	M.Niewiński, P.Szwemin	Sensitivity of high vacuum standard parameters to the share of molecule specular reflections in the gas scattering	82	1099 - 1102

[Pub35]	Vacuum	M.Niewiński	Comparison of the high vacuum standard parameters computed from two models	82	1141-1144
[Pub36]	Vacuum	R.Gronau, J.Szmidt, P.Firek, E.Czerwosz, D.Jarzyńska, E.Staryga	Study of the ability to field emission from diamond-like carbon layers and carbon nanotubes	82	962-965

6.2. Scientific and Technical Papers Published in Journals not Included in the ISI Database

Number	Journal	Authors	Title	Volume	Pages
[Pub37]	Elektronika	Z.Mączyński, J.Rogowski, M.Baszun	Precyzyjne wymuszanie zerowej magnetyzacji przypomiarań materiałowych	1/2008	18 - 21
[Pub38]	Elektronika	J.Arabas, S.Szostak, L.Łukasiak, A.Jakubowski	Studies of the feasibility of using global and local optimization methods in MOSFET characterization	1/2008	43 - 45
[Pub39]	Elektronika	G.Wąchała, A.Pfitzner	Zastosowanie algorytmu ewolucyjnego do znajdowania przybliżeń początkowych w symulacji struktur półprzewodnikowych	1/2008	54 - 56
[Pub40]	Elektronika	G.Głuszko, L.Łukasiak, A.Jakubowski	Characterization of SOI structures by means of 3-level charge - pumping	1/2008	72 - 74
[Pub41]	Elektronika	A.Rudziński	Ograniczenia przestrajania filtra pasmowoprzepustowego z zerem transmitancji na drugiej harmonicznej sygnału.	2/2008	45 - 47
[Pub42]	Elektronika	T.Bieniek, J.Śteżewski, M.Sochacki, J.Szmidt	Symulacje elektryczne diod Schottky'ego oraz tranzystorów RESURF JFET i RESURF MOSFET na podłożach z węgla krzemu (SiC)	7-8/2008	11 - 15
[Pub43]	Elektronika	M.Kulik, J.Żuk, W.Rzodkiewicz, K.Pysznik, A.Drożdziel, M.Turek, S.Prucnal, M.Sochacki, J.Szmidt	Badania optyczne politypów 6H-SiC oraz 15R-SiC poddanych wielokrotnej implantacji jonami glinu w podwyższonej temperaturze	7-8/2008	15 - 18
[Pub44]	Elektronika	Z.Szczepański, R.Kisiel	Problemy montażu struktur SiC stosowanych w elektronice wysokich temperatur i dużych mocy	7-8/2008	19 - 24
[Pub45]	Elektronika	W.Pleskacz, A.Wielgus, D.Kasprowicz, T.Borejko, W.Kuźmich	Charakteryzacja komórek standardowych CMOS dla generacji wektorów testowych	9/2008	102 - 111
[Pub46]	Elektronika	M.Kaczkan, D.Pawlak	Właści emisyjne eutektyku $Tb_3Sc_2Al_3O_{12}-TbScO_3$ o periodycznym uporządkowaniu	9/2008	112 - 116
[Pub47]	Elektronika	J.Dawidczyk	Mieszanie opto-mikrofalowe w układach z fotodiodami PIN	9/2008	116 - 119
[Pub48]	Elektronika	W.Kuźmich, A.Pfitzner, E.Piwowska, D.Kasprowicz	Statyczny pobór mocy w nanometrowych układach scalonych CMOS	9/2008	119 - 122
[Pub49]	Elektronika	A.Sawicka, L.Łukasiak, A.Jakubowski	Modelowanie wybranych efektów krótkiego kanału w dwubramkowym tranzystorze MOS	9/2008	123 - 126
[Pub50]	Elektronika	M.Śmietana, A.Werbowy, J.Szmidt	Mikroelektroniczne i optoelektroniczne przyrządy sensorowe z warstwami diamentowymi i diamentopodobnymi	9/2008	126 - 130
[Pub51]	Elektronika	B.Galwas, J.Piotrowski, K.Madziar	Mikrofalowy model analogowych łączy światłowodowych	9/2008	13 - 18
[Pub52]	Elektronika	R.Mroczyński, R.B.Beck	Technologia i zastosowania warstw tlenko-azotków krzemu wytwarzanych metodą PECVD do struktur pamięciowych z podwójną warstwą dielektryczną ($SiO_xN_y-HfO_2$)	9/2008	131 - 135
[Pub53]	Elektronika	J.Krupka, Z.Mączyński, M.Baszun	Badania konduktywności zespolonej nanowarstw	9/2008	18 - 21

[Pub54]	Elektronika	P.Garbat, M.Sutkowski, A.Walczak	Przetwarzanie cyfrowe obrazów spolaryzowanych	9/2008	21 - 24
[Pub55]	Elektronika	J.Gibki, L.Łukasiak, A.Jakubowski	Charakteryzacja tranzystorów typu FinFET na podstawie analizy statycznych charakterystyk prądowo-napięciowych	9/2008	24 - 26
[Pub56]	Elektronika	J.Kalenik, K.Kiełbasiński, R.Kisiel, M.Jakubowska, J.Szmidt	Stabilność wybranych właściwości bezołowiowych połączeń lotowanych w grubowarstwowych układach hybrydowych	9/2008	27 - 36
[Pub57]	Elektronika	M.Kalisz, R.B.Beck	Modelowanie rozkładu energetycznego jonów w plazmie w.cz. przez dopasowanie teoretycznych profili poimplantacyjnych do profilu uzyskanego z pomiarów SIMS	9/2008	37 - 40
[Pub58]	Elektronika	Z.Jaworski	Niskomocowy specjalizowany układ scalony do detekcji tachykardii z przeznaczeniem do wszczepialnych defibrylatorów	9/2008	40 - 45
[Pub59]	Elektronika	A.Mossakowska-Wyszyńska	Model generacji promieniowania w laserach DBR z ośrodkiem w postaci planarnego światłowodu fotonicznego	9/2008	46 - 49
[Pub60]	Elektronika	M.Sutkowski, P.Garbat, A.Walczak	Polaryzacyjny system analizy obrazów z filtrem ciekłokrystalicznym	9/2008	50 -52
[Pub61]	Elektronika	M.Klimczak, R.Piramidowicz, M.Malinowski	Badanie emisji krótkofalowej w domieszkowanych jonami Nd ³⁺ szklach niskofotonowych	9/2008	52 - 56
[Pub62]	Elektronika	N.Kwietniewski, M.Sochacki, J.Szmidt, M.Guziewicz, E.Kamińska, A.Piotrowska	Wpływ procesów przygotowania podłoża 4H-SiC na właściwości diod Schottky'ego	9/2008	57 -62
[Pub63]	Elektronika	P.Firek, A.Werbowy, N.Kwietniewski, J.Szmidt, A.Olszyna, M.Ćwil	Wytwarzanie, trawienie plazmowe i właściwości cienkich warstw BaTiO ₃ do zastosowań elektronicznych	9/2008	62 - 68
[Pub64]	Elektronika	M.Koba, P.Szczepański	Teoria wielomodowej pracy lasera z ośrodkiem aktywnym w postaci kryształu fotonicznego o sieci kwadratowej	9/2008	69 - 78
[Pub65]	Elektronika	W.Kamiński, J.Kęsik, P.Warda, M.Osiniak, J.Kasprzak	Jonowy laser argonowo-kryptonowy do zastosowań w okulistyce	9/2008	79 - 81
[Pub66]	Elektronika	J.Jasiński, M.Osiniak	Energooszczędność w bezprzewodowych sieciach rozproszonych czujników	9/2008	82 - 87
[Pub67]	Elektronika	M.Niewiński	Modelowanie przepływu gazu z uwzględnieniem zderzeń międzycząsteczkowych metodą DSMC	9/2008	88 -92
[Pub68]	Elektronika	L.Łukasiak, D.Tomaszewski, A.Sawicka, G.Głuszko, M.Iwanowicz, A.Jakubowski	Modelowanie prądu pompowania ładunku w dwubramkowych strukturach MOS z bardzo cienką warstwą aktywną	9/2008	92 - 95
[Pub69]	Elektronika	A.Mazurak, J.Walczak, B.Majkusiak	Materiały o dużej stałej dielektrycznej w tranzystorach MOS	9/2008	96 - 102
[Pub70]	Journal of Semiconductor Technology and Science	J.Walczak, B.Majkusiak	Theoretical study of electron mobility in double-gate field effect transistors with multilayer (strained-)Si/SiGe Channel	Vol. 8, No 3	264 - 275
[Pub71]	Nasza Politechnika	J.Woźnicki	Wiedza Europy – Europa wiedzy	5 (71)	9 - 11
[Pub72]	Przegląd Telekomunikacyjny	A.Jakubowski, L.Łukasiak	Tranzystor – 60 lat minęło i co dalej?	5/2008	666 - 671

[Pub73]	SPIE – Optical Fibers and Their Applications	P.Lesiak, S.Ertman, D.Budaszewski, A.W.Domański, T.R.Woliński, I.Burska, M.Klimczak, R.Piramidowicz, P.Warda, W.Kamiński, R.Sitnik, M.Kujawińska	Remote measurements system for applications in photonic materials characterization	Vol. 7120	71200S-1 - 71200S-9
[Pub74]	SPIE – Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments	A.Szymańska, M.P.Zaremba	Gigabit Ethernet link parameters influence on quality of transmission and cost analysis of protected metropolitan area networks	Vol. 7124	71240Z-1 - 71230Z-10
[Pub75]	SPIE – Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments	M.Borecki, M.L.Korwin-Pawłowski, M.Bebłowska	The working condition of a short section of optical capillary in multi-parameters heads for lab-on-fiber application	Vol. 7124	71240C-1 - 71240C-6

6.3. Scientific and Technical Papers Published in Conference Proceedings

Number	Conference	Authors	Title	City, Country	Pages
[Pub76]	Fourth Workshop of the Thematic Network on Silicon-On-Insulator Technology, Devices and Circuits EUROSOI'2008 January 23-25	B.Majkusiak	Physics of the multigate MOS System	Cork, Ireland	55 - 68
[Pub77]	Fourth Workshop of the Thematic Network on Silicon-On-Insulator Technology, Devices and Circuits EUROSOI'2008 January 23-25	B.Majkusiak, D.Flandre	Theoretical considerations on lifetime of electrons in quasi-bound states and the tunnel current from the MOS/SOI quantum wells	Cork, Ireland	71 - 72
[Pub78]	IEEE East-West Design and Test International Symposium – EWDTs'08 October 9-12	A.Wielgus, W.Pleskacz	Characterization of CMOS Sequential Standard Cells for Defect Based Voltage Testing	Lvov, Ukraine	49 - 54
[Pub79]	IEEE International Conference on Computer Design ICCD 2008 October 12-15	Yi-Wei Lin, M.Marek-Sadowska, W.Mały, A.Pfitzner, D.Kasprowicz	Is there always performance overhead for regular fabric ?	Lake Tahoe, CA, USA	557 - 562
[Pub80]	IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems; IEEE DDECS April 16-18	A.Ł.Sobczyk, A.W.Łuczyk, W.A.Pleskacz	Controllable Local Clock Signal Generator for Deep Submicron GALS Architectures	Bratislava, Slovakia	14 - 17
[Pub81]	IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems; IEEE DDECS April 16-18	T.Borejko, W.A.Pleskacz	A Resistor less Voltage Reference Source for 90 nm CMOS Technology with Low Sensitivity to Process and Temperature Variations	Bratislava, Slovakia	38 - 43

[Pub82]	IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems; IEEE DDECS April 16-18	P.Malik, M.Baláž, M.Šimlašík, A.W.Łuczyc, W. A.Pleskacz	Various MDCT implementations in 0.35µm CMOS	Bratislava, Slovakia	170 - 173
[Pub83]	IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems; IEEE DDECS April 16-18	M.J.Beresiński, T.Borejko, W.Pleskacz, V.Stopjakova	Built-In Current Monitor for I _{DDQ} Testing in CMOS 90 nm Technology	Bratislava, Slovakia	259 - 262
[Pub84]	IMEKO TC 2 Symposium on Photonics in Measurements 2008 August 25 - 26	A.Walczak, L.Puzio, E.Nowinowski-Kruszelnicki, M.Sutkowski, P.Garbat	Edge extraction in polarized images	Prague, Czech Republic	T.3-O.2
[Pub85]	International Conference on Signals and Electronic Systems ICSES 2008 September 14-17	A.Płatonov, J.Jasnos, K.Jędrzejewski, Ł.Małkiewicz, Z.Jaworski, E.Piwowarska, P.Studziński	Particularities of cyclic intelligent ADC design, implementation and adjusting	Krakow, Poland	43 - 46
[Pub86]	II Krajowa Konferencja Nanotechnologii June 25-28	J.Krupka, M.Baszun, Z.Mączeński	Właściwości rezystywne wybranych nanowarstw przewodzących	Krakow, Poland	
[Pub87]	IX Electron Technology Conference ELTE'2007 September 4-7	D.Tomaszewski, G.Głuszko, A.Sawicka, Ł.Łukasiak, A.Jakubowski	Influence of the parameters of thin SOI structures on surface potential and carrier concentration	Krakow, Poland	25 - 28
[Pub88]	IX Electron Technology Conference ELTE'2007 September 4-7	M.Iwanowicz, Z.Pióro, Ł.Łukasiak, A.Jakubowski	Gate-signal generator for charge-pumping characterization of MOS devices	Krakow, Poland	29 - 34
[Pub89]	IX Electron Technology Conference ELTE'2007 September 4-7	A.Malinowski, P.Grabiec, M.Grodner, K.Kucharski, D.Tomszewski, A.Jakubowski	Analysis of technological processes dispersion based on electrical measurements of test structures	Krakow, Poland	35 - 38
[Pub90]	IX Electron Technology Conference ELTE'2007 September 4-7	B.Jaroszewicz, M.Zaborowski, D.Tomaszewski, J.Taff, A.Malinowski, P.Grabiec	Rozwój konstrukcji i technologii struktur ISFET z kontaktami od spodu (BSC ISFET) przeznaczonych do monitorowania środowiska wodnego	Krakow, Poland	133 - 136
[Pub91]	IX Electron Technology Conference ELTE'2007 September 4-7	A.Malinowski, K.Domański, P.Grabiec	Modelling and characterization of piezoresistive gauge	Krakow, Poland	141 - 144
[Pub92]	IX Electron Technology Conference ELTE'2007 September 4-7	J.Kalenik, J.Szmidt	Ultraźwźwiękowy montaż elementów elektrycznych SMD w obwodach drukowanych	Krakow, Poland	175 - 178
[Pub93]	NEMO General Scientific Networking Meeting'2008 June 27 - July 3	P.Szczepański, R.Piramidowicz	Active microstructured fibers for short wavelenght lasing applications	Santiago de Compostela, Spain	1 - 24
[Pub94]	V Ogólnopolska Konferencja Naukowa „Modelowanie i Symulacja” MiS-5 June 23-27	M.Kruczyk, M.Baszun	Modelowanie zachowań społecznych kolonii owadów dla problemu rozdziału zadań	Kościełisko, Poland	317 - 319
[Pub95]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	E.Papis, A.Piotrowska, N.Kwietniewski, M.Sochacki, J.Szmidt	Opracowanie i wykonanie pasywacji powierzchni węgla krzemu na bazie powłok siarczkowych	Darłówko-Wschodnie, Poland	1 - 4
[Pub96]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	K.Grasza, K.Racka-Dzietko, E.Tymicki, M.Raczkiewicz, P.Kamiński, R.Diduszko, A.Brzozowski, E.Jurkiewicz-Wergner, R.Jakiela, M.Kozubal, A.Bajor, J.Krupka	Opracowanie technologii nanokryształacji SiC – charakteryzacja kryształów otrzymanych w pierwszym etapie realizacji projektu	Darłówko-Wschodnie, Poland	11- 25

[Pub97]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	M. Sochacki, N. Kwietniewski, J. Szmidt, T. Bieniek, J. Stęszewski, A. Taube, K. Pazio	Przrządy unipolarne i struktury tranzystorowe na potrzeby elektroniki wysokotemperaturowej	Darłówo-Wschodnie, Poland	193 - 209
[Pub98]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	J. Żuk, A. Drożdżel, M. Kulik, S. Prucnal, K. Pyszniak, M. Sochacki, J. Szmidt, M. Turek	Domieszkowanie węgla krzemu metodą implantacji jonowej	Darłówo-Wschodnie, Poland	135 - 143
[Pub99]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	R. Kisiel, M. Guzewicz, A. Piotrowska	Połączenia ultrakompresyjne Al.-Al. w montażu struktur SiC	Darłówo-Wschodnie, Poland	
[Pub100]	VII Krajowa Konferencja Elektroniki KKE'2008 June 2-4	K. Racka-Dzietko, E. Tymicki, M. Raczkiwicz, K. Grasa, R. Jakiela, E. Jurkiewicz-Wegner, A. Bzrozowski, J. Krupka, M. Pawłowski	Badanie właściwości elektrycznych 6H-SiC z domieszką azotu	Darłówo-Wschodnie, Poland	
[Pub101]	VIII Konferencja „Uniwersytet Wirtualny – Model, Narzędzie, Praktyka” June 18-20	B. Galwas	Otwarte Uniwersytety, otwarte zasoby edukacyjne, otwarty dostęp	Warszawa, Poland	1 - 48
[Pub102]	VIII Konferencja „Uniwersytet Wirtualny – Model, Narzędzie, Praktyka” June 18-20	R. Piramidowicz, P. Witoński, P. Warda, W. Kamiński, M. Jusza, K. Anders, I. Burska, F. Matuszewski	Laboratorium pomiarów zdalnych idea i implementacja.	Warszawa, Poland	1 - 22
[Pub103]	VIII Konferencja „Uniwersytet Wirtualny – Model, Narzędzie, Praktyka” June 18-20	P. Garbat	Architektura tworzenia prezentacji dla potrzeb systemów nauczania na odległość	Warszawa, Poland	1 - 10
[Pub104]	VIII Konferencja „Uniwersytet Wirtualny – Model, Narzędzie, Praktyka” June 18-20	K. Madziar, M. Morawski, D. Paluch	Modernizacja podręcznika elektronicznego	Warszawa, Poland	
[Pub105]	XXII-th IEEE-SPIE Joint Symposium on Photonics, Web Engineering, Electronics for Astronomy and High Energy Physics Experiments, May 28 - June 1	K. Anders, M. Jusza, P. Gdula, P. Witoński, R. Piramidowicz	Pr+Yb doped ZBLAN upconversion fiber laser – modeling and technical details	Wilga, Poland	
[Pub106]	XV Konferencja Inżynierii Akustycznej i Biomedycznej April 14-18	M. Baszun, M. Głowska	Internetowy system ekspertowy bazujący na technikach zbiorów przybliżonych oraz logiki rozmytej do zastosowań telemedycznych	Krakow-Zakopane, Poland	7 - 8
[Pub107]	5th International Conference on Microwave Materials and Their Applications MMA-2008 November 1-4	Z. Mączyński, J. Krupka, M. Baszun	Dielectric properties of metallodielectric PE-Me composites within the pre-percolation metallic particle concentration range	Hangzhou, China	
[Pub108]	11 th Euromicro Conference on Digital System Design Architectures, Methods and Tools – DSD'2008 September 3-5	W. A. Pleskacz, M. Jenihhin, J. Raik, M. Rakowski, R. Ubar, W. Kuźmich	Hierarchical analysis of short defects between metal lines in CMOS IC	Parma, Italy	729 - 734
[Pub109]	15 th Workshop on Dielectric in Microelectronics WODiM'2008 June 23-25	B. Majkusiak	Analytical modelling of the tunnelling probability through double-layer gate stacks	Berlin, Germany	1 - 2

[Pub110]	15 th Workshop on Dielectric in Microelectronics WODiM'2008 June 23-25	R.Mroczyński, R.Beck, M.Szmidt, J.K.Efavi, H.B.Gottlob, M.C.Lemme	Application of PECVD silicon oxynitride layers in non-volatile semiconductor memory (NVSM) devices.	Berlin, Germany	1 - 2
[Pub111]	17 th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008 May 19-21	K.Madziar, B.Galwas	Optimization and Improvement of Operation in Microwave Oscillators by Using Optical Analog Link	Wroclaw, Poland	620 - 623
[Pub112]	17 th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008 May 19-21	D.Paluch	Scattering matrix description of an analog fibre optical links	Wroclaw, Poland	624 - 627
[Pub113]	17 th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008 May 19-21	B.L.Givot, J.Krupka, K.Derzakowski	Measurements of powders and liquids employing dielectric resonator technique	Wroclaw, Poland	411 - 414
[Pub114]	17 th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008 May 19-21	J.Krupka, M.Jacob, B.L.Givot, K.Derzakowski	Measurements of thin resistive films employing split post dielectric resonator technique	Wroclaw, Poland	892 - 895
[Pub115]	17 th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008 May 19-21	A.Stefański, J.Krupka	Complex permittivity measurements of lossy liquids at microwave frequencies	Wroclaw, Poland	1-4
[Pub116]	18 th International Travelling Summer School on Microwave and Lightwaves 5-11 July	B.Galwas	Microwave Photonics	Prague, Czech Republic	1- 44
[Pub117]	18 th International Travelling Summer School on Microwave and Lightwaves 5-11 July	K.Madziar	Fiber based photonic microwave filters for applications in optoelectronics oscillators	Prague, Czech Republic	1 - 29
[Pub118]	18 th International Travelling Summer School on Microwave and Lightwaves 5-11 July	P.Szczepański	Photonic crystals – applications in lasers	Prague, Czech Republic	1 - 40
[Pub119]	20 th International Conference on Systems Research Informatics and Cybernetics July 25	B.Czejdo, T.Cummings, M.Baszun, J.Czejdo	Intelligent tool to support evolution of information systems	Baden-Baden, Germany	29 - 41
[Pub120]	31 st International Spring Seminar on Electronics Technology Reliability and Life-time Prediction ISSE 2008 May 7-11	R.Kisiel, M.Guziewicz	High temperature applications of Al. wire connection to SiC Structures	Budapest, Hungary	138 - 139

6.4. Scientific and Technical Books

Number	Authors	Publisher	Title, volume, pages
[Pub121]	J.Arabas, S.Szostak	Oficyna Wydawnicza Politechniki Warszawskiej	Evolutionary Computation and Global Optimization: "Hybrid evolutionary algorithm in MOSEFET parameter extraction," Zeszyt "Elektronika" vol. 165, pp 33 – 41
[Pub122]	M.Baszun, M.Kruczyk	Wydział Transportu Politechniki Radomskiej	Computer systems aided science and engineering work in transport, mechanics and electrical engineering: "A real time telemedicine web expert system for wireless monitoring of drivers/ passengers," pp. 29 - 36
[Pub123]	B.Galwas, E.Piwowska, E.Grzejszczyk, M.Plebańska, T.Winek	Oficyna Wydawnicza Politechniki Warszawskiej	Postępy e-edukacji: „Studia podyplomowe: praktyka i modele realizacji,” pp. 31-37
[Pub124]	B.Galwas	Oficyna Wydawnicza Politechniki Warszawskiej	Postępy e-edukacji: „Otwarte uniwersytety, otwarte zasoby edukacyjne, otwarty dostęp do wiedzy,” pp. 11 - 20
[Pub125]	B.Galwas	Fundacja Rektorów Polskich	Benchmarking w systemie szkolnictwa wyższego: „eLearning i otwarte zasoby edukacyjne jako przedmiot benchmarkingu procesów w szkolnictwie wyższym,” pp. 145 - 154
[Pub126]	B.Galwas, R.Tadeusiewicz	Polska Akademia Nauk	Europa w perspektywie roku 2050, „Nauka i technika a przyszłość Europy,” pp. 221 - 237
[Pub127]	M.Sutkowski	Foto Kurier s.c.	Nikon. System tradycyjny i cyfrowy, Wyd. II, p. 312
[Pub128]	J.Woźnicki	Fundacja Rektorów Polskich	Benchmarking w systemie szkolnictwa wyższego: „Benchmarking jako zaawansowane narzędzie wspierające funkcje zarządzania w szkole wyższej,” pp. 13 - 16
[Pub129]	J.Woźnicki	Wydział Zarządzania i Ekonomii Politechnika Gdańska	Spółeczna odpowiedzialność uczelni: „Legislacyjne określenie pozycji uczelni jako instytucji życia publicznego,” pp. 13 - 23

7. PATENTS

- [Pat1] Z.Lisik, J.Szmidt, J.Podgórski, **Field Effect Transistor with Isolated Gate-MOSFET** (Tranzystor polowy z izolowaną bramką), Patent PL 198327 B1, 21.08.2008
- [Pat2] R.Piramidowicz, J.Wójeik, M.Makara, K.Skorupski, J.Olszewski, T.Martynkien, W.Urbańczyk, T.Nasiłowski, F.Berghmans, H.Thienpont, P.Szczepański, P.Gdula, **Microstructural fiber and its fabrication method** (Światłowod mikrostrukturalny i sposób wytwarzania światłowodu mikrostrukturalnego), Zgłoszenie patentowe nr P 386114 złożone w Urzędzie Patentowym RP 19.09.2008
- [Pat3] P.Wrzosek, J.Szmidt, M.Borecki, M.Bebłowska, **Optical capillary as a head for set of liquid parameters examination** (Głowica pomiarowa z kapilarą optyczną do badania wybranych parametrów cieczy), Zgłoszenie patentowe nr Z-385936 złożone w Urzędzie Patentowym RP 22.08.2008

8. REPORTS

- [Rep1] **3D Data precessing in visional monitoring system**, (Przetwarzanie danych 3D w systemach monitoringu wizyjnego), project leader: Piotr Garbat
- [Rep2] **Analysis, modelling and investigation of active waveguide photonic structures and characterization of active materials**, (Analiza, modelowanie i badanie warunków wzmocnienia i generacji w światłowodowych i fotonowych strukturach aktywnych oraz charakteryzacja materiałów aktywnych), project leader: Michał Malinowski
- [Rep3] **Charge pumping as a tool for characterization of electrophysical parameters of new-generation MIS devices** (Metoda pompowania ładunku jako narzędzie do charakteryzacji parametrów elektrofizycznych nowych generacji przyrządów typu MIS), project leader: Lidia Łukasiak
- [Rep4] **Contact and assembly technologies for high temperature, high power and high frequency applications of SiC devices**, (Technologia kontaktów i montażu dla przyrządów z węgla krzemu do zastosowań wysokotemperaturowych, wysokomocowych i wysokoczęstotliwościowych), project leader: Ryszard Kisiel
- [Rep5] **Controlling Leakage Power in NanoCMOS SoCs, European Commission 6 Framework Programme - Integrated Project CLEAN (FP6 – 4 – IST – 4 – 026980 – IP – CLEAN)**, project leader: Wiesław Kuźmicz
- [Rep6] **Deposition and measurements of thin metal and dielectric films intended for nanoelectronics and microwave technique**, (Wytwarzanie i charakteryzacja cienkich warstw metalicznych i dielektrycznych dla potrzeb nanoelektroniki i techniki mikrofalowej), project leader: Jerzy Krupka
- [Rep7] **Development of a system for investigation of semiconductor sensing microstructures fabricated with novel plasma techniques**, (Konstrukcja systemu do badań półprzewodnikowych mikrostruktur sensorowych powstałych z wykorzystaniem nowoczesnych technik plazmowych), project leader: Mateusz Śmietana
- [Rep8] **Development of broadband impedance spectrometer for tissue examination** (Opracowanie modelu szerokopasmowego spektrometru impedancyjnego do badań tkanek), project leader: Tadeusz Pałko
- [Rep9] **Dielectric layers fabricated by means of plasma methods for AIII-N (GaN, AlGaIn) semiconductor structures' technology**, (Warstwy dielektryczne wykonane metodami plazmowymi na potrzeby technologii struktur półprzewodnikowych wytwarzanych w azotkach pierwiastków III grupy układu okresowego (GaN i AlGaIn)), project leader: Jan Szmidt
- [Rep10] **Electronic detectors and chemical sensitive devices with diamond and diamon-like carbon (dlc) films**, (Elektroniczne detektory i przyrządy chemoczułe z warstwami diamentowymi i diamentopodobnymi), project leader: Jan Szmidt
- [Rep11] **Fiber lasers with Bragg gratings resonators**, (Lasery włóknowe z rezonatorami braggowskimi), project leader: Ryszard Piramidowicz
- [Rep12] **IC design skills for advanced DSM technologies, European Commission 7 Framework Programme – Project IDESA (contract No. 215180)**, project leader: Wiesław Kuźmicz
- [Rep13] **Image analysis for definition of parameter of flow in ventilation**, (Analiza obrazu w określaniu parametrów wentylacyjnych strumieni nawiewnych), project leader: Piotr Garbat
- [Rep14] **Investigation of diamond-like carbon (DLC) film properties deposited with plasma methods (RF PACVD) onto optical fibres**, (Badanie właściwości cienkich warstw diamentopodobnych (DLC) wytwarzanych technikami plazmowymi (RF PCVD) na włóknach światłowodowych), project leader: Mateusz Śmietana
- [Rep15] **Investigations of magnitude-phase characteristics and parameters of optical transmitters and receivers** (Badania charakterystyk i parametrów amplitudowo-fazowych nadajników i odbiorników optycznych), project leader: Bogdan Galwas
- [Rep16] **Investigations of microwave devices containing liquid crystals** (Badania własności mikrofalowych elementów zawierających ciekłe kryształy), project leader: Bogdan Galwas
- [Rep17] **Methods of simulation of processes and devices for nanometer integrated circuits** (Metody symulacji procesów i elementów nanometrowych układów scalonych), project leader: Wiesław Kuźmicz
- [Rep18] **Microwave conductivity of conjugated polymers and their blends**, (Przewodnictwo mikrofalowe polimerów przewodzących i ich blend), project leader: Jerzy Krupka
- [Rep19] **Modeling and characterization of multigate MOS SOI structures** (Modelowanie i charakteryzacja wielobramkowych struktur MOS SOI), project leader: Andrzej Jakubowski
- [Rep20] **Modeling of silicon structures with low-dimensional electron gas**, (Modelowanie struktur krzemowych z niskowymiarowym gazem elektronowym), project leader: Jakub Walczak
- [Rep21] **Network of Excellence for Micro-Optics – NEMO, Network of Excellence within 2nd IST 6FP of UE** (Mikronowe i

sub-mikronowe przyrządy dla fotoniki - NEMO), project responsible person in IMiO: Paweł Szczepański

- [Rep22] **New possibilities of the UV generation in ion lasers in the noble gases and its mixtures** (Nowe możliwości generacji promieniowania UV w jonowych laserach pracujących na gazach szlachetnych i ich mieszaninach), project leader: Jerzy Kęsik
- [Rep23] **Optoelectronic mikrosystem to make research of samples about nano-liters volumes with using the optical capillaries**, (Mikrosystem optoelektroniczny do badania próbek o nanolitrowych objętościach z wykorzystaniem kapilar optycznych), project leader: Jan Szmidt
- [Rep24] **Photonic devices and electronic materials investigation for sensors application**, (Konstrukcje fotoniczne dla techniki sensorowej i charakteryzacja materiałów elektronicznych), project leader: Jan Szmidt
- [Rep25] **Plasma Enhanced Chemical Vapor Deposition (PECVD) as a method of fabrication of ultrathin silicon oxynitride layers for CMOS-ULSI technology**, (Chemiczne osadzanie z fazy lotnej wspomagane plazmą (PECVD) jako metoda wytwarzania ultracienkich warstw tlenkowo-azotków krzemu dla technologii CMOS-ULSI), project leader: R.B. Beck
- [Rep26] **PULLING the limits of NANOCmos electronics - PULLNANO, Integrated Project 6FP UE**, project leader: Bogdan Majkusiak
- [Rep26] **Remote optical power supply to elements of active fiber networks**, (Zdalne zasilanie mocą optyczną elementów aktywnych sieci światłowodowych), project leader: Ryszard Piramidowicz
- [Rep27] **Unipolar devices and transistors for high-temperature electronics**, (Przyrządy unipolarne i struktury tranzystorowe na potrzeby elektroniki wysokotemperaturowej), project leader: Jan Szmidt

9. CONFERENCES, SEMINARS AND MEETINGS

9.1. International Conferences

- [Con1] **Fourth Workshop of the Thematic Network on Silicon-On-Insulator Technology, Devices and Circuits EUROSOI'2008**, Cork, Ireland, January 23-25
participant: B.Majkusiak
- [Con2] **IEEE East-West Design and Test International Symposium – EWDTs'08**, Lvov, Ukraine, October 9-12
participants: W.Pleskacz, A.Wielgus
- [Con3] **IEEE International Conference on Computer Design ICCD 2008**, Lake Tahoe, CA, USA, October 12-15
participants: D.Kasprowicz, A.Pfifzner
- [Con4] **IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems; IEEE DDECS**, Bratislava, Slovakia, April 16-18
participants: T.Borejko, A.W.Łuczyk, W.A.Pleskacz, A.Ł.Sobczyk
- [Con5] **IMEKO TC 2 Symposium on Photonics in Measurements 2008**, Prague, Czech Republic, August 25 – 26
participants: P.Garbat, M.Sutkowski
- [Con6] **International Conference on Signals and Electronic Systems ICSES 2008**, Krakow, Poland, September 14-17
participants: E.Piwowska, Z.Jaworski
- [Con7] **XXII-th IEEE-SPIE Joint Symposium on Photonics, Web Engineering, Electronics for Astronomy and High Energy Physics Experiments**, Wilga, Poland, May 28 - June 1
participants: K.Anders, P.Gdula, M.Jusza, R.Piramidowicz, P.Witoński
- [Con8] **5th International Conference on Microwave Materials and Their Applications MMA-2008**, Hangzhou, China, November 1-4
participants: M.Baszun, J.Krupka, Z.Mączyński
- [Con9] **11th Euromicro Conference on Digital System Design Architectures, Methods and Tools – DSD'2008**, Parma, Italy, September 3-5
participants: W.Kuźmich, W.A.Pleskacz, M.Rakowski
- [Con10] **17th International Conference on Microwaves, Radar and Wireless Communic. MIKON 2008**, Wrocław, Poland, May 19-21
participants: B.Galwas, J.Krupka, K.Madziar, D.Paluch
- [Con11] **20th International Conference on Systems Research Informatics and Cybernetics**, Baden-Baden, Germany, July 25
participant: M.Baszun

9.2. Local Conferences

- [Con12] **II Krajowa Konferencja Nanotechnologii, Krakow, Poland, June 25-28**
participants: M.Baszun, J.Krupka, Z.Mączyński
- [Con13] **V Ogólnopolska Konferencja Naukowa „Modelowanie i Symulacja” MiS-5**, Kościelisko, Poland, June 23-27
participant: M.Baszun
- [Con14] **VII Krajowa Konferencja Elektroniki KKE'2008**, Darłówko-Wschodnie, Poland, June 2-4
participants: T.Bieniek, R.Kisiel, J.Krupka, N.Kwietniewski, M.Sochacki, J.Stęszewski, J.Szmidt
- [Con15] **VIII Konferencja „Uniwersytet Wirtualny– Model, Narzędzie, Praktyka,”** Warszawa, Poland, June 18-20
participants: K.Anders, B.Galwas, P.Garbat, M.Jusza, W.Kamiński, K.Madziar, D.Paluch, R.Piramidowicz, P.Warda, P. Witoński
- [Con16] **XV Konferencja Inżynierii Akustycznej i Biomedycznej**, Krakow-Zakopane, Poland, April 14-18
participant: M.Baszun

9.3. Schools, Seminars and Meetings

- [Con17] **Institute Semianr:** Model generacji promieniowania w laserach posiadających ośrodek aktywny w postaci kryształu fotonicznego, September 11
participants: A.Jusza, M.Jusza, M.Kaczkan, M.Klimczak, M.Koba, M.Malinowski, R.Piramidowicz, P.Szczepański
- [Con18] **Institute Semianr:** Modelowanie generacji promieniowania w falowodowych laserach planarnych wykonanych na bazie dwuwymiarowych kryształów fotonowych, January 31
participants: W.Kamiński, M.Klimczak, K.Lesniewska-Matys, M.Malinowski, A.Mossakowska-Wyszyńska, R.Piramidowicz, P.Szczepański, P.Warda, P.Witoński
- [Con19] **Institute Semianr:** Opracowanie nowej metody badawczej do badania właściwości paliw i biopaliw płynnych z wykorzystaniem kapilar optycznych, January 24
participants: M.Borecki, P.Firek, R.Gronau, K.Kłós, M.Szczęsny, J.Szmidt, P.Wrzosek
- [Con20] **NEMO General Scientific Networking Meeting'2008**, Santiago de Compostela, Spain, June 27 – July 3
participants: M.Koba, A.Moossakowska-Wyszyńska, R.Piramidowicz, P.Szczepański, A.Tyszka-Zawadzka
- [Con21] **Student Association of Microelectronics and Nanoelectronics Seminar:** Pomiary temperatury w mikro i nanoskali, December 15
participants: P.Firek, T.Gotszalk, R.Gronau, K.Kłós, M.Szczęsny
- [Con22] **Student Association of Microelectronics and Nanoelectronics Seminar:** Nowe możliwości w elektronice realizowanej w technologii węgla krzemu, June 10
participants: M.Bakowski, P.Firek, R.Gronau, K.Kłós, M.Szczęsny
- [Con23] **Student Association of Microelectronics and Nanoelectronics Seminar:** Depozycja warstw atomowych, April 24
participants: P.Firek, M.Godlewski, R.Gronau, K.Kłós, M.Szczęsny
- [Con24] **Student Association of Microelectronics and Nanoelectronics Seminar:** Nowe technologie na bazie węgla krzemu i ich zastosowania w elektronice wielkich częstotliwości, dużych mocy i wysokich temperatur, March 13
participants: P.Firek, R.Gronau, K.Kłós, M.Szczęsny, J.Szmidt
- [Con25] **Student Association of Microelectronics and Nanoelectronics Seminar:** Nowe tendencje w technice - ADAPTRONIKA, January 24
participants: M.Bossak, P.Firek, R.Gronau, K.Kłós, M.Szczęsny
- [Con26] **Student Association of Optoelectronics Seminar:** Optyczne podstawy niewidzialności, December 16
participants: A.Jusza, M.Kaczkan, M.Klimczak, P.Lesiak, M.Koba, R.Piramidowicz
- [Con27] **The Day of Division od Microelectronics and Nanotechnology Wroclaw University of Technology in IMiO – Seminar 1:** Zakład Metrologii Mikro- i Nanostruktur Wydziału Elektroniki Mikrosystemów i Fotoniki Politechniki Wrocławskiej, January 30
participants: P.Firek, T.Gotszalk, R.Gronau, K.Kłós, K.Kolanek, M.Szczęsny, J.Szmidt, M.Woszczyna
- [Con28] **The Day of Division od Microelectronics and Nanotechnology Wroclaw University of Technology in IMiO – Seminar 2:** Wytwarzanie i analiza nanostruktur przy pomocy technik mikroskopii bliskich oddziaływań oraz wysokorozdzielczej spektroskopii Ramana, January 30
participants: P.Firek, T.Gotszalk, R.Gronau, K.Kłós, K.Kolanek, M.Szczęsny, J.Szmidt, M.Woszczyna
- [Con29] **The Day of Division od Microelectronics and Nanotechnology Wroclaw University of Technology in IMiO – Seminar 3:** Mikroskop sił atomowych – możliwości i zastosowania, January 30
participants: P.Firek, T.Gotszalk, R.Gronau, K.Kłós, K.Kolanek, M.Szczęsny, J.Szmidt, M.Woszczyna
- [Con30] **15th Workshop on Dielectric in Microelectronics WODiM'2008**, Berlin, Germany, June 23-25
participants: R.Beck, B.Majkusiak, R.Mroczyński, M.Szmidt
- [Con31] **18th International Travelling Summer School on Microwave and Lightwaves**, Prague, Czech Republic, 5-11 July
participants: B.Galwas, K.Madziar, P.Szczepański
- [Con32] **31st International Spring Seminar on Electronics Technology Reliability and Life-time Prediction ISSE 2008**, Budapest, Hungary, May 7-11
participant: R.Kisiel

10. AWARDS

- [Award1] Mikołaj Baszun, **President's of the Republic of Poland Gold Medal for Long-Term Service** (Medal Złoty za Długoletnią Służbę nadany przez Prezydenta Rzeczypospolitej Polskiej)
- [Award2] Romuald Beck, Tomasz Bieniek, Andrzej Jakubowski **WUT Rector's Collective Award for Scientific Achievements**, (Nagroda Zespołowa JM Rektora PW za osiągnięcia naukowe - cykl publikacji o zastosowaniu ultrapłytkiej implantacji azotu z plazmy w.cz. do wytwarzania ultracienkich warstw dielektrycznych dla technologii ULSI-CMOS)
- [Award3] Bogdan Galawas, **WUT Rector's Individual Award for Didactic Achievements** (Nagroda Indywidualna JM Rektora PW za osiągnięcia dydaktyczne - podręcznik multimedialny "Telekomunikacja Optofalowa")
- [Award4] Irena Guzewicz-Śmiech, **President's of the Republic of Poland Gold Medal for Long-Term Service** (Medal Złoty za Długoletnią Służbę nadany przez Prezydenta Rzeczypospolitej Polskiej)
- [Award5] Andrzej Jakubowski, Lidia Łukasiak, Agnieszka Zaręba, **WUT Rector's Collective Award for Scientific Achievements**, (Nagroda Zespołowa JM Rektora PW za osiągnięcia naukowe - prace w dziedzinie modelowania i charakteryzacji przyrządów polprzewodnikowych typu HBT i MOS z warstwami SiGe)
- [Award6] Jerzy Krupka, **Bronze Medal and Diploma from Association Of Polish Inventors And Rationalizers on International Invention & Innovation Show IWIS-2008** (Brązowy medal i Dyplom od Stowarzyszenia Polskich Wynalazców i Racjonalizatorów na Międzynarodowej Wystawie Wynalazków IWIS-2008 za wynalazek „Rezonatory do pomiaru elektromagnetycznych właściwości materiałów w paśmie częstotliwości mikrofalowych”)
- [Award7] Bogdan Majkusiak, **WUT Rector's Individual Award for Scientific Achievements** (Nagroda Indywidualna JM Rektora PW za osiągnięcia naukowe - "Modelowanie kwantowo-mechaniczne zjawisk fizycznych w nanoelektronicznych strukturach polprzewodnikowych typu MOS/SOI")
- [Award8] Michał Malinowski, Ryszard Piramidowicz, Magdalena Nakielska, Mariusz Klimczak, Jerzy Sarnecki, **WUT Rector's Collective Award for Scientific Achievements**, (Nagroda Zespołowa JM Rektora PW za osiągnięcia naukowe - "Badania i modelowanie światłowodowych, dielektrycznych osrodków wzmacniających i laserowych")
- [Award9] Zdzisław Mączyński, **Medal of National Education Commission** (Medal Komisji Edukacji Narodowej)
- [Award10] Witold Pleskacz, **"Golden Chalk" - Student Council of the Faculty Teaching Award** ("Złota Kreda" dla Najlepszego Wykładowcy w Kategorii Przedmiotów Modelowych Studiów I Stopnia od Samorządu Studenckiego Wydziału Elektroniki i Technik Informacyjnych)
- [Award11] Zbigniew Szczepański, **WUT Rector's Individual Award for Scientific and Didactic Ensemble of Achievements** (Nagroda Indywidualna JM Rektora PW za całokształt osiągnięć naukowych i dydaktycznych)
- [Award12] Jan Szmidt, Małgorzata Jakubowska, Jerzy Kalenik, Ryszard Kisiel, Zbigniew Szczepański, Konrad Kielbasiński, Anna Młozniak, E. Zwierkowska, Krystyna Szyłko, Ryszard Biadań, **WUT Rector's Collective Award for Organizing Achievements**, (Nagroda Zespołowa JM Rektora PW za osiągnięcia organizacyjne -"Integracje środowiska naukowców zajmujących się tematyką mikroukładów hybrydowych i mikrosystemów w ramach Środowiskowego Laboratorium Mikroukładów Hybrydowych i Mikrosystemów")
- [Award13] Jan Szmidt, Elżbieta Staryga, Riwana Torz-Piotrowska, Andrzej Wrzyszczyński, Kazimierz Paprocki, **Gold Medal and Diploma with Distinction from Association of Polish Inventors And Rationalizers on International Invention & Innovation Show IWIS-2008 for „Diamond Electrodes Produced by HF CVD Method for Electrochemical Applications”**(Dyplom i Złoty Medal z Wyróżnieniem od Stowarzyszenia Polskich Wynalazców i Racjonalizatorów na Międzynarodowej Wystawie Wynalazków IWIS-2008 za wynalazek „Diamentowe elektrody wytwarzane metodą HF CVD dla elektrochemicznych zastosowań”)
- [Award14] Jan Szmidt, Elżbieta Staryga, Riwana Torz-Piotrowska, Andrzej Wrzyszczyński, Kazimierz Paprocki, **Genius Medal from Association of Hungarian Inventors on International Invention & Innovation Show IWIS-2008 for „Diamond Electrodes Produced by HF CVD Method for Electrochemical Applications”**(Medal od Stowarzyszenia Węgierskich Wynalazców na Międzynarodowej Wystawie Wynalazków IWIS-2008 za wynalazek „Diamentowe elektrody wytwarzane metodą HF CVD dla elektrochemicznych zastosowań”)
- [Award15] Mateusz Śmietana, **WUT Rector's Individual Award for Scientific Achievements - Diamond-like carbon films applied in optical waveguide sensing techniques** (Nagroda Indywidualna JM Rektora PW za osiągnięcia naukowe - rozprawa doktorska pt.:Warstwy diamentopodobne w światłowodowej technice czujnikowej)