WARSAW UNIVERSITY OF TECHNOLOGY
Faculty of Electronics and Information Technology

Institute of Microelectronics and Optoelectronics

annual report 2017

WARSAW UNIVERSITY OF TECHNOLOGY
Faculty of Electronics and Information Technology

Institute of Microelectronics and Optoelectronics

annual report 2017

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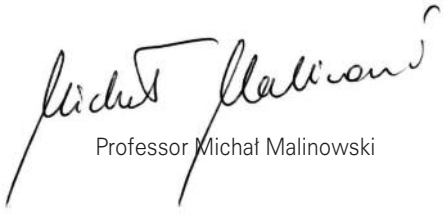
From the Director

This Annual Report summarizes the activities of the Institute of Microelectronics and Optoelectronics (IMiO) in the year 2017, with particular attention given to its research and educational potential. The Institute is a part of the Faculty of Electronics and Information Technology, the biggest faculty of the Warsaw University of Technology. Among six institutes constituting the Faculty, Institute of Microelectronics and Optoelectronics is the one most focused on advanced technologies of modern electronics and photonics.

It should be noted that the Institute has its roots deep in history. Although formally founded in 1970, it evolved from the Chair of Radio Engineering established in 1929 by Professor Janusz Groszkowski, who is often called "the father of Polish electronics". The Institute is linked with the beginnings of the Faculty of Electronics and Information Technology not only by the person of Prof. Groszkowski, who worked in IMiO until end of his career, but also by its location – part of the Institute is situated in the Building of Radio Engineering at the Warsaw University of Technology main campus where the Faculty started its operation in 1951 (as the Faculty of Communications). Currently, the Institute's Technology Centre is located there. It includes laboratories specializing in silicon processing (clean-room), hybrid technologies and assembly techniques, fibre optic and integrated optoelectronics, laser optoelectronics and characterization of new electronic and photonic materials. All 11 high-tech laboratories in the field of electronic and photonic technologies established as a result of the investments conducted in recent years within the Innovative Economy Operational Program framework have reached their full operational capacity and are extensively used to conduct advanced research and provide research services.

The present research activities of the Institute are concentrated in the area of microelectronics, nanoelectronics and photonics. These include in particular: VLSI systems, microelectronic and nanoelectronic semiconductor devices, hybrid circuits (e.g., microwave, optoelectronic), sensors, microsystems, lasers, active photonic materials, fiber optics and integrated photonics, electronic imaging and image processing. It is worth to emphasize that research activities of the Institute include modelling, CAD, manufacturing and versatile characterization. In the field of teaching, the Institute meets the challenges posed by the development of modern technology and information society. The educational offer (at all levels – B.Sc., M.Sc. and Ph.D.) reflects the main fields of the advanced electronics and photonics and, simultaneously, the main research expertise of the Institute. The Institute's involvement in distance learning studies of Electronics and Telecommunications is also worth mentioning, especially postgraduate studies in the domain of tools and techniques of virtual education that began in 2004. Several student laboratories in the area of electronics, microelectronics and photonics, located in the recently expanded wings of the Faculty building, have reached their full operational capacity in 2017, improving considerably the quality of the education offered by IMiO.

Moreover, I would like to thank all the colleagues working at IMiO for their constant commitment and effort to make the Institute an outstanding place to be.



Professor Michał Malinowski

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1. GENERAL INFORMATION

1.1. Board of Directors

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1.2. Organisation of the Institute and Areas of its Activities

The Institute of Microelectronics and Opto-electronics is a part of the Faculty of Electronics and Information Technology – the largest Faculty of the Warsaw University of Technology. Our Institute consists of five divisions:

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

During the past forty-six 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 UE Framework Programme.
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.

1.3. Microelectronics and Nanoelectronics Devices Division

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 microcontrollers.

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Sławomir Szostak, Ph.D.	Assistant Professor
Jakub Walczak, Ph.D.	Assistant Professor
Agnieszka Zaręba, Ph.D.	Senior Lecturer

Junior academic staff

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Mirosław Puźniak, M.Sc.	Ph.D. Student
Małgorzata Szulkowska, M.Sc.	Ph.D. Student
Piotr Wiśniewski, M.Sc.	Ph.D. Student

Technical and administrative staff

Witold Ciemiewski
Kazimierz Dalbiak
Krzysztof Krogulski

To name a few examples of its research topics:

- 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 (modeling of devices behaviour and modeling 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, SiOxNy);
- Ultra-shallow implantation from r.f. plasma;
- Very low temperature processing of test structure;
- Fabrication of ultrathin amorphous silicon layers by PECVD
- Fabrication of double barrier structures and devices;
- MEMS/MOEMS processing;
- Silicon photonic devices fabrication.

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1.4. VLSI Engineering and Design Automation Division

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, investigations of new devices and circuits for future generations of microelectronic systems.

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Tomasz Borejko, Ph.D.	Assistant Professor
Zbigniew Jaworski, Ph.D.	Assistant Professor
Dominik Kasprowicz, Ph.D.	Assistant Professor
Arkadiusz Łuczyk, Ph.D.	Assistant Professor
Krzysztof Siwiec, Ph.D.	Assistant Professor
Marek Niewiński, Ph.D.	Assistant Professor
Andrzej Wielgus, Ph.D.	Assistant Professor
Adam Wojtasik, Ph.D.	Assistant Professor

Junior academic staff

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Marek Ciepłucha, M.Sc.	Ph.D. Student
Jakub Kopański, M.Sc.	Ph.D. Student
Daniel Pietroń, M.Sc.	Ph.D. Student, Science Assistant
Łukasz Wiechowski, M.Sc.	Ph.D. Student, Science Assistant
Michał Wołodźko, M.Sc.	Ph.D. Student

Science research staff

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Paweł Narczyk, M.Sc.	Assistant

Technical and administrative staff

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

Current research projects in the Division include:

- methodologies of integrated circuit design for manu-facturability: 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,
- development of CAD tools for integrated circuit design and verification, with special emphasis on analog full custom ASICs design,
- design of digital, analog and mixed signal VLSI circuits for special applications such as innovative AD converters, data processing in physical experiments and medical equipment, RF front ends for wireless data transmission etc.,
- modeling and control of leakage currents in nanometer digital circuits,
- investigations and development of new VESTIC microelectronics technology.

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1.5. Image and Microwave Photonics Division

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

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Krzysztof Madziar, Ph.D.	Assistant Professor
Jerzy Piotrowski, Ph.D.	Assistant Professor
Marek Sutkowski, Ph.D.	Assistant Professor
Piotr Witoński, Ph.D.	Assistant Professor
Agnieszka Szymańska, Ph.D.	Senior Lecturer

Technical and administrative staff

Jerzy Domański, M.Sc.

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

- theoretical principles of image modeling, processing and analysis;
- application of image processing methods for diagnostic control and measurement systems in industry, medicine, research and commerce;
- image acquisition in polarization imaging systems and optical image processing;
- 3D Vision methods and algorithms;
- electro optic effects in liquid crystals and their applications to LCD and photo refractive phenomena in liquid crystals;
- 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;
- modelling and computer aided design of microwave devices and circuits;
- controlling of microwave circuits parameters by means of optical signals;
- investigations and modeling of optical-microwave frequency conversion processes;
- modeling of optically controlled microwave devices, as photodiodes, photovaractors, phototransistors;
- modeling of optoelectronic and microwave devices for data transmission networks.

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1.6. Electronic Materials and Microsystem Technology Division

The research activity of the Division concentrates on optoelectronics (e.g., measuring systems using fiber optic sensors), and hybrid technologies, and the development of wide bandgap semiconductor technology in the design, modeling and manufacturing of microelectronic devices operating at high temperatures, including power semiconductor devices. Fundamental and applied research are carried out. Research groups are organised for defined tasks.

Head of the Division

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Piotr Firek, Ph.D.	Assistant Professor
Jerzy Kalenik, Ph.D.	Assistant Professor
Konrad Kiełbasiński, Ph.D.	Assistant Professor
Krystian Król, Ph.D.	Assistant Professor
Aleksander Werbowy, Ph.D.	Assistant Professor

Junior academic staff

Magdalena Dominik, M.Sc.	Ph.D. Student
Maciej Kamiński, M.Sc.	Ph.D. Student
Kinga Kondracka, M.Sc.	Ph.D. Student
Anna Katarzyna Myśliwiec, M.Sc.	Ph.D. Student
Michał Myśliwiec, M.Sc.	Ph.D. Student
Bartłomiej Stonio, M.Sc.	Ph.D. Student
Anastasiia Veklych, M.Sc.	Ph.D. Student
Michał Waśkiewicz, M.Sc	Ph.D. Student

Science research staff

Jerzy Krupka, Ph.D., D.Sc.	Tenured Professor
Mariusz Sochacki, Ph.D., D.Sc.	Professor
Norbert Kwietniewski, M.Sc	Assistant

Technical and administrative staff

Katarzyna Kubicka

The main research areas are as follows:

- the use of graphene in the design of photodetectors for the far-infrared range with the electrical and optical characterization of graphene produced on different substrates, or a transferred onto the substrate;
- the design, modeling and fabrication of microelectronic devices based on silicon carbide (SiC) technology;
- the development of electrical characterization methods for the determination of energy distribution of traps in MOS devices;
- designing, modeling and fabrication of microelectronic and optoelectronic devices using transparent dielectric and conductive oxides Fabrication, and characterization of high-k dielectric layers;
- 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 Surface Mount Technologies SMT on 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.);
- Design, fabrication and characterization of multi-junction photovoltaic cells with high energy efficiency;
- design and monitoring of photovoltaic systems, strategy for development of photovoltaics;
- 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.

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1.7. Optoelectronics Division

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, new optical waveguide materials and structures, laser spectroscopy, laser construction and laser applications in medicine and air pollution monitoring.
Photovoltaics laboratory, as a part of the Division, serves as a focal point for conducting and stimulating research and demonstration activities, educating students, organizing technical meetings, workshops, symposia and conferences, disseminating information and addressing environmental issues.

Head of the Division

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Marcin Kaczkan, Ph.D.	Assistant Professor
Jerzy Kęsik, Ph.D.	Assistant Professor
Agnieszka Mossakowska- -Wyszyńska, Ph.D.	Assistant Professor
Stanisław Stopiński, Ph.D.	Assistant Professor
Anna Tyszka-Zawadzka, Ph.D.	Assistant Professor
Piotr Warda, Ph.D.	Assistant Professor

Junior academic staff

Krzysztof Anders, M.Sc.	Assistant
Dawid Budnicki, M.Sc.	Ph.D. Student
Marta Filipowicz, M.Sc.	Ph.D. Student
Bartosz Janaszek, M.Sc.	Ph.D. Student
Anna Jusza, M.Sc.	Assistant
Marcin Kieliszczyk, M.Sc.	Ph.D. Student
Paweł Komorowski, M.Sc.	Ph.D. Student
Marcin Kowalczyk, M.Sc.	Ph.D. Student
Aleksandra Paśnikowska, M.Sc.	Ph.D. Student
Mateusz Słowikowski, M.Sc.	Ph.D. Student
Tomasz Stańczyk, M.Sc.	Ph.D. Student
Tadeusz Tenderenda, M.Sc.	Ph.D. Student

Science research staff

Marcin Koba, Ph.D, D.Sc.	Professor
Marek Gusowski, Ph.D.	Assistant Professor
Andrzej Kaźmierczak, Ph.D,	Assistant Professor

Technical and administrative staff

Bartosz Fetliński, M.Sc.
Maciej Juźwik, M.Sc.

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;
- 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;
- spectroscopic and theoretical research of light generation in silicon photonic lasers.

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1.8. Statistical Data

SPECIFICATION	2016	2017	DIFFERENCE
Academic staff	**78**	**74**	**-4**
Tenured professors	10	9	-1
Professors	7	8	+1
Docent	1	1	0
Assistant professors	29	27	-2
Senior lecturers	3	2	-1
Assistants and Ph.D. students	28	27	-1
Science research staff	**9**	**11**	**+2**
Technical and Administrative staff	**19**	**18**	**-1**
Teaching activities	**76**	**77**	**+1**
Basic courses	38	39	+1
Advanced courses	16	16	0
Special courses	22	22	0
Research projects	**39**	**32**	**-7**
Granted by the University	17	11	-6
Granted by State Institutions	18	16	-2
Granted by International Institutions	4	5	+1
Degrees awarded	**45**	**51**	**+6**
D.Sc. degrees	0	3	+3
Ph.D. degrees	4	2	-2
M.Sc. degrees	10	9	-1
B.Sc. degrees	31	37	+6
Publications	**183**	**140**	**-43**
Sci.-tech. books	1	2	+1
Sci.-tech. papers in journals	49	48	-1
Sci.-tech. papers in conference proceedings	133	90	-43
Patents	**2**	**7**	**+5**
Reports	**131**	**84**	**-47**
Conferences	**33**	**35**	**+2**
Awards	**14**	**14**	**0**

Microelectronics and Nanoelectronics Devices Division

2. STAFF

2.1. Senior Academic Staff

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–'08), Member od Programme Committee of: Diagnostics & Yield Conference ('88–), Member of the Faculty Council ('96–), Co-chairman ('03–), Chairman ('06); Member of Programme Committee of ELTE ('84, '04, '07, '13), Member of Technical Programme Committee ESSDERC ('05–'13), Senior Member of IEEE ('97–'06), Head of CEZAMAT Project Office ('08–'12), Vice-President for Scientific Affairs of CEZAMAT PW Ltd ('12–)., WUT Rector's Collective Award for Scientific Achievements ('06,'08,'12).

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2.2. Junior Research Staff

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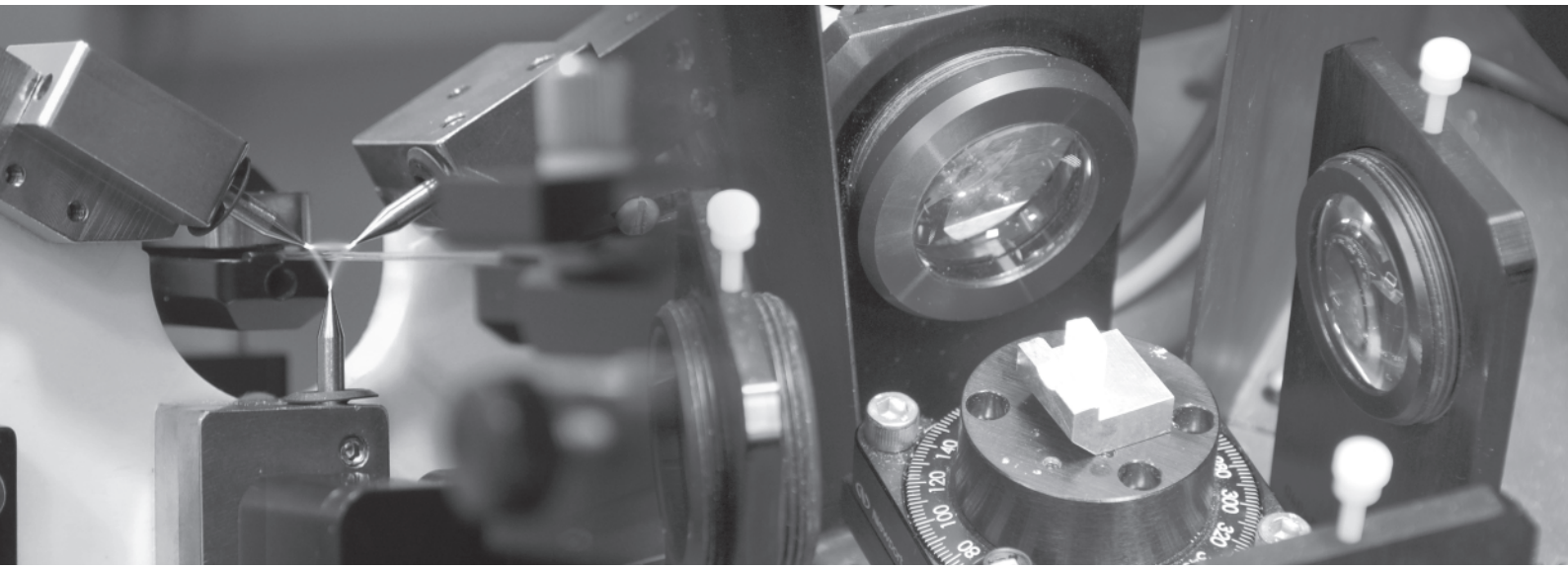
GR | Building of Radio Engineering – ul. Koszykowa 75
GE | Building of Electronics – ul. Nowowiejska 15/19
GG | WUT Main Building – Pl. Politechniki 1



Optoelectronics Division

2.3. Science Research Staff

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Andrzej Kaźmierczak	Ph.D.	Research Assistant Professor	+48 22 2347782	027 GR
Marcin Koba	Ph.D., D.Sc.	Research Assistant Professor	+48 22 2347782	028 GR
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2.4. Technical and Administrative Staff

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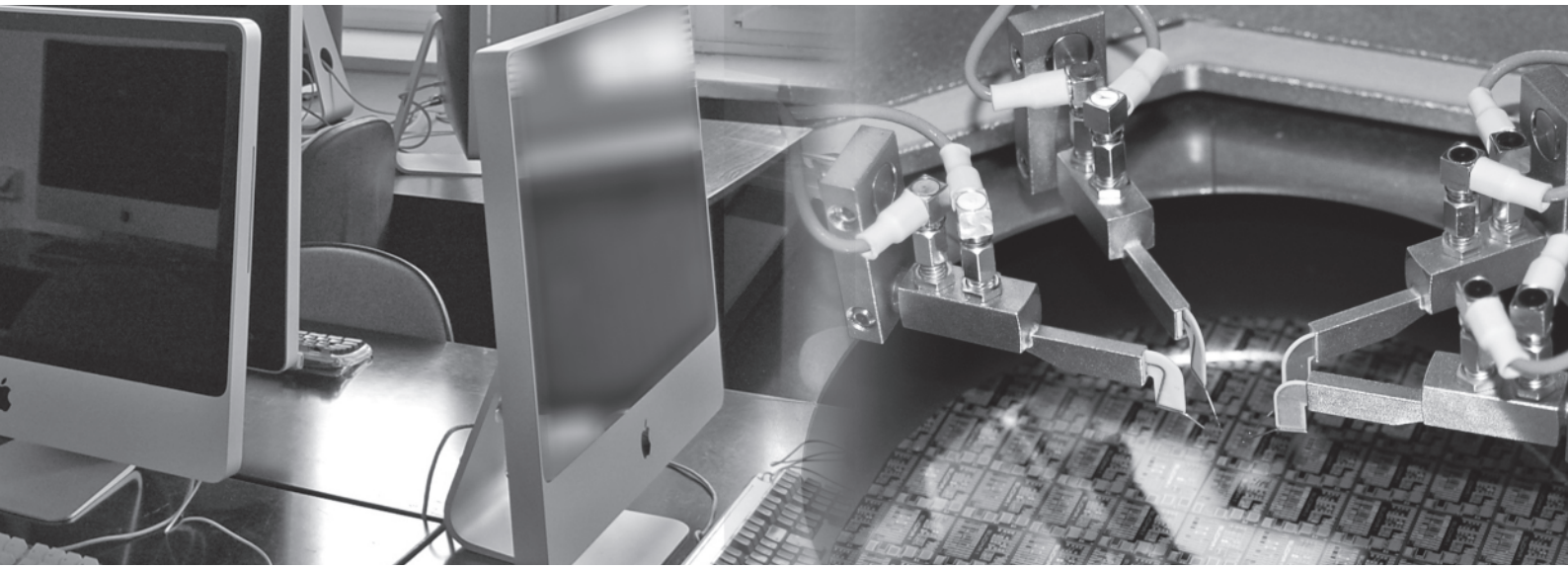
Bogdan Sowa	M.A.	Financial Specialist	+48 22 2347771	236 GR
Sylwia Trubisz		Administrative Specialist	+48 22 2346046	237 GR



VLSI Engineering
and Design Automation Division

3. TEACHING ACTIVITIES

3.1. Basic Courses

[Edu1] **Algorithms and Data Structures** (Algorytmy i struktury danych), **AISDE**, Adam Wojtasik

[Edu2] **Analog Circuit Design for VLSI Systems** (Projektowanie układów analogowych dla systemów VLSI) **PUAV**, Wiesław Kuźmicz

[Edu3] **Application of Matlab in Calculation Methods** (Matlab w zastosowanych metodach obliczeniowych) **MZMO**, Mikołaj Baszun, Krystian Król

[Edu4] **Computer-Aided Design of Printed-Board Circuits** (Projektowanie obwodów drukowanych), **PADS**, Jerzy Kalenik, Ryszard Kisiel

[Edu5] **Digital Circuits** (Układy cyfrowe), **UCYF**, Elżbieta Piwowarska

[Edu6] **Electronic Elements and Circuits** (Elementy i układy elektroniczne), **ELIU**, Andrzej Pfitzner

[Edu7] **Electronic Elements and Circuits – Laboratory** (Elementy i układy elektroniczne – laboratorium), **ELIUL**, Andrzej Pfitzner

[Edu8] **Electronics 1** (Elektronika 1), **ELE1**, Lidia Łukasiak, Sławomir Szostak

[Edu9] **Electronics 2** (Elektronika 2), **ELE2**, Lidia Łukasiak, Jakub Jasiński

[Edu10] **Equipment – Programming Synthesis of Digital Systems** (Synteza sprzętowo – programowa systemów cyfrowych), **SSP**, Elżbieta Piwowarska

[Edu11] **Fields and waves**, (Pola i fale), **POFA**, Jerzy Piotrowski

[Edu12] **Fundamentals of Circuit and System Technology** (Podstawy technologii układów i systemów), **PTUIS**, Romuald Beck

[Edu13] **Fundamentals of Lasers** (Lasery – kurs podstawowy), **LKP**, Paweł Szczepański

[Edu14] **Fundamentals of Microelectronics** (Podstawy mikroelektroniki), **PMK**, Wiesław Kuźmicz

[Edu15] **Fundamentals of Microprocessor Techniques** (Podstawy techniki mikroprocesorowej), **TMIK**, Lidia Łukasiak

[Edu16] **Fundamentals of Microwave Engineering** (Podstawy techniki w.cz.), **TWCZ**, Jerzy Piotrowski

[Edu17] **Fundamentals of Plasmonics and Metamaterials** (Podstawy plazmoniki i metamateriałów), **PLAZ**, Janusz Parka

[Edu18] **Fundamentals of Photonics** (Podstawy fotoniki), **FOT**, Michał Malinowski

[Edu19] **Fundamentals of Solid State Electronics** (Elektronika ciała stałego), **ELCS**, Jan Szmidt, Witold Pleskacz

[Edu20] **Hybrid Systems** (Układy hybrydowe), **UKH**, Ryszard Kisiel

[Edu21] **Integrated Optoelectronics** (Optoelektronika zintegrowana) **OZT**, Michał Malinowski

[Edu22] **Introduction to Microsystems** (Wstęp do mikrosystemów), **WMS**, Andrzej Mazurak, Robert Mroczyński

[Edu23] **Introduction to Numerical Methods** (Wstęp do metod numerycznych), **WNUM**, Jerzy Krupka

[Edu24] **Introduction to Programming** (Podstawy programowania), **PRM**, Marek Niewiński

[Edu25] **Introduction to the UNIX System** (Użytkowanie systemu UNIX), **USUX**, Andrzej Wielgus

[Edu26] **Ligthwave Telecommunication** (Telekomunikacja optofalowa), **TEOP**, Agnieszka Szymańska

[Edu27] **Meeting 1 – Fundamentals of Information Technology** (Zjazd 1 – Podstawy technologii informacyjnej), **ZJ1Z**, Krzysztof Madziar

[Edu28] **Meeting 4 – Advanced Course Laboratory** (Zjazd 4 – Zaawansowane laboratorium kierunkowe), **ZJ4Z**, Agnieszka Szymańska

[Edu29] **Methods of Image Acquisition and Processing for Photography** (Techniki rejestracji i obróbki obrazów w fotografii), **TROOF**, Marek Sutkowski

[Edu30] **Object Programming** (Programowanie obiektowe), **PROE**, Adam Wojtasik

[Edu31] **Operating Systems** (Systemy operacyjne), **SOE**, Andrzej Wielgus

[Edu32] **Optoelectronic Devices and Systems** (Elementy i systemy optoelektroniczne), **ESO**, Marcin Kaczkan

[Edu33] **Physical Fundamentals of Information Processing** (Fizyczne podstawy przetwarzania informacji), **FPPI**, Jan Szmidt, Bogdan Majkusiak

[Edu34] **Physics** (Fizyka ogólna), **FOM**, Mikołaj Baszun

[Edu35] **Programming for mobile Apple iOS and MacOS X** (Programowanie dla systemów: mobilnego iOS oraz MacOS X), **APIOS**, Adam Wojtasik

[Edu36] **Programming microcontrollers in C language** (Programowanie mikrokontrolerów w języku C), **PMIK**, Sławomir Szostak

[Edu37] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PP**, Lidia Łukasiak, Andrzej Pfitzner

[Edu38] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PPRM**, Antoni Siennicki

[Edu39] **Solid-State Physics** (Fizyka ciała stałego), **FCSM**, Jan Szmidt, Agnieszka Zaręba

3.2. Advanced Courses

[Edu40] **Advanced Semiconductor Structures** (Zaawansowane struktury półprzewodnikowe) **ZSP**, Tomasz Skotnicki

[Edu41] **Analog Integrated Circuit Design for VLSI Systems** (Projektowanie bloków analogowych dla systemów VLSI) **PSSA**, Wiesław Kuźmicz, Tomasz Borejko

[Edu42] **Characterization of Materials for Microelectronics** (Charakteryzacja materiałów dla mikroelektroniki) **CHA**, Jan Szmidt, Aleksander Werbowy

[Edu43] **Computational Methods in Microelectronics and Photonics** (Metody obliczeniowe w mikroelektronice i fotonice), **MOBI**, Andrzej Pfitzner, Dominik Kasprowicz, Agnieszka Mossakowska-Wyszyńska

[Edu44] **Digital Image Processing** (Cyfrowe przetwarzanie obrazów), **CPOO**, Piotr Garbat

[Edu45] **Fiber-Optic Communication** (Komunikacja światłowodowa), **KOS**, Ryszard Piramidowicz

[Edu46] **Fundamentals of Nanoelectronics and Nanophotonics** (Podstawy nanoelektroniki i nanofotoniki), **NANO**, Bogdan Majkusiak, Paweł Szczepański

[Edu47] **Fundamentals of Photovoltaics** (Podstawy fotowoltaiki) **PFOT**, Michał Malinowski

[Edu48] **Introduction to Digital VLSI System Design** (Projektowanie scalonych systemów cyfrowych), **PSSC**, Zbigniew Jaworski

[Edu49] **Laboratory of Fundamentals of Nanoelectronics and Nanophotonics** (Pracownia podstaw nanoelektroniki i nanofotoniki), **PNAN**, Bogdan Majkusiak, Paweł Szczepański

[Edu50] **Lasers** (Lasery) **LAS**, Paweł Szczepański

[Edu51] **Microsystems Engineering** (Inżynieria mikrosystemów) **MIK**, Ryszard Kisiel

[Edu52] **Nanotechnologies** (Nanotechnologie), **NAN**, Jan Szmidt, Aleksander Werbowy

[Edu53] **Photovoltaic Systems** (Systemy fotowoltaiczne), **SFOT**, Mateusz Śmietana

[Edu54] **Vision Monitoring Systems** (Systemy monitoringu wizyjnego) **SYMW**, Piotr Garbat

[Edu55] **VLSI System Design** (Projektowanie systemów scalonych w technice VLSI), **PSSV**, Wiesław Kuźmicz, Zbigniew Jaworski

3.3. Courses in English

[Edu56] **Electronics 1, EELE1**, Bogdan Majkusiak

3.4. Courses for other Faculties

[Edu57] **Ecologic Aspects of Electronic Materials and Equipment Production, Faculty of Management** (Ekologiczne aspekty produkcji materiałów I urządzeń elektronicznych, Wydział Zarządzania), **EKASP**, Ryszard Kisiel

[Edu58] **Electromagnetic Compatibility, Faculty of Management** (Kompatybilność elektromagnetyczna, Wydział Zarządzania), **KOMEL**, Jerzy Piotrowski

[Edu59] **Electronic Circuits and the Introduction to Microelectronics, Faculty of Management** (Układy elektroniczne i wstęp do mikroelektroniki, Wydział Zarządzania), **UEMIK**, Sławomir Szostak

[Edu60] **Electronic Devices, Faculty of Management** (Elementy elektroniczne, Wydział Zarządzania), **ELEME**, Lidia Łukasiak

[Edu61] **Electronic Equipment Assembly Processes, Faculty of Management** (Inżynieria montażu urządzeń elektronicznych, Wydział Zarządzania), **IMUEL**, Ryszard Kisiel

[Edu62] **Electronic Equipment Design Techniques, Faculty of Management** (Techniki konstrukcji urządzeń elektronicznych, Wydział Zarządzania), **TEKUE**, Ryszard Kisiel

[Edu63] **Electronic Material and Structure Production Engineering, Faculty of Management** (Inżynieria produkcji materiałów i struktur elektronicznych, Wydział Zarządzania), **INMAS**, Mikołaj Baszun

[Edu64] **Electronics 1, Faculty of Mechatronics** (Elektronika 1, Wydział Mechatroniki), **ELE1**, Sławomir Szostak

[Edu65] **Electronics 2, Faculty of Mechatronics** (Elektronika 2, Wydział Mechatroniki), **ELE2**, Jakub Jasiński

[Edu66] **Energy Conditioning and Storage Laboratory, Faculty of Physics** (Laboratorium przetwarzania i magazynowania energii, Wydział Fizyki) **LPME**, Michał Malinowski

[Edu67] **Information Techniques and Systems, Faculty of Transport** (Technologie i systemy informatyczne, Wydział Transportu), **TISI**, Jarosław Dawidczyk

[Edu68] **Introduction to Microprocessor Systems, Faculty of Management** (Wstęp do systemów mikroprocesorowych, Wydział Zarządzania), **WSYMI**, Jakub Jasiński

[Edu69] **Laboratory of Nanotechnology, Faculty of Physics** (Laboratorium nanotechnologii, Wydział Fizyki), **NAN**, Robert Mroczyński

[Edu70] **Laboratory of Photonics, Faculty of Physics** (Laboratorium fotoniki, Wydział Fizyki), **FOT**, Ryszard Piramidowicz

[Edu71] **Laboratory of Physics 2, Faculty of Physics** (Laboratorium Fizyki 2, Wydział Fizyki), **FIZ2**, Janusz Parka

[Edu72] **Logic Circuits, Faculty of Management** (Układy logiczne, Wydział Zarządzania), **UKLO**, Piotr Firek

[Edu73] **Laser Technology, Faculty of Physics** (Technika Laserów, Wydział Fizyki), **TL**, Ryszard Piramidowicz

[Edu74] **Methods of Electronic Element Diagnostics, Faculty of Management** (Metody diagnostyki elementów elektronicznych, Wydział Zarządzania), **MEDEL**, Jan Gibki

[Edu75] **Photonic Devices, Faculty of Management** (Elementy fotoniczne, Wydział Zarządzania), **ELFOT**, Ryszard Piramidowicz

3.5. Courses in English for other Faculties

[Edu76] **Optical Fiber Technology, Faculty of Mechatronics** (Techniki światłowodowe, Wydział Mechatroniki), **OFT**, Ryszard Piramidowicz

[Edu77] **Photographic Techniques in Image Acqusition, Faculty of Mechatronics** (Techniki fotograficzne w rejestracji obrazów, Wydział Mechatroniki), **PTIA**, Marek Sutkowski

Image and Microwave
Photonics Division

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, May 2016–May 2017, **sub-projects:**

[Pro1.1] **Analysis and investigation of optical materials, photonic structures and circuits** (Analiza i badania materiałów, struktur i układów fotonicznych), project leaders: Michał Malinowski and Paweł Szczepański, co-workers: Agnieszka Mossakowska-Wyszyńska, Stanisław Jonak, Marcin Kaczkan, Ryszard Piramidowicz

The project includes spectroscopic investigations of rare-earth activated solids for technological and biological applications, as well as studies of periodic active and passive structure for potonic applications. This concerns bulk, nanocrystalline and waveguide matrix for lasers and amplifiers, various phosphors, including white light and up-conversion phosphors, sensors, and photovoltaic conversion, as well as hyperbolic metamaterials and PT-structers.

The project is focused on development of modeling tools for optical passive and active micro-photonic devices such as; planar and fiber waveguides, amplifiers and lasers, nonlinear optical high-finesse (ring, DFB/DBR, photonic crystal) resonators, power optimization and quantum noise analysis of amplifiers and lasers, laser action studies in new solid-state lasers, including waveguide and photonic crystal structures, tunable filters and absorbers as well as novel class of active media based on active hyperbolic metamaterials.

[Pro1.2] **Modeling of the charge transport in the solid body including collisions, using Monte Carlo method** (Modelowanie metodą Monte Carlo transportu cząstek w ciele stałym z uwzględnieniem zderzeń), project leader: Andrzej Pfitzner; co-workers – other members of the VLSI Engineering and Design Automation Division.

As the dimensions of integrated circuits shrink to nanometer scale, the physical phenomena which occur during charge transport become quite complex. Typical drift-diffusion and hydrodynamic models cannot take them into account because of its applicability limitation. To overcome this problem one could use Ensemble Monte Carlo technique enhanced with quantum-mechanical models of collisions to solve the transport equation. The main disadvantage of this method is lack of open access software. The available commercial implementation by contrast can not be extended with new phenomena models developed by user. So, the aim of this work was to develop new – easily extensible – software for simulating charge transport implementing self – consistent Ensemble Monte Carlo method. The strong emphasis was put on implementation of probabilistic collision's models with phonon and impurities. The modified and adjusted C^{++} classes from OpenFOAM framework were widely used.

The main accomplish tasks includes:

- elaboration of a new "problem case" directory structure (using OpenFOAM data format) which allows user to assign material and doping properties to selected geometry region and also allows to define the types and the positions of the contacts;
- a new Self Consistent Ensemble Monte Carlo 3D solver which includes: implementation of the charge dispersion algorithms (optical and acoustic phonon collisions and collision with impurities – Brooks-Herring model) and dedicated Poisson solver which takes into account the spatial distribution of charge particles;

The results from the new solver were compared to the results from Archimedes 2D Monte Carlo simulator. This preliminary test shows a good agreement what confirm the correctness of algorithm implementation.

[Pro1.3] **Structures, technologies and materials for sensor systems and microsystems based on detectors, which includes materials characterization by means of electrical, photonic and microwave resonance methods, development of laboratory scale technology and assembly of photonic and electronic structures for microsystem integration and development of high efficiency power electronic converters for renewable energy resources** (Konstrukcje, technologie i materiały dla sensoryki i mikrosystemów z udziałem czujników, w tym charakteryzacje materiałów metodami elektrycznymi, fotonicznymi i rezonansu mikrofalowego, opracowanie w skali laboratoryjnej technologii i konstrukcji struktur fotonicznych i elektronicznych na potrzeby integracji mikrosystemowej oraz rozwój przekształtników energoelektronicznych o wysokiej sprawności współpracujących z odnawialnymi źródłami energii elektrycznej), project leader: Jan Szmidt, co-workers: Michał Borecki, Aleksander Werbowy, Ryszard Kisiel, Mariusz Sochacki, Jerzy Krupka, Piotr Firek, Jerzy Kalenik, Mateusz Śmietana

Within the framework of the project several goals were achieved. Electromagnetic properties of high-resistive silicon were investigated. Fiber-optic sensor systems sensitivity, intended for studying biological materials, was optimized by applying thin film cover layers. Ion-sensitive field effect transistor (ISFET) structures were fabricated and characterized from the point of view of their potential applications in biological and medical sciences. Heterojunction ZnO/4H-SiC visible range-blind UV detecting diodes were fabricated and studied. High efficiency power electronic converters for renewable energy resources were developed and studied.

[Pro1.4] **The development and comprehensive characterization of MOS/MOSFET structures with high-k dielectric materials** (Technologia struktur testowych MOS/MOSFET oraz weryfikacja jakości wytworzonych struktur półprzewodnikowych), project leader: Robert Mroczyński

The aim of this project is the development and comprehensive characterization of MOS/MOSFET structures with high-k dielectric materials. The dielectric stack will be fabricated by means of low-temperature technologies, i.e., Plasma-Enhanced Chemical Vapor Deposition and Reactive Magnetron Sputtering. As the metal gate aluminum, as well as titanium nitride (TiN) will be used. Electrical characterization of fabricated in this work MOS structures will be performed in order to ultimate verification of the quality of technology available in modernized clean-room facility at the disposal of Division of Microelectronic and Nanoelectronic Devices.

[Pro1.5] **Use of polarization splitting phenomenon in microwave photonic devices** (Zastosowanie zjawiska polaryzacji światła w układach fotoniki mikrofalowej oraz możliwość wykorzystania metod zobrazowań tomograficznych w zakresie ubTHz i THz), project leader: Janusz Parka, co-workers: Jerzy Woźnicki, Piotr Garbat, Krzysztof Madziar, Marek Sutkowski, Piotr Witoński, Jerzy Piotrowski, Agnieszka Szymańska, Jerzy Domański

The use of polarization beam splitting opens a new degree of freedom for microwave photonic elements. The use of this phenomena and devices like polarization beam splitters/combiners (PBS/PBC) expand commonly used description methodology of such devices - the scattering matrix.

By operating on each polarization state independently, varieties of improvements are possible to obtain. Depending on the type of investigated device, this can be the doubling of modulation scheme capacity – for polarization beam splitted electro-optical modulators – and improved control and dynamics of microwave photonic filters.

Acquisition of three-dimensional images in terahertz range is possible due to the application of various tomography techniques. As part of the project, Terahertz Computed tomography (CT) studies were performed. We have reviewed selected methods of reconstruction (BP, FBP, SART...). For each method, we present advantages, drawbacks and limitations for 3D imaging the internal structure of an object.

[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 leaders: Paweł Szczepański and Michał Malinowski, May 2017–May 2018, **sub-projects:**

[Pro2.1] **Analysis and investigation of photonic materials, structures and systems** (Analiza i badania materiałów, struktur i układów fotonicznych), project leaders: Paweł Szczepański, co-workers: Agnieszka Mossakowska-Wyszyńska, Stanisław Jonak, Marcin Kaczkan, Ryszard Piramidowicz

The investigations conducted within this work are dedicated to:

- Luminescence characterization of bulk, nano, composite, as well as photovoltaic materials
- Design and investigation of fiber amplifiers and laser systems for IR and VIS spectral ranges, as well as application-specific photonic integrated systems (ASPICs)
- Complex theoretical analysis of passive and active tunable hyperbolic metamaterial aimed at practical realization and applications. Last efforts have been dedicated to development of effective medium model enabling dispersion characteristics shaping of multilayer structures composed of stimulus-sensitive materials characterized by various plasma resonances. Moreover, the existence of tunable birefringence suitable for thin film voltage-controlled polarization filters has been demonstrated.

[Pro2.2] **Functional verification of the digital integrated circuits – probabilistic model of the regression testing procedure** (Weryfikacja funkcjonalna cyfrowych układów scalonych- model probabilistycznego testowania regresyjnego), project leader: Andrzej Pfitzner; co-workers: Witold Pleskacz, Marek Ciepłucha and other members of the VLSI Engineering and Design Automation Division.

The main goal of the work is to propose an efficient regression testing strategy for the digital IC verification. It includes the development of the probabilistic model in order to estimate the digital simulation time required to fulfill the verification requirements. The verification completeness is defined as satisfying the pre-defined coverage metrics implemented according to the verification plan. The model will be implemented in the MATLAB environment. The provided results will allow for estimation of the verification effectiveness of the regression testing process and help to validate different regression testing strategies.

[Pro2.3] **Materials, technologies, structures and devices for sensorics, microsystems and power electronics** (Materiały, technologie, struktury i przyrządy dla sensoryki, mikrosystemów oraz energoelektroniki), project leader: Jan Szmidt, co-workers: Jerzy Krupka, Mateusz Śmietana, Marcin Koba, Mariusz Sochacki, Piotr Firek, Aleksander Werbowy, Magdalena Dominik, Maciej Kamiński, Kinga Kondracka, Norbert Kwietniewski, Aleksandra Paculska, Andrzej Taube, Michał Waśkiewicz, Natalia Kyc, Anna Myśliwiec, Zbigniew Rudkowski

Within the framework of the project several goals were achieved. Polymer-Si composites were investigated from the point of view of their potential microwave and far infra-red (IR) applications. Fiber-optic based microinterferometers with thin film coatings intended for studying biological materials were obtained and examined. Ion-sensitive field effect transistor (ISFET) structures were fabricated and characterized from the point of view of their potential applications in biological and medical sciences. Heterojunction ZnMgO/4H-SiC UV detecting diodes were fabricated and investigated. High efficiency power electronic converters for renewable energy resources were developed and studied.

[Pro2.4] **Technology and characterization of MOS/TFT structures with modern active materials** (Technologia i charakteryzacja struktur MOS/TFT z wykorzystaniem nowych typów warstw aktywnych), project leader: Robert Mroczyński, co-workers: R.B. Beck, W. Ciemiewski, K. Dalbiak, J. Jasiński, L. Łukasiak, B. Majkusiak, A. Mazurak, R. Mroczyński, S. Szostak, J. Walczak

This project is devoted to the technology and electrical/structural characterization of the new type of materials for the MOS/TFT structures. Active materials, i.e., charge-transport semiconductors, in the form of silicon nano-crystals (Si-NCs), Indium-Gallium-Zinc Oxide (IGZO) or other type of semiconductor, will be investigated. These materials can be successfully used in FET or TFT structures. The proposed work is experimental one. Dielectric materials with higher values of permittivity will be used as the gate dielectric layers in examined test structures. Dielectric layers will be fabricated by means of reactive magnetron sputtering method. There are planned electrical characterization of fabricated structures in order to the verification of the quality of proposed technology and the possible application of active materials in MOS/TFT structures.

[Pro2.5] **The use of 3D images in the process of improving the quality of imaging and testing of frequency mixers with reduced transformation losses based on microwave photonics systems** (Zastosowanie obrazów 3D w procesie poprawy jakości zobrazowania oraz badania mieszaczy częstotliwości o zredukowanych stratach przemiany bazujących na układach fotoniki mikrofalowej.), project leader: Janusz Parka, co-workers: Jerzy Woźnicki, Piotr Garbat, Krzysztof Madziar, Marek Sutkowski, Piotr Witoński, Jerzy Piotrowski, Agnieszka Szymańska, Jerzy Domański

Part 1. The scope of the research was to investigate multiple configurations of analog optical links (AOL) allowing to obtain RF frequency mixing. Major interest was put to determine the source of non-linearities – depending on the investigated AOL configuration – that was the source of the mixing effect – the intensity modulator non-linearities over different biasing conditions or the photodetector non-linearities. The proposed methodology of reduction of mixing losses was to introduce fiber amplifier (EDFA) into the AOL in order to reduce natural link attenuation, compensate effects of low modulation efficiency and in result obtain controlled level of the intermediate frequency at the output. Moreover, a scope was put to non-linear effects in the fiber – the Brillouin scattering – that in this case was considered as a parasitic effect.

Part 2. The aim of this work was study the usefulness of three-dimensional images in solving the problem of recovery missing fragments of images. As part of the work, two inpainting algorithms has implemented and analyzed: 1. Alg. PathMatch 2. Alg. Criminisi. Next, the possibilities of using additional depth information from depth cameras has explored. The results obtained on the test data set for various types of 3D cameras has been compared with ground truth data. The evaluation has been carried out on a set of synthetic and real data.

[Pro3] **Adaptive digital filters for conditioning biomedical signals** (Adaptacyjne filtry cyfrowe do kondycjonowania sygnałów biomedycznych, projekt realizowany przez Koło Naukowe Systemów Scalonych), Students Scientific Association of Integrated Circuits, project leader: Marek Niewiński, co-workers: Adrian Oleksiak, Sebastian Cieślak, Paweł Pieńczuk, Krzysztof Belewicz, June 2017–December 2017

The aim of the project was to develop a digital filters dedicated for BioSoC: – highly integrated System-on-Chip for health monitoring. To improve ECG and EMG signal measurement, a three types of filters were designed: (LP) low pass – for cutting signal over 150 Hz, (HP) high pass – to pass signal higher then 0,5 Hz and Notch filter to eliminate power supply disturbances. As a solution a Infinite Impulse Response filter type was chosen due to their efficiency in implementation (lower computational power needs and less memory usage then FIR filters). The Notch filter is able to adapt to power supply with frequency from 45–65 Hz. To accomplish that, the LMS algorithm was implemented to calculate optimal filter coefficients on the fly. Firstly the solution was simulated with Matlab software to find the optimal coefficient values. Then the filters were implemented on FPGA platform (Nexys Video Artix 7) and tested with generated ECG signals. The tests show that accurateness of the solution.

[Pro4] **Hybrid light sources based on praseodymium doped low-phonon fibers** (Hybrydowe źródła światła na bazie niskofononowych światłowodów domieszkowanych jonami prazeodymu) project leader: Krzysztof Anders, May 2017––March 2018

The main aim of the project is to develop lasers and ASE sources in the field of VIS-IR-MIR based on low-phonon glasses doped with praseodymium ions in hybrid configuration.

The scope of project covers development of coherent and non-coherent light sources (so-called ASE source – amplified spontaneous emission) working in VIS-IR-MIR spectral range.

The pigtailed pumping source as well as silica fiber resonator elements will be coupled to the fluorozirconate and chalcogenide fibers with developed glue-spliced technique creating a hybrid connection. Main researches will focus on obtaining laboratory systems for coherent and non-coherent light sources working at ca. 635 nm, 1.3 μm and 4.75 μm.

[Pro5] **Integrated optical gyroscope driven by an application specific integrated circuit** (Zintegrowany żyroskop optyczny sterowany specjalizowanym elektronicznym układem scalonym) project leader: Stanisław Stopiński, May 2017–March 2018

The project focuses on development of an integrated optical gyroscope. The main objective is to develop an application specific photonic integrated circuit that comprises a single-frequency ring laser system and an interferometric detection circuit. The design of the integrated gyro is compliant with an electronic driver, realized in a form of an application specific integrated circuit, developed in a standard CMOS technology. Both devices will be manufactured in the framework of multi-project wafer runs organized by commercial foundries. The photonic and electronic chips will eventually be flip-chip bonded and the performance of the developed gyro system will be evaluated.

[Pro6] **Investigation of excited state absorption processes leading to up-conversion in active glasses doped with $Er^{3+}+Yb^{3+}$ ions for applications in visible lasers** (Badania procesów absorpcji ze stanu wzbudzonego prowadzących do konwersji wzbudzenia w szkłach aktywnych podwójnie domieszkowanych jonami $Er^{3+}+Yb^{3+}$ pod kątem zastosowań w układach laserów na zakres widzialny), project leader: Krzysztof Anders, May 2016–February 2017

The main aim of this project was to study and analyze the short wavelength emission conditions of low phonon glasses doped with erbium and ytterbium ions excited by IR semiconductor laser diodes.

One of the subtasks was development of software for unique ESA setup for excited state absorption characteristics with the ability to view the measurement scene and access via a web browser.

Measurements of ground state absorption characteristics were performed, allowing for precise determination of the position of energetic levels and determination of absorption cross sections, phonon energy and refractive index coefficients of flurozirconate glasses were measured. The spectroscopic measurements of the excited state absorption characteristics were carried out for the Er and Er+Yb:ZBLAN samples, allowing to determine excited state absorption cross sections and predefine the excitation conversion processes leading to visible emission. In addition, an important achievement is the development of a synthetic analysis of the influence of the Yb sensitized Er:ZBLAN samples on the efficiency of the up-conversion process for 980 nm and 1480 nm excitation.

[Pro7] **Microelectronic integrated circuit for photonic integrated gyroscope** (Specjalizowany elektroniczny układ scalony do sterowania zintegrowanym żyroskopem optycznym) project leader: Krzysztof Siwiec, May 2017–March 2018

Big progress has been made in fabrication of photonic integrated circuits (PIC), which creates new possibilities in the area of miniature sensors using optical effects. One of very promising applications is development of miniature gyroscope based on Sagnac effect. However, PICs do not offer so wide possibilities in the area of data processing both in analog and digital domain. Because of this the potential of PIC technology lies in the possibility to integrate it with microelectronic integrated circuits (IC).

The aim of this work was to design application specific integrated circuit (ASIC) implementing analog and digital signal processing and providing biasing and power management for the PIC gyroscope. The ASIC has been designed in AMS 0.35 μm CMOS technology and allows to amplify and measure frequency of the PIC gyroscope output signal. The dimensions and pinout of the developed ASIC allow to connect it with parallel the designed PIC with the flip-chip bonding technology. This experiment will allow to verify the possibilities of such integration technology.

[Pro8] **Multi-channel photonic integrated transmitter driven by an application specific integrated circuit** (Zintegrowany wielokanałowy nadajnik fotoniczny sterowany specjalizowanym elektronicznym układem scalonym), project leader: Stanisław Stopiński, May 2016–February 2017

The project is focused on development of a novel multi-channel, wavelength division multiplexed (WDM) photonic transmitter. The device will be realized as an application specific photonic integrated circuit (ASPIC) in a generic indium phosphide technology. The optical chip will be designed in a compliance with a dedicated driver realized as an application specific integrated circuit (ASIC). The project is the first trial of hybrid integration of photonic and electronic integrated circuits with the use of flip-chip technology.

[Pro9] **New photonic composite materials based on polymers doped with metal-organic complexes** (Nowe fotoniczne materiały kompozytowe na bazie polimerów domieszkowanych kompleksami metalo-organicznymi) project leader: Anna Jusza, May 2017–December 2017

The main aim of the project is the development of manufacturing technology and investigation of luminescent properties of new optically active composite materials – polymer matrices doped with RE^{3+} metalo-organic complexes. It seems that RE^{3+} doped polymer lasers may create an interesting alternative for polymer lasers structures doped with organic dyes, however under the condition of overcoming problems with significant quenching of luminescence, being a result of interactions between RE^{3+} ions and highly energetic phonons, inherent for the polymer matrices. Doping of polymer material with RE^{3+} complexes, which would isolate active centers from the influence of matrix's phonons, may help solving this problem. Such composites enable combining the excellent emission properties of solid state lasers and unique advantages of polymeric material – mechanical strength, flexibility and low cost of manufacturing. The set of powdered lanthanide complexes of different ions differing in structural properties was manufactured and carefully studied with respect of their structural and luminescent properties. In particular – emission and excitation spectra were measured together with fluorescence kinetics, which enabled comparison of luminescent properties of developed materials. It has been shown, that precise selection of ligands surrounding lanthanide ion is responsible not only for effective isolation of active ions from the environment, but also for localization of excitation band related with ligand-lanthanide energy transfer processes.

[Pro10] **Polymer-based composite fibers doped with nanocrystals activated with rare earth ions** (Kompozytowe światłowody włóknowe na bazie materiałów polimerowych z domieszką nanokryształów aktywowanych jonami ziem rzadkich), project leader: Anna Jusza, May 2016–March 2017

The main aim of the project is development of the manufacturing technology and investigation of luminescent properties of a new type of active materials for applications in visible light sources – composite fibers based on polymer matrices doped with rare earth ions activated nanocrystals. Composite materials, which are a combination of two different phases – for example, polymer matrix and optically active crystalline nanostructures, potentially allow the design and construction of a new class of active materials with improved optical and mechanical properties. Among the many composite materials, polymer-based composites appear to have a special potential. Active polymer composites, intensively investigated and developed for a few years, in the opinion of many authors are considered as a solution that can revolutionize the market of shortwave coherent light sources (particularly blue and green, virtually inaccessible for present semiconductor lasers.

[Pro11] **Raman spectrometer with 3D printed mechanical elements** (Spektrometr Ramana z wykonanymi w technologii druku 3D elementami mechanicznymi, projekt realizowany przez Koło Naukowe Mikroelektroniki i Nanoelektroniki KNMiN), Students Scientific Association of Microelectronic and Nanoelectronics (KNMiN), project leader: Mateusz Śmietana, co-workers: Mateusz Bagłaj, Michał Długoszewski, Mateusz Wąsowski, Leonard Franaszczuk, Maciej Trębiński, June 2017–December 2017

Raman spectroscopy is a non-invasive technique capable for optical identification of various chemical compounds such as drugs, explosives, minerals, and non-organic substances, as well as defects in semiconductors. The aim of the project is to develop a low-cost Raman spectrometer, where mechanical elements are be 3D printed using FDM technique. There is planned design and printing of packaging elements as well as all the holders for moving optical elements. Data received with the spectrometer will be processed by Rasberry Pi-based subsystem and compared with widely available libraries of Raman spectra for different materials.

4.2. Projects Granted by the Ministry of Science and Higher Education

[Pro12] **Neuronal cell cultures substrates with optical fiber sensors monitoring** (Podłoża do hodowli neuronalnych z monitorowaniem stanu hodowli przez czujniki światłowodowe), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Anna Katarzyna Dębowska (supervisor: Śmietana Mateusz), October 2014–July 2017

In this project we want to explore the possibilities of monitoring neuronal cultures with the use of optical fiber sensors. Studying in vitro cultured neuronal networks provides important data about the processes taking place in the human brain. However, the means of collecting the information about the propagation of action potentials, and communication between cells and groups of cells are still imperfect. We want to develop a new way of recording neuronal activity, basing on the measurement of changes in the refractive index of the cell membrane. The project is funded by the Polish Ministry of Science and Higher Education and is a part of PhD thesis.

4.3. Projects Granted by National Centre for Research and Development

[Pro13] **DIAMSEC – ultrasensitive sensing platform for rapid detection of epidemiological and pandemic threats** (DIAMSEC – ultraczuła platforma sensoryczna do szybkiej detekcji zagrożeń epidemiologicznych i pandemicznych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Mateusz Śmietana, co-workers: Marcin Koba, Emil Pituła, December 2017–November 2020

The aim of the project is to develop and prepare for implementation an innovative sensing platform for rapid detection of pandemic and epidemic conditions. The project proposes a development of a technology for synthesis and modification of sensing structures based on thin films of diamond, titanium oxide, ITO and graphene towards medium-scale production of ultrasensitive tests for detection of viruses and pathogenic bacteria. DIAMSEC platform can be used directly by a patient, as well as to assist in diagnosis-making process for people in emergency rooms, small clinics, and doctors' offices, in ambulances to the scene of the accident in order to rapid diagnostics of patients. It can also be used to conduct screening tests towards detection of sources and avoid spreading of infectious diseases. Thanks to the universal approach it can be also used in veterinary medicine. Use of the platform DIAMSEC comparing to the currently used methods lead to a shorter measurement time, a reduction in amount required analyte, higher sensitivity and lower cost of a single test.

[Pro14] **Directed-energy laser weapon systems, Non-lethal laser weapon systems** (Laserowe systemy broni skierowanej energii, laserowe systemy broni nieśmiercionośnej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Ryszard Piramidowicz, August 2015 –June 2018

The project aims to develop a set of demonstrators of: solid state lasers for directed energy laser weapon systems;

- laser systems and technologies for directed energy laser weapon systems; detection and measurement systems;
- prevention and protection technology against directed energy laser weapon systems; non-lethal laser weapon systems.

The project will also result in identification of the risk associated with the use of non-lethal laser weapon and investigation the effects of laser weapon systems on construction materials, military devices and biological tissues.

[Pro15] **Innovative, hardware-software component, based on a dedicated integrated circuit and software to perform various cryptographic application, with the particular attention paid to electronic identification systems with the high level of confidence** (Innowacyjny komponent sprzętowo-programowy, wykorzystujący specjalizowany układ scalony oraz oprogramowanie, realizujący różne funkcje kryptograficzne, ze szczególnym uwzględnieniem zastosowań w systemach identyfikacji elektronicznej z wysokim poziomem pewności IDSoC), Warsaw University of Technology,

Institute of Microelectronics and Optoelectronics, project leader: Witold Pleskacz, co-workers: A. Łuczyk, L. Łukasiak, P. Szczepański, S. Reszewicz, A. Borkowski, M. Derlecki, J. Bęczkowski, September 2017–August 2020

The aim of the project is to develop and manufacture an innovative single-chip secure processor – IDSoC. The developed system on chip will be composed of a proprietary application processor with an increased fault tolerance and security level. The processor will include a non-volatile memory area dedicated to storing both embedded software and sensitive user data, such as biometric data. Thanks to the appropriate error detection and correction systems as well as hardware encryption, the non-volatile memory will ensure data integrity and confidentiality. In addition, the integrated IDSoC system will be equipped with a set of peripherals for hardware cryptographic support. During the project, it is planned to develop a true random number generator (TRNG) and to carry out research on the possibility of the physical unclonable function (PUF) utilization for the purpose of identification and authentication. It is also anticipated to develop a set of sensors for the monitoring of the integrated circuit's environmental conditions (e.g. temperature, supply voltage, clock frequency). The mechanisms of the external interference detection in the system's physical structure will also be employed, which will significantly protect the system features against unauthorized access attempts and will prevent from the acquisition of sensitive data. The IDSoC system, to be developed during the project, might be utilized in the applications in which the storage and processing of sensitive data is required, e.g. in electronic identification systems (electronic identity card, e-passport). The inherent part of the IDSoC system will be its dedicated firmware, developed in the course of the project. The firmware will support and enable all the system's functions, most notably the electronic identification with high level of confidence and other advanced cryptographic procedures.

[Pro16] **Methods and means of protection and defense against high power microwave pulses** (Metody i sposoby ochrony i obrony przed impulsami HPM), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Mariusz Sochacki, co-workers: Jan Szmidt, Piotr Firek, December 2014–December 2020

The protection and defense system against high power microwave pulses will be equipped with limiting diodes. The protection semiconductor devices will be designed, manufactured and characterized in the Institute of Microelectronics and Optoelectronics. Wide bandgap semiconductors can be used in such kind of application, primarily the silicon carbide (SiC) wafers. The diodes will be characterized by means of current-voltage and capacitance-voltage measurements. Finally, the microwave properties of the devices will be studied, which is important especially in the context of their application in microwave transceiver circuits.

[Pro17] **Miniature, dual-frequency, system-on-a-chip for precise satellite navigation GPS/Galileo integrated with application processor dedicated to IoT devices with low power consumption** (Miniaturowy, dwuczestotliwościowy, jednoukładowy system scalony do precyzyjnej nawigacji satelitarnej GPS/Galileo zintegrowany z procesorem aplikacyjnym dedykowany do urzadzen IoT o niskim poborze mocy NaviSoC), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Witold Pleskacz, co-workers: P. Narczyk, K. Marcinek, T. Mrozek, I. Butryn, D. Pietroń, Ł. Wiechowski, November 2017–October 2020

The development concept of specialized microcontroller for precise satellite navigation meets the growing needs of many sectors of the world economy, where according to estimates 6–7% of European GDP depends on satellite navigation applications. The aim of the project is to develop, produce, test and demonstrate the dual-frequency, system-on-a-chip for precise GPS/Galileo satellite navigation. The system will be integrated with application processor and will allow for a significant increase in the accuracy of mobile devices. The consortium was established to realize this project. It consists of one scientific entity (Warsaw University of Technology) and the two entrepreneurs (ChipCraft Sp. z o.o. and Inowatronika – Tomasz Radomski).

Within the project NCBiR NR02-0096-10/2011 "Dual-mode blocks of the integrated circuit GALILEO and GPS signal receiver in nanometer CMOS technology for precise positioning of mobile objects" realized in 2011–2014, applicant has developed, produced and characterized integrated circuits forming the so-called chipset – three circuits of complete analogue path of the satellite navigation receiver, which can receive two frequency bands from both constellations

Galileo and GPS. Due to its size and the lack of the full integration on the one silicon die the technology did not extend beyond the area of laboratory demonstrations.

The miniaturization of the chipset will be achieved by development of NaviSoC system-on-a-chip by the ChipCraft company in cooperation with the Warsaw University of Technology and with the Inowatronika company. Experience of Warsaw University of Technology from the previous project mentioned above will be utilized. The developed technology will be examined and demonstrated in operational conditions, i.e. in IoT class devices (Internet-of-Things) produced in the course of this project thanks to the cooperation and exploiting experience of Inowatronika company.

[Pro18] **Nanophotonics with metal – group-IV-semiconductor nanocomposites: From single nanoobjects to functional ensembles (NaMSeN)** (NaMSeN – Nanofotonika bazująca na nanokompozytach metali i półprzewodników z grupy IV – od pojedynczych nanoobiektów do zespołów funkcjonalnych), V4-Japan Advanced Materials Joint Call of National Centre for Research and Development, Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Romuald Beck, February 2016–January 2019

The NaMSeN project aims to advance the field of group-IV semiconductor nano-structures in the new stage closer to photonic applications by overcoming intrinsic limitations of these materials (namely the low absorption cross section and emission rate due to the dominating indirect transitions) via formation of metal-semiconductor nanostructural composites and alloys (SiGe, heavy doping Si:B,P etc.) The enhancement of optical properties should be achieved mainly by exciton – plasmon coupling, Purcell effect and crystal lattice modification by strain. The project includes development of relevant technologies, theoretical models and characterization methods. The nano-composites will be studied on different scales from single nano-objects, microscopic ensembles up to test devices.

The project is matching the Joint Call theme of materials for electronics and energy harvesting by addressing applications to chemical and bio-sensing as well as light emitting devices. Bio-compatibility and degradability of nanocomposites will be tested in living cells using single nano-particle luminescence imaging.

Top research group from all Visegrad countries and Japan are selected to form this project consortium with high potential for sustainable and fruitful collaboration.

[Pro19] **New integrated photonic passive optical network** (System WDM-PON w technologii fotoniki scalonej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Ryszard Piramidowicz, October 2015–March 2018

The main aim of the project is development and investigation of a novel solution for optical access systems – WDM-PON system, based on photonic integrated circuits (PICs) as well as elaboration of the roadmap for implementation of such a solution in real systems of telecom operators. The scope of the project covers in particular designing, manufacturing, versatile characterization and evaluation of key transceiver PICs for WDM-PON access systems, as well as photonic components for application in its nodes. As a result - the demonstrator of the system with implemented PICs components will be developed, allowing determination of the technical and economic capabilities of deploying the proposed solution in real systems.

[Pro20] **Technologies of semiconductor materials for high power and high frequency electronics** (Technologie materiałów półprzewodnikowych dla elektroniki dużych mocy i wysokich częstotliwości WidePOWER), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-workers: Piotr Firek, Krystian Król, Aleksander Werbowy, Michał Waśkiewicz, Kinga Kondracka, Jakub Szarafiński, Andrzej Taube, Norbert Kwietniewski, Mariusz Sochacki, Kazimierz Dalbiak, Witold Ciemiewski, December 2017–November 2020

The overall aim of this project is to develop technology of silicon carbide (SiC) homoepitaxy and gallium nitride (GaN) heteroepitaxy towards production grade device epitaxial structures. Silicon carbide and AlGaN/GaN/SiC wafers for fabrication of 1.7 kV/3.3 kV devices and vertical HEMTs are expected as basic product for the implementation. Quality of

the wafers will be verified by the fabrication of 1.7 kV PiN diode and VHEMTs that will be ready for the implementation in advanced power electronics. The processing of SiC PiN diode will be upgraded up to 3.3 kV devices to investigate main barriers of implementation in the case of high voltage bipolar SiC devices. Comprehensively characterized and certified epitaxial structures will be the subject of market analysis on the day of completion of the project in order to assess the competitiveness and scale of production giving real rate of investment return. The findings from the demonstration pilots of power converters and aviation band amplifiers will be widely published among companies and further stakeholders. The key performance measurement of these applications is that companies outside the consortium have specific knowledge to make better informed decisions about future R&D strategies and investments for the uptake of advanced power electronics. It will support the commercialization of wafers and devices efficiently.

[Pro21] **Tunable hyperbolic metamaterials for photonic devices of novel generation** (Przestrajalne metamateriały hiperboliczne na potrzeby nowej generacji przyrządów fotonicznych HYPERMAT), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Michał Malinowski, co-workers: Robert Mroczyński, Ryszard Piramidowicz, Anna Jusza, Krzysztof Anders, Anna Tyszka-Zawadzka, Bartosz Janaszek, Marcin Kieliszczyk, Bartosz Fetliński, December 2017–November 2020

The main objective of this project is to develop an innovative technology of tunable multilayer hyperbolic metamaterials (THMMs) operating in NIR and MIR frequency ranges. Such structures exhibit extraordinary features unprecedented in commercially available state-of-the-art photonic solutions, resulting from unusual dispersion characteristics which can be controlled by an external electric field. THMMs can be used as efficient, adaptive antireflective coatings (AR) or as tunable edge-filters in photonic components commercially offered by our large industrial partner, i.e., PCO S.A. The development of the technology of tunable hyperbolic metamaterials, demonstration of the proof of concept, and transfer of the technology to PCO S.A. could become the foundation for the technological platform of a novel class of photonic components, which would significantly enrich PCO S.A.'s commercial offer and become a strong impulse for the development of innovative national photonics industry, offering products globally. We expect that project results will contribute to the development of science related to nanotechnology and photonics. An intensive cooperation between Consortium partners will emerge to advance scientific leadership of the Polish scientific units as the leaders in the modeling, technology and characterization of photonic devices including nanostructures based on THMMs.

4.4. Projects Granted by the National Science Centre

[Pro22] **Active Tunable Hyperbolic Metamaterials** (Aktywne przestrajalne metamateriały hiperboliczne), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Bartosz Janaszek, co-worker: Marcin Kieliszczyk, July 2017–July 2020

The main objective of this project is to investigate Active Tunable Hyperbolic Metamaterial's properties. Full characterization of such structures requires not only performing a series of numerical simulations, but also derivation of theoretical models of light interaction with the considered structure. Theoretical analysis will cover classical as well as semi-classical approach allowing for obtaining crucial optical parameters, such as reflection, transmission and Photonic Density of States (PDOS). In particular, PDOS forms an especially useful framework for obtaining an effective gain of an active structure. Further investigations will include supporting calculations based on standard effective medium theory (EMT), nonlocal-effect-corrected EM, as well as transfer-matrix method (TMM). The crucial point of the analysis comprises complex numerical simulation based on Finite Difference Time Domain (FDTD) method. Such an approach allows for observation and investigation of wave propagation in any pre-defined medium, including periodical nanostructures, e.g. Active Tunable Hyperbolic Metamaterials.

[Pro23] **Conductive photonic structures for multiparametric bio-chemical diagnostics** (SONATA BIS Przewodzące struktury fotoniczne do wieloparametrycznej diagnostyki biochemicznej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Mateusz Śmietana, May 2015–May 2019

The main objective of this project is to design, fabricate and characterize a platform of a new class of optical-fiber-based bio-sensor employing transparent and electrochemically active thin overlays. The obtained sensors will be additionally functionalized with organic bio-film and capable for simultaneous label-free optical and electrochemical measurement, or optical measurement of biochemical interactions taking place at sensor's surface for stimulated (controlled) electrochemical potential. Combination of these two optical and electrochemical systems within one sensing structure will allow for selective detection and multi-parameter analysis of bio-analytes reaching surface of the overlay.

[Pro24] **Investigation on interaction between bio-active media and electromagnetic field in photonic crystal fiber devices with suspended core** (OPUS Badanie oddziaływania struktur aktywnych biologicznie z polem elektromagnetycznym w układach światłowodów fotonicznych z zawieszonym rdzeniem), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Mateusz Śmietana, February 2015–February 2018

The primary goal of this research project is to design and characterize of a platform for a new class of bio-sensor enabling label-free detection of biological substance, based on measurement of interactions between electromagnetic field and biologically active layer, immobilized inside microchannels of a suspended-core fibre or also on its outer surface. The thesis of the research project is, that a label-free detection of biological compounds, based on a spatially confined interaction with E-M wave and with the binding layer on the inner surface of microchannels of a suspended-core microstructured fibre, may be a viable alternative to fluorescence label-based detection, as well as to plasmonic or waveguide-based sensing structures.

[Pro25] **Novel luminescent materials for mid-infrared region – analysis and investigation of optical properties of chalcogenide glasses doped with rare earth ions** (PRELUDIUM Nowe materiały luminescencyjne na zakres średniej podczerwieni – badanie i analiza właściwości optycznych szkieł chalkogenidkowych domieszkowanych jonami ziem rzadkich), project leader: Krzysztof Anders, February 2014–February 2017

The aim of the project is to investigate and comprehensively analyse the mid-infrared radiation conditions of chalcogenide glasses doped with rare earth ions. The set of studied materials consists of experimental series of bulk samples of low phonon chalcogenide glasses (based on GeAsGaSe compounds) doped with praseodymium, dysprosium, terbium and holmium. The framework of the project is research and analysis of the spectroscopic properties (absorption, excitation and emission characteristics; fluorescence dynamics, including the measurements in the cryogenic temperatures ~7K) that will allow analysis of excitation and relaxation mechanisms of electron states responsible for the emission in the mid-infrared region – MIR (> 3 um). Until now, this spectral range, particularly attractive for application in metrology, sensing, medical, and military, has been practically out of reach of typical, compact laser sources (semiconductor lasers and solid state lasers).

[Pro26] **Oxide nanostructures for electronics, optoelectronics and photovoltaics** (Nanostruktury tlenkowe do zastosowań w elektronice, optoelektronice i fotowoltaice), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, June 2013–June 2018

Aim of this project is explanation and description of complex electro-optical properties of a group of wide band gap oxide materials (Al_2O_3, HfO_2, ZrO_2, ZnO). Despite the fact that these materials are presently key elements of modern electronic (gate oxides, transparent electronics, memories), optoelectronic (transparent contacts) and photovoltaic (transparent contacts) devices, influence of growth conditions on their electrical and optical properties is still not clear. By selecting growth conditions we can deposit both dielectric (isolating) and semiconducting layers, in the case of ZnO even with a metallic conductivity. Doped in a controlled way, grown at specific conditions, thin layers of ZnO should enable us construction of transparent contacts to wide band gap semiconductors (SiC, GaN). To achieve goals of the

project we should answer several questions on the origin of shallow donors in ZnO, in particular role of hydrogen in these films (our present investigations question the fact that hydrogen is dominant shallow donor in our films), on the role played by vacancies in conductive and dielectric films, on the method of recrystallization blocking of gate oxides, on the mechanisms of compensations in ZnO layers grown in the ALD processes with ammonia water. We will investigate why gate oxides (mainly HfO_2) have excellent isolating properties, when deposited as amorphous ones, but loose these properties after recrystallization. Thus, the ways to block their recrystallizations are crucial and need detail investigations. The working hypothesis is that small deviations from oxides stoichiometry importantly affect electro-physical material parameters of selected oxides.

[Pro27] **Study on possibilities of shaping the luminescent properties of composite white light sources based on polymer materials** (PRELUDIUM Analiza możliwości kształtowania właściwości luminescencyjnych kompozytowych źródeł światła białego na bazie materiałów polimerowych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Anna Jusza, February 2014–February 2017

The aim of this project is an investigation and analysis of the shaping possibilities of visible (red, green and blue) luminescence properties of the new class of optically active materials - composites based on polymer matrices doped with nanocrystals activated by praseodymium ions. Investigated materials oxide, fluoride and oxyfluoride nanocrytallites of varying crystalline structure doped with different concentration of Pr^{3+} as well as bulk polymer composites based on PMMA (poly[methyl methacrylate]) doped with these nanocrystals. Selection of the praseodymium as the activator is mainly due to the favorable energy levels scheme allows for obtaining emission in red, green and blue spectral range and thus white light with a color temperature dependent on the ratio between the intensities of individual optical transitions. High sensitivity of praseodymium optical properties on crystalline surroundings parameters is an additional advantage, should provide the ability of manipulating of the individual emission lines intensities.

The main outcome of this project will be the extension of the state of the art on the influence of crystalline surroundings (crystalline phase, net position, surface states, maximum phonon energy) and structural properties (specific surface area, average particle size, agglomeration level) on the luminescent properties of praseodymium doped nanocrystals as well as polymer-based composites activated with these nanopowders.

4.5. Projects Granted by International Institutions

[Pro28] **Convergence of Electronics and Photonics Techologies for Enabling Terahertz Applications CELTA** (CELTA – Konwergencja elektroniki i technik fotonicznych na rzecz rozwoju zastosowań techniki terahercowej), EU Horizon 2020 project, (Projekt realizowany w ramach Horyzont 2020: MSCA-ITN-2015-ETN – Marie Skłodowska-Curie Innovative Training Networks (ITN-ETN)), project leader: Krzysztof Madziar, March 2016–February 2020

CELTA aims to produce the next generation of researchers who will enable Europe to take a leading role in the multidisciplinary area of utilising Terahertz technology for applications involving components and complete systems for sensing, instrumentation, imaging, spectroscopy, and communications. All these technologies are keys to tackling challenges and creating solutions in a large number of focus areas relevant for the societal challenges identified in the Horizon 2020 programme. To achieve this objective, CELTA is comprised of 11 leading research institutions and has assembled a comprehensive research training programme for all the 15 early-stage researchers (ESRs). CELTA integrates multidisciplinary scientific expertise, complementary skills, and experience working in academia and industry to empower ESRs to work in interdisciplinary teams, integrate their activities, share expertise, and promote a vision of a converged co-design and common engineering language between electronics and photonics for Terahertz technologies.

[Pro29] **Green Power Electronics** (Zielona energoelektronika), EU INTERREG BALTIC SEA REGION project, (Projekt realizowany w ramach umowy partnerskiej zawartej z University of Southern Denmark z siedzibą w Sonderborgu w Danii), project leader: Mariusz Sochacki, co-workers: Krystian Król, Norbert Kwietniewski, Katarzyna Kubicka, March 2016–March 2019

The project Green Power Electronics will enhance the capacity of Baltic Sea Region companies to take up advanced power electronics into their R&D strategies and investment planning. Advanced power electronics is based on new materials and is a disruptive technology enabling the energy supply chain to increase energy efficiency. The novel technology is expected to enter the markets within the next 3–7 years. Challenges regarding the reliability under harsh conditions, economic viability of the transition towards advanced power electronics as well as general agreement on the technology and quality standards need to be overcome.

During the project period we carry out three pilots between companies and research institutions within the sectors renewable energies, i.e. wind energy, e-mobility and smart houses. Through these pilots we demonstrate the technical maturity, reliability and economic feasibility of advanced power electronics.

We market the technical and economic opportunities of advanced power electronics to companies in the Baltic Sea Region. SMEs will develop their individual technology roadmaps to take up this novel technology.

[Pro30] **High-precision techniques of millimeter and sub-Thz band characterization of materials for microelectronics TEAM TECH** (Wysokoprecyzyjne techniki charakteryzacji materiałów w zakresie fal milimetrowych oraz subterahercowych do zastosowań mikroelektronicznych), EU Structural Funds project, (Fundusze strukturalne UE: Program Operacyjny Inteligentny Rozwój (PO IR)), project leader: Jerzy Krupka, November 2016–October 2019

The main objective of this project will be to develop novel sensors and sensing methodologies useful to non-destructive contactless electric and magnetic characterization of materials at millimeter and sub-THz spectra. The implementation of this goal will be two-pronged. On one hand, the said resonant structures will be exploited to benefit from their inherent narrow-band properties, which are particularly useful at measuring low-loss materials. On the other hand, the research will also concern broadband measurement techniques based on multimode resonant structures. The auxiliary goal is adopting the technological approaches typical for the microelectronics industry and applies them for precise fabrication of novel resonant cavities operating in the millimeter and the sub-THz bands. Another such goal is development of a new low-loss yet high dielectric constant material for dielectric posts inserted into sensing cavities.

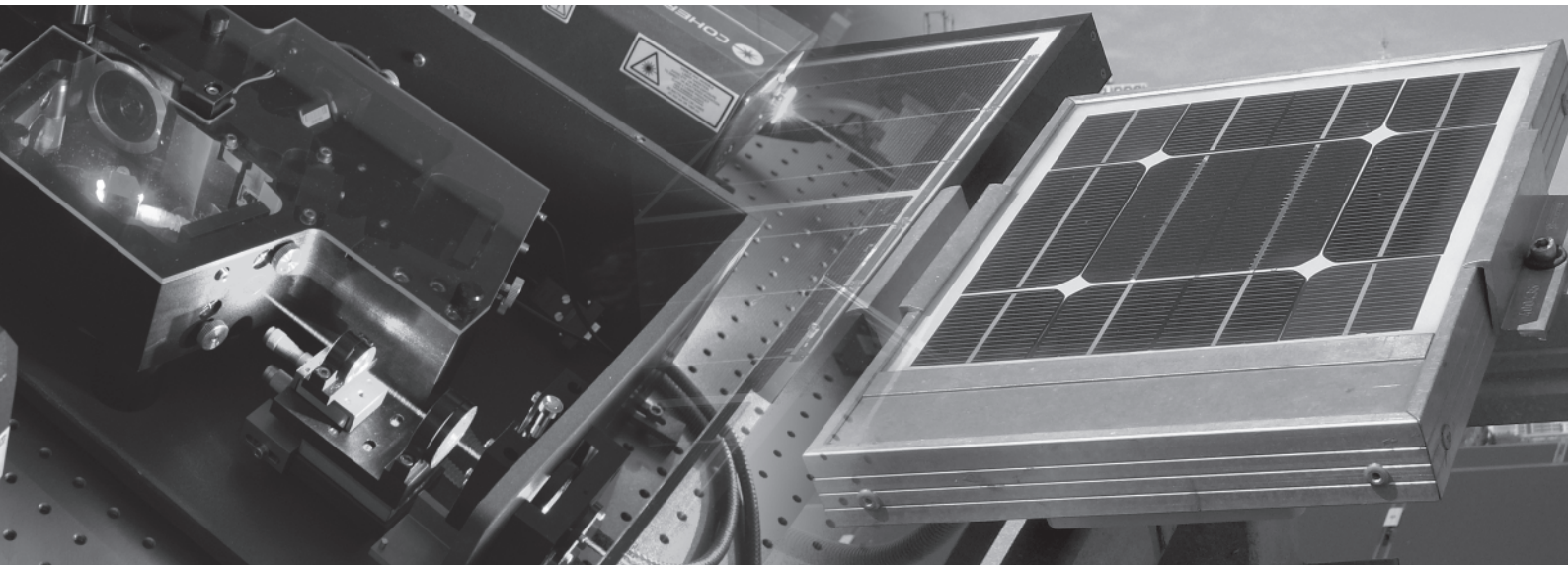
[Pro31] **Photonic Integrated Circuits Accessible to Everyone PICs4All** (PICs4All – Program powszechnego dostępu do technologii układów fotoniki scalonej), EU Horizon 2020 project, (Projekt realizowany w ramach Horyzont 2020 (ERC, działanie Research & Innovation Action, Innovation Action)), project leader: Ryszard Piramidowicz, January 2016–December 2018

The aim of the PICs4All CSA was to establish a European network of Application Support Centres (ASCs) in the field of Photonic Integrated Circuits (PICs) technology. The main task of ASCs is to lower the barrier to Researchers and SMEs for applying advanced InP and TriPleX based Photonic IC technology as they are offered by the JePPIX platform, and thus to increase the awareness of the existence of this worldwide unique facility. This is realized by actively scouting new application opportunities throughout Europe, helping the candidates to determine the technical and/or economic viability when applying integrated optical solutions and supporting them in the design, manufacturing and evaluation phase of their Application Specific Photonic IC's (ASPICs).

[Pro32] **THIN but Great Silicon 2 Design Objects** (Układy scalone CMOS w technologii ultra-cienkiego krzemu (THIN but Great Silicon 2 Design Objects)), EU project, ENIAC, project leader: Wiesław Kuźmicz, co-workers: Elżbieta Piwowarska, Zbigniew Jaworski, September 2014–December 2017

THINGS2DO is focused on building the Design & Development Ecosystem for FD-SOI-technology. This technology is uniquely positioned to take advantage of some very distinct strengths of the European Semiconductor Industry. The design/development ecosystem is based on 3 pillars:

- EDA – design automation is the basis to perform complex design creation and porting tasks;
- IP – availability of pre-designed building blocks is an absolute must for any emerging technology;
- Services – are a combination of IP and EDA-tooling. There is a rich mix of SMEs in Europe focused on this topic, providing service offerings to bring the innovative potential of FD-SOI.



Optoelectronics Division

5. DISSEMINATION OF KNOWLEDGE

5.1. Students Scientific Associations

5.1.1. Students Scientific Association of Microelectronic and Nanoelectronics (KNMiN) (Koło Naukowe Mikroelektroniki i Nanoelektroniki KNMiN)

Association Tutor: Mateusz Śmietana, Ph.D., D.Sc.
Members of the Board: Mateusz Bagłaj, Michał Długoszewski, Mateusz Wąsowski
Total number of Members: 22

In the interests of the Students Scientific Group of Microelectronics and Nanoelectronics are issues mainly related to the technology, design instruments, characterization and application of new materials in the field of optoelectronics and microelectronics. Examples of topics dealt with by the members of the Student Scientific Associacion: preparation and characterization of semiconductor structures, the organization of trips to conferences, workshops and symposia (where group members can get acquainted with the latest achievements in the field of micro-, nano- and optoelectronics, meetings of eminent personalities from the world of modern science and to present the results of their own research).

Activities of KNMiN members in 2017:

Realized projects:

- **Raman spectrometer with 3D printed mechanical elements** (Spektrometr Ramana z wykonanymi w technologii druku 3D elementami mechanicznymi), project leader: Mateusz Śmietana, co-workers: Mateusz Bagłaj, Michał Długoszewski, Mateusz Wąsowski, Leonard Franaszczuk, Maciej Trębiński, June 2017–December 2017

Exhibitions:

- Exhibitor at Scientific Circles' and Students Organizations' Fair "KONIK", 20–21.10.2017, Warsaw University of Technology

5.1.2. Student Scientific Association of Optoelectronics (KNO) (Koło Naukowe Optoelektroniki KNO)

Association Tutor: Ryszard Piramidowicz, Ph.D, D.Sc.
Members of the Board: Bartosz Janaszek, M.Sc., Marcin Kieliszczyk,M.Sc., Radosław Piekarski, B.Sc.
Total number of Members: 12

Student Association of Optoelectronics formally started in May 2006, however, the custom of nonobligatory student seminar meetings – foundation of our Association – has been successfully continued since 2002. Presently, the Association consists of students and Ph.D. students of Institute of Microelectronics and Optoelectronics, however graduate professionals complement our ranks, as well.

Main scientific interest:

- Fiber lasers and amplifiers
- Photonic Integrated Circuits
- Special optical fibers and fiber components
- New optically active materials for light sources (polymers, composites, glasses an nanocrystals doped with Rare Earth ions)

The goals of Student Optoelectronics Division:

- becoming more knowledgeable and research interests developing of Division's members,
- popularization of optoelectronics and photonics technology disciplines,
- conducting research and development work introducing Division's members to the character of scientific work,
- support of diverse forms of activity leading to the development of Division members' professional skills.

Activities of KNO members in 2017:

The scientific efforts of the KNO members were primarily dedicated to individual efforts, and in particular concerned analysis of properties of hyperbolic metamaterials, which lately become an important area of the Institute's research interest. Other activities were related to reorganization of the KNO aimed at improvements in the organization of undertaken research enterprises.

The goals of Student Optoelectronics Division:

a. Fragment "becoming more knowledgeable and research interests developing of Division's members" staje się "developing Division members' interest in scientific research",

b. Fragment "conducting research and development work introducing Division's members to the character of scientific work" staje się "conducting research and development work, which introduces Division's members to the realms of scientific work".

Publications of KNO members in 2017 in journals:

1. Janaszek Bartosz, Kieliszczyk Marcin, Tyszka-Zawadzka Anna [i in.]: Multiresonance response in hyperbolic metamaterials, w: Applied Optics, vol. 57, nr 9, 2018, ss. 2135–2141, DOI: 10.1364/AO.57.002135

2. Kieliszczyk Marcin, Janaszek Bartosz, Tyszka-Zawadzka Anna [i in.] : Tunable spectral and spatial filters for the mid-infrared based on hyperbolic metamaterials, w: Applied Optics, vol. 57, nr 5, 2018, ss. 1182–1187, DOI:10.1364/AO.57.001182

3. Janaszek Bartosz, Tyszka-Zawadzka Anna, Kieliszczyk Marcin, Szczepański Paweł: Przestrajalne metamateriały hiperboliczne, 2017, V Polska Konferencja Optyczna 2017, poster

5.1.3. Students Scientific Association of Microsystems (ONYKS) (Koło Naukowe Mikrosystemów ONYKS)

Association Tutor: Jakub Jasiński, Ph. D.
Members of the Board: Paweł Solecki, Maciej Harasim, Jakub Latusek
Total number of Members: 20

The members of the Students Scientific Association are involved in the implementation of various projects (analog, microcontrollers, FPGAs) and have necessary tools to accomplish circuit boards. The scientifict interest also includes popularization of electronics among the youth and students.

In 2017 Students Scientific Association took part in the following events:

- XXI Festival of Science organized by Polish Academy of Sciensces in Jabłonna, September 23th–24th, 2017. As in previous years, the memebers of ONYKS organized „Soldering school".
- Warsaw University of Technology Open Days 2017: Students Scientific Association organized the workshop on techniques of soldering.

ONYKS has realized the following project:

- **Class D Audio Amplifier**
  The aim of the project was to create an amplifier with low energy consumption. In this type of amplifier, the switches are either fully on or fully off, significantly reducing the power losses in the output devices. Efficiencies of 90-95% are possible.

5.1.4. Student Scientific Association of Integrated Systems (Koło Naukowe Systemów Scalonych)

Association Tutor: Marek Niewiński, Ph. D.
Members of the Board: Krzysztof Belewicz, Adrian Oleksiak, Sebastian Cieślak
Total number of Members: 5

The main areas of interest are: developing mixed analog-digital system using SoC board, designing extension board for SoC, programming microcontrollers and Integrated Circuit design.

Project realized in 2017 by association's members:

"Adaptive digital filters for conditioning biomedical signals."

The aim of the project was to develop a digital filters dedicated for BioSoC: – highly integrated System-on-Chip for health monitoring. To improve ECG and EMG signal measurement, a three types of filters were designed: (LP) low pass – for cutting signal over 150 Hz, (HP) high pass – to pass signal higher then 0,5 Hz and Notch filter to eliminate power supply disturbances. As a solution a Infinite Impulse Response filter type was chosen due to their efficiency in implementation (less computional memory usage then FIR filters). The Notch filter is able to adapt to power supply with frequency from 45–65 Hz. To accomplish that, the LMS algorithm was implemented to calculate optimal filter coefficients on the fly.

5.2. Cooperation with schools

In 2017 the Institute of Microelectronics and Optoelectronics actively participated in various forms of the popularization of science and knowledge among high school students. The main objective of this activity was to present the fields of science and technology represented by our Institute and thus encourage young people to study them.

Within the Wszechnica projects our scientists gave several lectures (Ryszard Piramidowicz – "**Laser – light with unusual properties**," Robert Mroczyński – "**How to make a chip**"). Several demonstrations were organized in IMiO's advanced laboratories (Semiconductor Technology lab, Photonics lab, Photovoltaics lab, IC Design lab, Image Processing lab. The Wszechnica project is managed by Slawomir Szostak.

IMiO participated in the Science Festival delivering several lectures and organizing a stand to demonstrate various research fields with great help from the students belonging to Microsystems ONYKS, Microelectronics and Nanoelectronics, and Optoelectronics Research Groups.

In 2017 we started collaboration with Warsaw XXVII High School aimed at organizing National STEM Contest under WUT auspices.

5.3. Fiber-Optic Photonics Platform (FOPP)
Polska Platforma Fotoniki Światłowodowej (PPFŚ)

Coordinator:
Ryszard Piramidowicz, Ph.D, D.Sc.
Warsaw University of Technology, Institute of Microelectronics and Optoelectronics

Consortium members:
Warsaw University of Technology (PW)
Bialystok University of Technology (PB)
Institute of Electronic Materials Technology (ITME)
Marie Curie-Sklodowska University (UMSC)
West Pomeranian University of Technology (ZUT)

Timeline: 2014–2018

The fundamental research objective of the Platform is to develop novel, innovative solutions for broadly understood optical fibers photonics, including such focus areas as sources and amplifiers of coherent and incoherent radiation, passive and active optical fibers of specially designed optical properties, micro-and nano-structured (including PCF) fibers for special applications, optical fiber sensors, micro and nano-optical elements and components.

The Platform is based on five pillars:

1) modeling and design,
2) fabrication technology,
3) characterization,
4) development and prototyping,
5) validation and testing constituting the complete food-chain of the manufacturing process.

Technological competences, indispensible for such a project, are offered by three main players on the Polish market of the fiber-optic technology: the Institute of Electronic Materials Technology (ITME), the Bialystok Technical University (PB) and the Marie Curie-Sklodowska University (UMCS). The design, characterization and prototyping capabilities are disposed by the three research groups of the Warsaw University of Technology (PW), while the validation and testing issues are covered mainly by West Pomeranian University of Technology (ZUT) and Warsaw University of Technology (PW). The combined potential of the platform's partners enables undertaking of practically all kinds of research and development work within the area of fiber-optic photonics and also significant involvement in the research within the field of planar/strip waveguide-based integrated structures. The main fields of interest are a result of up-to-now conducted projects (both fundamental research and R&D works), present expertise of partners and continuously monitored and anticipated demands of the market.

The core of the consortium consists of photonics fiber laboratories situated at the Warsaw University of Technology supported by technological laboratories of the main Polish manufacturers of specialty optical fibers (ITME, UMCS, PB). Infrastructure is complemented by testbeds of photonic systems offered by PW and ZUT. It is worth pointing out that the consortium members already have a unique infrastructure at their disposal and have technological ability and technical skills for manufacturing the sophisticated fiber-optic elements, successfully competing on the global market with the products of the most significant commercial manufacturers. Good examples are microstructed silica and polymer fibers developed at UMCS and systematically purchased by leading European research institutes and companies and nano-structured graded index lenses and microscope objectives

5.4. Photovoltaic Platform, Warsaw University of Technology (PVP) Platforma Fotowoltaiki Politechniki Warszawskiej (PF)

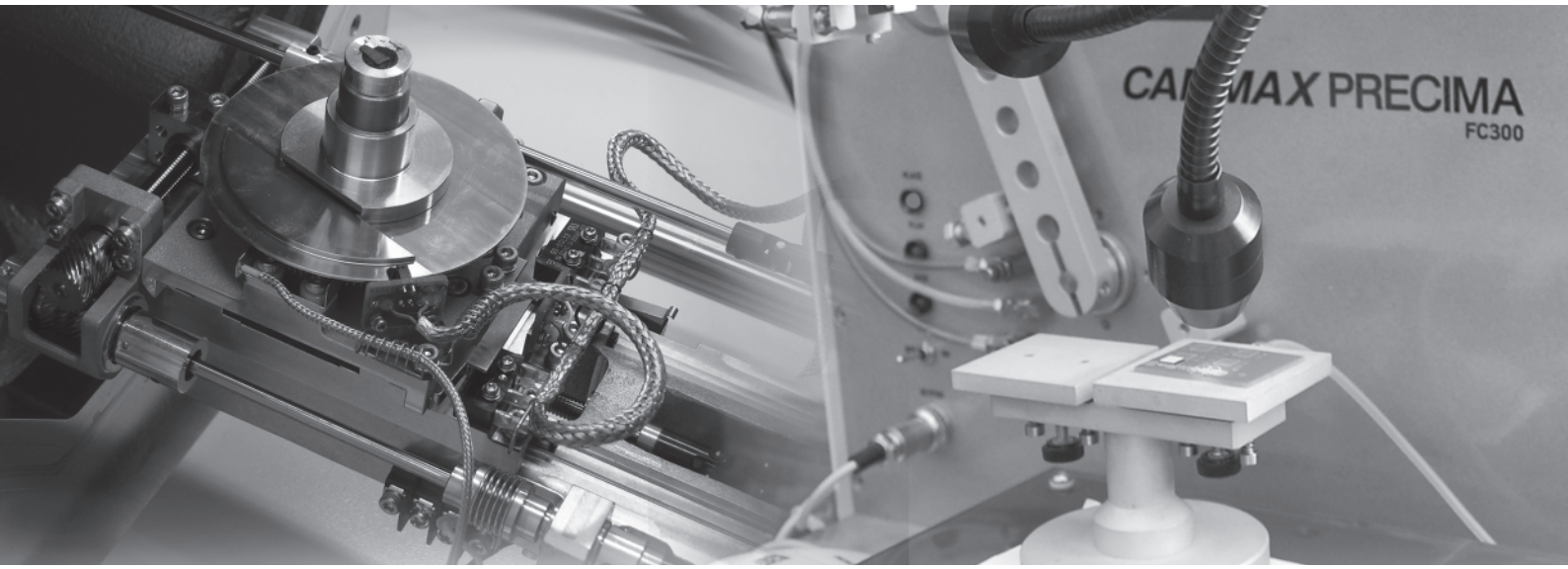
Coordinator:
Ryszard Piramidowicz, Ph.D, D.Sc.
Warsaw University of Technology, Institute of Microelectronics and Optoelectronics

The Photovoltaic Platform was established in 2014 at Warsaw University of Technology in order to increase utilization of the scientific potential and encouraging industry-oriented research services. The Photovoltaic Platform aims to bring together complementary competences of various research groups throughout University creating strong multidisciplinary photovoltaic group capable of successful realization of both large research projects and development of complete solutions for the industry partners. The Photovoltaic Platform core consists of teams from the Faculty of Electronics and Information Technology and Faculty of Physics, as well as teams from other faculties involved in research on various aspects of photovoltaic technologies.

Range of competences of the gathered research groups covers all levels of photovoltaics – from physics of the solar cells, structure of modules, inverters and mounting large methods, design, development and performance evaluation of photovoltaic systems up to energy profiles prediction and assessment of grid integration issues. The teams also help prospective investors to evaluate their model of engagement in the photovoltaic market, taking into consideration technical challenges, legal environment and economic feasibility.

Cooperation with industry partners is critical for long term development of photovoltaics at the Warsaw University of Technology. The Photovoltaic Platform cooperates closely with a number of large utility companies interested in taking part in expected rapid photovoltaic market development. The platform prepared concept study and design of test photovoltaic system for utility company. It also conducts quality assessment of small photovoltaic systems prepared by local installer companies to ensure all systems installed under utility supervision meet highest industry standards. The Photovoltaic Platform also conducted detailed performance analysis of a medium scale photovoltaic power plant installed by a utility company and detected design and installation flaws that explained lower then expected power output. Uniqueness of Photovoltaic Platform experts' competences was also underlined with participation in development of large scale thin-film photovoltaic modules factory concept for one of the largest Polish companies. The Photovoltaic Platform also assists the BOS Foundation in dissemination of knowledge on distributed prosumer energy sources.

Broad knowledge of polish photovoltaic market development provides the Photovoltaic Platform basis for further development of competences of the photovoltaic teams at Warsaw University of Technology in connection with identified needs of the industry. In parallel with involvement in the cooperation with business partners the Photovoltaic Platform teams remain engaged in a number of research project.



Electronic Materials and Microsystem
Technology Division

6. DEGREES AWARDED

6.1. D.Sc. Degrees

[DSc1] Marcin Koba, **Periodic structures for photonics: modeling, technologies, and applications** (Fotoniczne struktury periodyczne: modelowanie, technologie i aplikacje), 24 January 2017

[DSc2] Robert Mroczyński, **Technology and characterization of dielectric layers with high value of permittivity (εr>3.9)** for advanced semiconductor devices (Technologia i charakteryzacja warstw dielektrycznych o podwyższonej wartości przenikalności elektrycznej (εr>3.9) dla zaawansowanych przyrządów półprzewodnikowych), 24 January 2017

[DSc3] Mariusz Sochacki, **Fabrication and characterization by means of electrical methods for selected junctions in silicon carbide technology** (Wytwarzanie i charakteryzacja metodami elektrycznymi wybranych struktur złączowych w technologii węglika krzemu), 24 January 2017

6.2. Ph.D. Degrees

[PhD1] Tymoteusz Ciuk, **Application of epitaxial graphene layers on silicon carbide in the technology of semiconductor devices** (Zastosowanie epitaksjalnych warstw grafenowych na węgliku krzemu w technologii przyrządów półprzewodnikowych), supervisor: Jan Szmidt, 13 April 2017

[PhD2] Dominik Tanous, **Modelling of transport of charge carriers in the metal-insulator-semiconductor structures with nanocrystals embedded in the insulator layer** (Modelowanie transportu nośników ładunku w strukturach metal-izolator-półprzewodnik z nanokryształami w warstwie izolatora), supervisor: Bogdan Majkusiak, 22 June 2017

6.3. M.Sc. Degrees

[MSc1] Piotr Boguszewicz, **The project of low noise amplifier (LNA) for the K band in SiGe BiCMOS 130 nm technology** (Projekt niskoszumnego wzmacniacza (LNA) na pasmo K w technologii BiCMOS 130 nm), advisor: Tomasz Borejko, 13 October 2017

[MSc2] Piotr Borowy, **Comparative analysis of logic block efficiency in the PSoC integrated circuit** (Analiza porównawcza wydajności bloków logicznych w układach PSoC), advisor: Marek Niewiński, 17 March 2017

[MSc3] Filip Michał Jabłecki, **Terahertz time-domain spectroscopy of chosen writing materials** (Spektroskopia terahercowa wybranych materiałów piśmienniczych), advisor: Piotr Garbat, 17 March 2017

[MSc4] Marcin Rafał Kieliszczyk, **InP-based photonic integrated circuit for THz generation** (Układ fotoniki zintegrowanej w technologii InP dla generacji sygnału THz), advisor: Paweł Szczepański, 17 March 2017

[MSc5] Paweł Komorowski, **Erbium doped ZBLAN fiber laser operating in the visible – feasibility study** (Laser światłowodowy Er:ZBLAN na zakres widzialny – studium wykonalności), advisors: Ryszard Piramidowicz, Krzysztof Anders, 14 September 2017

[MSc6] Marcin Piotr Kowalczyk, **Free space optical vibromete**, (Wibrometr laserowy w wolnej przestrzeni), advisor: Ryszard Piramidowicz, 17 March 2017

[MSc7] Aleksandra Pacowska, **Analysis of cancer cells' viability with ISFET structures** (Analiza żywotności komórek nowotworowych przy użyciu struktur ISFET), advisor: Piotr Firek, 30 June 2017

[MSc8] Szymon Reszewicz, **ISM 2,4 GHz Voltage Controlled Oscillator and body biasing calibration circuit realized in FD-SOI 28 nm process** (Projekt scalonego generatora przestrajanego napięciem na pasmo ISM 2,4 GHz z układem kalibracji w technologii FD-SOI 28 nm), advisor: Krzysztof Siwiec, 27 October 2017

[MSc9] Michał Mateusz Wysocki, **The design of the tranceiver implementing the physical layer of EIA/TIA-485 standard** (Projekt układu wejścia/wyjścia realizującego warstwę fizyczną standardu EIA/TIA-485), advisor: Witold Pleskacz, 20 October 2017

6.4. B.Sc. Degrees

[BSc1] Grzegorz Mariusz Bernat, **The implementation of a rectifier integrated circuit for electromagnetic energy recovery module in 130-nm CMOS technology** (Implementacja układu prostownika dla scalonego modułu odzyskiwania energii z pola elektromagnetycznego w technologii CMOS 130 nm), advisor: Krzysztof Siwiec, 22 September 2017

[BSc2] Maciej Bieliński, **Implementation of graphic user interface to visualise states of custom made laboratory processors** (Środowisko z graficznym interfejsem użytkownika do wizualizacji stanów pracy dedykowanego procesora), advisor: Tomasz Borejko, 17 February 2017

[BSc3] Adam Borkowski, **Implementation of DC/DC converter to supply system-on-chip in CMOS 130 nm technology** (Implementacja przetwornicy napięcia typu DC/DC do zasilania scalonych systemów elektronicznych w technologii CMOS 130 nm), advisor: Tomasz Borejko, 29 June 2017

[BSc4] Luiza Dominika Czerwińska, **Analysis of the long-period fiber gratings in the near-infrared range** (Analiza długo-okresowych siatek światłowodowych w zakresie bliskiej podczerwieni), advisor: Mateusz Jakub Śmietana, 30 June 2017

[BSc5] Anna Górska, **Mobile application supporting remote photo capturing. Creating HDR images on mobile device** (Aplikacja wspomagająca proces fotografowania. Tworzenie obrazów HDR na urządzeniu mobilnym), advisor: Marek Sutkowski, 17 February 2017

[BSc6] Piotr Bogumił Grabiński, **Implementation of the receiver for physical layer of integrated external memory interface in CMOS 130 nm technology** (Implementacja odbiornika dla warstwy fizycznej do scalonego interfejsu pamięci zewnętrznej w technologii CMOS 130 nm), advisor: Tomasz Borejko, 29 September 2017

[BSc7] Szymon Grzemski, **The design of Wishbone to AMBA bus converter blocks** (Projekt bloków konwerterów magistrali WISHBONE na magistralę AMBA), advisor: Witold Pleskacz, 10 February 2017

[BSc8] Michał Kajak, **Digital holography with phase-shifting technique with semiconductor laser diodes illumination** (Holografia cyfrowa z zastosowaniem techniki przesunięcia fazowego w przypadku oświetlenia półprzewodnikowymi diodami laserowymi), advisors: Agnieszka Siemion, Krzysztof Anders, 21 June 2017

[BSc9] Jan Piotr Kanturski, **A survey of the efficiency of the engineering data clustering algorithms** (Badanie efektywności algorytmów klasteryzacji danych inżynierskich), advisor: Mikołaj Baszun, 24 November 2017

[BSc10] Bartosz Kościug, **Application for terahertz image filtration** (Oprogramowanie do filtracji obrazów terahercowych), advisor: Piotr Garbat, 29 June 2017

[BSc11] Jakub Kustra, **Modelling and designing an AWG multiplexer in integrated photonics technology** (Modelowanie i projektowanie sprzęgaczy siatkowych AWG w technologii fotoniki scalonej), advisor: Stanisław Stopiński, 07 February 2017

[BSc12] Andrzej Kosma Kwieciński, **Implementation of RV32I Instruction Set of RISC-V processor in HDL the language** (Implementacja zbioru instrukcji RV32I procesora RISC-V w języku opisu sprzętu), advisor: Arkadiusz Władysław Łuczyk, 29 September 2017

[BSc13] Natalia Lubojemska, **Building a workstation for taking 360 images of small objects** (Budowa stanowiska do rejestracji obrazów 360 stopni niedużych obiektów), advisor: Marek Sutkowski, 10 February 2017

[BSc14] Zofia Madej, **Image recording and processing in the THz band** (Rejestracja i przetwarzanie obrazów w zakresie THz), advisor: Piotr Garbat, 13 February 2017

[BSc15] Mateusz Marzec, **Pulsed oscillator module for ytterbium fiber laser in MOPA configuration** (Moduł oscylatora impulsowego do iterbowego lasera włóknowego w konfiguracji MOPA), advisor: Krzysztof Anders, 07 February 2017

[BSc16] Rafał Damian Masiakiewicz, **Implementation of basic analog blocks in FD-SOI 28 nm technology** (Implementacja podstawowych bloków analogowych w technologii FD-SOI 28 nm), advisor: Tomasz Borejko, 17 February 2017

[BSc17] Przemysław Michaluk, **Development of opto-electronic system for the purpose of measuring changes in the spectral output of fiber optic sensors** (Opracowanie systemu optoelektroniczngo na potrzeby pomiaru zmian spektralnych na wyjściu czujników światłowodowych), advisor: Mateusz Jakub Śmietana, 10 March 2017

[BSc18] Herbert Stanisław Namirski, **Design and simulation of electrical contacts properties in VeSTIC systems** (Projekt realizacji i analiza symulacyjna właściwości kontaktów elektrycznych w układach VeSTIC), advisor: Andrzej Pfitzner, 1 December 2017

[BSc19] Bartosz Łukasz Nogalski, **Smart Li-Ion battery management system** (Inteligentny system zarządzania baterią ogniw litowo-jonowych), advisor: Sławomir Szostak, 10 February 2017

[BSc20] Rafał Adam Nowakowski, **Application of m-line spectroscopy to determine the refractive index of optical materials** (Zastosowanie spektroskopii m-line do wyznaczania współczynnika załamania materiałów optycznych), advisor: Krzysztof Paweł Anders, 22 September 2017

[BSc21] Agata Olszewska, **Digital dermatoscopic camera** (Cyfrowa przystawka dermatoskopowa), advisor: Piotr Garbat, 13 February 2017

[BSc22] Robert Ostaszewski, **Testing of hardware performance under condition of Java Virtual Machine environment** (Testowanie wydajności sprzętu komputerowego w warunkach pracy maszyny wirtualnej Javy), advisor: Piotr Witoński, 30 June 2017

[BSc23] Monika Maria Piestrzyńska, **The study on optical interferometers based on Suspended-Core Fibers** (Badanie interferometrów światłowodowych opartych na światłowodzie z zawieszonym rdzeniem), advisor: Mateusz Jakub Śmietana, 17 February 2017

[BSc24] Adam Pipiro, **The design and implementation of a library that would aid the estimation of uncertainty of position in satellite navigation systems** (Projekt i implementacja biblioteki programistycznej wspomagającej szacowanie niepewności wyznaczania pozycji w systemach nawigacji satelitarnej), advisor: Marek Niewiński, 10 March 2017

[BSc25] Bartłomiej Pomianowski, **Photovoltaic microsystem installers' certification program** (Program certyfikacji instalatorów mikrosystemów fotowoltaicznych), advisor: Stanisław Pietruszko, 17 November 2017

[BSc26] Rafał Paweł Salwa, **Musical instrument simulator controlled by gestures** (Symulator instrumentów muzycznych sterowany za pomocą gestów), advisor: Piotr Garbat, 22 September 2017

DEGREES AWARDED

[BSc27] Jakub Piotr Szarafiński, **Production of AIN buffer layers for heteroepitaxy** (Wytwarzanie warstw buforowych AIN na potrzeby heteroepitaksji), advisor: Piotr Firek, 22 September 2017

[BSc28] Yadviga Tcherniavskaya, **Implementation of high-speed interface SpaceFibre in FD-SOI 28 nm technology** (Implementacja szybkiego interfejsu SpaceFibre w technologii FD-SOI 28 nm), advisor: Tomasz Borejko, 10 February 2017

[BSc29] Minh Tuan Tran Nguyen, **6T-SRAM cell design using VeSTIC technology** (Projektowanie komórki pamięci 6T-SRAM w technologii VeSTIC), advisor: Andrzej Pfitzner, 26 January 2017

[BSc30] Magdalena Trendak, **Deposition and characterization of titanium oxynitride thin films for application in optical fiber sensing** (Wytwarzanie i charakteryzacja cienkich warstw tlenoazotku tytanu na potrzeby czujnikowych struktur światłowodowych), advisor: Mateusz Jakub Śmietana, 30 June 2017

[BSc31] Piotr Rafał Wasiuk, **Implementation of the software environment to support a concurrent simulation of electronic circuits by means of HPC tools and infrastructure** (Implementacja środowiska programowego wspomagającego rozproszoną symulację układów elektronicznych z wykorzystaniem narzędzi i infrastruktury HPC), advisor: Arkadiusz Władysław Łuczyk, 29 September 2017

[BSc32] Daniel Waszczak, **Implementation of efficient sample rate conversion in VerilogHDL and MATLAB** (Implementacja konwertera częstotliwości próbkowania w języku Verilog i w programie MATLAB), advisor: Witold Pleskacz, 10 February 2017

[BSc33] Marcin Wolski, **Software development for graphical presentation of logic signals waveforms** (Opracowanie oprogramowania do graficznej realizacji przebiegów czasowych sygnałów logicznych), advisor: Witold Pleskacz, 30 June 2017

[BSc34] Adam Mateusz Wrona, **Design and implementation of integrated 2,4 GHz Bluetooth 4,0 Low Energy power amplifier in CMOS 130 nm** (Implementacja scalonego wzmacniacza mocy do nadajnika Bluetooth Low Energy 2,4 GHz w technologii CMOS 130 nm), advisor: Witold Pleskacz, 10 March 2017

[BSc35] Tomasz Zalewski, **Optical power amplifier module of ytterbium fiber in MOPA configuration** (Moduł wzmacniacza mocy optycznej do iterbowego lasera włóknowego w konfiguracji MOPA), advisor: Ryszard Piramidowicz, 13 February 2017

[BSc36] Urszula Zdulska, **Er:ZBLAN fiber laser in hybrid design** (Laser światłowodowy Er:ZBLAN o konstrukcji hybrydowej), advisor: Ryszard Piramidowicz, 10 February 2017

[BSc37] Krzysztof Zielant, **Use of independent gate biasing of dual-gate VeSFET transistors for adjustment of power usage and maximum frequency of electronic circuits** (Wykorzystanie niezależnej polaryzacji bramek tranzystora VeSFET do regulacji poboru mocy układów elektronicznych i ich szybkości), advisor: Andrzej Pfitzner, 01 December 2017

7. PUBLICATIONS

7.1. Scientific and Technical Papers published in Journals Included in the ISI[1] Database

NUMBER	JOURNAL	AUTHORS	TITLE	DOI	VOLUME	PAGES
[Pub1]	Physical Review B	Carvalho N., Goryachev M., Krupka J., Bushev P., Tobar M.	Low-temperature microwave properties of biaxial $YAlO_3$	10.1103/PhysRevB.96.045141	vol. 96 no. 4 (045141)	1–7
[Pub2]	Molecular Crystals and Liquid Crystals	Chodorow U., Parka J., Strzezysz O., Mazur R., Morawiak P., Pałka N.	Liquid crystal phase shifter for THz radiation with cholesteric liquid crystal	10.1080/15421406.2017.1403185	vol. 657 no. 1	51–55
[Pub3]	Biosensors & Bioelectronics	Dominik M., Leśniewski A., Janczuk M., Niedziółka-Jönsson J., Hołdyński M., Wachnicki Ł., Godlewski M., Bock W., Śmietana M.	Titanium oxide thin films obtained with physical and chemical vapour deposition methods for optical biosensing purposes	10.1016/j.bios.2016.09.079	vol. 93 no. 15	102–109
[Pub4]	Journal of Luminescence	Fetliński B., Boruc Z., Kaczkan M., Turczyński S., Pawlak D., Malinowski M.	Sensitisation of Pr^{3+} in $Y_4Al_2O_9:Ce^{3+}+Pr^{3+}$ system for down-conversion of solar spectrum	10.1016/j.jlumin.2016.09.008	vol. 181	133–137
[Pub5]	Optical Materials Express	Ficek M., Niedziałkowski P., Śmietana M., Koba M., Drijkoningen S., Bogdanowicz R., Bock W., Haenen K.	Linear antenna microwave chemical vapour deposition of diamond films on long-period fiber gratings for bio-sensing applications	10.1364/OME.7.003952	vol. 7 no. 11	3952–3962
[Pub6]	Circuit World	Górecki K., Bisewski D., Zarębski J., Kisiel R., Myśliwiec M.	Investigations of mutual thermal coupling between SiC Schottky diodes situated in the common case	10.1108/CW-10-2016-0046	vol. 43 no. 1	38–42
[Pub7]	Journal of Magnetic Resonance	Hosain M., Floch J., Krupka J., Tobar M.	Whispering Gallery mode ESR spectroscopy and parameters measurement in single crystal $SrLaAlO_4$ at millikelvin temperature	10.1016/j.jmr.2017.06.007	vol. 281 no. August 2017	209–216
[Pub8]	Optics Express	Janaszek B., Tyszka-Zawadzka A., Szczepański P.	Control of gain/absorption in tunable hyperbolic metamaterials	10.1364/OE.25.013153	vol. 25 no. 12	13153–13162
[Pub9]	Sensors and Actuators B – Chemical	Janczuk-Richter M., Dominik M., Roźniecka E., Koba M., Mikulic P., Bock W., Łoś M., Śmietana M., Niedziółka-Jönsson J.	Long-period fiber grating sensor for detection of viruses	10.1016/j.snb.2017.04.148	vol. 250, no. October, 2017	32–38
[Pub10]	IEEE Sensors Journal	Janik M., Myśliwiec A., Koba M., Celebańska A., Bock W., Śmietana M.	Sensitivity pattern of femtosecond laser micromachined and plasma-processed in-fiber Mach-Zehnder interferometers, as applied to small-scale refractive index sensing	10.1109/JSEN.2017.2695544	vol. 17 no. 11	3316–3322
[Pub11]	Surface and Coatings Technology	Jędrzejczak A., Batory D., Dominik M., Śmietana M., Cichomski M., Szymański W., Bystrzycka E., Prowizor M., Kozłowski W., Dudek M	Carbon coatings with high concentrations of silicon deposited by RF PECVD method at relatively high self-bias	10.1016/j.surfcoat.2017.09.044	vol. 329 no. 25 November	212–217

[1] Institute for Scientific Information (Philadelphia, USA)

[Pub12]	IEEE Transactions on Microwave Theory and Techniques	Judek J., Gertych A., Świniarski M., Zdrojek M., Krupka J., Piotrowski J.	Characterization of Finite-Width Ground Coplanar Waveguides on High Resistivity Silicon With Ultralow Metallization Thickness	10.1109/TMTT.2017.2731954	vol. PP no. 99	4836–4842
[Pub13]	IEEE Transactions on Electron Devices	Judek J., Zdrojek M., Sobieski J., Przewloka A., Piotrowski J.	Characterization of the CVD Graphene Monolayer as an Active Element of a One-Port Microwave Device	DOI:10.1109/TED.2017.2742942	vol. 64 no. 10	4340–4345
[Pub14]	Journal of Electronic Materials	Judek J., Zdrojek M., Dariusz S., Krupka J.	Microwave Resistivity of Thermally Oxidized High Resistivity Silicon Wafers	DOI:10.1007/s11664-017-5636-0	vol.46 no. 10	5589–5592
[Pub15]	Ultramicroscopy	Juszczyk J., Kaźmierczak-Bałata A., Firek P., Bodzenta J.	Measuring thermal conductivity of thin films by Scanning Thermal Microscopy combined with thermal spreading resistance analysis	10.1016/j.ultramic.2017.01.012	vol. 175 no. 4	81–86
[Pub16]	Journal of Alloys and Compounds	Kaczkan M., Pawlak D., Turczyński S., Malinowski M.	Site-selective energy upconversion in Pr^{3+}: $Y_4Al_2O_9$	10.1016/j.jallcom.2017.09.069	vol. 728 no. 25 December 2017	1009–1015
[Pub17]	Journal of Luminescence	Kaczkan M., Turczyński S., Malinowski M.	Spectroscopic properties and Judd–Ofelt analysis of Eu^{3+} in $Y_4Al_2O_9$ crystals	10.1016/j.jlumin.2017.12.027	vol. 12 no. in press	1–5
[Pub18]	Acta Physica Polonica A	Król K., Kwietniewski N., Gierałtowska S., Wachnicki Ł., Sochacki M.	Electronic Properties of Stacked ZrO_2 Films Fabricated by Atomic Layer Deposition on 4H-SiC	10.12693/APhysPolA.132.329	vol. 132 no. 2	329–331
[Pub19]	Scientific Reports	Krupka J., Pavlo A., Salski B., Kopyt P., Pacewicz A.	Ferromagnetic Resonance Revised – Electrodynamic Approach	10.1038/s41598-017-05827-7	vol. 7 no. 1 (5750)	1–6
[Pub20]	Journal of Applied Physics	Le Floch J., Murphy C., Hartnett J., Madrangeas V., Krupka J., Cros D.	Frequency-temperature sensitivity reduction with optimized microwave Bragg resonators	10.1063/1.4973676	vol. 121 no. 1	1–8
[Pub21]	Journal of Raman Spectroscopy	Łapińska A., Taube A., Wąsik M., Żukowska G., Dużyńska A., Judek J., Zdrojek M.	Raman spectroscopy of layered lead tin disulfide ($PbSnS_2$) thin films	10.1002/jrs.5064	vol. 48 no. 3	479–484
[Pub22]	Optical Materials	Malinowski M., Kaczkan M., Turczyński S.	Energy transfer and upconversion of Sm^{3+} ions in $YAlO_3$	10.1016/j.optmat.2016.06.031	vol. 63 no. 1	128–133
[Pub23]	Microelectronic Engineering	Mazurak A., Mroczyński R., Jasiński J., Tanous D., Majkusiak B., Kano S., Sugimoto H., Fujii M., Valenta J.	Technology and characterization of MIS structures with co-doped silicon nanocrystals (Si-NCs) embedded in hafnium oxide (HfOx) ultra-thin layers	10.1016/j.mee.2017.05.050	vol. 178 no. 25 June	298–303
[Pub24]	Microelectronic Engineering	Mroczyński R., Kwietniewski N., Konarski P.	Effects of ultra-shallow ion implantation from RF plasma onto electrical properties of 4H-SiC MIS structures with SiOx/HfOx and SiOxNy/HfOx double-gate dielectric stacks	10.1016/j.mee.2017.05.017	vol. 178 no. 25 June	116–121

[Pub25]	Optics Communications	Pniewski J., Ramaniuk A., Kasztelanic R., Śmietana M., Trippenbach M., Buczyński R.	Applicability of suspended-core fibres for attenuation-based label-free biosensing	10.1016/j.optcom.2017.06.025	vol. 402 no. 1 November	290–295
[Pub26]	IEEE Transactions on Microwave Theory and Techniques	Salski B., Olszewska-Placha M., Karpisz T., Rudnicki J., Gwarek W., Maliszewski M., Zofka A., Skulski J.	Microwave Applicator for Thermal Treatment of Bituminous Surface	10.1109/TMTT.2017.2659748	vol. 65 no. 9	3419––3427
[Pub27]	Journal of Alloys and Compounds	Sidorowicz A., Wajler A., Helena W., Nakielska M., Orliński K., Diduszko R., Olszyna A.	Preparation and characterization of thulium doped yttrium oxide ($Tm:Y_2O_3$) powders		vol. 709 no. 30	293–298
[Pub28]	Journal of the Anatomical Society of India	Sutkowski M., Paśko S., Żuk B.	A study of interdependence of geometry of the nuchal neck triangle and cervical spine line in the habitual and straightened postures	10.1016/j.jasi.2017.05.006	vol. 66 no. 1	31–36
[Pub29]	Optics Express	Śmietana M., Janik M., Koba M., Bock W.	Transition between bulk and surface refractive index sensitivity of micro-cavity in-line Mach- Zehnder interferometer induced by thin film deposition	10.1364/OE.25.026118	vol. 25 no. 21	26118––26123
[Pub30]	Microelectronic Engineering	Tanous D., Mazurak A., Majkusiak B.	Simulations of transient processes and characteristics of the nc-MOS structures	10.1016/j.mee.2017.05.013	vol. 178 no. 25 June	173–177
[Pub31]	Applied Physics Letters	Taube A., Sochacki M., Kwietniewski N., Werbowy A., Gierałtowska S., Wachnicki Ł., Godlewski M., Szmidt J.	Electrical properties of isotype and anisotype ZnO/4H-SiC heterojunction diodes	10.1063/1.4979872	vol. 110 no. 14	143509-1–– 143509-5
[Pub32]	Optics Express	Tenderenda T., Szostkiewicz Ł., Stańczyk T., Bienkowska B., Kunicki D., Murawski M., Mergo P., Piramidowicz R., Nasiłowski T.	Analysis of phase sensitivity to longitudinal strain in microstructured optical fibers	10.1364/OE.25.012216	vol. 25 no. 11	12216––12221
[Pub33]	Solid-State Electronics	Tomaszewski D., Głuszko G., Łukasiak L., Kucharski K., Malesińska J.	Elimination of the channel current effect on the characterization of MOSFET threshold voltage using junction capacitance measurements	1016/j.sse.2016.10.006	vol. 128 no. February	92–101
[Pub34]	Optics Express	Tyszka-Zawadzka A., Janaszek B., Szczepański P.	Tunable slow light in graphene-based hyperbolic metamaterial waveguide operating in SCLU telecom bands	10.1364/OE.25.007263	vol. 25 no. 7	7263––7272
[Pub35]	Journal of Alloys and Compounds	Wang Y., Włodarczyk D., Li L., Wittlin A., Przybylinska H., Sybilski P., Zhydachevskii Y., Ma C., Brik M., Malinowski M., Zorenko Y., Gorbenko V., Suchocki A.	Electronic structure of Ce^{3+} in yttrium and lutetium orthoaluminate crystals and single crystal layers,	10.1016/j.jallcom.2017.06.235	vol. 723 no. 5 November	157–163

[Pub36]	IEEE Journal of Quantum Electronics	Witoński P., Mossakowska-Wyszyńska A., Szczepański P.	Effect of Nonlinear Loss and Gain in Multilayer PT-Symmetric Bragg Grating	10.1109/JQE.2017.2761380	vol. 53 no. 6 (2100111)	1–11
[Pub37]	Superconductor Science and Technology	Wosik J., Krupka J., Qin K., Ketharnath D., Galstyan E., Selvamanickam V.	Microwave characterization of normal and superconducting states of MOCVD made YBCO tapes	10.1088/1361-6668/aa52a4	vol. 30 no. 3	1–13

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

NUMBER	JOURNAL	AUTHORS	TITLE	DOI	VOLUME	PAGES
[Pub38]	Journal of Electronics and Communication Engineering Research	Borecki M., Gęca M., Duk M., Korwin-Pawlowski M.	Miniature Gas Sensors Heads and Gas Sensing Devices for Environmental Working Conditions – A Review		vol. 1 no. 2	1–11
[Pub39]	Autobusy. Technika, Eksploatacja, Systemy Transportowe	Czejdo B., Daszczuk W., Baszun M.	Using Machine Learning to Enhance Vehicles Traffic in ATN (PRT) Systems		vol. 18 no. 12	1484––1489
[Pub40]	Informatyka, Automatyka, Pomiary w Gospodarce i Ochronie Środowiska	Domański G., Jaworski A., Kalenik J., Szabatin R., Wróblewski P., Smolik W., Kurjata R., Konarzewski B., Dziewiecki M., Marzec J., Zaremba K., Ziembicki M., Rychter A., Kryszyn J., Brzeski P., Szmidt J.	Gain Prediction Theory of Single Foil Gas Electron Multiplier Detector	10.5604/01.3001.0010.4601	vol. 7 no. 1	130–132
[Pub41]	Procedia Technology	Dominik M., Roźniecka E., Wachnicki Ł., Niedziółka--Jönsson J., Godlewski M., Bock W., Śmietana M.	Biofunctionalization effectiveness of titanium oxide thin films obtained with physical and chemical vapour deposition methods for optical label-free biosensing applications	10.1016/j.protcy.2017.04.098	vol. 27 no. Aug	232–233
[Pub42]	Elektronika – konstrukcje, technologie, zastosowania	Jakubowski A., Wierzbicki S.	Inklinometr z czujnikiem MEMS do monitorowania wytężenia konstrukcji dachów	10.15199/13.2017.9.3	vol. 58 no. 9	11–13
[Pub43]	Photonics Letters of Poland	Komorowski P., Anders K., Zdulska U., Piramidowicz R.	Erbium doped ZBLAN fiber laser operating in the visible-feasibility study	10.4302/plp.v9i3.769	vol. 9 no. 3	85–87
[Pub44]	Przegląd Elektrotechniczny	Król K., Sochacki M., Kwietniewski N., Gierałtowska S., Wachnicki Ł.	Zastosowanie dielektryków high-k w przyrządach mocy wytwarzanych w technologii węglika krzemu	10.15199/48.2017.08.28	vol. 8	106–109
[Pub45]	Elektronika – konstrukcje, technologie, zastosowania	Osiniak M., Pióro Z., Jakubowski A., Wierzbicki S.	Możliwość realizacji inklinometru z czujnikem MEMS dla systemów monitorowania obciążenia konstrukcji	10.15199/13.2017.1.8	no. 1	37–42

[Pub46]	Journal of Spine	Paśko S., Sutkowski M., Żuk B.	Evaluation of the Selected Parameters of the Body onto the Location of the Gravity Center Projected on Foot	10.4172/2165-7939.1000380	vol. 6 no. 4 (1000380)	1–5
[Pub47]	Devices and Methods of Measurements	Sutkowski M., Saukova Y.	Research of Digital Camera Dynamic Range on the Imaging Processing Basis	10.21122/2220-9506-2017-8-3-271-278	vol. 8 no. 3	271–278
[Pub48]	Maszyny Elektryczne: zeszyty problemowe	Woliński W., Romaniuk R.	Działalność Polskiego Komitetu Optoelektroniki Stowarzyszenia Elektryków Polskich		vol. 116 no. 4	205–211

7.3. Scientific and Technical Papers Published in Conference Proceedings

NUMBER	PROCEEDINGS OF CONFERENCE / ISBN/DOI	AUTHORS	TITLE	PAGES
[Pub49]	Program and Abstracts of 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 Centro Fermi, ISBN 978-88-943030-0-1	Anders K., Komorowski P., Zdulska U., Piramidowicz R.	Analysis of IR-to-VIS up-conversion mechanisms in Er+Yb doped fluorozirconate glasses	42–42
[Pub50]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Anders K., Krysiński R., Stępień R., Piramidowicz R.	Low-phonon glasses for application in MIR laser sources	1–1
[Pub51]	Abstracts of the 18th International Conference on Luminescence Federal University of Pernambuco ISBN 978-85-63273-36-9	Anders K., Sujecki S., Sojka Ł., Bereś-Pawlik E., Sakr H., Tang Z., Barney E., Furniss D., Benson T., Seddon A., Piramidowicz R.	Pr^{3+} doped chalcogenide fibers for application in MIR light sources	219–219
[Pub52]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Anders K., Gusowski M., Koba M., Marzec M., Zalewski T., Bortnowski P., Mergo P., Piramidowicz R.	Pulsed ytterbium fiber laser in MOPA configuration – design and development	1–1
[Pub53]	Abstracts of the 18th International Conference on Luminescence Federal University of Pernambuco ISBN 978-85-63273-36-9	Anders K., Jusza A., Komorowski P., Andrejuk P., Piramidowicz R.	Short wavelength up-converted emission studies in Er^{3+} and Yb^{3+} doped ZBLAN glasses	284–284
[Pub54]	Proceedings of EUROSOI-ULIS 2017 ISBN 978-1-5090-5314-8 DOI:10.1109/ULIS.2017.7962573	Beck R., Korb P.	Effects of non-stoichiometry of silicon oxide layers in double barrier structure on high temperature annealing of ultrathin silicon layer	1–4
[Pub55]	Proc. SPIE. 10445, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2017 ISBN 9781510613546 DOI:10.1117/12.2279986	Belka R., Keczkowska J., Suchańska M., Firek P., Wronka H., Kozłowski M., Radomska J., Czerwosz E., Craciunoiu F.	SEM and Raman studies of CNT films on porous Si	104454P-1–10445 4P-8

[Pub56]	The Eighth International Conference on Sensor Device Technologies and Applications, SENSORDEVICES 2017 ISBN 978-1-61208-581-4	Borecki M., Gęca M., Korwin-Pawlowski M., Prus P.	Capillary Sensor with UV-Forced Degradation and Fluorescence Reading of Diesel and Biodiesel Fuel Chemical Stability	25–30
[Pub57]	Proceedings of SPIE 10445, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2017 ISBN 9781510613546 DOI:10.1117/12.2280970	Borecki M., Prus P., Korwin-Pawlowski M., Rychlik A., Kozubel W.	Sensor set-up for wireless measurement of automotive rim and wheel parameters in laboratory conditions	1044569-1–10445 69-9
[Pub58]	Proceedings of SPIE 25th International Conference on Optical Fiber Sensors ISBN 9781510610910 DOI:10.1117/12.2267411	Czarnecka K., Dominik M., Janczuk-Richter M., Niedziółka-Jönsson J., Bock W., Śmietana M.	Specific detection of very low concentrations of DNA oligonucleotides with DNA-coated long-period grating biosensor	1–4
[Pub59]	The Eighth International Conference on Sensor Device Technologies and Applications, SENSORDEVICES 2017 ISBN 978-1-61208-581-4	Duk M., Kociubiński A., Lizak T., Borecki M.	Multichannel NDIR Methane Sensor for Soil Probes	109–111
[Pub60]	Proceedings of the 22nd Annual Symposium of the IEEE Photonics Society Benelux Chapter Delft University of Technology	Garbat P., Stawczyk A.	Polarization imaging with LC device for underwater vision	156–159
[Pub61]	Proceedings of the 22nd Annual Symposium of the IEEE Photonics Society Benelux Chapter Delft University of Technology	Garbat P., Waledzik K., Olszewska A., Adamczyk M., Piramidowicz R.	Remote monitoring heart and respiration rates using structured light and multi band camera	69–72
[Pub62]	Proceedings Volume 10439, Millimetre Wave and Terahertz Sensors and Technology X ISBN 9781510613423 DOI:10.1117/12.2280626	Garbat P., Kościug B.	Review of terahertz image enhancement techniques	104390D-1—104390D-8
[Pub63]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Golba A., Stopiński S., Jusza A., Anders K., Kaźmierczak A., Tomkiewicz M., Piramidowicz R.	Monolithically integrated multichannel transmitters for application in WDM-PON systems	1–1
[Pub64]	Proc. of SPIE Optical Fibers and Their Applications 2017 ISBN 9781510610958 DOI:10.1117/12.2271090	Golba A., Stopiński S., Jusza A., Anders K., Kaźmierczak A., Tomkiewicz M., Augustin L., Piramidowicz R.	Monolithically integrated multichannel transmitters for application in WDM-PON systems	1–8
[Pub65]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Jakub J., Anders K., Piramidowicz R.	5 W CW erbium doped fiber laser – design and development	1–1
[Pub66]	Program of the 8th International Conference on Metamaterials, Photonic Crystals and Plasmonics Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Janaszek B., Tyszka-Zawadzka A., Szczepański P.	Optical properties of bulk and waveguide structures based on tunable hyperbolic metamaterials	71–71

[Pub67]	Proceedings of the 8 th International Conference on Metamaterials, Photonic Crystals and Plasmonics Seoul National University	Janaszek B., Tyszka-Zawadzka A., Szczepański P.	Optical properties of bulk and waveguide structures based on tunable hyperbolic metamaterials	1265–1266
[Pub68]	V Polska Konferencja Optyczna, streszczenia ISBN 978-83-7518-839-4	Janaszek B., Tyszka-Zawadzka A., Kieliszczyk M., Szczepański P.	Przestrajalne metamateriały hiperboliczne	50–50
[Pub69]	Summer Topicals Meeting Series 2017 ISBN 978-1-5090-6570-7 DOI:10.1109/PHOSST.2017.8012656	Janaszek B., Tyszka-Zawadzka A., Szczepański P.	Tunable HMM-based devices for integrated photonics	73–74
[Pub70]	Proceedings of SPIE 25th International Conference on Optical Fiber Sensors ISBN 9781510610910 DOI:10.1117/12.2265961	Janik M., Koba M., Mikulic P., Bock W., Śmietana M.	Combined long-period grating and micro-cavity in-line Mach-Zehnder interferometer for refractive index sensing	1–4
[Pub71]	Proceedings of SPIE 25th International Conference on Optical Fiber Sensors ISBN 9781510604858 DOI:10.1117/12.2265755	Janik M., Koba M., Bock W., Śmietana M.	Tuning refractive index sensing properties of micro-cavity in-line Mach-Zehnder interferometer with plasma etching	1–4
[Pub72]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005181	Jaworski Z.	A highly linear 4-bit DAC with 1 GHz sampling rate implemented in 28 nm FD-SOI process	189–195
[Pub73]	VII Workshop on Physics and Technology of Semiconductor Lasers Lodz University of Technology	Jusza A., Paśnikowska A., Kaźmierczak A., Stopiński S., Tomkiewicz M., Piramidowicz R.	InP-based integrated transceivers for fiber-optic access systems	1–2
[Pub74]	Abstracts of the 18th International Conference on Luminescence Federal University of Pernambuco ISBN 978-85-63273-36-9	Jusza A., Łyszczek R., Gil M., Mergo P., Piramidowicz R.	Luminescent properties of polymer nanocomposites doped with europium and terbium M-O complexes	185–185
[Pub75]	Programme of 5th International Conference on Multifunctional, Hybrid and Nanomaterials 2017	Jusza A., Łyszczek R., Gil M., Mergo P., Piramidowicz R.	Metal-organic RE complexes embedded in PMMA matrix – structural and luminescent properties of polymer-based composite materials	1–1
[Pub76]	Abstracts of the 18th International Conference on Luminescence, 2017 Federal University of Pernambuco ISBN 978-85-63273-36-9	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	PMMA-based composite optical fibers doped with RE^{3+} activated nanocrystals – technology and luminescent properties	158–158
[Pub77]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	PMMA-based nanocomposite materials activated with Pr^{3+} ions	1–1
[Pub78]	Abstracts of the 18th International Conference on Luminescence, 2017 Bialystok University of Technology ISBN 9781510610958	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	180–180

[Pub79]	VII Workshop on Physics and Technology of Semiconductor Lasers Lodz University of Technology	Jusza A., Anders K., Dybała F., Bercha A., Trzeciakowski W., Piramidowicz R.	Pressure-tuned laser diodes for applications in optical spectroscopy of up-converting luminescent materials	1–2
[Pub80]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Jusza A., Łyszczek R., Gil M., Mergo P., Piramidowicz R.	Rare earth complexes as a dopants for luminescent polymer composite materials	1–1
[Pub81]	Program and Abstracts of 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 ISBN 978-88-943030-0-1	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	Visible luminescent properties of Pr^{3+} doped fluoride nanocrystals and their PMMA-based composites	88–88
[Pub82]	Proc. SPIE. 10445, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2017 ISBN 9781510613546 DOI:10.1117/12.2280971	Kalenik J., Firek P., Szmidt J., Czerwosz E., Kozłowski M., Stępińska I., Wódka T.	Long time stability of lamps with nanostructural carbon field emission cathodes	104450P-1–10445 0P-7
[Pub83]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology, ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005173	Kasprowicz D.	Variability-aware table-based DC model of a dual-gate transistor	154–158
[Pub84]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Kaźmierczak A., Stopiński S., Jusza A., Anders K., Markowski K., Osuch T., Piramidowicz R.	Analysis of optical input signal polarization influence on InP integrated photonic interrogators	1–1
[Pub85]	VII Workshop on Physics and Technology of Semiconductor Lasers Lodz University of Technology	Kaźmierczak A., Anders K., Słowikowski M., Stopiński S., Krej M., Dziuda Ł., Piramidowicz R.	Integrated read-out unit for fiber-optic sensor network	1–2
[Pub86]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Kaźmierczak A., Stopiński S., Jusza A., Anders K., Piramidowicz R.	Photonic Integrated Circuits for Sensing Applications: Ultra – Compact Optical Transducers and Interrogators	1–1
[Pub87]	Proc. of SPIE Optical Fibers and Their Applications 2017 ISBN 9781510610958 DOI:10.1117/12.2271041	Kaźmierczak A., Stopiński S., Jusza A., Anders K., Piramidowicz R.	Sensing Applications of Photonic Integrated Circuits: Ultra–Compact Optical Transducers and Interrogators	1–8
[Pub88]	Book of Abstracts: ISSE 2017, 40th International Spring Seminar on Electonics Technology Technical University of Sofia ISBN 978-619-7066-15-9	Kisiel R., Myśliwiec M.	Combination of Solid-Liquid Interdiffusion and Sintering Bonding for GaN Devices Assembly	90–91
[Pub89]	IEEE Conference Publications of 40th International Spring Seminar on Electronics Technology ISSE 2017 ISBN 978-1-5386-0582-0 DOI:10.1109/ISSE.2017.8000906	Kisiel R., Myśliwiec M.	Combination of Solid-Liquid Interdiffusion and Sintering Bonding for GaN Devices Assembly	1–4

[Pub90]	The Eighth International Conference on Sensor Device Technologies and Applications, SENSORDEVICES 2017 ISBN 978-1-61208-581-4	Kociubiński A., Duk M., Muzyka K., Borecki M.	Ultraviolet Photodetectors Fabricated on 4H-SiC	78–80
[Pub91]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Komorowski P., Zdulska U., Anders K., Markowski K., Osuch T., Piramidowicz R.	Erbium doped ZBLAN fiber laser operating in green spectral range – modelling, design and development	1–1
[Pub92]	The European Conference PHYSICS OF MAGNETISM 2017 Instytut Fizyki Molekularnej PAN ISBN 978-83-933663-4-7	Krupka J., Pavlo A., Salski B., Kopyt P., Pacewicz A.	Ferromagnetic Resonance and the Linewidth in Spherical Samples – Revision of the Standard Measurement Techniques	1–1
[Pub93]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8004587	Kuźmicz W.	The future of CMOS: More Moore or the next big thing?	21–26
[Pub94]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Laskownicki M., Anders K., Jusza A., Piramidowicz R.	UV-VIS spectroscopic properties of Ho^{3+} doped fluorozirconate glass	1–1
[Pub95]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005183	Łuczyk A.	A method to manage unknown values generation and propagation during gate level simulations of multi-clock digital circuits	200–204
[Pub96]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005284	Łuczyk A., Neneman K., Pleskacz W.	Principal component analysis of accelerations in human dynamic movements: A sample set length effect study	601–606
[Pub97]	Proceedings of 27th International Travelling Summer School on Microwaves and Lightwaves School of Electrical Engineering, KTH Royal Institute of Technology	Madziar K.	Photonic and Microwave Photonic Generation of RF Signals	1–42
[Pub98]	XVII Konferencja Uniwersytet Wirtualny – VU'17 – Materiały konferencyjne Polsko-Japońska Akademia Technik Komputerowych	Madziar K., Galwas B.	Projekt elektroniczny w kursie internetowym Doświadczenia OKNO PW	1–19
[Pub99]	Book of Abstracts of XIV INTERNATIONAL CONFERENCE ON MOLECULAR SPECTROSCOPY AGH University of Science and Technology ISBN 978-83-63663-94-0	Malinowski M., Kaczkan M., Turczyński S.	Multisite luminescence of rare earth ions doped $Y_4Al_2O_9$ crystals	35–35

[Pub100]	E-MRS Fall Meeting 2017	Mazurak A., Jasiński J., Mroczyński R.	Stress-and-Sense Investigation of Memory Effects in Si-NCs MIS Structures	348–348
[Pub101]	8th Power Electronics for Plasma Engineering Conference – Conference Proceedings TRUMPF Huettinger Sp. z o.o. ISBN 978-83-930983-7-8	Mroczyński R.	Dielectric and conductive materials fabricated by means of RF plasma enhanced methods for semiconductor structures – technology and applications	1–1
[Pub102]	48th IEEE Semiconductor Interface Specialists Conference – Abstracts	Mroczyński R., Jasiński J.	Electro-physical properties of gate-last MOSFETs with low-temperature SiOxNy/HfOx stack after ultra-shallow fluorine implantation from RF plasma	215–215
[Pub103]	Book of Abstracts INFOS 2017 IHP Innovations for high performance microelelctronics	Mroczyński R.	Improvement of electro-physical properties of 4H-SiC MIS structures with SiOx/HfOx and SiOxNy/HfOx stacks by means of ultra-shallow ion implantation from RF plasma	1–1
[Pub104]	BIT's 3rd World Congress of Smart Materials-2017 "Step towards a ubiquitous smart future" BIT Group Global Ltd.	Mroczyński R.	Low-Temperature Technology Of MIS Structures With Silicon Nanocrystals Embedded in Hafnium Oxide (HfOx) Layers For NVSM Applications	119–119
[Pub105]	IEEE Conference Publications of 40th International Spring Seminar on Electronics Technology ISSE 2017 ISBN 978-1-5386-0582-0 DOI:10.1109/ISSE.2017.8000908	Myśliwiec M., Kisiel R.	Fluxless Pressure Ag Sintering in Creation of Au-Ag Connection Systems	1–4
[Pub106]	Book of Abstracts: ISSE 2017, 40th International Spring Seminar on Electonics Technology Technical University of Sofia ISBN 978-619-7066-15-9	Myśliwiec M., Kisiel R.	Fluxless Pressure Ag Sintering in Creation of Au-Ag Connection Systems	94–95
[Pub107]	Proceedings of the 2017 IEEE 20th International Symposium on Design and Diagnostics of Electronic Circuits and Systems ISBN 978-1-5386-0471-7 DOI:10.1109/DDECS.2017.7934570	Narczyk P., Siwiec K., Pleskacz W.	Analog front-end for precise human body temperature measurement	1–6
[Pub108]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005225	Narczyk P., Siwiec K., Pleskacz W.	Temperature calibration technique based on on-chip resistor	328–332
[Pub109]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005240	Pietroń D., Borejko T., Siwiec K., Pleskacz W.	Importance of on-chip inductor modeling in radio frequency integrated circuits	398–403
[Pub110]	Abstracts of the 18th International Conference on Luminescence, 2017 Federal University of Pernambuco ISBN 978-85-63273-36-9	Piramidowicz R., Anders K., Jusza A., Komorowski P., Zdulska U., Markowski K., Osuch T.	All-fiber Er:ZBLAN lasers in hybrid geometry	221–221

[Pub111]	VII Workshop on Physics and Technology of Semiconductor Lasers Lodz University of Technology	Piramidowicz R., Stopiński S., Jusza A., Anders K., Kaźmierczak A., Paśnikowska A., Słowikowski M., Szczepański P.	Generic technologies of integrated photonics	1–2
[Pub112]	Proceedings on the Conference on Lasers and Electro-Optics Europe and 12th European Quantum Electronics Conference, CLEO ISBN 978-1-5090-6736-7 DOI:10.1109/CLEOE-EQEC.2017.8086668	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	Polymer-based composite active fiber doped with Tm^{3+} and Yb^{3+} – technology and luminescent properties in VIS spectral range	1–1
[Pub113]	Programme of 5th International Conference on Multifunctional, Hybrid and Nanomaterials 2017	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	Polymer nanocomposites doped with RE^{3+} ions for applications in VIS light sources	1–1
[Pub114]	Program and Abstracts of 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 ISBN 978-88-943030-0-1	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	RE^{3+} doped luminescent polymer composites	136–136
[Pub115]	Proceeding of the 10th International Scientific and Technical Conference INSTRUMENTATION ENGINEERING 2017 ISBN 978-985-583-136-6	Saukova Y., Sutkowski M.	The uncertainity of anthropometric parameters measurements in digital bimetrics system	166–167
[Pub116]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology, ISBN 9781510610958	Słowikowski M., Mroczyński R., Golba A., Kaźmierczak A., Stopiński S., Piramidowicz R.	Passive elements of photonic integrated circuits – design and technology	1–1
[Pub117]	Proceedings of SPIE 25th International Conference on Optical Fiber Sensors ISBN 9781510610910 DOI:10.1117/12.2265932	Sobaszek M., Dominik M., Burnat D., Bogdanowicz R., Stranak V., Sezemsky P., Śmietana M.	Optical monitoring of thin film electro-polymerization on surface of ITO-coated lossy-mode resonance sensor	1–4
[Pub118]	Program and Abstracts of 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 ISBN 978-88-943030-0-1	Sojka Ł., Tang Z., Furniss D., Bereś-Pawlik E., Piramidowicz R., Anders K., Seddon A., Benson T., Sujecki S.	Investigation of mid infrared spontaneous emission sources based on Pr^{3+} doped selenide-chalcogenide fibre	149–149
[Pub119]	Conference proceedings of 19th European Conference on Integrated Optics ECIO 2017 European Conference on Integrated Optics	Stopiński S., Siwiec K., Myśliwiec M., Kisiel R., Augustin L., Pleskacz W., Piramidowicz R.	A multi-channel photonic integrated transmitter driven by an application specific integrated circuit	1–2
[Pub120]	Proceedings on the Conference on Lasers and Electro-Optics Europe and 12th European Quantum Electronics Conference, CLEO ISBN 978-1-5090-6736-7 DOI:10.1109/CLEOE-EQEC.2017.8086879	Stopiński S., Jusza A., Piramidowicz R.	An interferometrie fiber-optic gyroscope system based on an application specific photonic integrated circuit	1–1
[Pub121]	Conference proceedings of 19th European Conference on Integrated Optics ECIO 2017 European Conference on Integrated Optics	Stopiński S., Augustin L., Piramidowicz R.	A single-frequency integrated ring laser for gyro applications	1–2

[Pub122]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Stopiński S., Jusza A., Koba M., Anders K., Augustin L., Piramidowicz R.	Development of an optical gyroscope system using application specific photonic integrated circuits	1–1
[Pub123]	VII Workshop on Physics and Technology of Semiconductor Lasers Lodz University of Technology	Stopiński S., Siwiec K., Myśliwiec M., Kisiel R., Pleskacz W., Piramidowicz R.	Hybrid integration of a multi-channel photonic integrated circuit with an integrated microelectronic driver	1–2
[Pub124]		Stopiński S., Jusza A., Piramidowicz R.	Optical gyroscopes in generic technology on InP platform	1–2
[Pub125]	Proceedings of the 22nd Annual Symposium of the IEEE Photonics Society Benelux Chapter Delft University of Technology	Stopiński S., Jusza A., Anders K., Kaźmierczak A., Słowikowski M., Markowski K., Osuch T., Krej M., Dziuda Ł., Piramidowicz R.	Optoelectronic system for monitoring physiological parameters of patients under MRI diagnosis	160–163
[Pub126]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Stopiński S., Jusza A., Anders K., Kaźmierczak A., Golba A., Tomkiewicz M., Augustin L., Piramidowicz R.	Photonic integrated circuits for application in WDM-PON	1–1
[Pub127]	Abstracts of the 18th International Conference on Luminescence Federal University of Pernambuco ISBN 978-85-63273-36-9	Sujecki S., Sojka Ł., Bereś-Pawlik E., Piramidowicz R., Anders K., Sakr H., Tang Z., Barney E., Furniss D., Benson T., Seddon A.	Numerical analysis of photoluminescence from Tb^{3+} doped chalcogenide glass fiber samples	225–225
[Pub128]	Prospects of Development of Processing Technologies and Equipment in Machine-Buildings University of Economics ISBN 978-5-9906195-4-8	Sutkowski M., Paśko S., Żuk B.	Optical system for measurements of the location of body gravity center projected on foot	226–233
[Pub129]	V Polska Konferencja Optyczna streszczenia Sobczyk Spółka Jawna ISBN 978-83-7518-839-4	Śmietana M.	Czujniki światłowodowe do monitorowania procesów chemicznych i zjawisk biologicznych	12–12
[Pub130]	Proceedings of SPIE 25th International Conference on Optical Fiber Sensors ISBN 9781510610910 DOI:10.1117/12.2267635	Śmietana M., Dominik M., Mikulic P., Bock W.	Refractive index sensing with Al_2O_3-nanocoated long-period gratings working at dispersion turning point: temperature cross-sensitivity	1–4
[Pub131]	V Polska Konferencja Optyczna streszczenia Sobczyk Spółka Jawna ISBN 978-83-7518-839-4	Tenderenda T., Szistkiewicz Ł., Stańczyk T., Bieńkowska B., Kunicki D., Murawski M., Mergo P., Piramidowicz R., Nasiłowski T.	Modelowanie czułości fazowej na rozciąganie modów prowadzonych we włóknach mikrostrukturalnych	60–60
[Pub132]	Proceedings of EUROSOI-ULIS 2017 ISBN 978-1-5090-5314-8 DOI:10.1109/ULIS.2017.7962568	Tomaszewski D., Głuszko G., Kucharski K., Malesińska J., Łukasiak L.	FDSOI MOSFET threshold voltage characterization based on AC simulation and measurements	1–4
[Pub133]	Book of Abstracts The Sixth International Workshop on Advanced Spectroscopy and Optical Materials Uniwersytet Gdański	Wang Y., Hrubiak R., Paszkowicz W., Kosyl K., Suchocki A., Kamińska A., Zhydachevskii Y., Turczyński S., Pawlak D., Malinowski M.	Spectroscopic properties of $Y4Al_2O_9$:Ce crystals under high pressure	97–97

[Pub134]	Book of Abstracts: International Conference on Oxide Materials for Electronic Engineering – fabrication, properties and applications OMEE-2017 Publishing House of Lviv Polytechnic ISBN 978-966-941-062-7	Wang Y., Suchocki A., Ciesielska M., Kamińska A., Zhydachevskii Y., Turczyński S., Pawlak D., Malinowski M.	Spectroscopic Properties of $Y4Al_2O_9$:Ce Crystals under High Pressure	142–142
[Pub135]	XLV Prace Szkoły Inżynierii Materiałowej Wydawnictwo Naukowe Akapit ISBN 978-83-63663-98-8	Wicher B., Chodun R., Nowakowska-Langier K., Okrasa S., Król K., Minikayev R., Strzelecki G., Zdunek K.	Warstwy metaliczne Mo otrzymywane metodą PMS	143–148
[Pub136]	Proceedings of the 2017 IEEE 20th International Symposium on Design and Diagnostics of Electronic Circuits and Systems ISBN 978-1-5386-0471-7 DOI:10.1109/DDECS.2017.7934562	Wołodźko M., Kuźmicz W.	A low power input amplifier for bio-signal acquisition in 28 nm FDSOI technology	1–4
[Pub137]	Proceedings of 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017 Lodz University of Technology ISBN 978-83-63578-11-4 DOI:10.23919/MIXDES.2017.8005195	Wysocki M., Siwiec K., Pleskacz W.	EIA/TIA-485 transceiver in standard 130 nm CMOS technology	258–263
[Pub138]	Book of abstracts: Optical Fibers and Their Applications 2017 Bialystok University of Technology ISBN 9781510610958	Zdulska U., Komorowski P., Osuch T., Markowski K., Anders K., Piramidowicz R.	All-fiber 1.55 μm Er:ZBLAN laser with hybrid resonator	1–1

7.4. Scientific and Technical Books

NUMBER	AUTHORS	PUBLISHER, ISBN	TITLE	PAGES
[Pub139]	Dominik M., Koba M., Bogdanowicz R., Bock W., Śmietana M.	Springer International Publishing Switzerland ISBN 978-3-319-42624-2 DOI:10.1007/978-3-319-42625-9_5	Plasma-Based Deposition and Processing Techniques for Optical Fiber Sensing, in: Fiber Optic Sensors – Current Status and Future Possibilities	95–114
[Pub140]	Firek P., Stonio B., Kamiński M., Wysokiński P., Sochacki M.	Instytut Tele- i Radiotechniczny ISBN 978-83-945855-2-5	Dry etching of dielectric thin films, in: Vacuum Technique & Technology	13–27

8. PATENTS

[Pat1]	Kalenik Jerzy, Mroczkowski Mateusz: **Light-emitting structure with powder material with light-emitting properties** (Struktura elektroluminescencyjna z proszkowym materiałem o właściwościach elektroluminescencyjnych), Invention, Accepted, Application number: P-410251, Patent/rights number: 226666, Application date: 25 November 2014, Patent (decision) date: 21 March 2017
[Pat2]	Kopański Jakub, Borejko Tomasz, Butryn Igor, Derlecki Mariusz, Pietroń Daniel, Siwiec Krzysztof, Wiechowski Łukasz, Pleskacz Witold: **Receiver blocks compatible with Bluetooth Low Energy standard** (Bloki toru odbiorczego zgodnego ze standardem Bluetooth Low Energy), Topography of integrated circuits, Application confirmed, Application number: S-0029, Application date: 23 June 2017
[Pat3]	Kopański Jakub, Borejko Tomasz, Butryn Igor, Pietroń Daniel, Siwiec Krzysztof, Wiechowski Łukasz, Pleskacz Witold: **Transceiver blocks compatible with Bluetooth Low Energy standard** (Bloki toru nadawczo-odbiorczego zgodnego ze standardem Bluetooth Low Energy), Topography of integrated circuits, Accepted, Application number: S-0027, Patent/rights number: S-0027, Application date: 23 June 2017, Patent (decision) date: 11 August 2017
[Pat4]	Kopański Jakub, Borejko Tomasz, Butryn Igor, Pietroń Daniel, Siwiec Krzysztof, Wiechowski Łukasz, Pleskacz Witold: **Transmitter front-end and elements of receiver path compatible with Bluetooth Low Energy standard** (Tor nadawczy i bloki toru odbiorczego zgodnego ze standardem Bluetooth Low Energy), Topography of integrated circuits, Accepted, Application number: S-0028, Patent/rights number: S-0028, Application date: 23 June 2017, Patent (decision) date: 11 August 2017
[Pat5]	Kopański Jakub, Borejko Tomasz, Pietroń Daniel, Siwiec Krzysztof, Wiechowski Łukasz, Wielgus Andrzej, Pleskacz Witold: **High-frequency receiver path compatible with Bluetooth Low Energy standard** (Tor odbiorczy wielkiej częstotliwości zgodny ze standardem Bluetooth Low Energy), Topography of integrated circuits, Accepted, Application number: S-0026, Patent/rights number: S-0026, Application date: 23 June 2017, Patent (decision) date: 11 August 2017
[Pat6]	Marcinek Krzysztof, Borejko Tomasz, Plasota Maciej, Siwiec Krzysztof, Wielgus Andrzej, Pleskacz Witold: **Dual core microcontroller Azuryt** (Dwurdzeniowy mikrokontroler Azuryt), Topography of integrated circuits, Accepted, Application number: S-0025, Patent/rights number: S-0025, Application date: 23 June 2017, Patent (decision) date: 11 August 2017
[Pat7]	Pleskacz Witold: **BioSoC, Trademark, Accepted**, Application number: Z-465509, Patent/rights number: Z-465509, Application date: 21 December 2016, Patent (decision) date: 29 May 2017

9. REPORTS

NUMBER	AUTHORS	TITLE	TYPE
[Rep1]	Anders K., Jusza A., Komorowski P., Andrejuk P., Piramidowicz R.	Short wavelength up-converted emission studies in Er^{3+} and Yb^{3+} doped ZBLAN glasses	**poster**: 18th International Conference on Luminescence 2017
[Rep2]	Anders K., Komorowski P., Zdulska U., Piramidowicz R.	Analysis of IR-to-VIS up-conversion mechanisms in Er+Yb doped fluorozirconate glasses	**poster**: 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 2017
[Rep3]	Anders K., Sujecki S., Sojka Ł., Bereś-Pawlik E., Sakr H., Zhuoqi T., Barney E., Furniss D., Benson T., Seddon A., Piramidowicz R.	Pr^{3+} doped chalcogenide fibers for application in MIR light sources	**presentation**: 18th International Conference on Luminescence 2017
[Rep4]	Anders K.	Investigation of excited state absorption processes leading to up-conversion in active glasses doped with Er^{3+}+Yb^{3+} ions for applications in visible lasers	**scientific report** from the project granted by the University
[Rep5]	Anders K.	Novel luminescent materials for mid-infrared region – analysis and investigation of optical properties of chalcogenide glasses doped with rare earth ions	**scientific report** from the project granted by the National Science Centre
[Rep6]	Beck R.	Nanophotonics with metal – group-IV-semiconductor nanocomposites: From single nanoobjects to functional ensembles (NaMSeN)	**scientific report** from the project granted by the National Centre for Research and Development
[Rep7]	Borecki M., Korwin-Pawlowski M., Gęca M., Prus P.	Capillary Sensor with UV-Forced Degradation and Fluorescence Reading of Diesel and Biodiesel Fuel Chemical Stability	**paper presented**: The Eighth International Conference on Sensor Device Technologies and Applications 2017
[Rep8]	Borecki M., Prus P., Rychlik A., Korwin-Pawlowski M.	Sensor set-up for wireless parameters measurement of rim and wheel in the laboratory conditions	**paper presented**: XL-th IEEE-SPIE Joint Symposium on Photonics, Web Engineering, Electronics for Astronomy and High Energy Physics Experiments 2017
[Rep9]	Dębowska A.K.	Neuronal cell cultures substrates with optical fiber sensors monitoring	**scientific report** from the project granted by the Ministry of Science and Higher Education
[Rep10]	Duk M., Kociubiński A., Lizak T., Borecki M.	Multichannel NDIR Methane Sensor for Soil Probes	**paper presented**: The Eighth International Conference on Sensor Device Technologies and Applications 2017
[Rep11]	Garbat P., Stawczyk A.	Polarization imaging with LC device for underwater vision	**poster**: 22nd Annual Symposium of the IEEE Photonics Benelux Chapter 2017
[Rep12]	Garbat P., Waledzik K., Olszewska A.	Remote monitoring heart and respiration rates using structured light and multi band camera	**presentation:** 22nd Annual Symposium of the IEEE Photonics Benelux Chapter 2017
[Rep13]	Gęca M., Borecki M., Kociubiński A.	Micro-heater units with stabilized power for capillary sensors	**paper presented**: XL-th IEEE-SPIE Joint Symposium on Photonics, Web Engineering, Electronics for Astronomy and High Energy Physics Experiments 2017

[Rep14]	Janaszek B., Tyszka-Zawadzka A., Kieliszczyk M., Szczepański P.	Przestrajalne metamateriały hiperboliczne	**poster**: V Polska Konferencja Optyczna 2017
[Rep15]	Janaszek B., Tyszka-Zawadzka A., Szczepański P.	Optical properties of bulk and waveguide structures based on tunable hyperbolic metamaterials	**poster**: 8th International Conference on Metamaterials, Photonic Crystals and Plasmonics 2017
[Rep16]	Janczyk G.	The Modular Interposer Architecture Providing Scalable Heat Removal, Power Delivery and Communication for many-core, exascale and post-CMOS era Applications	**paper presented**: European Nanoelectronics Applications, Design & Technology Conference and Electronics Design and Applications Workshop 2017
[Rep17]	Jasiński J.	Group of mobile robots	**scientific report** from the project granted by the University
[Rep18]	Jaworski Z.	A Highly Linear 4-bit DAC with 1 GHz Sampling Rate Implemented in 28 nm FD-SOI Process	**poster:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017
[Rep19]	Jusza A., Anders K., Dybała F., Bercha A., Trzeciakowski W., Piramidowicz R.	Pressure-tuned laser diodes for applications in optical spectroscopy of up-converting luminescent materials	**poster:** 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep20]	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	PMMA-based composite optical fibers doped with RE^{3+} activated nanocrystals – technology and luminescent properties	**presentation:** 18th International Conference on Luminescence 2017
[Rep21]	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	Praseodymium doped nanocrystals and nanocomposites for application in white light sources	**poster:** 18th International Conference on Luminescence 2017
[Rep22]	Jusza A., Lipińska L., Gil M., Mergo P., Piramidowicz R.	Visible luminescent properties of Pr^{3+} doped fluoride nanocrystals and their PMMA-based composites	**poster:** 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 2017
[Rep23]	Jusza A., Łyszczek R., Gil M., Mergo P., Piramidowicz R.	Luminescent properties of polymer nanocomposites doped with europium and terbium M-O complexes	**poster:** 18th International Conference on Luminescence 2017
[Rep24]	Jusza A., Łyszczek R., Gil M., Mergo P., Piramidowicz R.	Metal-organic RE complexes embedded in PMMA matrix – structural and luminescent properties of polymer-based composite materials	**poster:** 5th International Conference on Multifunctional, Hybrid and Nanomaterials 2017
[Rep25]	Jusza A., Paśnikowska A., Kaźmierczak A., Stopiński S., Tomkiewicz M., Piramidowicz R.	InP-based integrated transceivers for fiber-optic access systems	**presentation**: 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep26]	Jusza A.	Polymer-based composite fibers doped with nanocrystals activated with rare earth ions	**scientific report** from the project granted by the University
[Rep27]	Jusza A.	Study on possibilities of shaping the luminescent properties of composite white light sources based on polymer materials	**scientific report** from the project granted by the National Science Centre
[Rep28]	Kasprowicz D.	Variability-Aware Table-Based DC Model of a Dual-Gate Transistor	**presentation**: 24th International Conference Mixed Design of Integrated Circuits and Systems 2017

[Rep29]	Kaźmierczak A., Anders K., Słowikowski M., Stopiński S., Krej M., Dziuda Ł., Piramidowicz R.	Integrated read-out unit for fiber-optic sensor network	**presentation**: 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep30]	Kociubiński A., Duk M., Muzyka K., Borecki M.	Ultraviolet Photodetectors Fabricated on 4H-SiC	**paper presented**: The Eighth International Conference on Sensor Device Technologies and Applications 2017
[Rep31]	Krupka J.	High-precision techniques of millimeter and sub-Thz band characterization of materials for microelectronics TEAM TECH	**scientific report** from the project granted by the International Institutions
[Rep32]	Kuźmicz W., Wołodźko M.	A low power input amplifier for bio-signal acquisition in 28 nm FDSOI technology	**paper presented**: 20th International Symposium on Design and Diagnostics of Electonic Circuits and Systems 2017
[Rep33]	Kuźmicz W.	Low noise low frequency amplifier in 28 nm FDSOI	**presentation** IP-Embedded System Conference & Exhibition 2017
[Rep34]	Kuźmicz W.	More Moore Today and Tomorrow	**paper presented:** European Nanoelectronics Applications, Design & Technology Conference and Electronics Design and Applications Workshop 2017
[Rep35]	Kuźmicz W.	The future of CMOS: More Moore or the next big thing?	**paper presented:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017
[Rep36]	Kuźmicz W.	THIN but Great Silicon 2 Design Objects	**scientific report** from the project granted by the International Institutions
[Rep37]	Łuczyk A., Neneman K., Pleskacz W.	Principal Component Analysis of Accelerations in Human Dynamic Movements: A Sample Set Length Effect Study	**presentation**: 24th International Conference Mixed Design of Integrated Circuits and Systems 2017
[Rep38]	Łuczyk A.	A Method to Manage Unknown Values Generation and Propagation During Gate Level Simulations of Multi-Clock Digital Circuits	**presentation:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017
[Rep39]	Madziar K.	Convergence of Electronics and Photonics Techologies for Enabling Terahertz Applications CELTA	**scientific report** from the project granted by the International Institutions
[Rep40]	Madziar K., Galwas B.	Projekt elektroniczny w kursie internetowym Doświadczenia OKNO PW	**paper presented:** XVII Konferencja Uniwersytet Wirtualny Model, Narzędzia, Praktyka 2017
[Rep41]	Madziar K.	Investigation and analysis of opto-electronic oscillators with photonic resonators as frequency selection and stabilization elements	**scientific report** from the project granted by the University
[Rep42]	Madziar K.	Photonic and Microwave Photonic Generation of RF Signals	**paper presented:** 27th International Travelling Summer School on Microwaves and Lightwaves 2017
[Rep43]	Malinowski M., Kaczkan M., Turczyński S.	Multisite luminescence of rare earth ions doped $Y_4Al_2O_9$ crystals	**paper presented:** XIVth International Conference on Molecular Spectroscopy 2017

[Rep44]	Malinowski M., Szczepański P.	Analysis and investigation of optical materials, photonic structures and circuits	**scientific report** from the project granted by the University
[Rep45]	Mazurak A., Jasiński J., Mroczyński R.	Stress-and-Sense Investigation of Memory Effect in NC Si MIS Structures	**poster:** European Materials Research Society 2017 Fall Meeting 2017
[Rep46]	Mazurak A., Jasiński J., Mroczyński R.	Stress-and-Sense Investigation of Memory Effects in Si-NCs MIS Structures	**poster:** European Materials Research Society 2017 Fall Meeting 2017
[Rep47]	Mazurak A., Mroczyński R., Jasiński J., Tanous D., Majkusiak B., Kano S., Sugimoto H., Fujii M., Valenta J.	Technology and characterization of MIS structures with co-doped silicon nanocrystals (Si-NCs) embedded in hafnium oxide (HfO_x) ultra-thin layers	**presentation**: 20th Conference of Insulting Films on Semiconductors 2017
[Rep48]	Mroczyński R., Jasiński J.	Electro-physical properties of gate-last MOSFETs with low-temperature SiO_xN_y/HfO_x stack after ultra-shallow fluorine implantation from RF plasma	**poster:** 48th IEEE Semiconductor Interface Specialists Conference 2017
[Rep49]	Mroczyński R..	Dielectric and conductive materials fabricated by means of RF plasma enhanced methods for semiconductor structures – technology and applications	**poster:** 8th Power Electronics for Plasma Engineering Conference, Ditzingen & Freiburg, Germany 2017
[Rep50]	Mroczyński R.	Improvement of electro-physical properties of 4H-SiC MIS structures with SiO_x/HfO_x and SiO_xN_y/HfO_x stacks by means of ultra-shallow ion implantation from RF plasma	**paper presented**: 20th Conference of Insulting Films on Semiconductors 2017
[Rep51]	Mroczyński R.	Low-Temperature Technology Of MIS Structures With Silicon Nanocrystals Embedded in Hafnium Oxide (HfO_x) Layers For NVSM Applications	**paper presented**: BIT's 3rd World Congress of Smart Materials 2017
[Rep52]	Mroczyński R.	The development and comprehensive characterization of MOS/MOSFET structures with high-k dielectric materials	**scientific report** from the project granted by the University
[Rep53]	Narczyk P., Pleskacz W., Siwiec K.	Analog front-end for precise human body temperature measurement	**paper presented**: IEEE 20th International Symposium on Design and Diagnostics of Electonic Circuits and Systems 2017
[Rep54]	Narczyk P., Siwiec K., Pleskacz W.	Temperature Calibration Technique Based on On-Chip Resistor	**presentation:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017
[Rep55]	Niewiński M.	The development of IoT ecosystem based on PSOC 5 family devices	**scientific report** from the project granted by the University
[Rep56]	Parka J.	Use of polarization splitting phenomenon in microwave photonic devices	**scientific report** from the project granted by the University
[Rep57]	Pfitzner A.	Modeling of the charge transport in the solid body including collisions, using Monte Carlo method	**scientific report** from the project granted by the University
[Rep58]	Pietron D., Borejko T., Siwiec K., Pleskacz W.	Importance of On-Chip Inductor Modeling in Radio Frequency Integrated Circuits	**poster:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017

[Rep59]	Piramidowicz R., Anders K., Jusza A., Komorowski P., Zdulska U., Markowski K., Osuch T.	All-fiber Er:ZBLAN lasers in hybrid geometry	**poster:** 18th International Conference on Luminescence 2017
[Rep60]	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	Polymer-based composite active fiber doped with Tm^{3+} and Yb^{3+} – technology and luminescent properties in VIS spectral range	**poster:** Conference on Lasers and Electro-Optics Europe and European Quantum Electronics Conference 2015 2017
[Rep61]	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	Polymer nanocomposites doped with RE^{3+} ions for applications in VIS light sources	**poster:** 5th International Conference on Multifunctional, Hybrid and Nanomaterials 2017
[Rep62]	Piramidowicz R., Jusza A., Anders K., Lipińska L., Gil M., Mergo P.	RE^{3+} doped luminescent polymer composites	**presentation:** 7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 2017
[Rep63]	Piramidowicz R., Stopiński S., Jusza A., Anders K., Kaźmierczak A., Paśnikowska A., Słowikowski M., Szczepański P.	Generic technologies of integrated photonics	**presentation:** 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep64]	Piramidowicz R.	Construction of control module for medium power laser emitting infrared radiation of 1,9 μm wavelength	**scientific report** from the project granted by the University
[Rep65]	Piramidowicz R.	Directed-energy laser weapon systems, Non-lethal laser weapon systems	**scientific report** from the project granted by the National Centre for Research and Development
[Rep66]	Piramidowicz R.	New integrated photonic passive optical network	**scientific report** from the project granted by the National Centre for Research and Development
[Rep67]	Siwiec K.	Microelectronic integrated driver for photonic integrated multichannel transmitter	**scientific report** from the project granted by the University
[Rep68]	Śmietana M.	Conductive photonic structures for multiparametric bio-chemical diagnostics	**scientific report** from the project granted by the National Science Centre
[Rep69]	Śmietana M.	Czujniki światłowodowe do monitorowania procesów chemicznych i zjawisk biologicznych	**paper presented**: V Polska Konferencja Optyczna 2017
[Rep70]	Śmietana M.	Investigation on interaction between bio-active media and electromagnetic field in photonic crystal fiber devices with suspended core	**scientific report** from the project granted by the National Science Centre
[Rep71]	Śmietana M.	Passivated emitter photovoltaic cells with rear contacts	**scientific report** from the project granted by the University
[Rep72]	Sochacki M.	Methods and means of protection and defense against high power microwave pulses	**scientific report** from the project granted by the National Centre for Research and Development
[Rep73]	Sochacki M.	Green Power Electronics	**scientific report** from the project granted by the International Institutions
[Rep74]	Stopiński S., Jusza A., Anders K., Kaźmierczak A., Słowikowski M., Markowski K., Osuch T., Krej M., Dziuda Ł., Piramidowicz R.	Optoelectronic system for monitoring physiological parameters of patients under MRI diagnosis	**poster:** 22nd Annual Symposium of the IEEE Photonics Benelux Chapter 2017

[Rep75]	Stopiński S., Jusza A., Piramidowicz R.	An Interferometric Fiber-Optic Gyroscope System Based on an Application Specific Photonic Integrated Circuit	**presentation:** Conference on Lasers and Electro-Optics Europe and European Quantum Electronics Conference 2015 2017
[Rep76]	Stopiński S., Jusza A., Piramidowicz R.	Optical gyroscopes in generic technology on InP platform	**presentation:** 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep77]	Stopiński S., Siwiec K., Myśliwiec M., Kisiel R., Pleskacz W., Piramidowicz R.	Hybrid integration of a multi-channel photonic integrated circuit with an integrated microelectronic driver	**poster:** 7th Workshop on Physics and Technology of Semiconductor Lasers 2017
[Rep78]	Stopiński S.	Multi-channel photonic integrated transmitter driven by an application specific integrated circuit	**scientific report** from the project granted by the University
[Rep79]	Sujecki S., Sojka Ł., Bereś-Pawlik E., Piramidowicz R., Anders K., Sakr H., Tang Z., Barney E., Furniss D., Benson T., Seddon A.	Numerical analysis of photoluminescence from Tb^{3+} doped chalcogenide glass fiber samples	**poster:** 18th International Conference on Luminescence 2017
[Rep80]	Szmidt J.	Oxide nanostructures for electronics, optoelectronics and photovoltaics	**scientific report** from the project granted by the National Science Centre
[Rep81]	Szmidt J.	Structures, technologies and materials for sensor systems and microsystems based on detectors, which includes materials characterization by means of electrical, photonic and microwave resonance methods, development of laboratory scale technology and assembly of photonic and electronic structures for microsystem integration and development of high efficiency power electronic converters for renewable energy resources	**scientific report** from the project granted by the University
[Rep82]	Tanous D., Mazurak A., Majkusiak B.	Simulations of transient processes and characteristics of the nc-MOS structures	**presentation**: 20th Conference of Insulting Films on Semiconductors 2017
[Rep83]	Wieteska M., Obrębski W., Szczepankowski M., Tor P., Piątkowska-Janko E., Krupka J., Bogorodzki P.	Remotely Enhanced Liquids for Image Contrast (RELIC) System for 0.23 T Marconi Clinical Scanner	**presentation**: 9th Kraków Workshop on Novel Applications of Imaging and Spectroscopy in Medicine, Biology and Material Sciences 2017
[Rep84]	Wysocki M., Siwiec K., Pleskacz W.	EIA/TIA-485 Transceiver in Standard 130 nm CMOS Technology	**poster:** 24th International Conference Mixed Design of Integrated Circuits and Systems 2017

10. CONFERENCES, SEMINARS AND MEETINGS

10.1. Conferences

NUMBER	CONFERENCE	PARTICIPANTS
[Con1]	2nd International Scientific and Practical Conference: Geography And Ecology: Scientific Creativity, Interdisciplinary, Educational Technology (MTO-29), February 16–17, Mytischi, Russia	Sutkowski M.
[Con2]	5th International Conference on Multifunctional, Hybrid and Nanomaterials (HYMA 2017), March 06–10, Lisbon, Portugal	Anders K., Jusza A., Piramidowicz R.
[Con3]	5th International Conference on Oxide Materials for Electronic Engineering – fabrication, properties and application (OMEE 2017), May 29–June 02, Lviv, Ukraine	Malinowski M.
[Con4]	8th International Conference on Metamaterials, Photonic Crystals and Plasmonics (META 2017), July 25–28, Incheon, South Koreaa	Janaszek B., Szczepański P.
[Con5]	8th Power Electronics for Plasma Engineering Conference (PE^2 2017), May 16–18, Zielonka, Poland	Mroczyński R.
[Con6]	10th International Scientific and Technical Conference "INSTRUMENTATION ENGINEERING 2017", November 1–3, Minsk, Belarus	Sutkowski M.
[Con7]	17th Conference on Optical Fibers and Their Applications (OFTA 2017), January 23–27, Supraśl, Poland	Anders K., Golba A., Gusowski M., Jusza A., Kaźmierczak A., Koba M., Komorowski P., Mroczyński R., Piramidowicz R., Słowikowski M., Stopiński S., Zdulska U.
[Con8]	19th European Conference on Integrated Optics (ECIO 2017), April 03–05, Eindhoven, Netherlands	Kisiel R., Myśliwiec M., Pleskacz W., Piramidowicz R., Siwiec K., Stopiński S.
[Con9]	20th Conference of Insulting Films on Semiconductors (INFOS 2017), June 27–30, Potsdam, Germany	Mroczyński R.
[Con10]	22nd Annual Symposium of the IEEE Photonics Benelux Chapter (IEEE PSB 2017), November 27–28, Delf, Netherlands	Anders K., Garbat P., Jusza A., Kaźmierczak A., Piramidowicz R., Słowikowski M., Stopiński S.
[Con11]	24th International Conference Mixed Design of Integrated Circuits and Systems (MIXDES 2017), June 22–24, Bydgoszcz, Poland	Borejko T., Jaworski Z., Kasprowicz D., Kuźmicz W., Łuczyk A., Narczyk P., Neneman K., Pietroń D., Pleskacz W., Siwiec K.
[Con12]	25th International Conference on Optical Fiber Sensors (OFS 2017), April 24–28, Jeju, South Korea	Dominik M., Koba M., Śmietana M..
[Con13]	48th IEEE Semiconductor Interface Specialists Conference (SISC 2017), December 06–09, San Diego, USA	Jasiński J., Mroczyński R.
[Con14]	BIT's 3rd World Congress of Smart Materials (WCSM 2017), March 16–18, Bangkok, Thailand	Mroczyński R.
[Con15]	Conference on Lasers and Electro-Optics Europe and European Quantum Electronics Conference 2015 (CLEO/Europe-EQEC 2017), June 25–29, Munich, Germany	Anders K., Jusza A., Piramidowicz R., Stopiński S.
[Con16]	Conference on Millimetre Wave and Terahertz Sensors and Technology X as Part of the SPIE Security + Defence (SD 2017), September 11–14, Warszawa, Poland	Garbat P.
[Con17]	IEEE 20th International Symposium on Design and Diagnostics of Electonic Circuits and Systems (DDECS 2017), April 19–21, Dresden, Germany	Kuźmicz W., Narczyk P., Pleskacz W., Siwiec K.

[Con18]	Joint International EUROSOI Workshop and International Conference on Ultimate Integration on Silicon (EUROSOI-ULIS 2017), April 03–05, Athens, Greece	Beck R., Głuszko G., Łukasiak L.
[Con19]	The 18th International Conference on Luminescence (ICL 2017), August 27––September 01, Joao Pessoa, Brazil	Anders K., Jusza A., Komorowski P., Piramidowicz R., Zdulska U.
[Con20]	The Eighth International Conference on Sensor Device Technologies and Applications (SENSORDEVICES 2017), September 10–14, Rome, Italy	Borecki M., Kociubiński A.
[Con21]	The European Conference Physics of Magnetism 2017 (PM'17), June 26–30, Poznań, Poland	Krupka J.
[Con22]	V Polska Konferencja Optyczna (PKO 2017), July 02–06, Gniezno, Poland	Janaszek B., Kieliszczyk M., Piramidowicz R., Szczepański P., Śmietana M., Tenderenda T.
[Con23]	XIVth International Conference on Molecular Spectroscopy (ICMS 2017), September 03–07, Białka Tatrzańska, Poland	Kaczkan M., Malinowski M.
[Con24]	XVII Konferencja Uniwersytet Wirtualny Model, Narzędzia, Praktyka (VU 2017), June 28–29, Polsko-Japońska Akademia Technik Komputerowych, Warszawa, Poland	Galwas B., Madziar K.
[Con25]	XLth IEEE-SPIE Joint Symposium on Photonics, Web Engineering, Electronics for Astronomy and High Energy Physics Experiments, May 28–June 04, Wilga, Poland	Borecki M., Firek P., Kalenik J., Szmidt J.

10.2. Schools, Seminars and Meetings

NUMBER	EVENT	PARTICIPANTS
[Con26]	2017 IEEE Photonics Society Summer Topicals Meeting Series (SUM 2017), July 10–12, San Juan, Puerto Rico	Janaszek B., Szczepański P.
[Con27]	7th International Workshops on Photoluminescence of Rare-Earth: Photonic Materials and Applications PRE'17 (PRE 2017), November 30–December 02, Rome, Italy	Anders K., Jusza A., Komorowski P., Piramidowicz R., Zdulska U.
[Con28]	7th Workshop on Physics and Technology of Semiconductor Lasers (Semiconductor Laser Workshop 2017), October 15–18, Kraków, Poland	Anders K., Jusza A., Kaźmierczak A., Kisiel R., Myśliwiec M., Paśnikowska A., Piramidowicz R., Pleskacz W., Siwiec K., Słowikowski M., Stopiński S., Szczepański P
[Con29]	18 Studenckie Seminarium Naukowe Mikroelektroniki, October 27–29, Konopnica, Poland	Kondracka K., Stonio B.
[Con30]	27th International Travelling Summer School on Microwaves and Lightwaves (ITSS 2017), July 08–14, Stockholm, Sweden	Madziar K.
[Con31]	40th International Spring Seminar on Electronics Technology "High-Tech Electronics for a Better Tomorrow – Theoretical and Practical Aspects" (ISSE 2017), May 10–14, Sofia, Bulgaria	Kisiel R., Myśliwiec M.
[Con32]	European Materials Research Society 2017 Fall Meeting (E-MRS 2017 Fall Meeting), September 18–21, Warszawa, Poland	Jasiński J., Mazurak A., Mroczyński R.
[Con33]	European Nanoelectronics Applications, Design & Technology Conference and Electronics Design and Applications Workshop 2017 (ADTC & edaWorkshop17), May 08–10, Dresden, Germany	Janczyk G., Kuźmicz W.
[Con34]	The Sixth International Workshop on Advanced Spectroscopy and Optical Materials (IWASOM'2017), July 09–14, Gdańsk, Poland	Malinowski M.
[Con35]	XLV Szkoła Inżynierii Materiałowej (SIM 2017), September 26–29, Rytro, Poland	Król K.

11. AWARDS

[Award1] Borecki Michał, Korwin-Pawlowski Michael L., Gęca Mateusz, Prus Przemysław: **Best Paper Award on The Eighth International Conference on Sensor Device Technologies and Applications SENSORDEVICES 2017**

[Award2] Kęsik Jerzy: **President's of the Republic of Poland Gold Medal for Long-Term Service** (Medal Złoty za Długoletnią Służbę), 2017

[Award3] Kieliszczyk Marcin: **Second prize in the XXV National Adam Smoliński Competition** (Nagroda II stopnia w XXVI Ogólnopolskim Konkursie im. Adama Smolińskiego na najlepszą pracę dyplomową z dziedziny optoelektroniki obronioną w roku akademickim 2016/2017), 2017

[Award4] Kondracka Kinga: **2nd place in the Individual Presentation competition during 18 Studenckie Seminarium Naukowe Mikroelektroniki** (II miejsce w konkursie na Prezentację Indywidualną podczas 18 Studenckiego Seminarium Naukowego Mikroelektroniki), 2017

[Award5] Łuczyk Arkadiusz Władysław, Neneman Konrad, Pleskacz Witold: **Outstanding Paper Award, 24th International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2017**

[Award6] Piramidowicz Ryszard, Szczepański Paweł, Stopiński Stanisław Tomasz, Koba Marcin, Madziar Krzysztof Michał, Sater Hanna, Jusza Anna Maria, Trzaskowska Katarzyna, Anders Krzysztof Paweł: **Award for organisational achievements, WUT Rector's Collective Award for Organizing Achievements (1st stage)**, (Nagroda za osiągnięcia organizacyjne, Nagroda zespołowa I stopnia JM Rektora PW za osiągnięcia organizacyjne za organizację konferencji ECIO 2016), 2017

[Award7] Piramidowicz Ryszard, Malinowski Michał, Szczepański Paweł, Mossakowska-Wyszyńska Agnieszka, Tyszka-Zawadzka Anna, Kaczkan Marcin Piotr, Stopiński Stanisław Tomasz, Jusza Anna Maria, Anders Krzysztof Paweł, Kęsik Jerzy, Madziar Krzysztof Michał, Szymańska Agnieszka, Warda Piotr: **Award for didactic achievements, WUT Rector's Collective Award for Didactic Achievements (2nd stage)**, (Nagroda za osiągnięcia dydaktyczne, Nagroda zespołowa II stopnia JM Rektora PW za osiągnięcia dydaktyczne w roku akademickim 2015–2016), 2017

[Award8] Pleskacz Witold, Borejko Tomasz, Siwiec Krzysztof, Marcinek Krzysztof, Berent Andrzej, Narczyk Paweł: **Second Degree Team Award of Ministry of National Defence** (Nagroda II stopnia Ministra Obrony Narodowej w V Konkursie na najlepszą pracę naukową i wdrożenie z obszaru obronności pod patronatem Prezydenta Rzeczypospolitej Polskiej), 2017

[Award9] Siwiec Krzysztof, Marcinek Krzysztof, Narczyk Paweł, Borejko Tomasz, Wielgus Andrzej, Plasota Maciej, Kopański Jakub, Boguszewicz Piotr, Halauko Aleh, Pleskacz Witold: **FOCUS LENS 2016 in the Medical Innovation category**, (Soczewka FOCUSA 2016 w kategorii Innowacje medyczne), 2017

[Award10] Siwiec Krzysztof, Marcinek Krzysztof, Wielgus Andrzej, Borejko Tomasz, Narczyk Paweł, Kopanski Jakub, Kurjata-Pfitzner Ewa, Jarosz Adam, Plasota Maciej, Boguszewicz Piotr, Halauko Aleh, Pleskacz Witold: **WUT Rector's Collective Award for for Scientific Achievements (2nd stage)** (Nagroda zespołowa II stopnia JM Rektora PW za osiągnięcia naukowe w latach 2016–2017), 2017

[Award11] Siwiec Krzysztof: **Honored doctoral dissertation, WUT Rector's Individual Award for Scientific Achievements (3nd stage)** (Nagroda indywidualna III stopnia JM Rektora PW za wyróżnioną rozprawę doktorską w roku 2016), 2017

[Award12] Stonio Bartłomiej: **1st place in the Individual Presentation competition during 18 Studenckie Seminarium Naukowe Mikroelektroniki** (I miejsce w konkursie na Prezentację Indywidualną podczas 18 Studenckie Seminarium Naukowe Mikroelektroniki), 2017

[Award13] Szmidt Jan: **Award for lifetime achievements, Doctor Honoris Causa of National Technical University of Ukraine**, (Nagroda za całokształt dorobku, Doktorat Honoris Causa Politechniki Kijowskiej), 2017

[Award14] Śmietana Mateusz Jakub, Koba Marcin, Dominik Magdalena: **WUT Rector's Collective Award for for Scientific Achievements (1st stage)** (Nagroda zespołowa I stopnia JM Rektora PW za osiągnięcia naukowe w latach 2016–2017), 2017