

WARSAW UNIVERSITY OF TECHNOLOGY
Faculty of Electronics and Information Technology

Institute of Microelectronics and Optoelectronics

annual report

2016

IMiCO

WARSAW UNIVERSITY OF TECHNOLOGY
Faculty of Electronics and Information Technology

Institute of Microelectronics and Optoelectronics

IMiO
annual report
2016

Edited by Agnieszka Mossakowska-Wyszyńska

DTP: Hanna Sater

INSTITUTE OFFICES:

Research Affairs

Building of Radio Engineering – GR room 239

ul. Koszykowa 75, 00-662 Warsaw, Poland

phone/fax: +48 22 234 6063, phone: +48 22 234 7777

Teaching Affairs

Building of Electronics – GE room 159

ul. Nowowiejska 15/19, 00-665 Warsaw, Poland

phone/fax: +48 22 234 3652, phone: +48 22 234 5349

Internet Information

<http://www.imio.pw.edu.pl>

From the Director

This Annual Report summarizes the activities of the Institute of Microelectronics and Optoelectronics (IMiO) in the year 2016, 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 2016, improving considerably the quality of the education offered by IMiO.

In September 2016, Professor Paweł Szczepański completed his 8 year service as a Director of the Institute. It is my pleasure to express my sincere appreciation to his exceptional contributions in the creative development of the Institute. 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

**Director of the Institute**

Michał Malinowski, Ph.D., D.Sc. Tenured Professor
GR, room 239,
phone: +48 22 2347533
 +48 22 2346066
phone/fax: +48 22 2346063
e-mail: m.malinowski@imio.pw.edu.pl

**Deputy-Director for Research Affairs**

Ryszard Piramidowicz, Ph.D., D.Sc. Professor
GR, room 240,
phone: +48 22 2346067
 +48 22 2347888
phone/fax: +48 22 2346063
e-mail: r.piramidowicz@imio.pw.edu.pl

**Deputy-Director for Teaching Affairs**

Sławomir Szostak, Ph.D. Assistant Professor
GE, room 159,
phone: +48 22 2345349
 +48 22 2343652
phone/fax: +48 22 2343652
e-mail: s.szostak@imio.pw.edu.pl

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.

GENERAL INFORMATION

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.

Head of the Division

Romuald B. Beck, Ph.D., D.Sc. Tenured Professor
GR, room 336,
phone: +48 22 2347534,
fax: +48 22 2346065
e-mail: r.beck@imio.pw.edu.pl

Senior academic staff

Bogdan Majkusiak, Ph.D., D.Sc.	Tenured Professor
Tomasz Skotnicki, Ph.D., D.Sc.	Tenured Professor
Lidia Łukasiak, Ph.D., D.Sc.	Professor
Jakub Jasiński, Ph.D.	Assistant Professor
Andrzej Mazurak, Ph.D.	Assistant Professor
Robert Mroczyński, Ph.D.	Assistant Professor
Sławomir Szostak, Ph.D.	Assistant Professor
Jakub Walczak, Ph.D.	Assistant Professor
Jan Gibki, Ph.D.	Senior Lecturer
Agnieszka Zaręba, Ph.D.	Senior Lecturer

Junior academic staff

Michał Luźnia, M.Sc.	Ph.D. Student
Dominik Tanous, 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.

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.

Head of the Division

Andrzej Pfitzner, Ph.D., D.Sc. Professor
 GE, room 355,
 phone: +48 22 2347207
 fax: +48 22 2343654
 e-mail: apf@imio.pw.edu.pl

Technical and administrative staff

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

Senior academic staff

Wiesław Kuźmicz, Ph.D., D.Sc.	Tenured Professor
Witold Pleskacz, Ph.D., D.Sc.	Professor
Elżbieta Piwowarska, Ph.D.	Docent
Tomasz Borejko, Ph.D.	Assistant Professor
Grzegorz Janczyk, Ph.D.	Assistant Professor
Zbigniew Jaworski, Ph.D.	Assistant Professor
Dominik Kasprowicz, Ph.D.	Assistant Professor
Arkadiusz Łuczyk, 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

Igor Butryn, M.Sc.	Ph.D. Student
Marek Cieplucha, M.Sc.	Ph.D. Student
Mariusz Derlecki, M.Sc.	Ph.D. Student
Jakub Kopański, M.Sc.	Ph.D. Student
Michał Łukaszewicz, M.Sc.	Ph.D. Student
Piotr Mierzwiński, M.Sc.	Ph.D. Student
Daniel Pietroń, M.Sc.	Ph.D. Student
Łukasz Wiechowski, M.Sc.	Ph.D. Student
Michał Wołodźko, M.Sc.	Ph.D. Student

Science research staff

Wojciech Mały, Ph.D.	Professor
Krzysztof Marcinek, M.Sc.	Science Assistant
Paweł Narczyk, M.Sc.	Science Assistant
Krzysztof Siwiec, Ph.D.	Science Assistant

Current research projects in the Division include:

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

GENERAL INFORMATION

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.

Head of the Division

Jerzy Woźnicki, Ph.D., D.Sc. Tenured Professor
GE, room 156,
phone: +48 22 2347780,
fax: +48 22 2345419
e-mail: J.Woznicki@imio.pw.edu.pl

Senior academic staff

Janusz Parka, Ph.D., D.Sc.	Tenured Professor
Piotr Garbat, Ph.D.	Assistant Professor
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

Junior academic staff

Jacek Zawistowski, M.Sc.	Ph.D. Student
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Technical and administrative staff

Jerzy Domański, M.Sc.
Bożena Janus

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.

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

Jan Szmidski, Ph.D., D.Sc. Tenured Professor
 GE, room 115, GR, room 338, GG, room 104,
 phone: +48 22 2347200, +48 22 2347776
 fax: +48 22 2347204
 e-mail: J.Szmidski@elka.pw.edu.pl

Senior academic staff

Michał Borecki, Ph.D., D.Sc.	Professor
Ryszard Kisiel, Ph.D., D.Sc.	Professor
Mateusz Śmietana, Ph.D., D.Sc.	Professor
Mikołaj Baszun, Ph.D.	Assistant Professor
Piotr Firek, Ph.D.	Assistant Professor
Jerzy Kalenik, Ph.D.	Assistant Professor
Krzysztof Król, Ph.D.	Assistant Professor
Aleksander Werbowy, Ph.D.	Assistant Professor

Junior academic staff

Tymoteusz Ciuk, M.Sc.	Ph.D. Student
Magdalena Dominik, M.Sc.	Ph.D. Student
Anna Katarzyna Dębowska, B.Sc.	Ph.D. Student
Maciej Kamiński, M.Sc.	Ph.D. Student
Michał Myśliwiec, M.Sc.	Ph.D. Student
Bartłomiej Stonio, M.Sc.	Ph.D. Student
Andrzej Taube, M.Sc.	Ph.D. Student
Michał Waśkiewicz, M.Sc.	Science Assistant, Ph.D. Student

Science research staff

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

Technical and administrative staff

Ryszard Biaduń
 Katarzyna Trzaskowska

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.

GENERAL INFORMATION

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

Paweł Szczepański, Ph.D., D.Sc. Tenured Professor
GR, room 121,
phone/fax: +48 22 2345870
e-mail: p.szczepanski@imio.pw.edu.pl

Senior academic staff

Michał Malinowski, Ph.D., D.Sc. Tenured Professor
Ryszard Piramidowicz, Ph.D., D.Sc. Professor
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, Ph.D. Student
Bartosz Fetliński, M.Sc. Technician
Aleksandra Golba, M.Sc. Ph.D. Student
Bartosz Janaszek, M.Sc. Ph.D. Student
Anna Jusza, M.Sc. Assistant, Ph.D. Student
Mateusz Słowikowski, M.Sc. Ph.D. Student
Tadeusz Tenderenda, M.Sc. Ph.D. Student

Science research staff

Andrzej Kaźmierczak, Ph.D. Research Assistant Professor
Marcin Koba, Ph.D. Research Assistant Professor

Technical and administrative staff

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.

1.8. Statistical Data

SPECIFICATION	2015	2016	DIFFERENCE
Academic staff	83	78	-5
Tenured professors	10	10	0
Professors	7	7	0
Docent	1	1	0
Assistant professors	26	29	+3
Senior lecturers	3	3	0
Assistants and Ph.D. students	36	28	-8
Science research staff	12	9	-3
Technical and Administrative staff	18	19	+1
Teaching activities	81	76	-5
Basic courses	38	38	0
Advanced courses	22	16	-6
Special courses	21	22	+1
Research projects	42	39	-3
Granted by the University	15	16	+1
Granted by State Institutions	26	18	-8
Granted by International Institutions	1	4	+3
Degrees awarded	54	45	+5
Ph.D. degrees	6	4	-2
M.Sc. degrees	20	10	-10
B.Sc. degrees	28	31	+3
Publications	94	183	+89
Sci.-tech. books	8	1	-7
Sci.-tech. papers in journals	39	49	+10
Sci.-tech. papers in conference proceedings	47	132	+85
Patents	2	2	0
Reports	94	131	+37
Conferences	41	33	-8
Awards	15	13	-2



Microelectronics
and Nanoelectronics Devices Division

2. STAFF

2.1. Senior Academic Staff

- Mikołaj Baszun**, M.Sc. ('69), Ph.D. ('77), Computer engineering, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Member of Polish Acoustics Association ('01), WUT Rector's Collective Award ('06), President's of the Republic of Poland Gold Medal for Long-Term Service ('08).
room # 363 GE
phone: +48 22 2347906
fax: +48 22 2346063
e-mail: mbaszun@elka.pw.edu.pl
- 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 of 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).
room # 336 GR
phone: +48 22 2346065
+48 22 2347534
fax: +48 22 2346065
e-mail: r.beck@imio.pw.edu.pl
- Michał Borecki**, M.Sc. ('91), Ph.D. ('96), D.Sc. ('11), Electronics, Optoelectronics, Sensor Devices, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Member of Scientific Committee of Sensordevices Conference ('12-), Member of Optoelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('99-), Member of Association of Polish Electrical Engineers SEP ('99-), Member of Photonics Society of Poland ('08-), Member of the Faculty Council ('11-).
room # 537 GR
phone: +48 22 2347749
fax: +48 22 2346063
e-mail: borecki@imio.pw.edu.pl
- Tomasz Borejko**, M.Sc. ('03) with distinction, Ph.D. ('13) with distinction, Microelectronics and VLSI Design, Assistant Professor, full time, VLSI Engineering and Design Automation Division, Member of the "DDECS" Programme Committee (IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems) ('12-).
room # 365 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: T.Borejko@imio.pw.edu.pl
- Piotr Firek**, M.Sc. ('04), Ph.D. ('10), Microelectronics, Electron Technology, Thin Films, Sensors, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, WUT Rector's Collective Award for Scientific Achievements ('08, '09, '11), WUT Rector's Individual Award for Scientific Achievements in ('11), Conference Diagnostics & Yield Award with distinction ('09), VII Science Conference ELTE Award with distinction of ('10), Member of IMAPS Poland Chapter ('11-) and PTTS – Polish Society of Sensor Technology ('12-).
room # 423C GR
phone: +48 22 2347932
fax: +48 22 2347932
e-mail: P.Firek@elka.pw.edu.pl
- Piotr Garbat**, M.Sc. ('00), Ph.D. ('05), Image and Video Processing, Techniques, Computer Vision, 3D Data Processing in Multimedia Applications. Assistant Professor, full time, Image and Microwave Photonics Division, Member of SPIE ('01-), Member of Polish Liquid Crystal Society ('09-).
room # 150 GE
phone: +48 22 2347780
fax: +48 22 2346063
e-mail: pgarbat@imio.pw.edu.pl
- Jan Gibki**, M.Sc. ('74), Ph.D. ('97), Electronics, Automatics, Senior Lecturer, full time, Microelectronics and Nanoelectronics Devices Division, WUT Rector's Award for Didactic Achievements ('04).
room # 275 GE
phone: +48 22 2347535
fax: +48 22 2346065
e-mail: gibki@imio.pw.edu.pl
- Grzegorz Janczyk**, M.Sc. ('99) with distinction, Ph.D. ('05), VLSI Engineering and Automation Division, Assistant Professor, full time, IEEE member ('00-), Member of the "DDECS" Local Organizing Committee (IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems) ('14-).
room # 353 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: janczyk@imio.pw.edu.pl

STAFF

- Jakub Jasiński**, M.Sc. ('06), Ph.D. ('16), Microelectronics, Assistant Professor, full time, Microelectronics and Nanoelectronics Devices Division
room # 339 GR
phone: +48 22 2347534
email: J.Jasinski@imio.pw.edu.pl
- Zbigniew Jaworski**, M.Sc. ('90), Ph.D. ('97), Microelectronics, Assistant Professor, full time, VLSI Engineering and Design Automation Division, Minister's of Education and Science Team Prize ('06).
room # 354 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: jaworski@imio.pw.edu.pl
- Marcin Kaczkan**, M.Sc. ('98), Ph.D. ('04) with distinction, Optoelectronic, Laser technology, Spectroscopy of solid state laser materials, Assistant Professor, full time, Optoelectronics Division, WUT Rector's Collective Award for Scientific Achievements ('08,'10,'12).
room # 127 GR
phone: +48 22 2345047
fax: +48 22 2346063
e-mail: mkaczkan@elka.pw.edu.pl
- Jerzy Kalenik**, M.Sc. ('79), Ph.D. ('89), Electron Technology, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Member of IMAPS Poland Chapter ('84-), Dean's Representative for Students Apprenticeship ('91-), Member of Section on Electron Technology and Electronic Materials Technology of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('93-), WUT Rector's Collective Award for Organizing Achievements ('08).
room # 423A GR
phone: +48 22 2347779
fax: +48 22 2346063
e-mail: kalenik@imio.pw.edu.pl
- Dominik Kasprowicz**, M.Sc. ('01), Ph.D. with distinction ('06), Microelectronics, Assistant Professor ('07), semiconductor device modeling, full time, VLSI Engineering and Automation Division, WUT Rector's Individual Award for his dissertation thesis ('07), Member of IEEE Society ('12-14), Organizing Committee Chair of DDECS 2014 (IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems) ('13-14), Program Committee Member of DDECS ('14-), WUT Rector's Collective Award for Organizing Achievements (2nd stage)('15)
room # 353 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: dkaspro@imio.pw.edu.pl
- Andrzej Kaźmierczak**, M.Sc. ('02), Ph.D. ('07), Optoelectronic, Science Assistant Professor, full time, Optoelectronics Division
room # 027 GR
phone: +48 22 2347782
fax: +48 22 2346063
e-mail: a.kazmierczak@imio.pw.edu.pl
- Jerzy Kęsik**, M.Sc. ('67), Ph.D. ('77), Optoelectronic, Laser technology, Assistant Professor, part time, Optoelectronics Division, Prime Minister Award for remarkable technical and science national achievement ('00).
room # 125A GR
phone: +48 22 2347145
fax: +48 22 2346063
e-mail: kesik@imio.pw.edu.pl
- Ryszard Kisiel**, M.Sc. ('74), Ph.D. ('83), Electron Technology, D.Sc. ('10), microelectronics: packaging of high temperature devices, assembly techniques, lead-free technology Electronic Materials and Microsystem Technology Division, Professor, full time Member of IMAPS Poland Chapter ('87-), Member of Scientific Committee of IMAPS-Poland Chapter ('00-), Member of IEEE CPMT Society ('00-), President of IEEE CPMT Polish Chapter ('10-), Member of the Electron Technology and Electronic Materials Section of The Polish Academy of Sciences ('07-), Member of the Faculty Council ('10-), WUT Rector's Collective Award for Organizing Achievements ('08), WUT Rector's Individual Award for Scientific Achievements (1st stage)('11), WUT Rector's Collective Award for Scientific Achievements (1st stage) ('11).
room # 425 GR
phone: +48 22 2347852
fax: +48 22 2346063
e-mail: kisiel@imio.pw.edu.pl
e-mail: rkisiel@elka.pw.edu.pl
- Marcin Koba**, M.Sc. ('06), Ph.D. ('11), Optoelectronic, Science Assistant Professor, half time, Optoelectronics Division
room # 028 GR
phone: +48 22 2347782
fax: +48 22 2346063
e-mail: m.koba@imio.pw.edu.pl

- Krystian Król**, M.Sc. ('09), Ph.D. ('16), Microelectronics, Electron Technology, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division
room # 423a GR
phone: +48 22 2347785
e-mail: K.Krol@stud.elka.pw.edu.pl
- Jerzy Krupka**, M.Sc. ('73), Ph.D. ('77), D.Sc. ('89), Microwave Theory and Technique, Professor, full time, Electronic Materials and Microsystem Technology Division, Member of the Faculty Council ('89–), Member of Microwave Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('96–), Member of Editorial Board of IEEE Trans. Microwave Theory Tech. ('94–), Best Paper Award in Journal Measurements, Science and Technology ('99), Head of Characterization of Electronic Materials Group ('00–05), WUT Rector's Individual Award for Scientific Achievements (1st stage) ('00), Member of IOP Institute of Physics UK ('01–), Golden Cross awarded by the President of Poland ('06), Prime Minister Award for Outstanding Technical Achievements ('07), Bronze Medal and Diploma from Association Of Polish Inventors And Rationalizers on International Invention & Innovation Show IWIS-2008, WUT Rector's Collective Award for Educational Achievements (1st stage) ('10), Fellow of IEEE ('12).
room # 364 GE
phone: +48 22 2347693
fax: +48 22 2343652
e-mail: krupka@imio.pw.edu.pl
- Wiesław Kuźmicz**, M.Sc. ('70), Ph.D. ('74), D.Sc. ('86), Microelectronics and VLSI Design, Tenured Professor, full time, VLSI Engineering and Design Automation Division, Member of IEEE ('85–), Member of the Faculty Council ('87–), Head of VLSI Engineering and Design Automation Division ('00–'11), Member of Societas Scientiarum Varsoviensis ('02–), Member of the Civic Educational Association (Społeczne Towarzystwo Oświatowe) ('89–), Medal of National Education Commission ('03), The Minister of Education and Science Team Prize ('06).
room # 355 GE
phone: +48 22 2347207
+48 22 2347146
fax: +48 22 2343654
e-mail: wbk@imio.pw.edu.pl
- Arkadiusz Łuczyk**, M.Sc. ('08), Ph.D. ('15), Microelectronics and VLSI Design, Assistant Professor, full time, VLSI Engineering and Design Automation Division
room # 370 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: alu@imio.pw.edu.pl
- Lidia Łukasiak**, M.Sc. ('88), Ph.D. ('94), D.Sc. ('02), Microelectronics, Professor, full time, Microelectronics and Nanoelectronics Devices Division, Deputy-Director for Teaching Affairs of the Institute of Microelectronics and Optoelectronics ('04–), WUT Rector's Award for Scientific Achievements ('96), Prime Minister's Award for Distinguished Ph.D. Thesis ('95), Scientific Secretary of the Microelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('96–'03), Co-Chairman Conference "Diagnostics and Yield" ('00–), Member of Programme Comm. IEEE ICCDS ('02), Member of the Faculty Council ('02–), Programme Chairman of "Diagnostics and Yield" ('03, '06, '09), Deputy-Director for Teaching Affairs of the Institute of Microelectronics and Optoelectronics ('04–'16), Member of Technical Programme Committee ESSDERC ('05–'12), co-Editor of "Electron Technology" ('92–'95), WUT Rector's Collective Award for Scientific Achievements ('06, '08, '09), Member of the Connect Advisory Forum for ICT Research and Innovation (CAF) European Commission ('12–'14), WUT Rector's Collective Award for Organizing Achievements ('14).
room # 368 GE
phone: +48 22 2347147
+48 22 2345349
+48 22 2343652
fax: +48 22 2343652
e-mail: lukasiak@imio.pw.edu.pl
- Krzysztof Madziar**, M.Sc. ('06), Ph.D. ('16), Microwaves, Lightwaves, Microwave Photonics: generation of microwaves involving photonic techniques, microwave-light interactions, Assistant Professor, full-time, Image and Microwave Photonics Division.
room # 50 GE
phone: +48 22 2345783
e-mail: K.Madziar@elka.pw.edu.pl

STAFF

- Bogdan Majkusiak**, M.Sc. ('79), Ph.D. ('85), D.Sc. ('91), Prof. ('03), Microelectronics & Nanoelectronics, Professor, full time, Microelectronics and Nanoelectronics Devices Division, Scientific Secretary of the Microelectronics Section of the Electronics Telecommunication Committee PAN ('89-'96) and Member (89-), Member of the Faculty Council ('92-), Associate Dean for Academic Affairs ('96-'99) and Senior Associate Dean ('99-'02) of the Faculty of Electronics and Information Technology WUT, Member of the Technical Program Committee of the Conference Insulating Films on Semiconductor INFOS('05,'07,'09,'11), Member of Program Committee of the Conference Diagnostic and Yield ('84-), Member of Editorial Council of Electron Technology ('02-), Member of Nanotechnology Conference Program Committee ('07) and International Workshop on Computational Electronics IWCE ('10), Expert of Accreditation Committee of Technical Universities ('01-), Expert of Polish Accreditation Committee ('03-), Member of Scientific Council of Institute of Electron Technology ('03-'07), WUT Rector's Individual Award for Scientific Achievements ('08), WUT Rector's Collective Award for Scientific Achievements ('09,'12), WUT Rector's Collective Award for Organizing Achievements ('14).
room # 233 GR
phone: +48 22 2347773
+48 22 2346065
fax: +48 22 2346065
e-mail: majkusiak@imio.pw.edu.pl
- Michał Malinowski**, M.Sc. ('79), Ph.D. ('85), D.Sc. ('90), Electronics, Optoelectronics, Tenured Professor, full time, Optoelectronics Division, Member of Faculty Council ('90-), Member of Curriculum Committee I ('94-), Member of Optoelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('94-), Member of Association of Polish Electrical Engineers SEP ('96-), Head of Optoelectronics Division ('99-'16), WUT Rector's Collective Award for Scientific Achievements ('08,'10,'12), Member of Polish Society for Crystal Growth ('02-), Head of the Ph.D. Studies at WEITI ('12-'16), Member of National Science Centre Council ('12-), Director of the Institute of Microelectronics and Optoelectronics ('16-).
room # 123 GR
phone: +48 22 2347783
fax: +48 22 2347783
e-mail: M.Malinowski@elka.pw.edu.pl
- Wojciech Mały**, M.Sc. ('70), Ph.D. ('75), Microelectronics, Science Professor, quarter time, VLSI Engineering and Design Automation Division
room # 360 GE
phone: +48 22 2347207
fax: +48 22 2343654
- Krzysztof Marcinek**, M.Sc. ('09), Ph.D. ('16), Microelectronics, Electronics, Science Assistant, VLSI Engineering and Design Automation Division
room # 365 GE
phone: +48 22 2345364
fax: +48 22 2343654
e-mail: k.marcinek@imio.pw.edu.pl
- Andrzej Mazurak**, M.Sc. ('06), Ph.D. ('11) with distinction, Microelectronics, Assistant Professor, full time, Microelectronics and Nanoelectronics Devices Division, WUT Rector's Individual Award for Scientific Achievements (3rd stage) ('12). WUT Rector's Collective Award for Organizing Achievements ('14).
room # 232B GR
phone: +48 22 2346065
fax: +48 22 2346065
e-mail: a.mazurak@imio.pw.edu.pl
- Agnieszka Mossakowska-Wyszyńska**, M.Sc. ('91), Ph.D. ('96) with distinction, Optoelectronics, Quantum Electronics, Assistant Professor, full time, Optoelectronics Division, Grant from Foundation of Polish Science ('95), Member of Association of Polish Electrical Engineers SEP ('96-), Prime Minister Award for dissertation thesis ('97), Editor of Annual Report of Institute of Microelectronics and Optoelectronics ('00-), Member of the Faculty Council ('05-'12), Member of the Dean's Commission for Faculty Organization ('08-'12), Member of Photonics Society of Poland ('08-), Head of Teaching Group in Optoelectronics Division ('10-), Member of Organizing Committee of ELTE ('04, '13).
room # 119 GR
phone: +48 22 2347246
fax: +48 22 2346063
e-mail: amossako@elka.pw.edu.pl

- Robert Mroczyński**, M.Sc. ('03), Ph.D. ('08), Microelectronics, Electronics, Assistant Professor, full time, Microelectronics and Nanoelectronics Devices Division, Distinction for scientific reports at Conference: ELTE'04, ELTE'07, D&Y'06 and Vacuum Technique '11, Dekaban Foundation Scholarship ('11-'12), Scholarship of Advanced Studies Centre of WUT ('08-'09 and '11-'12), Winner of the competition "Knowledge with passion. We promote young scientists." organized by Innovation Transfer of Knowledge in Science Portal and Bolesław Markowski Higher School of Commerce in Kielce ('12), Participant of Science Infrastructure Management Support (SIMS) program supported by National Centre for Research and Development ('14), WUT Rector's Individual Award for Scientific Achievements (1st stage) ('14), WUT Rector's Collective Award for Organizing Achievements ('14), Member of Organizing Committee of Diagnostics & Yield Symposium ('06, '09), Member of Advisory Board of Dekaban Foundation at Warsaw University of Technology ('12-), Vice-Chairman of International Conference on Insulating Films on Semiconductor – INFOS 2013, Expert of the National Centre for Research and Development ('13-).
room # 232B GR
phone: +48 22 2346065
fax: +48 22 2346063
e-mail: rmroczyn@elka.pw.edu.pl
- Marek Niewiński**, M.Sc. ('91), Ph.D. ('06), Vacuum Science and Technology, full time Assistant Professor, VLSI Engineering and Design Automation Division.
room # 357 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: niewinski@imio.pw.edu.pl
- Janusz Parka**, M. Sc ('77), Ph.D. ('84), D.Sc. ('01), Material Science, Engineering of Liquid Crystals, Tenured Professor, full time, Image and Microwave Photonics Division, Member of International Society for Optical Engineering, Polish Chapter, Member of International Board of Optics of Liquid Crystals ('03-'08), Member of Polish Liquid Crystal Society ('09-).
room # 157 GE
phone: +48 22 2343655
+48 22 2347780
fax: +48 22 2345419
e-mail: J.Parka@imio.pw.edu.pl
- Andrzej Pfitzner**, M.Sc. ('74), Ph.D. ('78), D.Sc. ('99), Microelectronics: physics of semiconductors, device modeling, integrated circuits design for manufacturability; Professor, full time, VLSI Engineering and Design Automation Division; Member of the „MIXDES” International Science Committee ('94-) (Mixed Design of Integrated Circuits and Systems), member of the Science Committee of the Conference "Electron Technology" ('99-'08, '13-), Member of the Microelectronics Section of the Committee for Electronics and Telecommunication of the Polish Academy of Sciences ('99-), member of the NSZZ "Solidarność" University Commission ('10-) and Domestic Section for Science ('14-), Member of the Civic Educational Association STO ('90-); Member of the Faculty Council ('81-'85 & '90-), Deputy-Director for Teaching Affairs of the Institute of Microelectronics and Optoelectronics ('91-'99), Director of the Institute of Microelectronics and Optoelectronics ('99-'04), Member of the Dean's Financials Commission ('93-'99), WUT Rector's Individual Award for Scientific Achievements (1st stage) ('00), Member of the Senate Financials Commission ('02-'05), Chairman of the Faculty Council Educations Commission ('05-'08), Faculty Plenipotentiary for Quality of Education and member of the University Council for Education Quality ('07-), Disciplinary Officer of the Warsaw University of Technology for Academic Staff ('12-'14), Head of VLSI Engineering and Design Automation Division ('12-).
room # 360 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: apf@imio.pw.edu.pl
- Jerzy K. Piotrowski**, M.Sc. ('75), Ph.D. ('88) with distinction, Microwave and Lightwave Techniques, Assistant Professor, full time, Image and Microwave Photonics Division, Head of Teaching Group in Image and Microwave Photonics Division ('89-), Member of IEEE ('89-), Reviewer for the European Microwave Conference ('04-), Chairman of the IEEE AP/AES/MTT Joint Chapter (Poland Section) ('01-'02; '10-'12), WUT Rector's Individual Award for Scientific Achievements (1st stage) ('01), Visiting Professor at the Technische Universität Hamburg-Harburg ('02-'04), Member of the Faculty Council ('05-'08).
room # 52 GE
phone: +48 22 2345394
fax: +48 22 2343653
e-mail: piotrowski@imio.pw.edu.pl

STAFF

- Ryszard Piramidowicz**, M.Sc. ('94), Ph.D. ('00) with distinction, D.Sc. ('13), specialization: optoelectronics – optical spectroscopy, laser technique, fiber-optic elements and systems, integrated photonics, photovoltaics; Associate Professor (full time) in Optoelectronics Division, Deputy-Director for Research of the Institute of Microelectronics and Optoelectronics ('08–), member of the Faculty Council ('08–), coordinator of Photovoltaic Platform of WUT ('14–), coordinator of Fiber-Optic Photonic Platform ('14–), member of Association of Polish Electrical Engineers SEP ('96–) and Photonics Society of Poland ('12–), member of IEEE ('05–), OSA ('06–) and SPIE ('13–), WUT's representative in Technical Committee no. 282 of Polish Committee for Standardization ('98–), expert of National Science Centre ('12–), WUT Rector's Individual Award for Scientific Achievements ('00, '13), WUT Rector's Collective Award for Scientific Achievements ('00, '08, '10, '12).
- room # 240 GR
phone: +48 22 2347888
+48 22 2346067
fax: +48 22 2346063
e-mail:
r.piramidowicz@imio.pw.edu.pl
- Elżbieta Piwowska**, M.Sc. ('83), Ph.D. ('95) with distinction, Microelectronics, Docent, full time, VLSI Engineering and Design Automation Division, Member of the Faculty Council ('96–), WUT Rector's Award for Scientific Achievements ('89, '96), Ministry award for Teaching Achievements ('93, '03, '06), Deputy-Director for Teaching Affairs of the Institute of Microelectronics and Optoelectronics ('99–'04), Member of the Dean's Financial Commission ('99–'04), Member of the Microelectronics Section of the Committee for Electronics and Telecommunication of the Polish Academy of Sciences ('00–), Director of Centre for Distance Learning at WUT ('06–).
- room # 359 GE
phone: +48 22 2347207
+48 22 2347819
fax: +48 22 2343654
e-mail: e.piwowska@imio.pw.edu.pl
- Witold Pleskacz**, Witold Pleskacz, M.Sc. ('83), Ph.D. ('95) with distinction, D.Sc. ('11), Microelectronics (VLSI design, CAD, DFM), Professor, full time, VLSI Engineering and Design Automation Division, Member of the Faculty Council ('99–'02 & '11–), Institute representative for cooperation with high schools ('08–), Medal of National Education Commission ('13), WUT Rector's Individual Awards for Scientific Achievements ('89, '96, '12), Ministry of National Education Award for Teaching Achievements ('93), "Golden Chalk" – Student Council of the Faculty Teaching Awards ('00, '08, '12), "Golden Chalk" – Student Council of the Warsaw University of Technology Teaching Award ('12), Ministry of Science and Higher Education Award for Education Achievements ('06), WUT Rector's Awards for Educational Achievements (Collective '10, Individual '13), Member of IEEE ('13–), Member of the "CADSM" International Programme Committee (International Conference – the Experience of Designing and Application of CAD Systems in Microelectronics) ('01–), Member of the "YOT" Programme Committee (IEEE International Workshop on Yield Optimization & Test) ('01), Member of the "DFT" Programme Committee (IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems) ('02–), Member of the "DDECS" Programme Committee (IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems) ('04–), Member of the "MEMSTECH" International Programme Committee (International Conference on Perspective Technologies and Methods in MEMS Design) ('05–), Member of the "DSD-SS" Programme Committee (Euromicro Conference on Digital System Design-Special Sessions) ('05), Member of the "ECS" Programme Committee (Electronic Circuits and Systems Conference) ('05–'07), Member of the "ADEPT" International Programme Committee (International Conference on Advances in Electronic and Photonic Technologies) ('13–), Polish National Committee URSI – International Union of Radio Science ('11–), Member of the "MIXDES" International Programme Committee (International Conference: "Mixed Design of Integrated Circuits and Systems") ('14–), Member of IEEE DDECS Steering Committee ('14–).
- room # 359 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: pleskacz@imio.pw.edu.pl
- Krzysztof Siwiec**, M.Sc. ('09), Ph.D. ('16), Microelectronics, Electronics, Science Assistant, VLSI Engineering and Design Automation Division.
- room # 371 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: K.Siwiec@imio.pw.edu.pl

- Tomasz Skotnicki**, M.Sc. ('79), Ph.D. ('85), D.Sc. ('92), Microelectronics: physics of semiconductors, device modeling, advanced microelectronic technologies; Tenured Professor, full time, Microelectronics and Nanoelectronics Devices Division, Director of Consortium CEZAMAT ('13–).
room #339 GR
phone: +48 22 2347534
fax: +48 22 2346063
e-mail: t.skotnicki@imio.pw.edu.pl
thomas.skotnicki@gmail.com
- Mariusz Sochacki**, M.Sc.('02), Ph.D. ('07), Wide bandgap materials technology, Silicon carbide and gallium nitride power devices, Science Assistant Professor, full time, Electronic Materials and Microsystem Technology Division
room #423C GR
phone: +48 22 2347932
fax: +48 22 2346063
e-mail: msochack@elka.pw.edu.pl
- Stanisław Stopiński**, M.Sc. ('08), Ph.D. ('14), Optoelectronics: photonic integrated circuits, fiber optic elements and systems, full time, Optoelectronics Division, Assistant Professor
room # 127a GR
phone: +48 22 2345047
e-mail: S.Stopinski@imio.pw.edu.pl
- Marek Sutkowski**, M.Sc.('97), Ph.D. ('03), Photographic Techniques, Imaging and Video Systems, Application of LC Cells in Imaging Techniques, Holography in Multimedia Applications. Assistant Professor, full time, Image and Microwave Photonics Division, 3rd stage prize on V Sympozjum Naukowe TPO2006, Member of Polish Liquid Crystal Society ('10–), Leader of Scientific Club of Imaging "RGB" ('16–).
room #147 GE
phone: +48 22 2347780
fax: +48 22 2345419
e-mail: sut@imio.pw.edu.pl
- Paweł Szczepański**, M.Sc. (81), Ph.D. ('88), D.Sc. ('94), Optoelectronics, Tenured Professor, full time, Optoelectronics Division, Member of Faculty Council ('94–), Member of Association of Polish Electrical Engineers SEP ('96–), Member of Optoelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('96–), Member of Optical Society of America ('96–), Member of IEEE ('96–), Editor of Journal of Telecommunications and Information Technology ('98–), Member of Photonics Society of Poland ('08–), Deputy-Director for Research Affairs of the Institute of Microelectronics and Optoelectronics ('04–'08), Director of the Institute of Microelectronics and Optoelectronics ('08–'16), Representative of Warsaw University of Technology in Networks of Excellence of Micro-Optics NEMO ('04), Member of European Optical Society ('06–), Head of Optoelectronics Division ('16–).
rooms: # 239 GR
121 GR
phone: +48 22 2345870
+48 22 2347533
+48 22 2346066
fax: +48 22 2346063
e-mail: p.szczepanski@imio.pw.edu.pl
- Jan Szmidt**, M.Sc. ('76), Ph.D. ('84), D.Sc. ('95), Microelectronics, Electron Technology, Associate Professor, full time, Electronic Materials and Microsystem Technology Division, Head of Electronic Materials and Microsystem Technology Division ('05–), Member and Scientific Secretary of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('96–), Member of the Microelectronics Section ('93–) and Chairman of the Electron Technology and Electronic Materials Section ('03–) of the Electronics and Telecommunication Committee, Member of the Micro- and Nanotechnology Section of the Polish Academy of Sciences ('05–), Member of Faculty Council ('95–), WUT Rector's Award for Scientific and Didactic Achievements, Scientific Award of the IV Department of the Polish Academy of Science ('97), Member of IEEE ('97–), V-ce Deen of the Faculty ('02–'05), Golden Cross awarded by the President of Poland ('07), Medal of National Education Commission ('07), Dean of Faculty of Electronics and Information Technology ('08–'12), WUT Rector's Collective Award for Organizing Achievements ('08), Gold Medal and Diploma with Distinction from Association of Polish Inventors and Rationalizers on International Invention & Innovation Show IWIS-2008 ('08), Genius Medal from Association of Hungarian Inventors on International Invention & Innovation Show IWIS-2008 ('08), The Certificate for Mr J.Szmidt in
rooms: # 115 GE
338 GR
104 GG
phone: +48 22 2347220
+48 22 2347776
+48 22 2347200
fax: +48 22 2347204
e-mail: J.Szmidt@elka.pw.edu.pl

STAFF

recognition of participation in the „Al. Bassel Fair For Invention and Innovation” organized by the: Ministry of Economy and Trade in cooperation with League of Arab States & Association of Syrian Inventors ('09), the IFIA Scientific Medal of the International Federation of Inventors Associations for Excellent Invention Deemed to Represent Significant Scientific Value on the 14 Al Bassel Fair – Damascus 2009 ('09), Diploma for “Optical Fiber Sensors Nano – coated with Diamond – like Carbon” Budapest, Hungary ('09), Special Award “For the special involvement and significant support to the development of the Science & Technology Days Poland-East Forum idea” 3rd Forum Science & Technology Days POLAND – EAST, Białowieża ('10), BADGE: Merited for Lodz University of Technology, ('10), Special Award ITMED 2010 “For the special involvement and significant support to the development of the ITMED Forum idea” 4 International Forum Inovative Technologies for Medicine ITMED, Białystok ('10), WUT Rector’s Collective Award for Scientific Achievements „Development of a new multiparameter method for grading the liquid and the design and technology for micro-liquid sensors for applications in-situ” ('10), Gold Medal granted by Polish Success Academy for outstanding scientific and teaching achievements, Special Award “For the special involvement and significant support to the development of the Science & Technology Days Poland – East Forum idea” 5th International Forum Science & Technology Days POLAND – EAST, Białowieża, ('11), WUT Rector’s Collective Award for scientific achievements during the years of 2009–2010 for the activities in the field of design, modeling, fabrication and characterization of semiconductor devices based on silicon carbide ('11), WUT Rector’s Individual Award for Organizing Achievements ('11,'12), Member of the Scientific Council of the Institute of High Pressure Physics PAN ('11–'14), First Award in prof. Mieczysław Pożaryski Competition, Association of Polish Electrical Engineers SEP, for best article “The design and modeling of vertical transistors in silicon carbide DIMOSEFT” ('12), Rector of WUT ('12–).

Sławomir Szostak, M.Sc. ('95), Ph.D. ('01), Microelectronics, Assistant Professor, full time, Microelectronics and Nanoelectronics Devices Division, WUT Rector’s Award for Scientific Achievements ('02), Secretary of the 6th Symposium Diagnostics & Yield ('03), WUT Rector’s Collective Award for Scientific Achievements (1st stage) ('09), WUT Rector’s Collective Award for Educational Achievements (1st stage) ('10). Deputy-Director for Teaching Affairs of the Institute of Microelectronics and Optoelectronics ('16-),

room # 275 GE
phone: +48 22 2347535
fax: +48 22 2346063
e-mail: szostak@imio.pw.edu.pl

Agnieszka Szymańska, M.Sc. ('97), Ph.D. ('02), Microwave Electronics, Optoelectronics, Senior Lecturer, full time, Image and Microwave Photonics Division, Member of SPIE ('97–), Member of Photonics Society of Poland ('08–).

room # 53A GE
phone: +48 22 2347994
fax: +48 22 2343653
e-mail: A.Szymanska.1@elka.pw.edu.pl

Mateusz Śmietana, M.Sc. ('02), Ph.D. ('07) with distinction, D.Sc. ('14); Optoelectronics: optical fiber sensors, fiber gratings, fiber resonance devices; Thin Film: Physical and Chemical Vapor Deposition, Plasma Enhanced Deposition and Processing, Optical and Electrical Properties; Assistant Professor, full time, Division of Electronic Materials and Microsystem Technology, WUT Rector’s Individual Award for Scientific Achievements ('08, '11, '14), Member of Optical Society of America ('12), IEEE ('12), and The Association of TOP 500 Innovators('12–), Scholarship from the Ministère de l’Éducation, du Loisir et du Sports du Québec, Canada ('09–'10), for young Ph.D. from Center for Advanced Studies Warsaw University of Technology ('09–'11), from Foundation for Polish Science ('11–'13), and for outstanding young scientist from Ministry of Science and Higher Education ('11–'14), Diploma of Minister of Science and Higher Education for project “Waveguide pressure sensor” ('12), Diploma International Warsaw Invention Show IWIS 2012 – Silver Medal for the Invention Optical Fiber Sensor using Bacteriophages for Bacteria Detection ('12), XI PROINVENT Gold Medal and Moldova Ministry of Education Diploma for Optical fiber sensor with bacteriophage overlay for selective a bacteria detection ('13).

room # 424 GR
phone: +48 22 2346364
fax: +48 22 2346063
e-mail: msmietan@elka.pw.edu.pl

- Anna Tyszka-Zawadzka**, M.Sc. ('91), Ph.D. ('96) with distinction, Optoelectronics, Quantum Electronics, Assistant Professor, full time, Optoelectronics Division, Grant from Foundation of Polish Science ('95), Member of Association of Polish Electrical Engineers SEP ('96–), Prime Minister Award for dissertation thesis ('97), Member of Organizing Committee of ELTE ('13).
room # 120 GR
phone: +48 22 2345982
fax: +48 22 2346063
e-mail: A.Tyszka@elka.pw.edu.pl
- Jakub Walczak**, M.Sc. ('96), Ph.D. ('02), Microelectronics, Assistant Professor, full time, Microelectronics and Nanoelectronics Devices Division, WUT Rector's Collective Award for Scientific Achievements ('09).
room # 234 GR
phone: +48 22 2347534
fax: +48 22 2346063
e-mail: walczak@imio.pw.edu.pl
- Piotr Warda**, M.Sc. ('89), Ph.D. ('98) with distinction, Optoelectronics, Assistant Professor, full time, Optoelectronics Division, Member of Association of Polish Electrical Engineers SEP ('99–), Prime Minister Award for remarkable technical and science national achievement ('00).
room # 122 GR
phone: +48 22 2347772
fax: +48 22 2346063
e-mail: P.Warda@elka.pw.edu.pl
- Aleksander Werbowy**, M.Sc. ('94), Ph.D. ('99), Microelectronics, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, WUT Rector's Individual Award for Scientific Achievements (2nd stage) ('00), Secretary of the Electron Technology and Electronic Materials Section of the Polish Academy of Sciences ('03–'07) and ('07–), WUT Rector's Collective Award for Scientific Achievements ('06).
room # 422 GR
phone: +48 22 2347908
fax: +48 22 2346063
e-mail: werbowy@imio.pw.edu.pl
- Andrzej Wielgus**, M.Sc. ('92), Ph.D. ('03), Microelectronics, Assistant Professor, full time, VLSI Engineering and Design Automation Division, WUT Rector's Award for Scientific Achievements ('04).
room # 354 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: wielgus@imio.pw.edu.pl
- Piotr Witoński**, M.Sc. ('94), Ph.D. ('00), Microwave Electronics, Optoelectronics, Assistant Professor, full time, Image and Microwave Photonics Division, Member of Association of Polish Electrical Engineers SEP ('96–).
room # 56 GE
phone: +48 22 2347949
fax: +48 22 2343653
e-mail: P.Witonski@elka.pw.edu.pl
- Adam Wojtasik**, M.Sc. ('83), Ph.D. ('95) with distinction, CAD, Assistant Professor, full time, VLSI Engineering and Design Automation Division, WUT Rector's Award for Scientific Achievements ('89), Ministry of National Education Award for Teaching Achievements in Microelectronics ('93), WUT Rector's Award for Scientific Achievements ('96).
room # 353 GE
phone: +48 22 2347207
fax: +48 22 2343654
e-mail: wojtasik@imio.pw.edu.pl
- Jerzy Woźnicki**, M.Sc. ('70), Ph.D. ('79), D.Sc. ('88), Image Processing Techniques, Tenured Professor, full time, Image and Microwave Photonics Division, Head of Image and Microwave Photonics Division ('87–), Vice-Director of the Institute of Microelectronics and Optoelectronics ('84–'87), Member of the Faculty Council ('88–), Dean of the Faculty of Electronics and Information Technology ('90–'96), Chairman of the University Senate Committee on University Organisation ('90–'96), Rector of Warsaw University of Technology ('96–'02), Member of the Polish Section of SPIE ('89–'90), Member of Committee for Electronics and Telecommunication of the Polish Academy of Sciences ('89–'02), Member of Presidential Board of Polish Committee for Optoelectronics ('90–'93), Fellow of IEE ('95–), Member of the Scientific Council of the Institute of Vacuum Technology ('91–'95), Member of the Advisory Board of the Ministry of Post and Communication ('92–'96), Member of the Advisory Board of the Ministry of National Education: Financing Research at Universities ('93), Governmental Expert designated by the Polish Government ('96, '99), Chairman of the Siemens Award Jury (Poland) ('96–'02), Programme Coordinator ('97–'99) and Member of

STAFF

Programme Council ('95-'97) of the Programme for Reform of Higher Education and Research Organisation realized by Institute of Public Affairs, Member of the Committee on Science of science (Polish Academy of Sciences) ('96-'02), Deputy President (1997-1999), President (1999-2002) and Honorary President (2002-2005) of the Conference of Rectors of Academic Schools in Poland, Chairman of the Committee on Organisation and Legislation of CRASP ('97-'99; '05-'08; '08-'12; '12-'14), President of the Conference of Rectors of Polish Universities of Technology ('97-'99), Member of National Consultative Council for Reforms in Education ('98-'01), Chairman of Auditing Committee and Member of the Mutual Aid Society of the French Legion of Honour (Polish Section) ('00-), Deputy Chairman and Member of National Council for European Integration ('99-'01), Member of the Committee on Good Practices in High Education ('05-), Member of Editorial Board of Higher Education in Europe – published by UNESCO ('99-'09), Facilitator of International Follow Up Committee of UNESCO World Conference on Higher Education ('98), Member of Council of European University Association ('00-'02), President of Polish Rectors Foundation ('02-), Director of the Institute of Knowledge Society ('03-), Chairman of the Presidential Team in Charge of Elaboration of the Project of Law on Higher Education ('03-'05), Chairman of the Committee "Poland in United Europe" at Polish Academy of Sciences ('03-'06), Member of the Forecast Committee "Poland 2000 Plus" ('03-'06), Chairman of Multi-branch Commission for Mobility and Science Career acting at Ministry of Science and Higher Education ('06-'08), Member of the Ministerial Team for prepare the Reforms of research and higher education in Poland ('08), Member of the Committee of Ethics in Science (Polish Academy of Sciences) ('08-'12, '12-), Chairman of the Committee of the project "The strategy of development of higher education: 2010-2020" ('09-'10), Member of the Forum of Experts in Ministry of Science and Higher Education ('10-), Member of the team of Central Commission for Degrees and Titles for new academic disciplines ('11-), Commander's Cross: Polonia Restituta ('11), Chairman of the Programme Board the Monthly "Academic Forum" ('03-'12), Member of the Ministerial Team for changes in legal acts about higher education ('12-'13), WUT Rector's Individual Award for Organizing Achievements (2nd stage) ('12), Chairman of the Patronage Board of Monthly "Academic Forum" ('13-), President of the National Council for Science and Higher Education in Poland ('14-).

Agnieszka Zaręba, M.Sc. ('93), Ph.D. ('05), Microelectronics, Senior Lecturer, full time, Microelectronics and Nanoelectronics Devices Division, WUT Rector's Award for Didactic Achievements ('04), WUT Rector's Collective Award for Scientific Achievements ('08). WUT Rector's Collective Award for Organizing Achievements ('14), "Golden Chalk" – Student Council of the Faculty Teaching Awards ('16)

room # 339 GR
phone: +48 22 2347534,
fax: +48 22 2346063
e-mail: zareba@imio.pw.edu.pl

2.2. Junior Research Staff

- Krzysztof Anders**, M.Sc. ('08), electronics and optoelectronics: fiber lasers and amplifiers, spectroscopy of active materials, Research Assistant Lecturer, Ph.D. Student, Optoelectronics Division, Member of the SPIE ('14), supervisor: Ryszard Piramidowicz
room # 127a GR
phone: +48 22 2345047
e-mail: K.Anders@imio.pw.edu.pl
- Igor Butryn**, M.Sc. ('15), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 371 GE
phone: +48 22 2347207
e-mail: I.Butryn@stud.elka.pw.edu.pl
- Marek Cieplucha**, M.Sc. ('12), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 371 GE
phone: +48 22 2347207
e-mail: M.Cieplucha@stud.elka.pw.edu.pl
- Tymoteusz Ciuk**, M.Sc. ('12), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Jan Szmidt
room # 423a GR
phone: +48 22 2347785
e-mail: T.Ciuk@stud.elka.pw.edu.pl
- Mariusz Derlecki**, M.Sc. ('14), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 365 GE
phone: +48 22 2345364
e-mail: m.derlecki@stud.elka.pw.edu.pl
- Anna Katarzyna Dębowska**, B.Sc. ('13), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Mateusz Śmietana
room # 423 GR
phone: +48 22 2347932
e-mail: anna.katarzyna.d@gmail.com
- Magdalena Dominik (Szymańska)**, M.Sc. ('13), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Mateusz Śmietana
room # 423a GR
phone: +48 22 2347785
e-mail: m.szymanska.1@stud.elka.pw.edu.pl
- Bartosz Fetliński**, M.Sc. ('09), Electronic, Optoelectronic, Ph.D. Student, Optoelectronics Division, supervisor: Michał Malinowski
room # 026 GR
phone: +48 22 2347782
e-mail: B.Fetlinski@elka.pw.edu.pl
fetlinski@pv.pl
- Aleksandra Golba**, M.Sc. ('15), Electronic, Optoelectronic, Ph.D. Student, Optoelectronics Division, supervisor: Ryszard Piramidowicz
room # 027 GR
phone: +48 22 2341464
e-mail: golba@stud.elka.pw.edu.pl
- Bartosz Janaszek**, M.Sc. ('16), Optoelectronics: plasmonics, photonics, metamaterials, Ph.D. Student, Optoelectronics Division, supervisor: Paweł Szczepański
room # 120 GR
phone: +48 22 2345982
email: bjanasze@imio.pw.edu.pl
- Anna Jusza**, M.Sc. ('08), Optoelectronics: optical spectroscopy, laser materials, polymer composites, polymer fibers, photonic integrated circuits; Research Assistant Lecturer, Ph.D. Student, Optoelectronics Division, SPIE Student Member, supervisor: Ryszard Piramidowicz
room # 127a GR
phone: +48 22 2345047
e-mail: A.Jusza@imio.pw.edu.pl
- Maciej Kamiński**, M.Sc. ('15), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Jan Szmidt
room # 423 GR
phone: +48 22 2347932
e-mail: mkamins7@stud.elka.pw.edu.pl
- Jakub Kopański**, M.Sc. ('11), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 371 GR
phone: +48 22 2345364
e-mail: J.Kopanski@imio.pw.edu.pl

STAFF

- Michał Luśnia**, M.Sc. ('15), Microelectronics, Ph.D. Student, Microelectronics and Nanoelectronics Devices Division, supervisor: Bogdan Majkusiak
room # 234 GR
phone: +48 22 2347534
e-mail: M.Lusnia@stud.elka.pw.edu.pl
- Michał Łukaszewicz**, M.Sc. ('11), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 359 GR
phone: +48 22 2345478
e-mail: M.Lukaszewicz@imio.pw.edu.pl
- Piotr Mierzwiński**, M.Sc. ('09), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Wiesław Kuźmicz
room # 539 GR
phone: +48 22 2347781
e-mail: P.Mierzwinski@elka.pw.edu.pl
- Michał Myśliwiec**, M.Sc. ('13), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Ryszard Kisiel
room # 423a GR
phone: +48 22 2347785
e-mail: M.Myśliwiec@stud.elka.pw.edu.pl
- Daniel Pietroń**, M.Sc. ('15), Microelectronics, Electronics, Science Assistant, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 539 GR
phone: +48 22 2347781
e-mail: dpietron@stud.elka.pw.edu.pl
- Mateusz Słowikowski**, M.Sc. ('15), Electronic, Optoelectronic, Ph.D. Student, Optoelectronics Division, supervisor: Ryszard Piramidowicz
room # 027 GR
phone: +48 22 2341464
e-mail: m.slowikowski@imio.pw.edu.pl
- Bartłomiej Stonio**, M.Sc. ('14), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Jan Szmidt
room # 423a GR
phone: +48 22 2347785
e-mail: B.Stonio@stud.elka.pw.edu.pl
- Dominik Tanous**, M.Sc. ('10), Microelectronics, Ph.D. Student, Microelectronics and Nanoelectronics Devices Division, supervisor: Bogdan Majkusiak
room # 234 GR
phone: +48 22 2347534
e-mail: D.Taonus@stud.elka.pw.edu.pl
- Andrzej Taube**, M.Sc. ('10), Microelectronics, Electron Technology, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Jan Szmidt
room # 423a GR
phone: +48 22 2347785
e-mail: A.Taube@stud.elka.pw.edu.pl
- Tadeusz Tenderenda**, M.Sc. ('08), Optoelectronics, Ph.D. Student, Optoelectronics Division, supervisor: Ryszard Piramidowicz
room # 127a GR
phone: +48 22 2345047
e-mail: T.Tenderenda@elka.pw.edu.pl
- Michał Waśkiewicz**, M.Sc. ('13), Microelectronics, Electron Technology, Science Assistant, Ph.D. Student, Electronic Materials and Microsystem Technology Division, supervisor: Jan Szmidt
room # 423a GR
phone: +48 22 2347785
e-mail: M.Waskiewicz@stud.elka.pw.edu.pl
- Łukasz Wiechowski**, M.Sc. ('15), Microelectronics, Electronics, Science Assistant, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Witold Pleskacz
room # 357 GR
phone: +48 22 2347207
e-mail: dpietron@stud.elka.pw.edu.pl
- Piotr Wiśniewski**, M.Sc. ('14), Microelectronics, Ph.D. Student, Microelectronics and Nanoelectronics Devices Division, supervisor: Bogdan Majkusiak
room # 234 GR
phone: +48 22 2347534
e-mail: P.Wisniewski.5@stud.elka.pw.edu.pl
- Michał Wołodźko**, M.Sc. ('15), Microelectronics, Electronics, Ph.D. Student, VLSI Engineering and Design Automation Division, supervisor: Wiesław Kuźmicz
room # 539 GR
phone: +48 22 2347781
e-mail: mwolodzko@stud.elka.pw.edu.pl
- Jacek Zawistowski**, M.Sc. ('14), Image and Video Processing, Techniques, Computer Vision, Image and Microwave Photonics Division, supervisor: Jerzy Woźnicki
room # 148, 150 GE
phone: +48 22 2347780
e-mail: j.zawistowski@stud.elka.pw.edu.pl

2.3. Science Research Staff

NAME	DEGREE	POSITION	PHONE NUMBER	ROOM #
Andrzej Kaźmierczak	Ph.D.	Research Assistant Professor	+48 22 2347782	27 GR
Marcin Koba	Ph.D.	Research Assistant Professor	+48 22 2347782	28 GR
Jerzy Krupka	Ph.D., D.Sc.	Tenured Professor	+48 222347693	364 GE
Norbert Kwietniewski	M.Sc.	Science Assistant	+48 22 2347785	423a GR
Wojciech Mały	Ph.D.	Professor	+48 22 2343654	360 GE
Krzysztof Marcinek	Ph.D.	Science Assistant	+48 22 2345364	365 GE
Paweł Narczyk	M.Sc.	Science Assistant	+48 22 2345364	371 GE
Krzysztof Siwiec	Ph.D.	Science Assistant	+48 22 2345364	371 GE
Mariusz Sochacki	Ph.D.	Science Assistant Professor	+48 22 2347932	423c GR

2.4. Technical and Administrative Staff

NAME	DEGREE	POSITION	PHONE NUMBER	ROOM #
Anna Bednarek	B.A.	Secretary for Teaching	+48 22 2345047	159 GE
Ryszard Biaduń		Senior Foreman	+48 22 2347851	427 GR
Witold Ciemiewski		Senior Technician	+48 22 2347534	335 GR
Kazimierz Dalbiak		Senior Foreman	+48 22 2347534	335 GR
Jerzy Domański	M.Sc.	Senior R&D Engineer	+48 22 2345419	148 GE
Jerzy Gempel	M.Sc.	Senior R&D Engineer	+48 22 2347207	356 GE
Bożena Janus		Senior Technical Clerk	+48 22 2347771	236 GR
Stanisław Jeszka	M.Sc.	Senior R&D Engineer	+48 22 2347207	356 GE
Maciej Juźwik	M.Sc.	Senior R&D Engineer	+48 22 2347782	26 GR
Beata Karwan	M.A.	Financial Specialist	+48 22 2346059	237 GR
Krzysztof Krogulski		Senior Technician	+48 22 2347535	275 GE
Agnieszka Krzywosz		Secretary	+48 222347777	239 GR
Bogumiła Kwiatkowska		Reporting Specialist	+48 22 2346046	237 GR
Urszula Piotrkowicz		Accountant	+48 22 2347243	242 GR
Dagmara Rerak		Financial Specialist	+48 22 2346059	237 GR
Hanna Sater	M.Sc.	Promotion Specialist	+48 22 2347708	236 GR
Bogdan Sowa	M.A.	Financial Specialist	+48 22 2347771	236 GR
Sylwia Trubisz		Administrative Specialist	+48 22 2346046	237 GR
Katarzyna Trzaskowska	M.A.	Administrative Specialist	+48 22 2346018	236 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 Photonics** (Podstawy fotoniki), **FOT**, Michał Malinowski
- [Edu18] **Fundamentals of Solid State Electronics** (Elektronika ciała stałego), **ELCS**, Jan Szmidt, Witold Pleskacz
- [Edu19] **Hybrid Systems** (Układy hybrydowe), **UKH**, Ryszard Kisiel
- [Edu20] **Integrated Optoelectronics** (Optoelektronika zintegrowana) **OZT**, Michał Malinowski
- [Edu21] **Introduction to Microsystems** (Wstęp do mikrosystemów), **WMS**, Andrzej Mazurak, Robert Mroczyski
- [Edu22] **Introduction to Numerical Methods** (Wstęp do metod numerycznych), **WNUM**, Jerzy Krupka
- [Edu23] **Introduction to Programming** (Podstawy programowania), **PRM**, Marek Niewiński
- [Edu24] **Introduction to the UNIX System** (Użytkowanie systemu UNIX), **USUX**, Andrzej Wielgus
- [Edu25] **Lighthwave Telecommunication** (Telekomunikacja optyczna), **TEOP**, Agnieszka Szymańska
- [Edu26] **Meeting 1 – Fundamentals of Information Technology** (Zjazd 1 – Podstawy technologii informacyjnej), **ZJ1Z**, Krzysztof Madziar
- [Edu27] **Meeting 4 – Advanced Course Laboratory** (Zjazd 4 – Zaawansowane laboratorium kierunkowe), **ZJ4Z**, Agnieszka Szymańska
- [Edu28] **Methods of Image Acquisition and Processing for Photography** (Techniki rejestracji i obróbki obrazów w fotografii), **TROOF**, Marek Sutkowski
- [Edu29] **Object Programming** (Programowanie obiektowe), **PROE**, Adam Wojtasik
- [Edu30] **Operating Systems** (Systemy operacyjne), **SOE**, Andrzej Wielgus

TEACHING ACTIVITIES

- [Edu31] **Optoelectronic Devices and Systems** (Elementy i systemy optoelektroniczne), **ESO**, Marcin Kaczkan
- [Edu32] **Physical Fundamentals of Information Processing** (Fizyczne podstawy przetwarzania informacji), **FPPI**, Jan Szmidt, Bogdan Majkusiak
- [Edu33] **Physics** (Fizyka ogólna), **FOM**, Mikołaj Baszun
- [Edu34] **Programming for mobile Apple iOS and MacOS X** (Programowanie dla systemów: mobilnego iOS oraz MacOS X), **APIOs**, Adam Wojtasik
- [Edu35] **Programming microcontrollers in C language** (Programowanie mikrokontrolerów w języku C), **PMIK**, Sławomir Szostak
- [Edu36] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PP**, Lidia Łukasiak, Andrzej Pfitzner
- [Edu37] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PPRM**, Antoni Siennicki
- [Edu38] **Solid-State Physics** (Fizyka ciała stałego), **FCSM**, Jan Szmidt, Agnieszka Żaręba

3.2. Advanced Courses

- [Edu39] **Advanced Semiconductor Structures** (Zaawansowane struktury półprzewodnikowe) **ZSP**, Tomasz Skotnicki
- [Edu40] **Analog Integrated Circuit Design for VLSI Systems** (Projektowanie bloków analogowych dla systemów VLSI) **PSSA**, Wiesław Kuźmicz, Tomasz Borejko
- [Edu41] **Characterization of Materials for Microelectronics** (Charakteryzacja materiałów dla mikroelektroniki) **CHA**, Jan Szmidt, Aleksander Werbowy
- [Edu42] **Computational Methods in Microelectronics and Photonics** (Metody obliczeniowe w mikroelektronice i fotonice), **MOBI**, Andrzej Pfitzner, Agnieszka Mossakowska-Wyszyńska
- [Edu43] **Digital Image Processing** (Cyfrowe przetwarzanie obrazów), **CPOO**, Piotr Garbat
- [Edu44] **Fiber-Optic Communication** (Komunikacja światłowodowa), **KOS**, Ryszard Piramidowicz
- [Edu45] **Fundamentals of Nanoelectronics and Nanophotonics** (Podstawy nanoelektroniki i nanofotoniki), **NANO**, Bogdan Majkusiak, Paweł Szczepański
- [Edu46] **Fundamentals of Photovoltaics** (Podstawy fotowoltaiki) **PFOT**, Michał Malinowski
- [Edu47] **Introduction to Digital VLSI System Design** (Projektowanie scalonych systemów cyfrowych), **PSSC**, Zbigniew Jaworski
- [Edu48] **Laboratory of Fundamentals of Nanoelectronics and Nanophotonics** (Pracownia podstaw nanoelektroniki i nanofotoniki), **PNAN**, Bogdan Majkusiak, Paweł Szczepański
- [Edu49] **Lasers** (Lasery) **LAS**, Paweł Szczepański
- [Edu50] **Microsystems Engineering** (Inżynieria mikrosystemów) **MIK**, Ryszard Kisiel
- [Edu51] **Nanotechnologies** (Nanotechnologie), **NAN**, Jan Szmidt, Aleksander Werbowy
- [Edu52] **Photovoltaic Systems** (Systemy fotowoltaiczne), **SFOT**, Mateusz Śmietana
- [Edu53] **Vision Monitoring Systems** (Systemy monitoringu wizyjnego) **SYMW**, Piotr Garbat
- [Edu54] **VLSI System Design** (Projektowanie systemów scalonych w technice VLSI), **PSSV**, Wiesław Kuźmicz, Zbigniew Jaworski

3.3. Courses in English

- [Edu55] **Electronics 1, EELE1**, Bogdan Majkusiak

3.4. Courses for other Faculties

- [Edu56] **Ecologic Aspects of Electronic Materials and Equipment Production, Faculty of Management** (Ekologiczne aspekty produkcji materiałów i urządzeń elektronicznych, Wydział Zarządzania), **EKASP**, Ryszard Kisiel
- [Edu57] **Electromagnetic Compatibility, Faculty of Management** (Kompatybilność elektromagnetyczna, Wydział Zarządzania), **KOMEL**, Jerzy Piotrowski
- [Edu58] **Electronic Circuits and the Introduction to Microelectronics, Faculty of Management** (Układy elektroniczne i wstęp do mikroelektroniki, Wydział Zarządzania), **UEMIK**, Sławomir Szostak
- [Edu59] **Electronic Devices, Faculty of Management** (Elementy elektroniczne, Wydział Zarządzania), **ELEME**, Lidia Łukasiak
- [Edu60] **Electronic Equipment Assembly Processes, Faculty of Management** (Inżynieria montażu urządzeń elektronicznych, Wydział Zarządzania), **IMUEL**, Ryszard Kisiel
- [Edu61] **Electronic Equipment Design Techniques, Faculty of Management** (Techniki konstrukcji urządzeń elektronicznych, Wydział Zarządzania), **TEKUE**, Ryszard Kisiel
- [Edu62] **Electronic Material and Structure Production Engineering, Faculty of Management** (Inżynieria produkcji materiałów i struktur elektronicznych, Wydział Zarządzania), **INMAS**, Mikołaj Baszun
- [Edu63] **Electronics 1, Faculty of Mechatronics** (Elektronika 1, Wydział Mechatroniki), **ELE1**, Andrzej Jakubowski, Sławomir Szostak
- [Edu64] **Electronics 2, Faculty of Mechatronics** (Elektronika 2, Wydział Mechatroniki), **ELE2**, Zbigniew Pióro
- [Edu65] **Energy Conditioning and Storage Laboratory, Faculty of Physics** (Laboratorium przetwarzania i magazynowania energii, Wydział Fizyki) **LPME**, Michał Malinowski
- [Edu66] **Information Techniques and Systems, Faculty of Transport** (Technologie i systemy informatyczne, Wydział Transportu), **TISI**, Jarosław Dawidczyk
- [Edu67] **Introduction to Microprocessor Systems, Faculty of Management** (Wstęp do systemów mikroprocesorowych, Wydział Zarządzania), **WSYMI**, Zbigniew Pióro
- [Edu68] **Laboratory of Nanotechnology, Faculty of Physics** (Laboratorium nanotechnologii, Wydział Fizyki), **NAN**, Robert Mroczyński
- [Edu69] **Laboratory of Photonics, Faculty of Physics** (Laboratorium fotoniki, Wydział Fizyki), **FOT**, Ryszard Piramidowicz
- [Edu70] **Laboratory of Physics 2, Faculty of Physics** (Laboratorium Fizyki 2, Wydział Fizyki), **FIZ2**, Janusz Parka
- [Edu71] **Logic Circuits, Faculty of Management** (Układy logiczne, Wydział Zarządzania), **UKLO**, Piotr Firek
- [Edu72] **Laser Technology, Faculty of Physics** (Technika Laserów, Wydział Fizyki), **TL**, Ryszard Piramidowicz
- [Edu73] **Methods of Electronic Element Diagnostics, Faculty of Management** (Metody diagnostyki elementów elektronicznych, Wydział Zarządzania), **MEDEL**, Jan Gibki
- [Edu74] **Photonic Devices, Faculty of Management** (Elementy fotoniczne, Wydział Zarządzania), **ELFOT**, Ryszard Piramidowicz

3.5. Courses in English for other Faculties

- [Edu75] **Optical Fiber Technology, Faculty of Mechatronics** (Techniki światłowodowe, Wydział Mechatroniki), **OFT**, Ryszard Piramidowicz
- [Edu76] **Photographic Techniques in Image Acquisition, Faculty of Mechatronics** (Techniki fotograficzne w rejestracji obrazów, Wydział Mechatroniki), **PTIA**, Marek Sutkowski

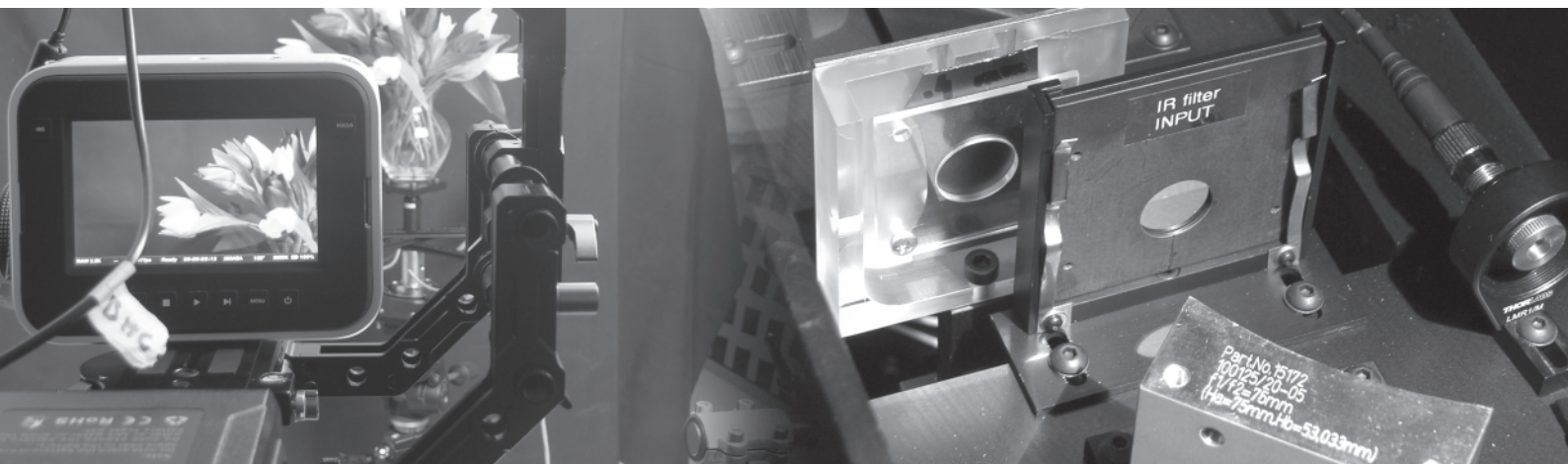


Image and Microwave
Photonics Division

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 2015–May 2016, **sub-projects:**
- [Pro1.1] **Design, materials and technologies for microsystems in sensor technology** (Konstrukcje, materiały i technologie dla mikrosystemowych technik sensorowych), project leader: Jan Szmidt, co-workers: Michał Borecki, Aleksander Werbowy, Ryszard Kisiel, Mariusz Sochacki, Jerzy Krupka, Piotr Firek, Jerzy Kalenik, Mateusz Śmietana
- [Pro1.2] **Development of software tools for the diagnosis of analog integrated circuits** (Rozwój narzędzi programowych do diagnostyki analogowych układów scalonych), project leader: Andrzej Pfitzner; co-workers – other members of the VLSI Engineering and Design Automation Division.
- [Pro1.3] **Modeling and investigation of optical materials, photonic structures and circuits** (Modelowanie, opracowanie i charakteryzacja materiałów, struktur i układów fonicznych), project leader: Michał Malinowski
- The project includes spectroscopic investigations of rare-earth activated solids for technological and biological 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.
- 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.
- [Pro1.4] **Technology and characterization of TFT transistors with active amorphous IGZO layers** (Technologia i charakteryzacja struktur tranzystorów TFT z aktywnymi warstwami amorficznego IGZO), project leader: Robert Mroczyński
- The main objective of this work was the development of the Thin-Film Transistors (TFT) technology with Indium-Gallium-Zinc Oxide (IGZO) amorphous layer and electrical characterization of fabricated test structures. The current work is a continuation of research studies that have been performed in the Institute of Microelectronics and Optoelectronics Warsaw University of Technology previously.
- In the course of this work there has been designed the technology of TFT structures with Indium-Gallium-Zinc Oxide active semiconductor and hafnium oxide (HfO_x) high-k gate dielectric layers. Both functional films were obtained by means of reactive magnetron sputtering in RF plasma. In order to select the most favorable semiconductor and dielectric layers in the final TFT structure, the extensive structural, optical and electrical characterization were performed.
- The fabricated TFT transistors demonstrated relatively good electrical properties with a very low threshold voltage value ($U_t \sim 0.3\text{V}$), low sub-threshold swing ($SS \sim 400 \text{ mV/dec}$), and a relatively good I_{on}/I_{off} ratio of the order of 4.
- The development of this technology results in the possibility of implementation of new tasks and preparation of specialized 'clean-room' laboratory (located in Microelectronics and Nanoelectronics Devices Division) to fabrication of TFT structures on alternative substrates (especially in view of the ongoing work in the field of so-called transparent and flexible electronics), as well as carrying on scientific cooperation with other R&D units in Poland and abroad. Obtained in the course of this work findings were also used for the preparation of several publications on the National Conference of Electronics ("KKE 2015") and Electron Technology Conference ("ELTE 2016").

RESEARCH PROJECTS

[Pro1.5] **The use of direct and external modulation, and nonlinear properties of Mach-Zender modulator in optoelectronic oscillators systems** (Wykorzystanie modulacji bezpośredniej i zewnętrznej oraz własności nieliniowych modulatora Macha-Zendera w układach oscylatorów optoelektronicznych), project leader: Janusz Parka, co-workers: J. Woźnicki, P. Garbat, K. Madziar, M. Sutkowski, P. Witoński, J. Piotrowski, A. Szymańska, J. Domański

[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 2016–May 2017, **sub-projects:**

[Pro2.1] **Analysis and investigation of optical materials, photonic structures and circuits** (Analiza i badania materiałów, struktur i układów fonicznych), 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 photonic 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-structures.

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.

[Pro2.2] **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.

- [Pro2.3] **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 micro-system 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 charakteryzacja materiałów metodami elektrycznymi, fonicznymi i rezonansu mikrofalowego, opracowanie w skali laboratoryjnej technologii i konstrukcji struktur fonicznych 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.
- [Pro2.4] **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 Mroczynski
- 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.
- [Pro2.5] **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.

RESEARCH PROJECTS

[Pro3] Active polymer fibers – new materials for fiber lasers and amplifiers applications (Aktywne światłowody polimerowe – nowe materiały do zastosowań w układach laserów i wzmacniaczy światłowodowych), project leader: Anna Jusza, May 2015– March 2016

The main aim of the project is the development of manufacturing technology and investigation of luminescent properties of new optically active materials – composite fibers based on polymer matrices doped with RE³⁺ metallo-organic complexes. It seems that RE³⁺ 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 RE³⁺ ions and highly energetic phonons, inherent for the polymer matrices. Doping of polymer material with RE³⁺ complexes, which would isolate active centers from the influence of matrix's phonons, may help solving this problem. Such composites enable combining the excellent lasing properties of solid state lasers and unique advantages of polymeric material – mechanical strength, flexibility and low cost of manufacturing. In particular, europium doped materials allow for obtaining the efficient emission in the orange (613 nm) spectral range – rare in laser technology.

[Pro4] Construction of control module for medium power laser emitting infrared radiation of 1,9 μm wavelength (Konstrukcja modułu sterowania do lasera średniej mocy emitującego promieniowanie podczerwone, projekt realizowany przez Koło Naukowe Optoelektroniki KNO), Students Scientific Association of Optoelectronics (KNO), project leader: Ryszard Piramidowicz, co-workers: Bartosz Janaszek, Marcin Kieliszczyk, May 2016–December 2016

This project was a part of activity of the KNO dedicated to manufacturing a fully functional modular fiber laser system based theta-type resonator. This particular part of the project was focused on manufacturing module providing control of thermal and electrical parameters of pumping diodes and output power of complete laser system. The work conducted within this project was financially supported by rector's grant programme 2016 for student associations.

[Pro5] Development of on-chip temperature calibration technique for analog front-end for precision human body temperature measurement for civil and military purpose. (Opracowanie metody kalibracji typu on-chip (wewnątrz układu scalonego) analogowego toru do precyzyjnego pomiaru temperatury ciała człowieka dla potrzeb cywilnych i wojskowych), project leader: Paweł Narczyk, May 2015–March 2016

The main goal of the grant was to complete research work connected with doctoral thesis of the author. As a result of the grant the author had created a new temperature calibration technique for analog blocks of integrated circuits designed in nanometer technologies. As part of the previous research analog front-ends for precision human body temperature and skin resistance measurement were developed. The main difficulty was to obtaining the required very high accuracy over a very wide operating temperature range of an integrated circuit (from -40°C to +125°C). In such extreme temperatures, standard and generally known compensation and calibration temperature methods are not suitable to achieve the required measurement accuracy.

As a result of previously conducted research a theory, how to solve the problem described above, was established. During the grant the author checked the proposed solution. In the first stage calibration resistors, which are a key element of the author's temperature calibration technique, were measured. In the second stage a model of the analog front-end for precision human body temperature measurement with particular emphasis on the temperature calibration technique was developed in Python. In the next step schematic and layout of the temperature calibration module were designed and integrated with previously designed the analog front-end. In the last stage of conducted research fabricated prototypes were measured in order to finally verify proposed solution. The practical result of the research is a complete system for precision human body temperature and skin resistance measurement for use in civil and military industry.

- [Pro6] Group of mobile robots** (Budowa zespołu robotów mobilnych, projekt realizowany przez Koło Naukowe Mikrosystemów ONYKS), Students Scientific Association Microsystem (ONYKS), project leader: Jakub Jasiński, May 2016–December 2016
- The main purpose of the grant was to create a group of mobile robots – two minisumo robots and one micromouse. Our goal was to acquaint with issues in the field of Electronics and mechanics. Those robots can take part in competitions and compete with other machines.
- The minisumo robot tries to push the other robot out of the designated space.
- The micromouse robot is supposed to find a way out of the labyrinth in the shortest possible time. This is obtained using a variety of sensors and a well-developed algorithm.
- [Pro7] Investigation and analysis of optoelectronic oscillators involving polarization splitting based microwave photonic filters for frequency selection** (Badanie i analiza oscylatorów optoelektronicznych pracujących z mikrofalowym filtrem fonicznym opartym o zjawisko polaryzacji światła w światłowodzie), project leader: Krzysztof Madziar, May 2015–March 2016
- The aim of the project was the investigation of microwave optoelectronic oscillators that involve a special class of frequency selection devices – microwave photonic filters (MFF). This group of oscillators provides high frequency and high spectral purity output signal. They use photonic devices as fibers, optical resonators as high Q elements. Photonic elements can also be used as microwave frequency selection units – in configuration of microwave photonic filters. Oscillators were analyzed using an open-loop approach. Most attention was paid to the behavior and shaping of their transmission characteristics by changing the state of light polarization in optical paths of the MFF. Conducted research led to establishing a high spectral purity, low phase noise oscillation at desired frequency with a very low level of side spurious.
- [Pro8] Investigation and analysis of opto-electronic oscillators with photonic resonators as frequency selection and stabilization elements** (Badanie i analiza oscylatorów optoelektronicznych pracujących z rezonatorami fonicznymi w układach selekcji częstotliwości), project leader: Krzysztof Madziar, May 2016–December 2016
- The aim of this project was to investigate possible applications of well-known photonic filters as frequency selecting units in opto-electronic oscillators. Use of such photonic elements in microwave oscillators allows to overcome well-known bottlenecks in improvement of spectral characteristics of generated RF signals. Multiple setups were taken into consideration, including fiber ring resonators (FRR) and whispering gallery mode resonators (WGM). Optimal operating conditions were obtained. Negative effects were also observed and eliminated. The project also covered investigation of external factor influence to open-loop characteristics.
- [Pro9] Investigation of excited state absorption processes leading to up-conversion in active glasses doped with $\text{Er}^{3+} + \text{Yb}^{3+}$ ions for applications in visible lasers** (Badania procesów absorpcji ze stanu wzbudzonego prowadzących do konwersji wzbudzenia w szklach aktywnych podwójnie domieszkowanych jonami $\text{Er}^{3+} + \text{Yb}^{3+}$ 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 fluoro-zirconate 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.

RESEARCH PROJECTS

[Pro10] Microelectronic integrated driver for photonic integrated multichannel transmitter (Układ scalonego sterownika dla zintegrowanego wielokanałowego nadajnika fonicznego), project leader: Krzysztof Siwiec, May 2016– December 2016

In recent year's big progress has been done in the area of fabrication of photonic integrated circuits (PIC), which allows integration of optical devices such as: lasers, photodetectors, Mach-Zehnder modulators or optical fibers in the semiconductor structure. This technology has big potential especially in the area of fast data transfer, thanks to wide bandwidth and low interference. 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). This integration is also a big challenge, as it requires very fast interface between PIC and IC. Flip-chip bonding is one of the possible solutions to this problem, thanks to low parasitic capacitance and inductance of interconnections, which allows achieving high bandwidth of the communication channel.

The aim of this work was to design application specific integrated circuit (ASIC) containing drivers and power management for photonic integrated multichannel transmitter. The ASIC has been designed in AMS 0.35 μm CMOS technology and allows driving the PIC transmitter up to 2 GHz. The achieved parameters can be further increased by porting the design to a newer technology node. 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 verifying the possibilities of such integration technology.

[Pro11] Multichannel optical time domain reflectometer in generic integration technology (Wielokanałowy reflektometr optyczny w technologii fotoniki scalonej), project leader: Stanisław Stopiński, May 2015–March 2016

Optical time domain reflectometers (OTDR) enable characterization of basic functional parameters of fiber-optic communication links. However, the functionality of devices currently available on the market is limited to single-channel operation, which means that only one optical fiber link can be monitored at the same time. The primary scientific goal of the project is designing, manufacturing and performing characterization of photonic integrated circuits that would allow realization of integrated multi-channel OTDR systems. The devices are realized in indium phosphide based generic integration technology. The design of integrated reflectometers uses active and passive photonic elements available on the SMART Photonics foundry platform.

[Pro12] Multi-channel photonic integrated transmitter driven by an application specific integrated circuit (Zintegrowany wielokanałowy nadajnik foniczny 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.

[Pro13] Passivated emitter photovoltaic cells with rear contacts (Ogniwa fotowoltaiczne w technologii pasywnego emitera i tylnych kontaktów projekt realizowany przez Koło Naukowe Mikroelektroniki i Nanoelektroniki KNMiN), Students Scientific Association of Microelectronic and Nanoelectronics (KNMiN), project leader: Mateusz Śmietana, May 2016–December 2016

The purpose of this grant was to develop a fabrication procedure leading up to the creation of passivated emitter solar cells with rear contacts. It was first in WUT attempt to fabricate photovoltaic device from stage of silicon wafer. Every process starting from formation of p-n junction to characterization of ready cells was conducted in the Institute of Microelectronics and Optoelectronics. Project resulted in creation of PERC solar cells, with power efficiency up to 5.0%.

[Pro14] Polymer-based composite fibers doped with nanocrystals activated with rare earth ions (Kompozytowe światłowodowe 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).

[Pro15] Spectroscopic analysis of glass materials for applications in mid-infrared light sources (Badanie i analiza spektroskopowa materiałów szklanych do zastosowań w źródłach światła na zakres średniej podczerwieni), project leader: Krzysztof Anders, May 2015–March 2016

Aim of the project was to study and analyze the mid-infrared emission properties of low-phonon glasses (chalcogenide and fluorozirconate) doped with rare earth ions. The project scope covered measurements and analysis of the absorption characteristics (both room temperature and cryogenic temperatures) that allows precise determination of location and determination of the energy levels and absorption cross section coefficients, measurements and analysis of refractive indices of glasses (with m-line spectroscopy) for determining reflection from the test materials, measurement and analysis of Raman spectra for determining the phonon energy of the active glasses, measurements and analysis of the emission spectra and fluorescence dynamics characteristics of the of excited states, analysis of basic parameters of emission (lifetimes levels and cross sections for the emission) and analysis of radiative and non-radiative transition probabilities.

[Pro16] The development of IoT ecosystem based on PSoC 5 family devices (Rozbudowa ekosystemów PSoC Cypress na potrzeby zastosowań w obszarze Internet of Things – IoT, projekt realizowany przez Koło Naukowe Systemów Scalonych), Students Scientific Association of Integrated Circuits, project leader: Marek Niewiński, May 2016–December 2016

The concept of the Internet of Things – the network of interconnected devices with sensors, network connectivity that allows them to collect and exchange different kinds of data - is becoming the most influential technology in our times. A typical IoT infrastructure consists of the following blocks: hardware, communication, software back-end and applications. The PSoC 5 devices – which are composed of ARM M3 microprocessor, configurable analog and digital blocks – could be a perfect IoT hardware layer platform but they lack of the communication hardware.

The main aim of the grant was to extend the PSoC 5 development platform with additional modules of short and long distances communication and geo-location. The three new components was added to the PSoC Creator IDE which ensure the programmable control over the of HC-05 (Bluetooth) and SIM808 (GSM/GPRS and GPS) modules. The user has to connect the modules to the dedicated I/O ports of PSoC 5 and then invoke the proper sequence of software routines. The created software simplifies the process of sending and receiving bytes streams via Bluetooth and GSM channels. It also enables the possibility of tracking the position of the device. The created solution can significantly reduce the implementation time in prototyping of IoT solution's development when using PSoC 5 devices.

RESEARCH PROJECTS

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

[Pro17] 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

[Pro18] 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.

[Pro19] Innovative graphene-titanium engine valve with improved functional properties (Innowacyjne grafenowo-tytanowe zawory silnikowe o podwyższonych właściwościach użytkowych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, April 2013–February 2016

The subject matter of the project covering development, based on a comprehensive interdisciplinary research, of a new material in the form of lightweight titanium alloys coated with graphene, with improved mechanical, physical and chemical properties for potential applications in the automotive industry will be an important contribution to research in the field of surface engineering and environmental protection. Developing a comprehensive characterization of performed graphene coatings, graphene/titanium alloy systems will form the basis for the phenomenological description of the phenomena occurring at the influence of certain loads. The performance tests of the finished product, in the form of graphene-titanium engine valves shall allow estimating the changes that have occurred in the structure of Ti alloy and graphene coating, as a result of service loads of the developed final product. Thanks to this it will be possible to estimate the extent to which the graphene coatings covering the surface of the engine valves affect their functional parameters. As a result of the project implementation the primary utilitarian effect of the project will be the production of graphene-titanium engine valves, retaining stability even under extreme operating conditions, the experimental determination of their properties and analytical-numerical models of the valve behavior.

[Pro20] Integrated circuit technology for measurement of psychophysiological parameters under dynamic conditions (Mikroukładowa technologia pomiaru parametrów psychofizjologicznych w warunkach dynamicznych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Witold Pleskacz, co-workers:

Tomasz Borejko, Jakub Kopański, Krzysztof Marcinek, Paweł Narczyk, Maciej Plasota, Tomasz Radomski, Krzysztof Siwiec, Andrzej Wielgus, October 2012–April 2016

The project aims to develop a new integrated circuit technology enabling the measurement of psychophysiological parameters under dynamic conditions. It will allow integration of multiple systems and measuring circuits inside the IC chip. Solution developed in the design will reduce the dimensions of the current applied solutions, increase reliability, lower power consumption and increase the possibility of applications.

New integrated circuit technology for measurement of psychophysiological parameters will be implemented through two parallel developed original solutions: bioSoC and bioSiP. BioSoC is a specialized integrated circuit, with the analog-digital signal processing paths and microcontroller for processing and analyzing data. BioSiP is a minimodule developed for integrating functions and measurement capabilities of modern diagnostic equipment. The developed measurement system will be attractive as a new generation of mobile devices, component monitoring systems and health care.

The project will result in measurement modules made on basis of the bioSiP and the bioSoC technology. Modules will be a part of drivers monitoring stand.

During realization of bioSoC modules, projects of following blocks will be developed: ECG measurement chain, EMG measurement chain, resuscitation rate measurement chain, sigma-delta A/C converter, power management block, I/O interfaces, microcontroller and RTC clock. Blocks will be integrated in a silicon die, which will be fabricated and packaged in plastic or ceramic package.

During realization of bioSiP modules, projects of chosen sets of bioSiP modules and complete research stand will be developed. The stand will be used to perform necessary tests of developed modules, including experimental tests of drivers. Software controlling bioSiP modules and research stand controlling system will be created.

[Pro21] Logistics and monitoring technologies and ways to protect the environment before starting work, during drilling, hydraulic fracturing processes and during the operation, including monitoring of groundwater, air, noise, soil, greenhouse gases and other (Logistyka i technologie monitoringu oraz sposoby ochrony środowiska przed rozpoczęciem prac, w trakcie wiercenia, w procesach szczelinowania hydraulicznego oraz na etapie eksploatacji, w tym monitoring wód podziemnych, powietrza, hałasu, gleby, emisji gazów i innych), Warsaw University of Technology, project leader: Jarosław Arabas, **Task 3: Multiparametric sensor of liquid surface monitoring as possible methane source** (Analiza czujników metanu w kierunku aplikacji do monitorowania powierzchni zbiornika cieczy), sub-project leader: Michał Borecki, October 2013–September 2016

The objective of the project is construction of low cost sensor that can continuously monitor surface of the flowback water pit as a methane source. For this purpose we plan to implement two innovations. The first is the study of multiparametric methane sensor that consist of modified NDIR and SnO₂ heads equipped with additional aerosol, humidity and temperature sensing units. The second is the study of integration technology multiparametric sensor in supernatant construction which is connected with development of local data processing methods.

[Pro22] 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 Szmiedt, 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.

RESEARCH PROJECTS

[Pro23] 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 nanoobjektów 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 nano-composites 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.

[Pro24] 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.

[Pro25] Soldier psychological profile management system including development and use of HEALTH-CHIPS

technology (System zarządzania profilami psychologicznymi żołnierzy z opracowaniem i wykorzystaniem technologii HEALTH-CHIPS), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Witold Pleskacz, co-workers: Andrzej Berent, Tomasz Borejko, Igor Butryn, Mariusz Derlecki, Patryk Kłoczko, Jakub Kopański, Krzysztof Marcinek, Maciej Moskała, Paweł Narczyk, Daniel Pietroń, Maciej Plasota, Tomasz Radomski, Krzysztof Siwiec, Paweł Wiecha, Łukasz Wiechowski, Andrzej Wielgus, May 2013–May 2016

The main goal of the project is to elaborate psychological profiles management system. In technological aspect, the project aims to develop unique in the world wearable integrated circuit, which will allow continuous monitoring and immediate analysis of physiological parameters of human body (including heart activity, respiration rate, oxygen saturation of blood, skin resistance, skin temperature and air pressure). "Health-Chips" (HeC) technology will be a part of experimental research leading to development of universal profiles of soldiers, taking into account their psychophysiological characteristics and level of training. HeC technology will consist of a few functional elements: dedicated integrated circuit BioChip (BCp), logical structure of psychological profiles and intelligent analytical software implemented in BCp, psychological profiles management system.

Realization of the main goal requires development of new technology in the area of sensors, data acquisition and processing techniques, proper modeling and inference to find soldier psychological profile.

4.4. Projects Granted by the National Science Centre

[Pro26] Conductive photonic structures for multiparametric bio-chemical diagnostics (SONATA BIS Przewodzące struktury foniczne 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.

[Pro27] Development of an accurate model of traps in metal/insulator/4H-SiC structures by Thermally Stimulated Current (TSC) measurement (Konstrukcja precyzyjnego modelu pułapek w strukturach metal/dielektryk/4H-SiC przy wykorzystaniu pomiaru prądu wzbudzanego termicznie (TSC)), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, April 2013–February 2016

The aim of the research is the use of the method of characterization using the temperature change of the sample to determine the energy structure of electrically active traps in SiO₂/SiC interface and cross-section of the trap, resulting in a realistic possibility of linking the results of electrical measurements of the traps with the reasons for their formation. A new setup will be designed and implemented to measure Thermally Stimulated Current (TSC) of MIS test capacitors. It was hypothesized that the application of room temperature techniques without the use of light in the spectrum strongly connected with the absorption edge of the semiconductor material, such as the commonly used Terman method based on the measurement of high-frequency capacitance-voltage characteristics (HF C-V) gives too low energy resolution of traps position in the bandgap, and the sensitivity of the method at room temperature is often too small for the characterization of samples with the best performance (low density of traps).

[Pro28] Electrical characterization of the advanced MIS structures in the range of low and very low frequencies (Elektryczna charakteryzacja zaawansowanych struktur MIS w zakresie niskich i bardzo niskich częstotliwości), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jakub Jasiński, July 2013–January 2016

Search for new dielectric layers is one of the important development trends of contemporary microelectronics. These layers are applied in almost all types of modern semiconductor devices (gate dielectrics of MIS capacitors and transistors, non-volatile memory cells). Simultaneously the development of microelectronic industry is always accompanied by scaling. Reduction of device dimensions leads to the intensification of carrier tunneling through ever thinner dielectric layers.

In the case of nCMOS structures tunneling is a process which leads to charge/discharge nanocrystallites, while in multi-layer high-k dielectrics with a thin buffer layer the tunneling current may charge/discharge traps located at the interface between dielectric layers and built-in high-k layer.

The nature of the charge/discharge processes mentioned above and the accompanying mechanisms of carrier transport in the ultra thin dielectric layers seem to be revealed in the range of low and very low frequencies, due to the fact that time constants of these processes can be high in certain situations. The Authors of this application, however, did not find the results of such characterization of mentioned structures in the literature. The characterization presented in the literature is usually limited to static I(V) characteristics or C(V) and G(V) curves at frequencies equal or higher than 500 Hz.

Deeper understanding of the phenomena accompanying the current flow through the dielectric layers mentioned above may require characterization in a wider frequency range, beginning from a few hundredths Hz. This will enable development of a more comprehensive small-signal model of the investigated layers than that presented in the literature. The model will most probably contain elements denoting phenomena that may only be observed at low-frequency measurements. This will also enable extraction of electrophysical parameters of the structure that could not be extracted so far.

RESEARCH PROJECTS

[Pro29] 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.

[Pro30] 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 chalcogenidkowych 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 $\sim 7\text{K}$) that will allow analysis of excitation and relaxation mechanisms of electron states responsible for the emission in the mid-infrared region – MIR ($> 3\ \mu\text{m}$). 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).

[Pro31] Optical gyroscope in an experimental photonic integration technology – analysis of possibility of realization and research on basic properties

(Żyroskop optyczny w eksperymentalnej technologii fotoniki scalonej – analiza możliwości wykonania i badania podstawowych właściwości), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Stanisław Stopiński February 2014–February 2016

The main project objective is research and analysis of possibility of realizing a monolithically integrated optical gyroscope in an experimental, indium phosphide based photonic integration technology. Tackling of this problem is mainly inspired by the recent advances in the field of fabrication technology of integrated optoelectronic devices, combined with pure scientific curiosity. However, in a longer perspective proving the proposed hypothesis can pave the way for launching projects oriented towards applied research, potentially interesting for the Polish navigation systems industry. The scientific challenge is very attractive – to the author's best knowledge there are no examples of realization of a fully integrated optical gyroscope, despite a large research effort in this field.

[Pro32] 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 lose 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.

[Pro33] 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 nanocrystallites 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.

[Pro34] The effect of phosphorus on the electro-physical properties of dielectric layers produced by 4H-SiC thermal oxidation (Wpływ fosforu na właściwości elektro-fizyczne warstw dielektryków wytwarzanych metodą termicznego 4H-SiC), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Krystian Król, March 2013–March 2016

The goal of the project is conducting research on possibility of influencing electrical parameters of metal-oxide-semiconductor structure on silicon carbide (SiC) by introducing additional elements to interface region of this structure. The main hypothesis of planned research is that electrical properties of thermal oxides obtained on silicon carbide can be improved (especially by decreasing interface density of states D_{it}) by introducing phosphorus to transition region of MOS structure using shallow ion implantation. This technology can be beneficial for understanding oxidation process of silicon carbide. By performing chemical and electrical research of prepared samples an effect of phosphorus incorporation will be described. As a result an explanation of mechanisms responsible for observed phenomenon will be proposed. A secondary goal of this project is developing optimal technological steps with respect to electrical properties of MOS structure using thermal dielectric on SiC with special consideration of interface density of states.

4.5. Projects Granted by International Institutions

[Pro35] Convergence of Electronics and Photonics Technologies for Enabling Terahertz Applications CELTA (CELTA – Konwergencja elektroniki i technik fonicznych 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.

[Pro36] High-precision techniques of millimeter and sub-Thz band characterization of materials for microelectronics TEAM TECH (Wysokoprecyzyjne techniki charakteryzacji materiałów w zakresie fal milimetrycznych 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.

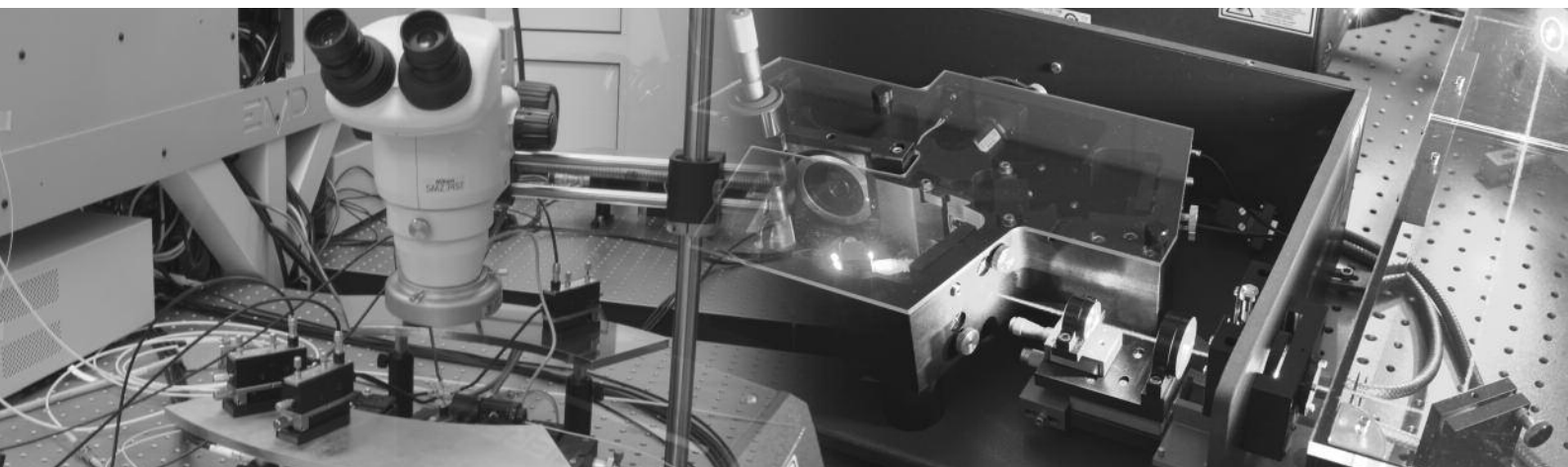
[Pro37] Photonic Integrated Circuits Accessible to Everyone PICs4All (PICs4All – Program powszechnego dostępu do technologii układów fotoniki scalonej), **EU Horizon 2020 project**, (Projekt realizowany w ramach Horyzont 2020 (ERC, działanie Research & Innovation Action, Innovation Action)), project 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).

[Pro38] THIN but Great Silicon 2 Design Objects (Układy scalone CMOS w technologii ultra-cienkiego krzemu),
EU project, ENIAC, project leader: Wiesław Kuźmich, 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 Association: 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 2016:

Realized projects:

- “Low-pressure measurements using fiber-optic sensors on blood vessel blockages”, 04.2016–09.2016, Founds of Student Union of Warsaw University of Technology
- “Photovoltaic cells in passive emitter and back contacts technology”, 07.2016–12.2016, Founds of Rector of Warsaw University of Technology

Exhibitions:

- Exhibitor at Scientific Circles' and Students Organizations' Fair “KONIK”, 20–21.10.2016, Warsaw University of Technology
- Exhibitor at 20th Warsaw Science Festival, 1.10.2016, Warsaw University of Technology

Achievements:

- 1st place in voting for subsidy from Founds of Students Union of University of Technology, with project “Low-pressure measurements using fiber-optic sensors on blood vessel blockages”.

Publications of KNMiN members in 2016 in journals:

1. Burnat D., Koba M., Wachnicki Ł., Gieratowska S., Godlewski M., Śmietana M., “Refractive index sensitivity of optical fiber lossy-mode resonance sensors based on atomic layer deposited TiO_x thin overlay”, 6th European Workshop on Optical Fibre Sensors, Proceedings of SPIE Vol. 9916, 99161G (2016).

DISSEMINATION OF KNOWLEDGE

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, Marcin Kieliszczyk,
Radosław Piekarski

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 and 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 2016:

The major achievement for the Association in 2016 is successful construction of fully functional thulium-doped fibre laser system based theta-type resonator. The project itself consisted of two separated parts. First part was dedicated to manufacturing a seed generator of infrared radiation and the second part was focused on construction of laser controlling module. The outcomes of the project were presented on "XI Sympozjum Techniki Laserowej 2016".

Publications of KNO members in 2016 in journals:

1. Piekarski Radosław, Janaszek Bartosz, Kieliszczyk Marcin, Piramidowicz Ryszard: Analiza generacji w strukturze lasera światłowodowego z rezonatorem w konfiguracji typu theta, w: Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016 / Jabczyński Jan K., Jankiewicz Ewa (red.), 2016, Drukarnia graffiti, ss. 88–88
2. Piekarski Radosław, Janaszek Bartosz, Szczepański Paweł, Mroczyński Robert Paweł: Analiza możliwości generacji impulsów ultrakrótkich w planarnej strukturze hybrydowej z wykorzystaniem grafenu jako nieliniowego absorbera, w: Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016 / Jabczyński Jan K., Jankiewicz Ewa (red.), 2016, Drukarnia graffiti, ss. 73–73

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

Association Tutor: Jakub Jasiński, Ph. D.

Members of the Board: Grzegorz Bernat, Krzysztof Skwieciński,
Alan Rashid

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 scientific interest also includes popularization of electronics among the youth and students. Activities of ONYKS members in 2016:

In 2016 Students Scientific Association took part in the following events:

- XIX Festival of Science organized by Polish Academy of Sciences in Jabłonna, September 24th–25th, 2016. As in previous years, the members of ONYKS organized „Soldering school”.
- Educational picnic „From Micro to Macro” organized by Warsaw University of Technology, May 14th, 2016. The aim was to present the projects of Students Scientific Associations to children and teenagers.

ONYKS has realized the following projects:

- **PowerGEO,**
This is a tracking device system. In case someone wants to steal our bike, module sends us a message, along with our bike’s position (in case it has already changed). Thanks to that we can quickly react and catch the thief. The main aim of the project was to build a complete device with many smart technologies. PowerGEO contains numerous modules such as GPS/GLONASS, Bluetooth Low Energy, GSM and MEMS sensors.

- **Construction of rocket’s on-board computer.**

The aim of the project was to build a complete computer to control a rocket. The device consists of a module with 3 MEMS sensors for data synthesis, parachute control system and a SD card to storage data.

- **Shannon’s Ultimate Machine**

The aim of the project was to learn programming in C and improve skills in digital systems. The device consists of: wooden box, servomotor and PCB module with Arduino. It is merely a small wooden box, with a single switch on one face. When you throw the switch, there is an anger. The lid slowly rises, and from beneath it emerges a hand. The hand reaches down, turns the switch off and retreats into the box. With the finality of a closing box, the lid snaps shut and peace reigns once more.

- **Maze Game**

The aim of the project was to learn programming in C and improve skills with Arduino. The device consists of PCB module with Arduino and normal wooden maze with small ball inside. User changes the slope of maze surface by joystick and ball’s run track. This device attracted great interest of children at Festival of Science in Jabłonna.

DISSEMINATION OF KNOWLEDGE

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

Association Tutor: Marek Niewiński, Ph. D.

Members of the Board: Piotr Borowy, Bartosz Dec,
Mikołaj Pałgan

Total number of Members: 10

Student Association of Integrated Systems was registered in end April 2015. The main areas of interest are: developing mixed analog-digital system using PSOC board, designing extension board for PSOC, programming microcontrollers and Integrated Circuit design.

Project realized in 2016 by association's members:

“The development of IoT ecosystem based on PSoC 5 family devices”.

The main aim of the project was to extend the PSoC 5 development platform with additional modules of short and long distances communication and geolocation. The new components were added to the PSoC Creator IDE which ensure the programmable control over:

- HC-05 (Bluetooth)
- SIM808 (GSM/GPRS and GPS)

The user has to connect the modules to the dedicated I/O ports of PSoC 5 and then invoke the proper sequence of software routines. The created software simplify the process of sending and receiving bytes streams via Bluetooth and/or GSM channels. The created solution can significantly reduce the implementation time in prototyping of IoT solution's development when using PSoC 5 devices.

5.1.5. Student Scientific Association – Club of Imaging “RGB” (Obrazowe Koło Naukowe RGB – OKN RGB)

Association Tutor: Marek Sutkowski, Ph. D.

Members of the Board: Natalia Lubojemska, Rafał Gorzelańczyk

Total number of Members: 5

In response to variety of scientific subjects around images, group of students close to Ph.D. Marek Sutkowski came with an idea to establish Student Organization, which could widen their knowledge and interests. As the result at march 11th 2016 we founded Obrazowe Koło Naukowe RGB (OKN RGB) with five members at the day of opening.

Basing on our knowledge, thesis and ideas that came up we started our projects. At the very beginning we participated in *Mata Pula* conducted by *Rada Kół Naukowych przy Politechnice Warszawskiej*, which gave us opportunity to receive subsidy. However, we did receive good notes, but our requested budget was too big and we did not receive any funds.

Activities of OKN RGB members in 2016:

One of the core activity of OKN RGB are cyclic meetings where we exchange our knowledge or gain new one with help of our lecturers and guests. In 2016 we had following activities:

- “3D Photography”, presented by CEO Natalia Lubojemska and mentor Ph.D. Marek Sutkowski
- “Virtual Reality”, presented by our member Kamil Czerski
- “Photograph the music”, presented by special guest, award winning, polish music photographer Jan Bebel
- Two photograph exhibitions in Library of Faculty of Electronics and Information Technology
- Others

In the second half of 2016 we organised photographic contest for students of Warsaw University of Technology with theme “Moja Politechnika”. We gain patronage and sponsorship from following companies: RICOCH, OLYMPUS and FOTO•KURIER. What is more, besides campaigns in social media we also had our contest announced in Program 4 of Polskie Radio.

We are using social media and our website to inform about our ongoing activities:

www.facebook.com/OKNPW/ and www.okn-rgb.cba.pl

5.2. Cooperation with schools

In 2016 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 (Jan Smidt, Piotr Firek – “Nanoworld – the reality and dreams”, 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 Sławomir 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

DISSEMINATION OF KNOWLEDGE

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)
Białystok University of Technology (PB)
Institute of Electronic Materials Technology (ITME)
Marie Curie-Skłodowska University (UMCS)
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, indispensable 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 Białystok Technical University (PB) and the Marie Curie-Skłodowska 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 microstructured 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 than 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. Ph.D. Degrees

- [PhD1] Andrzej Grodzicki, **The design method of integrated charge pumps for low amplitude ripple in nanometer CMOS technologies** (Metoda projektowania zintegrowanych pomp ładunkowych o małej amplitudzie tętnień w nanometrowych technologiach CMOS), supervisor: Witold Pleskacz, 5 May 2016
- [PhD2] Arkadiusz Malinowski, **Analysis of Dispersion of Electrical Parameters of FinFETs**, supervisor: Andrzej Jakubowski, 17 May 2016
- [PhD3] Krzysztof Marcinek, **Universal processor architecture for satellite navigation systems GNSS** (Uniwersalna architektura procesora dla systemów nawigacji satelitarnej GNSS), supervisor: Witold Pleskacz, 10 May 2016
- [PhD4] Krzysztof Siwiec, **Low noise fractional frequency synthesizer architecture using delay lines for submicrometer and nanometer CMOS technologies** (Niskoszumna architektura układu ułamkowej syntezy częstotliwości wykorzystująca linie opóźniające dla submikrometrowych i nanometrowych technologii CMOS), supervisor: Witold Pleskacz, 18 October 2016

6.2. M.Sc. Degrees

- [MSc1] Michał Bemowski, **ECG signal application for biometric human identification** (Zastosowanie sygnału EKG do biometrycznej identyfikacji tożsamości), advisor: Zbigniew Jaworski, 30 March 2016
- [MSc2] Bartosz Andrzej Janaszek, **Analysis of optical properties of hyperbolic metamaterials based on graphene** (Analiza własności optycznych metamateriałów hiperbolicznych funkcjonalizowanych grafenem), advisor: Paweł Szczepański, 8 September 2016
- [MSc3] Patryk Paweł Kłoczko, **Functional verification of the BLE Controller** (Weryfikacja funkcjonalna kontrolera BLE z wykorzystaniem mechanizmów pokrycia i metodyki UVM), advisor: Witold Pleskacz, 28 October 2016
- [MSc4] Paweł Marek Korb, **Optimizing the deposition process of the silicon oxide by PECVD in view of the oxygen content in the produced layer** (Optymalizacja procesu osadzania tlenku krzemu metodą PECVD pod kątem zawartości tlenu w wytworzonej warstwie), advisor: Romuald Beck, 21 October 2016
- [MSc5] Monika Mastyk, **Fabrication and characterization of thin functional ZnO films: n-ZnO/p-4H-SiC heterojunction and transparent ZnMgO:Al electrode for GaN-based UV electroluminescent diode** (Wytwarzanie i charakteryzacja cienkich warstw funkcjonalnych ZnO: heterozłącza n-ZnO/p-4H-SiC i przezroczystej elektrody ZnMgO:Al dla diod elektroluminescencyjnych), advisor: Aleksander Werbowy, 28 October 2016
- [MSc6] Konrad Tadeusz Neneman, **Dynamic human movement monitoring system based on a measurement of acceleration** (Monitoring dynamicznych ruchów lokomocyjnych człowieka na podstawie pomiarów akcelerometrycznych), advisor: Witold Pleskacz, 23 March 2016
- [MSc7] Kamil Patryk Sażyński, **Project of detector of optimal position to solar radiation in satellite PW-Sat2** (Projekt detektora optymalnego położenia satelity PW-Sat2 względem promieniowania słonecznego), advisor: Stanisław Pietruszko, 18 March 2016
- [MSc8] Michał Daniel Toporowski, **The Applications of Evolutionary Methods for Distance Measurement in a Transmission Channel** (Zastosowania metod ewolucyjnych przy pomiarze odległości w kanale transmisyjnym), advisor: Jarosław Dawidczyk, 26 October 2016
- [MSc9] Anastasiia Veklych, **Producing and characterization of aluminum-based dielectric thin films** (Wytwarzanie i charakteryzacja dielektrycznych warstw na bazie glinu), advisor: Piotr Firek, 18 March 2016
- [MSc10] Paweł Stanisław Wiecha, **Implementation of a Bluetooth Low Energy Link Layer Controller** (Implementacja kontrolera warstwy połączeń Bluetooth Low Energy), advisor: Witold Pleskacz, 14 October 2016

DEGREES AWARDED

6.3. B.Sc. Degrees

- [BSc1] Radosław Maciej Bartnik, **Test bench for investigating attenuation properties of optical fibers** (Stanowisko pomiarowe do badania tłumienności światłowodów włóknowych), advisor: Ryszard Piramidowicz, 19 February 2016
- [BSc2] Agnieszka Maria Biegun, **Digital image registration system** (Cyfrowa rejestracja obrazów – prezentacja multimedialna), advisor: Marek Sutkowski, 17 February 2016
- [BSc3] Mikołaj Bogusz, **Analysis of the effectiveness of artificial neural networks as applied to data classification** (Analiza efektywności sztucznych sieci neuronowych w zastosowaniu do klasyfikacji danych), advisor: Mikołaj Baszun, 23 September 2016
- [BSc4] Anna Czabatorowicz, **Application to manage high-power laser diode controllers** (Opracowanie aplikacji zarządzającej sterownikami diod laserowych dużej mocy), advisor: Sławomir Szostak, 1 July 2016
- [BSc5] Rafał Gorzelańczyk, **Preparing of stationary 3D scenes imaging equipment for holographic printing** (Kalibracja przestrzeni pomiarowej dla potrzeb systemu cyfrowej generacji hologramów), advisor: Marek Sutkowski, 17 February 2016
- [BSc6] Paweł Gurnecki, **Programming library supporting evaluation of uncertainty in measurement with Monte Carlo method** (Biblioteka programistyczna wspomagająca wyznaczanie złożonej niepewności pomiaru z wykorzystaniem metody Monte Carlo), advisor: Marek Niewiński, 17 February 2016
- [BSc7] Jakub Bogumił Kaczmarek, **Detection of processing related radiation damage effects by means of electrical characterization** (Badanie efektów uszkodzeń radiacyjnych – skutków procesów trawienia plazmowego), advisor: Romuald Beck, 30 September 2016
- [BSc8] Paweł Komorowski, **Erbium doped fiber amplifier for L – band operation – design and characterisation** (Wzmacniacz EDFA na pasmo L – konstrukcja i badanie parametrów), advisor: Ryszard Piramidowicz, 18 February 2016
- [BSc9] Kinga Kondracka, **Study of influence of blood vessels cells on ISFET transistors** (Badanie oddziaływania komórek naczyń krwionośnych na struktury ISFET), advisor: Piotr Firek, 11 February 2016
- [BSc10] Leszek Kosowski, **Diagnostics of the impulse signal from the crankshaft position sensor. The application of PSoC5LP** (Diagnostyka impulsowego sygnału z czujnika położenia wału. Zastosowanie układu PSoC5LP), advisor: Elżbieta Piwowarska, 23 September 2016
- [BSc11] Łukasz Kostyra, **Graphical library implementation in C language for STM32 microcontrollers**, (Implementacja biblioteki graficznej w języku C na mikrokontrolery STM32), advisor: Sławomir Szostak, 19 February 2016
- [BSc12] Łukasz Królak, **Research of color reproduction fidelity of selected digital cameras**, (Badanie poprawności odwzorowania kolorystycznego wybranych aparatów cyfrowych), advisor: Marek Sutkowski, 28 October 2016
- [BSc13] Bartosz Krzemiński, **Implementation of USB Device interface for the MIPS architecture processor**, (Projekt bloków interfejsu magistrali USB dla procesora o architekturze MIPS), advisor: Andrzej Wielgus, 30 September 2016
- [BSc14] Tomasz Piotr Kubrak, **Safe data exchange platform using steganography for OSX/iOS environment**, (Platforma bezpiecznej wymiany danych z użyciem steganografii dla środowiska OSX/iOS), advisor: Adam Wojtasik, 16 February 2016
- [BSc15] Michał Leszek Kućko, **Mixing video files using chroma key technique**, (Miksowanie plików wideo z wykorzystaniem techniki kluczowania barwnego), advisor: Piotr Witoński, 19 February 2016
- [BSc16] Arkadiusz Jan Kulesza, **Design and implementation of devices grid for controlling AC equipment in smart building**, (Projekt i realizacja sieci urządzeń zarządzających odbiornikami prądu zmiennego w inteligentnym budynku), advisor: Sławomir Szostak, 1 July 2016

- [BSc17] Natalia Kyc, **Application of laser in cutting silicon base in biomedical use**, (Wykorzystanie lasera do cięcia podłoży krzemowych w zastosowaniach biomedycznych), advisor: Piotr Firek, 11 February 2016
- [BSc18] Sangho Lee, **Extraction of Selected Parameters of MOS Capacitors from C-V Characteristics**, (Wyznaczanie wybranych parametrów kondensatorów MOS z charakterystyk pojemnościowo-napięciowych), advisor: Lidia Łukasiak, 21 March 2016
- [BSc19] Volodymyr Martseniuk, **Digital CMOS cells in the FD-SOI technology**, (Cyfrowe komórki CMOS w technologii FD-SOI), advisor: Elżbieta Piwowarska, 23 September 2016
- [BSc20] Paulina Niedźwiedziuk, **The application for analysis and visualization of the modes distribution in fiber**, (Opracowanie aplikacji do analizy i wizualizacji rozkładu modów w światłowodzie włóknistym), advisor: Agnieszka Mossakowska-Wyszyńska, 15 February 2016
- [BSc21] Agata Katarzyna Ornoch, **Preparation of silver nanoparticles on TiO₂ layers**, (Wytwarzanie nanocząstek srebra na warstwach TiO₂), advisor: Piotr Firek, 19 February 2016
- [BSc22] Mateusz Marian Poncyliusz, **Implementation of a table lookup models of transistors in the Spice simulator**, (Implementacja tablicowych modeli tranzystorów w programie Spice), advisor: Dominik Krzysztof Kasprówicz, 21 October 2016
- [BSc23] Michalina Anna Pszczółkowska, **Creating depth map using stereo pair**, (Tworzenie map głębi z wykorzystaniem stereopary), advisor: Marek Sutkowski, 1 July 2016
- [BSc24] Robert Jacek Sitarski, **Sample and Hold circuit in 65 nm technology**, (Układ próbkująco-pamiętający w technologii 65 nm), advisor: Zbigniew Jaworski, 11 July 2016
- [BSc25] Maksym Skórka, **Control, test and calibration of monochromator SP-2500i**, (Sterowanie, test i kalibracja monochromatora Princeton Instruments SP-2500i), advisor: Marcin Piotr Kaczkan, 19 February 2016
- [BSc26] Robert Artur Sobolewski, **Parallel processing system administration module for Mac OS**, (Moduł administrowania systemem przetwarzania równoległego w systemie Mac OS), advisor: Adam Wojtasik, 16 February 2016
- [BSc27] Przemysław Maciej Szymański, **Design computer network for a company including network security**, (Opracowanie projektu sieci komputerowej z uwzględnieniem bezpieczeństwa sieciowego), advisor: Piotr Witoński, 22 September 2016
- [BSc28] Piotr Andrzej Walędziak, **Building a tool comparing selected classification algorithms**, (Stworzenie narzędzia do porównywania wybranych algorytmów klasyfikujących), advisor: Mikołaj Baszun, 20 September 2016
- [BSc29] Andrzej Artur Wojciechowski, **Design of the CAN interface controller sub-blocks with AMBA APB bus**, (Projekt podbloków kontrolera interfejsu CAN z magistralą AMBA APB), advisor: Witold Pleskacz, 30 September 2016
- [BSc30] Jakub Zaczek, **Library of networking tools for applications developed with Swift language**, (Biblioteka narzędzi sieciowych dla aplikacji mobilnych tworzonych w języku Swift), advisor: Adam Wojtasik, 16 February 2016
- [BSc31] Michał Żakowski, **3D deformable objects registration and shape analysis**, (Lokalizacja i analiza kształtu trójwymiarowych obiektów deformowanych), advisor: Piotr Garbat, 22 February 2016



Image and Microwave Photonics Division

7. PUBLICATIONS

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

NUMBER	JOURNAL	AUTHORS	TITLE	DOI	VOLUME	PAGES
[Pub1]	Polish Academy of Sciences Committee on Metrology and Scientific Instrumentation	Bisewski D., Myśliwiec M., Górecki K., Kisiel R., Zarębski J.	Examinations of selected thermal properties of packages of SiC Schottky diodes, in: Metrology and Measurement Systems	10.1515/mms-2016-0033	vol. 23	451–459
[Pub2]	International Journal of Thermophysics, Springer Link	Bodzenta J., Juszczak J., Kaźmierczak-Balata A., Firek P., Fleming A., Chirtoc M.	Quantitative Thermal Microscopy Measurement with Thermal Probe Driven by dc+ac Current	10.1007/s10765-016-2080-y	vol. 37 no. 7	1–17
[Pub3]	Biomedical Optics Express	Brzozowska E., Koba M., Śmietana M., Górka S., Janik M., Gamian A., Bock W.	Label-free Gram-negative bacteria detection using bacteriophage-adhesin-coated long-period gratings	10.1364/BOE.7.000829	vol. 7 no. 3	829–840
[Pub4]	Applied Physics Letters	Ciuk T., Petruk O., Kowalik A., Jóźwik I., Szmida J., Rychter A., Strupiński W.	Low-noise epitaxial graphene on SiC Hall effect element for commercial applications	10.1063/1.4953258	vol. 108 no. 223504	1–6
[Pub5]	Radiation Measurement	Drozdowski W., Witkowski M., Brylew K., Łachmański W., Makowski M., Wojtowicz A., Turczyński S., Pawlak D., Malinowski M.	A preliminary assessment of $\text{Lu}_2\text{Y}_2\text{Al}_2\text{O}_9:\text{Pr}$ (LuYAM:Pr) as a potential scintillator	10.1016/j.radmeas.2016.06.009	vol. RM 5630	1–9
[Pub6]	Journal of Luminescence	Fetliński B., Boruc Z., Kaczkan M., Turczyński S., Pawlak D., Malinowski M.	Sensitisation of Pr^{3+} in $\text{Y}_2\text{Al}_2\text{O}_9:\text{Ce}^{3+}+\text{Pr}^{3+}$ System for Down-Conversion of Solar Spectrum	10.1016/j.jlumin.2016.09.008	vol. 181	133–137
[Pub7]	Applied Physics Letters	Ficek M., Sobaszek M., Gnyba M., Ryl J., Gołuski Ł., Śmietana M., Jasiński J., Caban P., Bogdanowicz R.	Optical and electrical properties of boron doped diamond thin conductive films deposited on fused silica glass substrates	10.1016/j.apsusc.2016.06.165	vol. 387	846–856
[Pub8]	Circuit World	Grzesiak W., Maćków P., Maj T., Synkiewicz B., Witek K., Kisiel R., Myśliwiec M., Borecki J., Serzysko T., Żupnik M.	Application of Direct Bonded Copper Substrates for Prototyping of Power Electronic Modules	DOI:10.1108/CW-10-2015-0051	vol. 42 no. 1	23–31
[Pub9]	Optics Express	Janaszek B., Tyska-Zawadzka A., Szczepański P.	Tunable graphene-based hyperbolic metamaterial operating in SCLU telecom bands	10.1364/OE.24.024129	vol. 24 no. 21	24129–24136
[Pub10]	Optical Materials	Kaczkan M., Turczyński S., Pawlak D., Wencka M., Malinowski M.	Laser site-selective spectroscopy of Eu^{3+} ions doped $\text{Y}_4\text{Al}_2\text{O}_9$	10.1016/j.optmat.2016.06.023	vol. 58	412–417
[Pub11]		Kaczkan M.	Luminescence from the 5D _{1,2,3} excited states of Eu^{3+} in $\text{Y}_4\text{Al}_2\text{O}_9$ crystal	10.1016/j.optmat.2016.01.046	vol. 59	60–65

¹ Institute for Scientific Information (Philadelphia, USA)

PUBLICATIONS

[Pub12]	Journal of Luminescence	Kaczkan M., Boruc Z., Turczyński S., Pawlak D., Malinowski M.	Site-selective laser spectroscopy of Sm ³⁺ ions in Y ₄ Al ₂ O ₉	10.1016/j.jlumin.2015.09.016	vol. 170 no. 1	330–335
[Pub13]	Circuit World	Kalenik J., Kielbasiński K., Firek P., Czerwosch E., Szmidt J.	Thermal properties of modified carbon films	10.1108/CW-10-2015-0055	vol. 42 no. 1	37–41
[Pub14]	Surface and Coatings Technology	Kalisz M., Grobelny M., Świniarski M., Firek P.	Comparison of the structural and corrosion properties of the graphene/SiN(200) coating system deposited on titanium alloy surfaces covered with SiN transition layers	10.1016/j.surfcoat.2016.04.064	no. 299	65–70
[Pub15]	Journal of Lightwave Technology	Koba M., Śmietana M., Brzozowska E., Górka S., Janik M., Mikulic P., Cusano A., Bock W.	Bacteriophage Adhesin-Coated Long-Period Grating-Based Sensor: Bacteria Detection Specificity	10.1109/JLT.2016.2532466	vol. 34 no. 19	4531–4536
[Pub16]	Microelectronic Engineering	Kociubiński A., Borecki M., Duk M., Sochacki M., Korwin-Pawłowski M.	3D photodetecting structure with adjustable sensitivity ratio in UV–VIS range	10.1016/j.mee.2016.01.041	vol. 154 no. 25	48–52
[Pub17]	Journal of Alloys and Compounds	Kołodziejak K., Gajc M., Sar J., Diduszko R., Roźniatowski K., Pawlak D.	Synthesis and structural study of a self-organized MnTiO ₃ -TiO ₂ eutectic	10.1016/j.jallcom.2015.11.010	vol. 659 no. Feb 25	152–158
[Pub18]	AIP Advances	Krupka J., Zając M., Kucharski R., Gryglewski D.	Dielectric properties of highly resistive GaN crystal grown by ammonothermal method at microwave frequencies	10.1063/1.4944750	vol. 6 no. 035313	035313-1–035313-6
[Pub19]	Nuclear Instruments & Methods in Physics Research	Krupka J., Karcz K., Kamiński P., Jensen L.	Electrical properties of as-grown and proton-irradiated high purity silicon	10.1116/1.4906090	vol. 380	76–83
[Pub20]	Scientific Reports	Krupka J., Salski B., Kopyt P., Gwarek W.	Electrodynamics study of YIG filters and resonators	10.1038/srep34739	vol. 6 no. 34739	1–9
[Pub21]	IEEE Transactions on Microwave Theory and Techniques	Krupka J., Kamiński P., Jensen L.	High Q-Factor Millimeter-Wave Silicon Resonators	10.1109/TMTT.2016.2607712	vol. 64 no. 12	4149–4154
[Pub22]	Physica Status Solidi A-Applications and Materials Science	Kwietniewski N., Mastyk M., Werbowy A., Taube A., Gieraltowska S., Wachnicki Ł., Sochacki M.	Electrical characterization of ZnO/4H-SiC n-p heterojunction diode	10.1002/pssa.201532667	vol. 213 no.5	1120–1124
[Pub23]	The Journal of Physical Chemistry Part C	Łapińska A., Taube A., Judek J., Zdrojek M.	Temperature Evolution of Phonon Properties in Few-Layer Black Phosphorus	DOI:10.1021/acs.jpcc.6b01468	vol. 120 no. 9	5265–5270
[Pub24]	IEEE Journal of Quantum Electronics	Mossakowska-Wyszyńska A., Witoński P.	Bistable Operation of 1-D Photonic Crystal Laser With Saturable Absorber	10.1039/C5RA09999D	vol. 52 no. 5	640011001–640011010

[Pub25]	Journal of Lightwave Technology	Różycki-Bakon R., Koba M., Firek P., Roźniecka E., Niedziółka-Jönsson J., Śmietana M.	Stack of nano-films on optical fiber end-face for label-free bio-recognition	10.1109/JLT.2016.2615294	vol. 34 no. 23	5357–5362
[Pub26]	Microelectronic Engineering, Elsevier BV	Sochacki M., Król K., Waśkiewicz M., Racka K., Szmidt J.	Interface traps in Al/HfO ₂ /SiO ₄ /4H-SiC metal-insulator-semiconductor (MIS) structures studied by the thermally-stimulated current (TSC) technique	10.1016/j.mee.2016.02.047	vol. 157	46–51
[Pub27]	Chinese Optics Letters	Sutkowski M., Piecek W.	Charge distribution into illuminated dye-doped surface stabilized ferroelectric liquid crystal cell	10.3788/COL.201614.102302	vol. 14 no. 10	1–5
[Pub28]	Journal of Lightwave Technology	Śmietana M., Koba M., Mikulic P., Bock W.	Combined Plasma-Based Fiber Etching and Diamond-Like Carbon Nanooverlay Deposition for Enhancing Sensitivity of Long-Period Gratings	10.1109/JLT.2016.2528411	vol. 34 no. 19	4615–4619
[Pub29]	Thin Solid Films	Śmietana M., Dominik M., Myśliwiec M., Kwietniewski N., Mikulic P., Witkowski B., Bock W.	Properties of silicon nitride thin overlays deposited on optical fibers – effect of fiber suspension in radio frequency plasma-enhanced chemical vapor deposition reactor	10.1016/j.tsf.2016.01.046	vol. 603	8–13
[Pub30]	Optics Express	Śmietana M., Koba M., Mikulic P., Bock W.	Towards refractive index sensitivity of long-period gratings at level of tens of μm per refractive index unit: fiber cladding etching and nano-coating deposition	10.1364/OE.24.011897	vol. 24 no. 11	11897–11904
[Pub31]	Journal of Physics D: Applied Physics	Taube A., Łapińska A., Judek J., Wochtman N., Zdrojek M.	Temperature induced phonon behaviour in germanium selenide thin films probed by Raman spectroscopy	10.1088/0022-3727/49/31/315301	vol. 49 no. 315301	315301.1–315301.5
[Pub32]	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	10.1016/j.sse.2016.10.006	vol. 128	92–101

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

NUMBER	JOURNAL	AUTHORS	TITLE	DOI	VOLUME	PAGES
[Pub33]	Sensors & Transducers	Borecki M., Korwin-Pawlowski M.	Capillary Sensor with UV-VIS Reading of Effects of Diesel and Biodiesel Fuel Degradation in Storage		vol. 205 no. 10	1–9
[Pub34]	Inżynieria Powierzchni – Surface Engineering	Buczko Z., Derewnicka D., Okurowski W., Kozłowski R., Kozłowski M., Krupka J.	Electrochemical copper composite coatings with graphene as a dispersion phase		vol. 21 no. 1	56–61
[Pub35]	Autobusy. Technika, Eksploatacja, Systemy Transportowe	Czejdo B., Bhattacharya S., Baszun M., Daszczuk W.	Improving Resilience of Autonomous Moving platforms by Real time Analysis of Their Cooperation	10.15199/13.2015.11.8	no. 6	1294–1301

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[Pub36]	Elektronika – konstrukcje, technologie, zastosowania	Firek P., Veklych A., Sochacki M.	Osadzenie i charakteryzacja cienkich warstw dielektrycznych AlO_xN_y	10.15199/13.2016.10.15	vol. 57 no. 10	54–57
[Pub37]	Materiały Elektroniczne	Kielbasiński K., Szałapak J., Krzemiński J., Młóżniak A., Jakubowska M., Szostak S.	Stabilność wysokotemperaturowa ekologicznych rezystorów grubowarstwowych	10.12797/Politeja.12.2015.36.02	vol. 44 no. 4	1–10
[Pub38]	Postępy Fizyki	Kurnik W., Nader M., Szmidt J.	Obchody roku Jana Czochralskiego	10.1557/opl.2014.220	vol. 67 no. 1–2	2–9
[Pub39]	Mechanik: miesięcznik naukowo-techniczny	Małek M., Wiśniewski J., Joanna S., Koralnik M., Mizera J., Kurzydłowski K.	Characterization and evaluation properties of ceramic proppants used in the extraction of the unconventional hydrocarbons		vol. 5–6	516–517
[Pub40]		Mazurak A., Jasiński J., Majkusiak B.	Effect of nanocrystal geometric location on tunnel currents and small-signal admittance of MIS structures	10.1002/pssc.201600206	vol. 13 no. 10–12	1035–1039
[Pub41]	Physica Status Solidi	Mroczyński R., Kalisz M., Dominik M.	Electrical characterization of MIS structures with HfO_x gate dielectric films fabricated on silicon substrates modified by ultra-shallow ion implantation from RF plasma	10.1002/pssc.201600061	vol. 13 no. 10–12	816–821
[Pub42]	IOP Conference Series	Myśliwiec M., Lewandowski A., Wiatr W., Weremczuk J., Szczepański Z., Kisiel R.	Challenges in packaging of IR detectors – technology of elastic electrical connections	10.1088/1757-899X/104/1/012007	vol. 104 no. 012007	1–4
[Pub43]	International Journal of Microelectronics and Computer Science	Neneman K., Łuczyk A., Szostak S., Pleskacz W.	A Simple Tridimensional Processing of Acceleration Measurements for Dynamic Movements Monitoring of Sportsmen		vol. 7 no. 2	47–53
[Pub44]	Devices and Methods of Measurements	Paško S., Sutkowski M.	Anthropometric measurement based on structure from motion imaging technique	10.21122/2220-9506-2016-7-3-305-311	vol. 7 no. 3	305–311
[Pub45]	Elektronika – konstrukcje, technologie, zastosowania	Pióro Z., Jakubowski A., Wierzbicki S., Osiniak M.	Koncepcja wykorzystania inklinometrów z czujnikami MEMS do monitorowania obciążenia konstrukcji dachów	10.15199/13.2016.7.11	no. 7	41–44
[Pub46]			Design of open-porous materials for high-temperature fuel cells,		vol. 96 no. 2	110–114
[Pub47]	Journal of Power Technologies	Skibiński J., Caban P., Wejrzanowski T., Grybczuk M., Kurzydłowski K.	Numerical simulations of epitaxial growth in MOVPE reactor as a tool for aluminum nitride growth optimization		vol. 96 no. 2	110–114
[Pub48]	Journal of Physics	Tanous D., Mazurak A., Majkusiak B.	Charging/discharging processes in nanocrystalline MOS structures – Theoretical study	10.1088/1742-6596/709/1/012012	vol. 709 no. 012012	1–6
[Pub49]	Elektronika – konstrukcje, technologie, zastosowania	Wiśniewski P., Majkusiak B.	Model teoretyczny tunelowego tranzystora polowego	10.15199/13.2016.7.9	vol. 57 no. 7	33–38

7.3. Scientific and Technical Papers Published in Conference Proceedings

NUMBER	PROCEEDINGS OF CONFERENCE / ISBN/DOI	AUTHORS	TITLE	PAGES
[Pub50]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Beck R., Korb P.	Effects of high temperature annealing of double barrier structure with ultrathin PECVD silicon and non-stoichiometric silicon oxide layers	1–2
[Pub51]	E-MRS Fall Meeting 2016	Beck R., Korb P., Ber K.	Ellipsometric spectroscopy as a tool for investigation of nanocrystals in ultrathin PECVD silicon layers' behavior during high temperature annealing	111–111
[Pub52]	EUROSOL-ULIS 2016, Book of Abstracts ISBN 978-1-4673-8609-8 DOI:10.1109/ULIS.2016.7440085	Beck R., Ber K.	Recrystallization and oxidation - competing processes during PECVD ultrathin silicon layer high temperature annealing	190–193
[Pub53]	The Seventh International Conference on Sensor Device Technologies and Applications, SENSORDEVICES 2016 ISBN 978-1-61208-494-7	Borecki M., Korwin-Pawłowski M., Gęca M., Prus P.	Capillary Sensor with Fluorescence Reading of Effects of Diesel and Biodiesel Fuel Degradation in Storage	41–47
[Pub54]	Proceedings of SPIE: Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261498	Borecki M., Duk M., Kociubiński A., Korwin-Pawłowski M.	Multiparametric methane sensor for environmental monitoring	1–9
[Pub55]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Burnat D., Koba M., Wachnicki Ł., Gieraltowska S., Godlewski M., Smetana M.	Wieloparametryczny czujnik metanu do monitorowania środowiska naturalnego	1–2
[Pub56]	Proceedings of the SPIE Sixth European Workshop on Optical Fibre Sensors ISBN 9781510602199 DOI:10.1117/12.2236908	Burnat D., Koba M., Wachnicki Ł., Gieraltowska S., Godlewski M., Smetana M.	Refractive index sensitivity of optical fiber lossy-mode resonance sensors based on atomic layer deposited TiO _x thin overlay	1–4
[Pub57]	Proceedings of the 2016 IEEE 19 th International Symposium on Design and Diagnostics of Electronic Circuits and Systems ISBN 978-1-5090-2467-4 DOI:10.1109/DDECS.2016.7482469	Butryn I., Siwiec K., Kopański J., Pleskacz W.	Integer-N phase locked loop for bluetooth receiver in CMOS 130 nm technology	1–5
[Pub58]	Proc. of 1 st IEEE International Verification and Security Workshop (IVSW) ISBN 978-1-5090-1140-7 DOI:10.1109/IVSW.2016.7566600	Cieplucha M., Pleskacz W.	New Architecture of the Object-Oriented Functional Coverage Mechanism for Digital Verification	1–6
[Pub59]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016	Czyżewska L., Łyszczek R., Gil M., Jusza A., Pędzisz J., Piramidowicz R., Mergo P.	Nowe aktywne związki kompleksowe europu i terbu dla technik laserowych	119–119

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[Pub60]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261406</p>	<p>Dębowska A., Dominik M., Koba M., Janik M., Bock W., Śmietana M.</p>	<p>Effect of oxygen plasma modification on refractive index sensing with micro-cavity in-line Mach-Zehnder interferometer</p>	1–7
[Pub61]	<p>Proceedings of the SPIE Sixth European Workshop on Optical Fibre Sensors ISBN 9781510602199 DOI:10.1117/12.2236899</p>	<p>Dębowska A., Koba M., Janik M., Bock W., Śmietana M.</p>	<p>Increased sensitivity of femtosecond laser micro-machined in-fiber Mach-Zehnder interferometer for small-scale refractive index sensing</p>	1–4
[Pub62]	<p>Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica</p>	<p>Dębowska A., Dominik M., Koba M., Janik M., Bock W., Śmietana M.</p>	<p>Modyfikacja cech funkcjonalnych mikrointerferometrów Macha-Zehndera w wyniku trawienia w plazmie tlenowej</p>	1–2
[Pub63]		<p>Dominik M., Siuzdak K., Niedziałkowski P., Stranak V., Sezemsky P., Sobaszek M., Bogdanowicz R., Ossowski T., Śmietana M.</p>	<p>Annealing of indium tin oxide (ITO) coated optical fibers for optical and electrochemical sensing purposes</p>	1–2
[Pub64]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2263289</p>			1–6
[Pub65]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2263480</p>		<p>Reflection configuration of long period grating sensor working at dispersion turning point</p>	1–6
[Pub66]	<p>Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica</p>	<p>Dominik M., Mikulic P., Bock W., Śmietana M.</p>	<p>Reflection mode of long period grating based sensor</p>	1–2
[Pub67]	<p>Proceedings of the SPIE Sixth European Workshop on Optical Fibre Sensors ISBN 9781510602199 DOI:10.1117/12.2236878</p>	<p>Dominik M., Niedziółka-Jönsson J., Roźniecka E., Wachnicki Ł., Godlewski M., Mikulic P., Bock W., Śmietana M.</p>	<p>Regeneration of titanium oxide nano-coated long-period grating biosensor</p>	1–4
[Pub68]	<p>Proc. SPIE. 10031, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2016 ISBN 9781510604858 DOI:10.1117/12.2248512</p>	<p>Doroz P., Duk M., Korwin-Pawlowski M., Borecki M.</p>	<p>Amplifiers dedicated for large area SiC photodiodes</p>	1–10
[Pub69]	<p>Proc. SPIE. 10031, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2016 ISBN 9781510604858 DOI:10.1117/12.2249024</p>	<p>Drozd J., Duk M., Borecki M.</p>	<p>Brushless DC electric motor application in environment CH₄ sensor</p>	1–4
[Pub70]	<p>Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica</p>	<p>Ficek M., Sobaszek M., Gnyba M., Ryl J., Siuzdak K., Bock W., Śmietana M., Bogdanowicz R.</p>	<p>Long-period grating coated with boron-doped diamond thin film: opto-electrochemical device</p>	1–2

PUBLICATIONS

[Pub71]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261660</p>	<p>Firek P., Wysokiński P.</p>	<p>Manufacturing of HfO_xN_y films using reactive magnetron sputtering for ISFET application</p>	<p>1–6</p>
[Pub72]	<p>Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016</p>	<p>Firek P., Kalenik J., Czerwosz E., Wronka H., Krawczyk S., Kozłowski M.</p>	<p>Warstwy C-Pd do zastosowań w czujnikach wodoru</p>	<p>1–2</p>
[Pub73]	<p>Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica</p>	<p>Firek P., Kondracka K., Kiepusa A., Waśkiewicz M., Lewicki S., Zdanowski R.</p>	<p>Wpływ komórek naczyń krwionośnych na charakterystyki tranzystorów jonoczułych</p>	<p>1–2</p>
[Pub74]	<p>Conference proceedings of 18th European Conference on Integrated Optics ECIO 2016 ISBN 978-83-64102-01-1</p>	<p>Garbat P., Garbat K., Parka J.</p>	<p>Liquid crystal materials with high birefringence and low-loss for THz applications</p>	<p>1–1</p>
[Pub75]	<p>Proc. SPIE. 10031, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2016 ISBN 9781510604858 DOI:10.1117/12.2249184</p>	<p>Gęca M., Lizak T., Kociubiński A., Borecki M., Korwin-Pawłowski M.</p>	<p>Nichrome micro-heaters as actuators for microfluidic sensors</p>	<p>1–8</p>
[Pub76]	<p>Proceedings of 23rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529770</p>	<p>Górecki K., Bisewski D., Zarębski J., Kisiel R., Myśliwiec M.</p>	<p>High-temperature properties of Schottky diodes made of silicon carbide</p>	<p>382–386</p>
[Pub77]	<p>Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016</p>	<p>Janaszek B., Tyszka-Zawadzka A., Szczepański P., Mroczyński R.</p>	<p>Analiza wzmocnienia w objętościowych strukturach metamateriałów hiperbolicznych funkcjonalizowanych grafenem</p>	<p>95–95</p>
[Pub78]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260761</p>	<p>Janik M., Koba M., Bock W., Śmietana M.</p>	<p>Influence of the size of a micro-cavity fabricated in an optical fiber using the femtosecond laser in a form of in-line Mach-Zehnder interferometer on its refractive index sensitivity</p>	<p>1–6</p>
[Pub79]	<p>Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016</p> <p>Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica</p>		<p>Wpływ wielkości mikrootworu wykonanego w światłowodzie z użyciem lasera femtosekundowego na pomiar współczynnika załamania cieczy</p>	<p>1–2</p>
[Pub80]	<p>Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260761</p>	<p>Jasiński J., Mazurak A., Majkusiak B.</p>	<p>Effect of interface traps parameters on admittance characteristics of the MIS (metal-insulator-semiconductor) tunnel structures</p>	<p>1–8</p>
[Pub81]	<p>Abstract booklet of 14th International Conference Reliability and Stress-Related Phenomena in Nanoelectronics-Experiment and Simulation ("Stress Workshop")</p>		<p>Extraction of Border/Bulk Traps Parameters Based on Admittance Measurements</p>	<p>1–1</p>

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[Pub82]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Jasiński J., Mazurak A., Majkusiak B.:	Wpływ parametrów pułapek powierzchniowych na charakterystyki admitancyjne tunelowych struktur MIS (metal-izolator-półprzewodnik)	1–2
[Pub83]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2263521	Jaworski Z.	A 10 Gs/s latched comparator with dynamic offset cancellation in 28 nm FD-SOI process	1–7
[Pub84]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261891		A fully differential OTA with dynamic offset cancellation in 28 nm FD-SOI process	1–9
[Pub85]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016		Szybki komparator w technologii FD-SOI 28 nm	1–2
[Pub86]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Jaworski Z.	Wzmacniacz transkonduktancyjny w technologii FD-SOI 28 nm	1–2
[Pub87]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529741	Jaworski Z.	Verilog HDL model based thermometer-to-binary encoder with bubble error correction	249–254
[Pub88]	Program & Abstract of EMN Meeting on Organic-Electronics and Photonics Open-Access Publication and Conference Management by Scientists and for Scientists	Jusza A.	Luminescent properties of praseodymium doped polymer nanocomposites	5–6
[Pub89]	SPIE Photonics Europe 2016 Technical Summaries	Jusza A., Anders K., Dybała F., Bercha A., Trzeciakowski W., Piramidowicz R.	Pressure tuned semiconductor lasers for investigation of up-conversion phenomena in RE ³⁺ doped materials	247–247
[Pub90]	7 th International Symposium on Optical Materials IS-OM7 2016 Abstracts Book – Program	Jusza A., Lipińska L., Polis P., Olszyna A., Piramidowicz R.	Short-wavelength emission properties of holmium doped LaAlO ₃ nanocrystals and PMMA-based nanocomposites	120–120
[Pub91]	E-MRS Fall Meeting 2016	Kaczmarek J., Taube A., Boll T., Ekielski M., Kruszka R., Borysiewicz M., Myśliwiec M., Piskorski K., Wzorek M., Kozubal M., Wojtasiak W., Kuchta D., Góralczyk M., Prystawko P., Zając M., Kucharski R., Stiller K., Kamińska E.	In-depth Study of Nanocrystalline Ru-Si-O as Schottky Electrode for Nitride Semiconductors	1–5
[Pub92]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261694	Kalenik J., Czerwosw E., Biernacki K., Rymarczyk J., Stępińska I.	Optical properties of lamps with cold emission cathode	1–5

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[Pub93]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Kalenik J., Czerwos E., Biernacki K., Rymarczyk J., Stępińska I.	Właściwości optyczne lamp z zimną katodą	1–2
[Pub94]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261873	Kamiński M., Firek P., Caban P.	Characterization thin films TiO ₂ obtained in the magnetron sputtering process	1–8
[Pub95]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Kamiński M., Firek P., Caban P.	Charakteryzacja cienkich warstw TiO ₂ wytworzonych w procesie rozpylania magnetronego	1–2
[Pub96]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Kamiński M., Firek P.	Wytwarzanie tranzystora ISFET z zastosowaniem TiO ₂ w roli dielektryka bramkowego	1–2
[Pub97]	Proc. IEEE MTT-S International Symposium ISBN 9781509006991	Karpisz T., Kopyt P., Salski B., Krupka J.	Open-ended waveguide measurement of liquids at millimeter wavelengths	1–2
[Pub98]	Proc. 21 st International Conference on Microwaves, Radar and Wireless Communications ISBN 9781509022151 DOI:10.1109/MIKON.2016.7491962	Karpisz T., Skulski J., Salski B.	Resonant Measurement Method for Microwave Characterization of Bituminous Mixtures	1–3
[Pub99]	Conference proceedings of 18 th European Conference on Integrated Optics ECIO 2016 ISBN 978-83-64102-01-1	Kaźmierczak A., Stopiński S., Jusza A., Anders K., Markowski K., Osuch T., Różanowski K., Lewandowski J., Piramidowicz R.	Development of photonic sensing system for patient condition monitoring during MRI diagnostics	1–2
[Pub100]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Kiełbasiński K., Jasiński J., Mikołajczyk A.	Układ dynamicznej korekcji współczynnika mocy w zasilaczach impulsowych	1–2
[Pub101]	Conference proceedings of 18 th European Conference on Integrated Optics ECIO 2016 ISBN 978-83-64102-01-1	Koba M., Szczepański P.	Threshold Analysis of 2-D Gain and Index Coupled Photonic Crystal Lasers	1–2
[Pub102]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Kociubiński A., Gęca M., Borecki M.	Technologia i charakteryzacja mikrogrzejników planarnych do klasyfikacji parametrów cieczy o nanolitrowej objętości	1–2
[Pub103]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529740	Kołaciński C., Szymański A., Jarosz A., Kurjata-Pfitzner E., Wasowski J., Borejko T., Siwiec K., Pleskacz W.	The integrated transmitter and receiver modules for pulse oximeter system	243–248

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[Pub104]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529716	Kopański J., Wiechowski Ł., Siwiec K., Pleskacz W.	A low sampling frequency switched capacitor low-pass filter for wireless receivers	130–135
[Pub105]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Król K., Waškiewicz M., Sochacki M., Taube A., Gieraltowska S., Wachnicki Ł., Godlewski M., Szmidt J.	Analiza pułapek w strukturach MIS ZrO ₂ /SiO ₂ /4H-SiC oraz HfO ₂ /SiO ₂ /4H SiC	1–2
[Pub106]	Book of Abstracts of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016	Kuźmicz W.	CMOS FD-SOI Technology in the Eyes of a Circuit Designer	16–16
[Pub107]	Proceedings of IEEE East-West Design & Test Symposium (EWDTS'2016) ISBN 978-1-5090-0693-9 DOI:10.1109/EWDTS.2016.7807626	Kuźmicz W.	Extension of the Corner Stitching Data Structure for Arbitrary Layout Shapes	64–67
[Pub108]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529736	Kuźmicz W.	MOS transistor as a current-controlled device	223–228
[Pub109]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260788			1–6
[Pub110]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Łukasiak L., Jasiński J., Beck R., Ikraiam F.	Modeling high-frequency capacitance in SOI MOS capacitors	1–2
[Pub111]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260777	Łukasiak L., Jasiński J., Jakubowski A.	Simulation of electrical characteristics of GaN vertical Schottky diodes	1–6
[Pub112]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Łukasiak L., Jakubowski A.	Simulation of electrical characteristics of vertical GaN Schottky diodes	1–2
[Pub113]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Madziar K., Bełda A., Galwas B.	Badania zjawiska opto-mikrofalowej przemiany częstotliwości na modulatorze Macha-Zehndera dla jego różnych warunków pracy	1–5
[Pub114]	Proc. 21 st International Conference on Microwaves, Radar and Wireless Communications, 2016, IEEE ISBN 9781509022151 DOI:10.1109/MIKON.2016.7492111	Madziar K., Galwas B.	An Open-Loop Approach to Optical Domain Combined Dual-Loop Optoelectronic Oscillator	639–642

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[Pub115]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Madziar K., Galwas B.	Kształtowanie charakterystyk transmisyjnych interferencyjnych mikrofalowych filtrów fotonicznych wykorzystujących dzielniki i sumatory polaryzacji	1–2
[Pub116]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261416		Polarization control based interference microwave photonic filters	1–6
[Pub117]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Malinowski A., Łukasiak L., Tomaszewski D., Jakubowski A.	Charakteryzacja procesu usuwania fotorezystu ArF 193 nm za pomocą rodników wodoru	1–2
[Pub118]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica		Rozrzuty parametrów elektrycznych tranzystorów finFET i ich wpływ na skalowanie	1–2
[Pub119]	EUROSOI-ULIS 2016, Book of Abstracts ISBN 978-1-4673-8609-8 DOI:10.1109/ULIS.2016.7440086	Mazurak A., Jasiński J., Majkusiak B.	Effect of inner interface traps on high-k gate stack admittance characteristics	194–197
[Pub120]	E-MRS Spring Meeting 2016		Effect of nanocrystal geometric location on tunnel currents and small-signal admittance of MIS structures	223–223
[Pub121]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016	Mergo P., Łyszczek R., Gil M., Jusza A., Czyżewska L., Pędzisz J., Kopeć J., Piramidowicz R.	Aktywne polimery dla technologii aktywnych światłowodów polimerowych	121–121
[Pub122]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260787	Mierzwiński P., Kuźmich W., Domański K., Tomaszewski D., Głuszko G.	Bipolar transistor in VESTIC technology: prototype	1–9
[Pub123]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica		Tranzystor bipolarny w technologii VESTIC: prototyp	1–2
[Pub124]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016		Analiza nieliniowej struktury periodycznej wykazującej parzystą symetrię	72–72
[Pub125]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Mossakowska- Wyszyńska A., Witoński P., Szczański P.	Transmission properties analysis of 1D pt-symmetric photonic structures	1–2
[Pub126]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2260706			1–11

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[Pub127]	E-MRS Spring Meeting 2016	Mroczyński R., Kalisz M., Dominik M.	Effect of ultra-shallow F/N ions implantation on electrical parameters of MIS structures based on HfO _x gate dielectrics	163–163
[Pub128]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Mroczyński R., Kwietniewski N., Piotrowski J., Szczepański P.	Fabrication and characterization of infrared photodetectors based on graphene	1–2
[Pub129]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261659	Mroczyński R., Kwietniewski N., Piotrowski J., Judek J., Zdrojek M., Szczepański P.	Fabrication and preliminary characterization of infrared photodetectors based on graphene	1–7
[Pub130]	E-MRS Fall Meeting 2016	Mroczyński R., Mazurak A., Jasiński J., Beck R., Kano S., Sugimoto H., Imakita K., Fujii M., Valenta J.	Technology and characterization of MOS structures with co-doped silicon nanocrystals (Si-NCs) embedded in dielectric ensembles	112–112
[Pub131]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2258741	Mroczyński R., Wachnicki Ł., Gieratowska S.	Technology and characterization of Thin-Film Transistors (TFTs) with a-IGZO semiconductor and high-k dielectric layer	1–7
[Pub132]	Conference proceedings of 18 th European Conference on Integrated Optics ECIO 2016 ISBN 978-83-64102-01-1	Mroczyński R., Kwietniewski N., Piotrowski J., Szczepański P.	Technology of infrared photodetectors based on graphene layers	1–2
[Pub133]		Mroczyński R.	Technology and characterization of thin-film transistors (TFTs) with novel amorphous semiconductor and high-k dielectric layers	1–2
[Pub134]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Mroczyński R., Dominik M.	Thermal stability of deposited by means of RF reactive magnetron sputtering hafnium oxide (HfO _x) and hafnium oxynitride (HfO _x N _y) thin films	1–2
[Pub135]		Mroczyński R., Kalisz M., Jasiński J., Kwietniewski N., Dominik M., Beck R., Szmidt J.	Ultra-shallow ion implantation from RF plasma and its effect on electro-physical properties of MOS structures with SiO ₂ /HfO ₂ double-gate dielectric layers fabricated on Si and 4H-SiC	1–2
[Pub136]	Conference Abstract Book BIT's 6 th Annual World Congress of Nano Science and Technology-2016	Mroczyński R.	Ultra-shallow ion implantation from r.f. plasma – the phenomenon and effect on electro-physical properties of MOS structures fabricated on Si and SiC substrates	403–403
[Pub137]	Extended Abstracts: ISSE 2016, 39 th International Spring Seminar on Electronics Technology ISBN 978-80-261-0618-0			81–82
[Pub138]	Proceedings of 39 th International Spring Seminar on Electronics Technology ISSE 2016 ISBN 978-1-5090-1389-0 DOI:10.1109/ISSE.2016.7563176	Myśliwiec M., Kisiel R., Fałat T.	Die attach by diffusion Sn-Ag-Sn soldering in high temperature electronics applications	140–143

[Pub139]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Myśliwiec M., Kisiel R.	Materiały i technologie montażu dla potrzeb elektroniki wysokotemperaturowej	1–2
[Pub140]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica		Połączenia dyfuzyjne Ag/Sn oraz Cu/Sn w montażu wysokotemperaturowym	1–2
[Pub141]	Proceedings of the 2016 IEEE 19 th International Symposium on Design and Diagnostics of Electronic Circuits and Systems ISBN 978-1-5090-2467-4 DOI:10.1109/DDECS.2016.7482451	Narczyk P., Siwiec K., Pleskacz W.	Precision human body temperature measurement based on thermistor sensor	1–5
[Pub142]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529798	Neneman K., Łuczyk A., Pleskacz W.	Monitoring of dynamic movements using acceleration measurements	515–518
[Pub143]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261385	Niewiński M., Gurnecki P.	Multiplatform application for calculating a combined standard uncertainty using a Monte Carlo method	1–6
[Pub144]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica		Wieloplatformowa aplikacja do wyznaczania niepewności złożonej metodą Monte Carlo	1–2
[Pub145]	Proc. 21 st International Conference on Microwaves, Radar and Wireless Communications, 2016 ISBN 9781509022151 DOI:10.1109/MIKON.2016.7492080	Opalska K., Opalski L., Wiatr W., Piotrowski J., Kasprowicz D.	Small-Signal Lumped-Element Equivalent Model for High Operating Temperature Infrared Photodetectors	1–4
[Pub146]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529756	Pfitzner A., Kowalska B.	Contribution to scaling of Vertical-Slit Field-Effect Transistor (VeSFET)	321–325
[Pub147]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Pfitzner A.	Tranzystor VeSFET z niezależnie polaryzowanymi bramkami – modelowanie, właściwości i zastosowania	1–2
[Pub148]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016	Piekarski R., Janaszek B., Kieliszczyk M., Piramidowicz R.	Analiza generacji w strukturze lasera światłowodowego z rezonatorem w konfiguracji typu theta	88–88
[Pub149]		Piekarski R., Janaszek B., Szczepański P., Mroczyński R.	Analiza możliwości generacji impulsów ultrakrótkich w planarnej strukturze hybrydowej z wykorzystaniem grafenu jako nieliniowego absorbera	73–73

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[Pub150]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016	Piekarski R., Janaszek B., Kjeliszczuk M., Bortnowski P., Siejak E., Krysiński R., Anders K., Piramidowicz R.	Analiza parametrów generacyjnych lasera światłowodowego z rezonatorem w konfiguracji typu theta	102–102
[Pub151]	Proc. European Space Agency 8 th Wideband Gap Semiconductors and Components Workshop, 2016	Piotrowska A., Kamińska E., Taube A., Wojtasiak W., Gwarek W., Kucharski R., Zając M., Prystawko P., Kruszewski P., Ekielski M., Szerling A., Kruszka R., Kozubal M., Trajnerowicz A.	Recent Progress in AlGaIn/GaN HEMTs on Truly Bulk GaN	1–6
[Pub152]	SPIE Photonics Europe 2016 Technical Summaries	Piramidowicz R., Jusza A., Anders K., Gil M., Łyszczek R., Mergo P.	Development of optically active polymer fibers for application in new light sources and amplifiers	96–96
[Pub153]	7 th International Symposium on Optical Materials IS-OM7 2016 Abstracts Book – Program	Piramidowicz R., Jusza A., Anders K., Mergo P., Gil M., Łyszczek R., Lipińska L.	Luminescent properties of RE ³⁺ doped polymer-based nanocomposite materials	94–94
[Pub154]	Program & Abstract of EMN Meeting on Organic-Electronics and Photonics	Piramidowicz R.	RE ³⁺ doped polymer materials for application in active fiber-optic components	1–2
[Pub155]	Proceedings of the 2016 IEEE 19 th International Symposium on Design and Diagnostics of Electronic Circuits and Systems ISBN 978-1-5090-2467-4 DOI:10.1109/DDECS.2016.7482464	Siwiec K., Marcinek K., Boguszewicz P., Borejko T., Halauko A., Jarosz A., Kopanski J., Kurjata-Pfytzner E., Narczyk P., Plasota M., Wielgus A., Pleskacz W.	BioSoC: Highly integrated System-on-Chip for health monitoring	1–6
[Pub156]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Stonio B., Firek P., Szmidt J.	Wykorzystanie trawienia azotku glinu (AlN) w technologii tranzystora MISFET	1–2
[Pub157]	Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	Stonio B., Taube A., Łapińska A., Świniarski M., Judek J., Firek P., Szmidt J., Zdrojek M.	Wytwarzanie i charakteryzacja pojedynczych warstw siarczku molibdenu metodą CVD	1–2
[Pub158]	SPIE Photonics Europe 2016 Technical Summaries	Stopiński S., Lelit M., Jusza A., Anders K., Osuch T., Szczepański P., Różanowski K., Lewandowski J., Piramidowicz R.	ASPIC-based interrogator of FBG sensors	221–221
[Pub159]	Conference proceedings of 18 th European Conference on Integrated Optics ECIO 2016	Stopiński S., Golba A., Jusza A., Anders K., Kaźmierczak A., Piramidowicz R.	Development of a WDM-PON system based on photonic integrated circuits	1–2
[Pub160]	ISBN 978-83-64102-01-1	Stopiński S., Anders K., Lelit M., Augustin L., Piramidowicz R.	Integrated optical time division reflectometer	1–2
[Pub161]	Book of abstracts of 19 th International Conference on Defects in Insulating Materials	Suchocki A., Wang Y., Ciesielska M., Kamińska A., Zhydachevskii Y., Turczyński S., Pawlak D., Malinowski M.	Spectroscopic properties of Y ₄ Al ₂ O ₉ :Ce crystals	1–1
[Pub162]	Conference Abstract Book BIT's 6 th Annual World Congress of Nano Science and Technology-2016	Szczepański P., Koba M.	Semi-analytical modeling of periodic structures for photonics	73–73

[Pub163]		Szczepański P., Janaszek B., Tyszka-Zawadzka A., Mroczyński R., Piekarski R.	Własności optyczne metamateriałów hiperbolicznych funkcjonalizowanych grafenem	1–2
[Pub164]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górnictwo-Hutnicza im. Stanisława Staszica	Śmietana M., Koba M., Pysz D., Bock W., Buczyński R.	Otwory wykonane z użyciem mikroobróbki laserowej we włóknach światłowodowych do zastosowań sensorycznych i mikrofluidycznych	1–2
[Pub165]		Śmietana M., Sośnicki K., Pysz D., Buczyński R.	Światłowodowy interferometr międzymodowy do badania cieczy oparty na światłowodzie z zawieszonym rdzeniem	1–2
[Pub166]				1–2
[Pub167]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261816	Tanous D., Mazurak A., Majkusiak B.	Impact of nanocrystal(s) location on C-V-t and I-V-t characteristics of nc-MOS structures	1–8
[Pub168]	E-MRS Spring Meeting 2016	Tanous D., Mazurak A., Majkusiak B.	Simulation Based Investigation of nC-Si MOS Structures	223–223
[Pub169]	Proc. IWN 2016	Taube A., Kamińska E., Piotrowska A., Wojtasiak W., Ekielski M., Myśliwiec M., Kozubal M., Kaczmarek J., Wzorek M., Góralczyk M., Kuchta D., Prystawko P., Zajac M., Kucharski R.	AlGaIn/GaN High Electron Mobility Transistors on Semi-Insulating Ammono-GaN Substrates with Regrown Ohmic Contacts	1–7
[Pub170]	E-MRS Fall Meeting 2016	Taube A., Kamińska E., Piotrowska A., Ekielski M., Myśliwiec M., Szerling A., Kruska R., Wojtasiak W., Kozubal M., Kaczmarek J., Wzorek M., Góralczyk M., Kuchta D., Prystawko P., Zajac M., Kucharski R.	Development of AlGaIn/GaN HEMTs on Semi-Insulating Bulk GaN Substrates for High Frequency Applications	1–6
[Pub171]	Proc. IEEE EDS Distinguished Lecturer Mini-Colloquium on GaN HEMT Technology, 2016	Taube A., Kamińska E., Piotrowska A., Ekielski M., Myśliwiec M., Wojtasiak W., Kozubal M., Kaczmarek J., Wzorek M., Góralczyk M., Kuchta D., Prystawko P., Zajac M., Kucharski R.	Development of AlGaIn/GaN High Electron Mobility Transistors on Semi-Insulating Ammono-GaN Substrates	1–7
[Pub172]	Książka Abstraktów XI Sympozjum Techniki Laserowej STL 2016	Tyszka-Zawadzka A., Janaszek B., Szczepański P., Mroczyński R.	Własności propagacyjne aktywnych struktur falowodowych HMM funkcjonalizowanych grafenem	82–82
[Pub173]	Proceedings of 23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016 ISBN 978-83-63578-08-4 DOI:10.1109/MIXDES.2016.7529724	Wiecha P., Cieplucha M., Kloczko P., Pleskacz W.	Architecture and design of a Bluetooth Low Energy Controller	164–167
[Pub174]	Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016 Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górnictwo-Hutnicza im. Stanisława Staszica	Wielgus A., Pleskacz W.	Charakteryzacja komórek standardowych CMOS pod kątem rozwarć dla generacji wektorów testowych	1–2

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[Pub175]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261887	Wielgus A., Pleskacz W.	CMOS standard cells characterization for open defects for test pattern generation	1–8
[Pub176]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261752	Wiśniewski P., Majkusiak B.	Modeling of tunnel field effect transistor: the impact of construction parameters	1–9
[Pub177]	_____ Materiały Konferencyjne: XII Konferencja Naukowa Technologia Elektronowa, ELTE '2016	Wiśniewski P., Majkusiak B.	Modelowanie charakterystyk admitancyjnych tranzystora MOS z ultracienkim dielektrykiem	1–2
[Pub178]	_____ Katedra Elektroniki, Wydział Informatyki Elektroniki i Telekomunikacji Akademia Górniczo-Hutnicza im. Stanisława Staszica	_____	Modelowanie tranzystora tunelowego TFET – wpływ parametrów konstrukcyjnych	1–2
[Pub179]	_____	Wiśniewski P., Mroczyński R., Majkusiak B.	_____	1–2
[Pub180]	Proceedings of SPIE Electron Technology Conference 2016 ISBN 9781510608436 DOI:10.1117/12.2261676	Wiśniewski P., Mroczyński R., Majkusiak B.	Reactive ion etching (RIE) of silicon for the technology of nanoelectronic devices and structures	1–7
[Pub181]	Proceedings of SPIE Photonics Europe 2016 ISBN 9781510601413 DOI:10.1117/12.2225610	Zawistowski J., Kurzejamski G., Garbat P., Naruniec J.	Products recognition on shop-racks from local scale-invariant features	9896131 – 9896137
[Pub182]	ИССЛЕДОВАНИЯ И РАЗРАБОТКИ В ОБЛАСТИ МАШИНОСТРОЕНИЯ, ЭНЕРГЕТИКИ И УПРАВЛЕНИЯ МАТЕРИАЛЫ XVI Международной научно-технической конференции студентов, аспирантов и молодых ученых ISBN 978-985-535-314-1	Бояровская К., Давыдова К., Савкова Е., Sutkowski M.	Экспериментальные исследования динамического диапазона средств технического зрения	250–252

7.4. Scientific and Technical Books

NUMBER	AUTHORS	PUBLISHER, ISBN	TITLE	PAGES
[Pub183]	Piramidowicz R.	European Conference on Integrated Optics ISBN 978-83-64102-01-1	Conference proceedings of 18 th European Conference on Integrated Optics ECIO 2016	48

8. PATENTS

[Pat1]	Kamiński Wojciech, Warda Piotr, Kęsik Jerzy, The method of modifying the spectral characteristics of the ion gas laser and the laser discharge tube (Sposób kształtowania charakterystyki widmowej promieniowania gazowego lasera jonowego oraz laserowa rura wyładowcza), patent no: PAT.224240, 24 May 2016
[Pat2]	Pleskacz Witold: BioSoC , trademark, application no: Z-465509, 21 December 2016

9. REPORTS

NUMBER	AUTHORS	TITLE	TYPE
[Rep1]	Anders K., Piątkowski D., Ragiń T., Kochanowicz M., Żmojda J., Dorosz D., Piramidowicz R.	Erbium-doped bismuth-oxide glasses for application in fiber lasers and amplifiers	poster: Conference SPIE Photonics Europe 2016
[Rep2]	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
[Rep3]	Anders K.	Spectroscopic analysis of glass materials for applications in mid-infrared light sources	scientific report from the project granted by the University
[Rep4]	Beck R., Ber K.	Recrystallization and oxidation – competing processes during PECVD ultrathin silicon layer high temperature annealing	poster: Joint International EUROSOL Workshop and International Conference on Ultimate Integration on Silicon 2016
[Rep5]	Beck R., Korb P., Ber K.	Ellipsometric spectroscopy as a tool for investigation of nanocrystals in ultrathin PECVD silicon layers' behavior during high temperature annealing	poster: European Materials Research Society Fall Meeting 2016
[Rep6]	Beck R., Korb P.	Effects of high temperature annealing of double barrier structure with ultrathin PECVD silicon and non-stoichiometric silicon oxide layers	poster: 12 th Electron Technology Conference ELTE 2016
[Rep7]	Bieniek T., Janczyk G.	Innovative, scalable architecture of modular interposer system for massive heat removal, high power delivery and optical signaling-CarrlCool project	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep8]	Borecki M., Duk M., Kociubiński A., Korwin-Pawlowski M.	Wieloparametryczny czujnik metanu do monitorowania środowiska naturalnego	poster: 12 th Electron Technology Conference ELTE 2016
[Rep9]	Borecki M., Firek P., Szmidt J., Szmidt M., Urbańska K., Niemiec T., Kuczyńska B., Korwin-Pawlowski M.	Mikroelektroniczne i optoelektroniczne przyrządy do zastosowań w diagnostyce prowadzonej w oparciu o badania ośrodków ciekłych	oral presentation: Spotkanie InterBioMed 2016
[Rep10]	Borecki M., Korwin-Pawlowski M., Gęca M., Prus P.	Capillary Sensor with Fluorescence Reading of Effects of Diesel and Biodiesel Fuel Degradation in Storage	oral presentation: SENSORDEVICES 2016, The Seventh International Conference on Sensor Device Technologies and Applications, IARIA Conference 2016

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[Rep11]	Borecki M.	Logistics and monitoring technologies and ways to protect the environment before starting work, during drilling, hydraulic fracturing processes and during the operation, including monitoring of groundwater, air, noise, soil, greenhouse gases and other	scientific report from the project granted by National Centre for Research and Development
[Rep12]	Cieplucha M., Pleskacz W.	New architecture of the object-oriented functional coverage mechanism for digital verification	oral presentation: 1 st IEEE International Verification and Security Workshop 2016
[Rep13]	Czyżewska L., Łyszczek R., Gil M., Jusza A., Pędzisz J., Piramidowicz R., Mergo P.	Nowe aktywne związki kompleksowe europu i terbu dla technik laserowych	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep14]	Dębowska A., Dominik M., Koba M., Janik M., Bock W., Śmietana M.	Modyfikacja cech funkcjonalnych mikroiinterferometrów Macha-Zehndera w wyniku trawienia w plazmie tlenowej	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep15]	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
[Rep16]	Dominik M., Mikulic P., Bock W., Śmietana M.	Reflection mode of long period grating based sensor	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep17]	Dominik M., Siuzdak K., Niedziałkowski P., Stranak V., Sezemsky P., Sobaszek M., Bogdanowicz R., Ossowski T., Śmietana M.	Annealing of indium tin oxide (ITO) coated optical fibers for optical and electrochemical sensing purposes	poster: 12 th Electron Technology Conference ELTE 2016
[Rep18]	Doroz P., Duk M., Korwin-Pawlowski M., Borecki M.	Amplifiers dedicated for large area SiC photodiodes	oral presentation: XXXVIII th IEEE-SPIE Joint Symposium 2016
[Rep19]	Drozd J., Duk M., Borecki M.	Brushless DC electric motor application in environment CH ₄ sensor	oral presentation: XXXVIII th IEEE-SPIE Joint Symposium 2016
[Rep20]	Ficek M., Sobaszek M., Gnyba M., Ryl J., Siuzdak K., Bock W., Śmietana M., Bogdanowicz R.	Long-period grating coated with boron-doped diamond thin film: opto-electrochemical device	poster: 12 th Electron Technology Conference ELTE 2016
[Rep21]	Firek P., Kalenik J., Czerwosz E., Wronka H., Krawczyk S., Kozłowski M.	Warstwy C-Pd do zastosowań w czujnikach wodoru	poster: 12 th Electron Technology Conference ELTE 2016
[Rep22]	Firek P., Kondracka K., Kiepusa A., Waśkiewicz M., Lewicki S., Zdanowski R.	Wpływ komórek naczyń krwionośnych na charakterystyki tranzystorów jonoczułych	poster: 12 th Electron Technology Conference ELTE 2016
[Rep23]	Garbat P., Garbat K., Parka J.	Liquid crystal materials with high birefringence and low-loss for THz applications	poster: 18 th European Conference on Integrated Optics ECIO 2016
[Rep24]	Garbat P., Nowinowski-Kruszelnicki E.	Variable liquid crystal devices for image processing systems	poster: XXI Conference on Liquid Crystals Chemistry, Physics and Applications 2016
[Rep25]	Gęca M., Lizak T., Kociubiński A., Borecki M., Korwin-Pawlowski M.	NiCr micro heaters as actuators in micro-fluidics sensors	oral presentation: XXXVIII th IEEE-SPIE Joint Symposium 2016, oral presentation
[Rep26]	Janaszek B., Tyszka-Zawadzka A., Szczepański P., Mroczynski R.	Analiza wzmocnienia w objętościowych strukturach metamateriałów hiperbolicznych funkcjonalizowanych grafenem	poster: XI Sympozjum Techniki Laserowej STL 2016

[Rep27]	Janik M., Koba M., Bock W., Śmietana M.	Wpływ wielkości mikrootworu wykonanego w światłowodzie z użyciem lasera femtosekundowego na pomiar współczynnika załamania cieczy	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep28]	Jasiński J., Mazurak A., Majkusiak B.	Extraction of Border/Bulk Traps Parameters Based on Admittance Measurements	poster: 14 th International Conference Reliability and Stress-Related Phenomena in Nanoelectronics – Experiment and Simulation (“Stress Workshop”) 2016
[Rep29]	Jasiński J., Mazurak A., Majkusiak B.	Wpływ parametrów pułapek powierzchniowych na charakterystyki admitancyjne tunelowych struktur MIS (metal-izolator-półprzewodnik)	poster: 12 th Electron Technology Conference ELTE 2016
[Rep30]	Jasiński J.	Construction of Multitasking Universal Prototyping Platform for Electronic Devices	scientific report from the project granted by the University
[Rep31]	Jasiński J.	Electrical characterization of the advanced MIS structures in the range of low and very low frequencies	scientific report from the project granted by the National Science Centre
[Rep32]	Jaworski Z.	Szybki komparator w technologii FD-SOI 28 nm	poster: 12 th Electron Technology Conference ELTE 2016
[Rep33]	Jaworski Z.	Wzmacniacz transkonduktancyjny w technologii FD-SOI 28 nm	poster: 12 th Electron Technology Conference ELTE 2016
[Rep34]	Jusza A., Anders K., Dybała F., Bercha A., Trzeciakowski W., Piramidowicz R.	Pressure tuned semiconductor lasers for investigation of up-conversion phenomena in RE ³⁺ doped materials	poster: Conference SPIE Photonics Europe 2016
[Rep35]	Jusza A., Lipińska L., Polis P., Olszyna A., Piramidowicz R.	Short-wavelength emission properties of holmium doped LaAlO ₃ nanocrystals and PMMA-based nanocomposites	poster: 7 th International Symposium on Optical Materials 2016
[Rep36]	Jusza A.	Active polymer fibers – new materials for fiber lasers and amplifiers applications	scientific report from the project granted by the University
[Rep37]	Jusza A.	Luminescent properties of praseodymium doped polymer nanocomposites	oral presentation: EMN on Organic – Electronics and Photonics Meeting 2016, oral presentation
[Rep38]	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
[Rep39]	Kalenik J., Czerwosz E., Biernacki K., Rymarczyk J., Stępińska I.	Właściwości optyczne lamp z zimną katodą	poster: 12 th Electron Technology Conference ELTE 2016
[Rep40]	Kamiński M., Firek P., Caban P.	Charakteryzacja cienkich warstw TiO ₂ wytworzonych w procesie rozpylania magnetonowego	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep41]	Kamiński M., Firek P.	Wytwarzanie tranzystora ISFET z zastosowaniem TiO ₂ w roli dielektryka bramkowego	poster: 12 th Electron Technology Conference ELTE 2016
[Rep42]	Każmierczak A., Stopiński S., Jusza A., Anders K., Markowski K., Osuch T., Różanowski K., Lewandowski J., Piramidowicz R.	Development of photonic sensing system for patient condition monitoring during MRI diagnostics	poster: 18 th European Conference on Integrated Optics ECIO 2016

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[Rep43]	Kiełbasiński K., Jasiński J., Mikołajczyk A.	Układ dynamicznej korekcji współczynnika mocy w zasilaczach impulsowych	poster: 12 th Electron Technology Conference ELTE 2016
[Rep44]	Kisiel R.	Integretation of thermoelectrically cooled infrared photodetectors with wideband electronics	scientific report from the project granted by National Centre for Research and Development
[Rep45]	Koba M., Szczepański P.	Threshold Analysis of 2-D Gain and Index Coupled Photonic Crystal Lasers	poster: 18 th European Conference on Integrated Optics ECIO 2016
[Rep46]	Kociubiński A., Gęca M., Borecki M.	Technologia i charakteryzacja mikrogrzejników planarnych do klasyfikacji parametrów cieczy nanolitrowej objętości	poster: 12 th Electron Technology Conference ELTE 2016
[Rep47]	Król K., Waśkiewicz M., Sochacki M., Taube A., Gieraltowska S., Wachnicki Ł., Godlewski M., Szmiedt J.	Analiza pułapek w strukturach MIS ZrO ₂ /SiO ₂ /4H-SiC oraz HfO ₂ /SiO ₂ /4H SiC	poster: 12 th Electron Technology Conference ELTE 2016
[Rep48]	Król K.	The effect of phosphorus on the electro- physical properties of dielectric layers produced by 4H-SiC thermal oxidation	scientific report from the project granted by the National Science Centre
[Rep49]	Kuźmicz W., Piwowarska E.	Design of a low noise low frequency amplifier, 1–38 p.	presentation: THINGS2DO Research Meeting 2016
[Rep50]	Kuźmicz W.	CMOS FD-SOI technology in the eyes of a circuit designer, 1–55 p.	oral presentation: 23 rd International Conference Mixed Design of Integrated Circuits and Systems 2016
[Rep51]	Kuźmicz W.	Technologia FD-SOI z punktu widzenia projektanta układów, 1–54 p.	presentation: WEITI seminarium nt. technologii CMOS FDSOI 2016
[Rep52]	Kuźmicz W.	THIN but Great Silicon 2 Design Objects	scientific report from the project granted by National Centre for Research and Development
[Rep53]	Kuźmicz W.	VESTIC: a new manufacturing technology for integrated circuits	scientific report from the project granted by National Centre for Research and Development
[Rep54]	Łukasiak L., Jakubowski A.	Simulation of electrical characteristics of vertical GaN Schottky diodes	poster: 12 th Electron Technology Conference ELTE 2016
[Rep55]	Łukasiak L., Jasiński J., Beck R., Ikraim F.	Modeling high-frequency capacitance in SOI MOS capacitors	poster: 12 th Electron Technology Conference ELTE 2016
[Rep56]	Madziar K., Belda A., Galwas B.	Badania zjawiska opto-mikrofalowej przemiany częstotliwości na modulatorze Macha-Zehndera dla jego różnych warunków pracy	poster: 12 th Electron Technology Conference ELTE 2016
[Rep57]	Madziar K., Galwas B.	An Open-Loop Approach to Optical Domain Combined Dual-Loop Optoelectronic Oscillator	poster: 21 st International Conference on Microwaves, Radar and Wireless Communications 2016
[Rep58]	Madziar K., Galwas B.	Kształtowanie charakterystyk transmisyjnych interferencyjnych mikrofalowych filtrów fotonicznych wykorzystujących dzielniki i sumatory polaryzacji	poster: 12 th Electron Technology Conference ELTE 2016

[Rep59]	Madziar K., Maleńczyk I., Piwowska E., Galwas B.	Model, tools, practice (WUT) Experiences in Distance Teaching, 1–25 p.	oral presentation: 4 th Annual Dutch-Polish-Belarusian Trilateral Conference Education as a Human Right: Modernising Higher Education to Meet the Challenges of the 21 st Century 2016
[Rep60]	Madziar K.	Investigation and analysis of optoelectronic oscillators involving polarization splitting based microwave photonic filters for frequency selection	scientific report from the project granted by the University
[Rep61]	Madziar K.	Photonic Techniques in High Frequency Signal Generation	oral presentation: 26 th International Travelling Summer School on Microwaves and Lightwaves 2016
[Rep62]	Malinowski A., Łukasiak L., Tomaszewski D., Jakubowski A.	Charakteryzacja procesu usuwania fotorezystu ArF 193nm za pomocą rodników wodoru	poster: 12 th Electron Technology Conference ELTE 2016
[Rep63]	Malinowski A., Łukasiak L., Tomaszewski D., Jakubowski A.	Rozrzuty parametrów elektrycznych tranzystorów finFET i ich wpływ na skalowanie	poster: 12 th Electron Technology Conference ELTE 2016
[Rep64]	Malinowski M.	Modeling and investigation of optical materials, photonic structures and circuits	scientific report from the project granted by the University
[Rep65]	Mazurak A., Jasiński J., Majkusiak B.	Effect of Inner Interface Traps on High-K Gate Stack Admittance Characteristics	poster: Joint International EUROSOL Workshop and International Conference on Ultimate Integration on Silicon 2016
[Rep66]	Mazurak A., Jasiński J., Majkusiak B.	Effect of nanocrystal geometric location on tunnel currents and small-signal admittance of MIS structures	poster: European Materials Research Society Spring Meeting 2016
[Rep67]	Mergo P., Łyszczek R., Gil M., Jusza A., Czyżewska L., Pędzisz J., Kopeć J., Piramidowicz R.	Aktywne polimery dla technologii aktywnych światłowodów polimerowych	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep68]	Mierzwiński P., Kuźmich W., Domański K., Tomaszewski D., Głuszko G.	Tranzystor bipolarny w technologii VESTIC: prototyp	poster: 12 th Electron Technology Conference ELTE 2016
[Rep69]	Mossakowska-Wyszyńska A., Witoński P., Szczepański P.	Analiza nieliniowej struktury periodycznej wykazującej parzystą symetrię	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep70]	Mossakowska-Wyszyńska A., Witoński P., Szczepański P.	Transmission properties analysis of 1D PT-symmetric photonic structures	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep71]	Mroczyński R., Dominik M.	Thermal stability of deposited by means of RF reactive magnetron sputtering hafnium oxide (HfO _x) and hafnium oxynitride (HfO _x N _y) thin films	poster: 12 th Electron Technology Conference ELTE 2016
[Rep72]	Mroczyński R., Kalisz M., Dominik M.	Effect of ultra-shallow F/N ions implantation on electrical parameters of MIS structures based on HfO _x gate dielectrics	poster: European Materials Research Society 2016 Spring Meeting 2016
[Rep73]	Mroczyński R., Kalisz M., Jasiński J., Kwietniewski N., Dominik M., Beck R., Szmidt J.	Ultra-shallow ion implantation from RF plasma and its effect on electro-physical properties of MOS structures with SiO _x /HfO _x double-gate dielectric layers fabricated on Si and 4H-SiC	poster: 12 th Electron Technology Conference ELTE 2016

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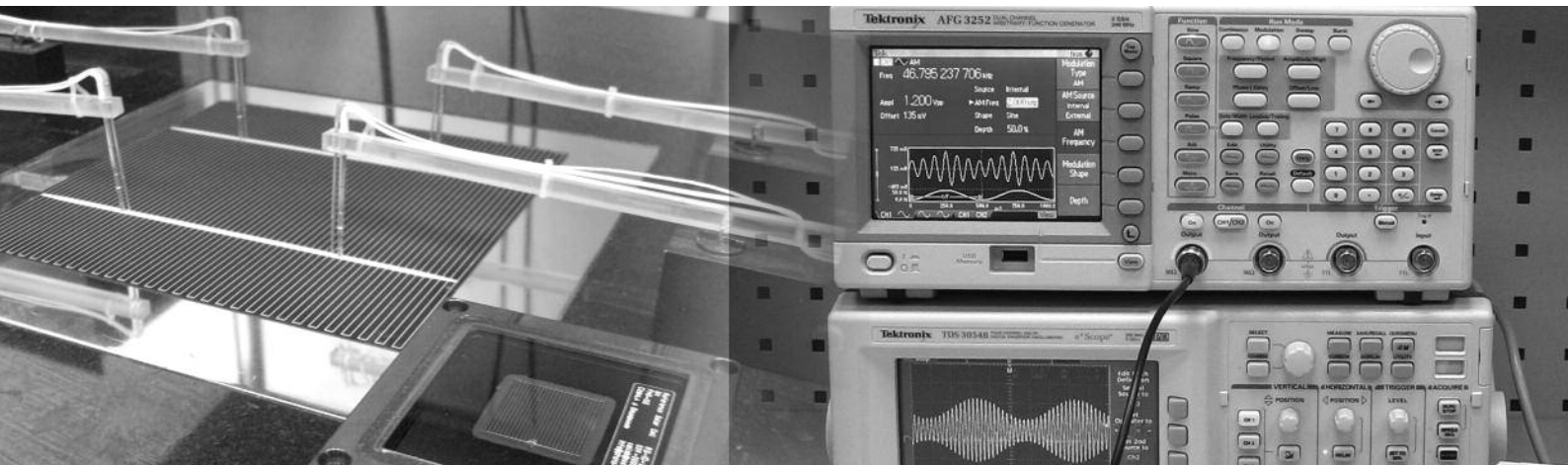
[Rep74]	Mroczyński R., Kwietniewski N., Piotrowski J., Szczepański P.	Fabrication and characterization of infrared photodetectors based on graphene	poster: 12 th Electron Technology Conference ELTE 2016
[Rep75]	Mroczyński R., Kwietniewski N., Piotrowski J., Szczepański P.	Technology of infrared photodetectors based on graphene layers	poster: 18 th European Conference on Integrated Optics ECIO 2016
[Rep76]	Mroczyński R., Mazurak A., Jasiński J., Beck R., Kano S., Sugimoto H., Imakita K., Fujii M., Valenta J.	Technology and characterization of MOS structures with co-doped silicon nanocrystals (Si-NCs) embedded in dielectric ensembles	poster: European Materials Research Society Fall Meeting 2016
[Rep77]	Mroczyński R.	Technology and characterization of TFT transistors with active amorphous IGZO layers	scientific report from the project granted by the University
[Rep78]	Mroczyński R.	Technology and characterization of thin-film transistors (TFTs) with novel amorphous semiconductor and high-k dielectric layers	poster: 12 th Electron Technology Conference ELTE 2016
[Rep79]	Mroczyński R.	Thin-film dielectric materials – technology and applications	oral presentation: Japanese-Polish Seminar on Materials Science 2016
[Rep80]	Mroczyński R.	Ultra-shallow ion implantation from r.f. plasma – the phenomenon and effect on electro-physical properties of MOS structures fabricated on Si and SiC substrates	oral presentation: 2016, BIT's 6 th Annual World Congress of Nano Science and Technology-2016
[Rep81]	Myśliwiec M., Kisiel R.	Materiały i technologie montażu dla potrzeb elektroniki wysokotemperaturowej	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep82]	Myśliwiec M., Kisiel R.	Połączenia dyfuzyjne Ag/Sn oraz Cu/Sn w montażu wysokotemperaturowym	poster: 12 th Electron Technology Conference ELTE 2016
[Rep83]	Narczyk P.	Development of on-chip temperature calibration technique for analog front-end for precision human body temperature measurement for civil and military purpose	scientific report from the project granted by the University
[Rep84]	Neneman K., Łuczyk A., Pleskacz W.	Monitoring of Dynamic Movements Using Acceleration Measurements	presentation: 23 rd International Conference Mixed Design of Integrated Circuits and Systems 2016
[Rep85]	Neneman K., Łuczyk A.	Principal Components Representation of Accelerations in Dynamic Human Movements	presentation: XXXVIII th IEEE-SPIE Joint Symposium 2016
[Rep86]	Niewiński M., Gurnecki P.	Wieloplatformowa aplikacja do wyznaczania niepewności złożonej metodą Monte Carlo	poster: 12 th Electron Technology Conference ELTE 2016
[Rep87]	Niewiński M.	Reconfigurable wireless data acquisition system using the system PSOC	scientific report from the project granted by the University
[Rep88]	Parka J.	The use of direct and external modulation, and nonlinear properties of Mach-Zender modulator in optoelectronic oscillators systems	scientific report from the project granted by the University
[Rep89]	Pfitzner A.	Development of software tools for the diagnosis of analog integrated circuits	scientific report from the project granted by the University
[Rep90]	Pfitzner A.	Tranzystor VeSFET z niezależnie polaryzowanymi bramkami – modelowanie, właściwości i zastosowania	oral presentation: 12 th Electron Technology Conference ELTE 2016

[Rep91]	Piekarski R., Janaszek B., Kieliszczak M., Bortnowski P., Siejak E., Krysiński R., Anders K., Piramidowicz R.	Analiza parametrów generacyjnych lasera światłowodowego z rezonatorem w konfiguracji typu theta	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep92]	Piekarski R., Janaszek B., Kieliszczak M., Piramidowicz R.	Analiza generacji w strukturze lasera światłowodowego z rezonatorem w konfiguracji typu theta	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep93]	Piekarski R., Janaszek B., Szczepański P., Mroczynski R.	Analiza możliwości generacji impulsów ultrakrótkich w planarnej strukturze hybrydowej z wykorzystaniem grafenu jako nieliniowego absorbera	poster: XI Sympozjum Techniki Laserowej STL2 016
[Rep94]	Piramidowicz R., Jusza A., Anders K., Gil M., Łyszczek R., Mergo P.	Development of optically active polymer fibers for application in new light sources and amplifiers	presentation: Conference SPIE Photonics Europe 2016
[Rep95]	Piramidowicz R., Jusza A., Anders K., Mergo P., Gil M., Łyszczek R., Lipińska L.	Luminescent properties of RE ³⁺ doped polymer-based nanocomposite materials	presentation: 7 th International Symposium on Optical Materials 2016
[Rep96]	Piramidowicz R.	Directed energy laser weapon systems and laser not lethal weapon systems	scientific report from the project granted by National Centre for Research and Development
[Rep97]	Piramidowicz R.	Fiber fuse – development and investigation of effect demonstrator parameters	scientific report from the project granted by the University
[Rep98]	Piramidowicz R.	New integrated photonic passive optical network	scientific report from the project granted by National Centre for Research and Development
[Rep99]	Piramidowicz R.	Optoelectronic monitoring of patients conditions in MRI	scientific report from the project granted by National Centre for Research and Development
[Rep100]	Piramidowicz R.	RE ³⁺ doped polymer materials for application in active fiber-optic components	oral presentation: EMN on Organic – Electronics and Photonics Meeting 2016
[Rep101]	Pleskacz W.	Integrated circuit technology for measurement of psychophysiological parameters under dynamic conditions	scientific report from the project granted by National Centre for Research and Development
[Rep102]	Pleskacz W.	Soldier psychological profile management system including development and use of HEALTH-CHIPS technology	scientific report from the project granted by National Centre for Research and Development
[Rep103]	Śmietana M., Koba M., Pysz D., Bock W., Buczyński R.	Otwory wykonane z użyciem mikroobróbki laserowej we włóknach światłowodowych do zastosowań sensorycznych i mikrofluidycznych	poster: 12 th Electron Technology Conference ELTE 2016
[Rep104]	Śmietana M., Sośnicki K., Pysz D., Buczyński R.	Światłowodowy interferometr międzymodowy do badania cieczy oparty na światłowodzie z zawieszonym rdzeniem,	oral presentation: 12 th Electron Technology Conference ELTE 2016
[Rep105]	Śmietana M.	Conductive photonic structures for multiparametric bio-chemical diagnostics	scientific report from the project granted by the National Science Centre
[Rep106]	Śmietana M.	Electrochemical biosensors with optically transparent layers of metal oxide	scientific report from the project granted by the University
[Rep107]	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

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[Rep108]	Sochacki M.	Silicon carbide technology ranging from materials science towards application	oral presentation: Japanese-Polish Seminar on Materials Science 2016
[Rep109]	Stonio B., Firek P., Szmidt J.	Wykorzystanie trawienia azotku glinu (AlN) w technologii tranzystora MISFET	poster: 12 th Electron Technology Conference ELTE 2016
[Rep110]	Stonio B., Taube A., Łapińska A., Świniarski M., Judek J., Firek P., Szmidt J., Zdrojek M.	Wytwarzanie i charakteryzacja pojedynczych warstw siarczku molibdenu metodą CVD	poster: 12 th Electron Technology Conference ELTE 2016
[Rep111]	Stopiński S., Anders K., Lelit M., Augustin L., Piramidowicz R.	Integrated optical time division reflectometer	poster: 18 th European Conference on Integrated Optics ECIO 2016
[Rep112]	Stopiński S., Golba A., Jusza A., Anders K., Kaźmierczak A., Piramidowicz R.	Development of a WDM-PON system based on photonic integrated circuits	poster: 18 th European Conference on Integrated Optics ECIO 2016
[Rep113]	Stopiński S., Lelit M., Jusza A., Anders K., Osuch T., Szczepański P., Rózanowski K., Lewandowski J., Piramidowicz R.	ASPIC-based interrogator of FBG sensors	poster: Conference SPIE Photonics Europe 2016
[Rep114]	Stopiński S.	Multichannel optical time domain reflectometer in generic integration technology	scientific report from the project granted by the University
[Rep115]	Stopiński S.	Optical gyroscope in an experimental photonic integration technology – analysis of possibility of realization and research on basic properties	scientific report from the project granted by the National Science Centre
[Rep116]	Szczepański P., Janaszek B., Tysza-Zawadzka A., Mroczynski R., Piekarski R.	Własności optyczne metamateriałów hiperbolicznych funkcjonalizowanych grafenem	poster: 12 th Electron Technology Conference ELTE 2016
[Rep117]	Szczepański P., Koba M.	Semi-analytical modeling of periodic structures for photonics	oral presentation: BIT's 6 th Annual World Congress of Nano Science and Technology 2016
[Rep118]	Szczepański P.	Ultrafast Photodetector based on Graphene (PhotoGraph)	scientific report from the project granted by National Centre for Research and Development
[Rep119]	Szmidt J.	Design, technologies and materials for microsystems in sensor technology	scientific report from the project granted by the University
[Rep120]	Szmidt J.	Development of an accurate model of traps in metal/insulator/4H-SiC structures by Thermally Stimulated Current (TSC) measurement	scientific report from the project granted by the National Science Centre
[Rep121]	Szmidt J.	Innovative graphene-titanium engine valve with improved functional properties	scientific report from the project granted by National Centre for Research and Development
[Rep122]	Szmidt J.	Light sources with cold emitters	scientific report from the project granted by National Centre for Research and Development
[Rep123]	Szmidt J.	Methods and means of protection and defense against high power microwave pulses	scientific report from the project granted by National Centre for Research and Development
[Rep124]	Szmidt J.	Oxide nanostructures for electronics, optoelectronics and photovoltaics	scientific report from the project granted by the National Science Centre

[Rep125]	Tanous D., Mazurak A., Majkusiak B.	Impact of nanocrystal(s) location on C-V-t and I-V-t characteristics of nc-MOS structures	poster: 12 th Electron Technology Conference ELTE 2016
[Rep126]	Tanous D., Mazurak A., Majkusiak B.	Simulation Based Investigation of nC-Si MOS Structures	poster: European Materials Research Society Spring Meeting 2016
[Rep127]	Tyszka-Zawadzka A., Janaszek B., Szczepański P., Mroczyński R.	Własności propagacyjne aktywnych struktur falowodowych HMM funkcjonalizowanych grafenem	poster: XI Sympozjum Techniki Laserowej STL 2016
[Rep128]	Wielgus A., Pleskacz W.	Charakteryzacja komórek standardowych CMOS pod kątem rozwarć dla generacji wektorów testowych	poster: 12 th Electron Technology Conference ELTE 2016
[Rep129]	Wiśniewski P., Majkusiak B.	Modelowanie charakterystyk admitancyjnych tranzystora MOS z ultracienkim dielektrykiem	poster: 12 th Electron Technology Conference ELTE 2016
[Rep130]	Wiśniewski P., Majkusiak B.	Modelowanie tranzystora tunelowego TFET – wpływ parametrów konstrukcyjnych	poster: 12 th Electron Technology Conference ELTE 2016
[Rep131]	Wiśniewski P., Mroczyński R., Majkusiak B.	Reactive ion etching (RIE) of silicon for the technology of nanoelectronic devices and structures	poster: 12 th Electron Technology Conference ELTE 2016



Optoelectronics Division

10. CONFERENCES, SEMINARS AND MEETINGS

10.1. Conferences

NUMBER	CONFERENCE	PARTICIPANTS
[Con1]	4 th Annual Dutch-Polish-Belarusian Trilateral Conference Education as a Human Right: Modernising Higher Education to Meet the Challenges of the 21 st Century, December 13, Minsk, Belarus	Madziar K., Piwowarska E.
[Con2]	7 th International Symposium on Optical Materials IS-OM7, February 29–March 04, Lyon, France	Anders K., Jusza A., Piramidowicz R.
[Con3]	12 th Electron Technology Conference ELTE 2016, September 11–14, Wisła, Poland	Beck R., Bieniek T., Borecki M., Dębowska A., Dominik M., Firek P., Jakubowski A., Janik M., Jasiński J., Jaworski Z., Kalenik J., Kisiel R., Korb P., Kuźmicz W., Łukasiak L., Madziar K., Majkusiak B., Malinowski A., Mazurak A., Mroczyński R., Myśliwiec M., Niewiński M., Pfitzner A., Pleskacz W., Sochacki M., Szczepański P., Szmidt J., Śmietana M., Wielgus A., Witoński P.
[Con4]	14 th IEEE East-West Design & Test Symposium EWDTS 2016, October 14–17, Yerevan, Armenia	Kuźmicz W.
[Con5]	14 th International Conference Reliability and Stress-Related Phenomena in Nanoelectronics – Experiment and Simulation “Stress Workshop” IRSP 2016, May 30–June 01, Dresden, Germany	Jasiński J., Majkusiak B., Mazurak A.
[Con6]	18 th European Conference on Integrated Optics ECIO 2016, May 18-2016, Warsaw, Poland	Anders K., Garbat P., Jusza A., Kaźmierczak A., Koba M., Mroczyński R., Parka J., Piramidowicz R., Stopiński S., Szczepański P.
[Con7]	19 th International Conference on Defects in Insulating Materials ICDIM 2016, July 10-15, Lyon, France	Malinowski M.
[Con8]	21 st International Conference on Microwaves, Radar and Wireless Communications MIKON 2016, May 09–11, Cracow, Poland	Madziar K., Kasprowicz D., Piotrowski J., Skulski J.
[Con9]	23 rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016, June 23–25, Łódź, Poland	Borejko T., Jakubowski A., Jaworski Z., Kisiel R., Kuźmicz W., Łuczyk A., Myśliwiec M., Neneman K., Pfitzner A., Pleskacz W., Siwiec K.
[Con10]	BIT's 6 th Annual World Congress of Nano Science and Technology – 2016 Nano S&T-2016, October 26–28, Singapore, Singapore	Mroczyński R., Szczepański P.
[Con11]	Conference SPIE Photonics Europe 2016, April 04–07, Brussels, Belgium	Anders K., Jusza A., Piramidowicz R., Stopiński S.
[Con12]	IEEE 19 th International Symposium on Design and Diagnostics of Electronic Circuits and Systems DDECS 2016, April 20–22, Košice, Slovakia	Borejko T., Kasprowicz D., Marcinek K., Narczyk P., Pleskacz W., Siwiec K., Wielgus A.
[Con13]	IEEE MTT-S International Symposium IMS 2016, May 22–27, San Francisco, United States of America	Krupka J.
[Con14]	Joint International EUROSOI Workshop and International Conference on Ultimate Integration on Silicon EUROSOI-ULIS 2016, January 25–27, Vienna, Austria	Beck R., Ber K., Jasiński J., Majkusiak B., Mazurak A.
[Con15]	The Seventh International Conference on Sensor Device Technologies and Applications SENSORDEVICES 2016, IARIA Conference, July 24–28, Nice, France	Borecki M.

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[Con16]	XI Sympozjum Techniki Laserowej STL 2016, September 27–30, Jastarnia, Poland	Janaszek B., Mossakowska-Wyszyńska A., Piekarski R., Szczepański P., Tyszk-Zawadzka A., Witoński P.
[Con17]	XVI International Scientific-Technical Conference of Students and Young Scientists' Research and Development in Engineering, Power Engineering and Control, April 28–29, Gomel, Belarus	Sutkowski M.
[Con18]	XXI Conference on Liquid Crystals Chemistry, Physics and Applications CLC 2016, September 18–23, Krynica-Zdrój, Poland	Garbat P.
[Con19]	XXXVIII th IEEE-SPIE Joint Symposium, May 30–June 6, Wilga, Poland	Borecki M., Łuczyk A., Neneman K.

10.2. Schools, Seminars and Meetings

NUMBER	EVENT	PARTICIPANTS
[Con20]	1 st IEEE International Verification and Security Workshop IVSW, July 04–06, Sant Feliu de Guixols, Catalunya, Spain	Cieplucha M., Pleskacz W.
[Con21]	6th European Workshop on Optical Fibre Sensors EWOFs 2016, May 31–June 03, Limerick, Ireland	Dębowska A., Dominik M., Koba M., Śmietana M.
[Con22]	26 th International Travelling Summer School on Microwaves and Lightwaves ITSS 2016, July 09–15, L'Aquila, Italy	Madziar K.
[Con23]	39 th International Spring Seminar on Electronics Technology "Printed Electronics and Smart Textiles" ISSE 2016, May 18–22, Pilsen, Czech Republic	Kisiel R., Myśliwiec M.
[Con24]	EMN on Organic – Electronics and Photonics Meeting (EMN Spain Meeting 2016), September 9–13, San Sebastian, Spain	Jusza A., Piramidowicz R.
[Con25]	European Materials Research Society 2016 Fall Meeting E-MRS 2016 Fall Meeting, September 19–22, Warsaw, Poland	Beck R., Ber K., Jasiński J., Korb P., Mazurak A., Mroczyński R., Myśliwiec M.
[Con26]	European Materials Research Society 2016 Spring Meeting, E-MRS 2016 Spring Meeting, May 02–06, Lille, France	Dominik M., Jasiński J., Majkusiak B., Mazurak A., Mroczyński R., Tanous D.
[Con27]	European Space Agency 8 th Wideband Gap Semiconductors and Components Workshop, September 12–13, Harwell, United Kingdom	Taube A.
[Con28]	IEEE EDS Distinguished Lecturer Mini-Colloquium on GaN HEMT Technology, June 22, Łódź, Poland	Myśliwiec M.
[Con29]	International Workshop on Nitride Semiconductors IWN 2016, October 2–7, Orlando, United States of America	Myśliwiec M.
[Con30]	Japanese-Polish Seminar on Materials Science, September 15, Warsaw, Poland	Mroczyński R., Sochacki M.
[Con31]	Spotkanie InterBioMed 2016, November 25–26, Rawa Mazowiecka, Poland	Borecki M., Firek P., Szmidt J.
[Con32]	THINGS2DO Research Meeting 2016, December 05, Grenoble, France	Kuźmich W., Piwowarska E.
[Con33]	WEITl seminar nt. technologii CMOS FDSOI, February 11, Warsaw, Poland	Kuźmich W.

11. AWARDS

- [Award1] Borejko T., Siwiec K., Marcinek K., Berent A., Łuczyk A. W., Piramidowicz R., Pleskacz W., **Polish Innovation Award 2016** (Polska Nagroda Innowacyjności 2016, przyznana przez Polską Agencję Przedsiębiorczości), 28 October 2016
- [Award2] Gacek A., Pleskacz W., Różanowski K., Trusczyński O., Kowalski P., Szczurek Z., Siwiec K., Marcinek K., Lewandowski J., **Diploma of the Ministry of Science and Higher Education** (Dyplom Ministra Nauki i Szkolnictwa Wyższego za projekt pod nazwą „System monitorowania parametrów psychofizycznych pacjentów w warunkach dynamicznych WBAN, oparty na technologiach mikromodułowych”), 24 March 2016
- [Award3] Janaszek B., **First prize in the XXV National Adam Smoliński Competition** (Nagroda I stopnia w XXV Ogólnopolskim Konkursie im. Adama Smolińskiego na najlepszą pracę dyplomową z dziedziny optoelektroniki obronioną w roku akademickim 2015/2016), 13 December 2016
- [Award4] Jasiński J. M., **WUT Rector’s Individual Award for Scientific Achievements (3rd stage)** (Nagroda indywidualna III stopnia JM Rektora PW za wyróżnioną rozprawę doktorską) October 2016
- [Award5] Kisiel R., **WUT Rector’s Individual Award for Didactic Achievements (3rd stage)** (Nagroda indywidualna III stopnia JM Rektora PW za osiągnięcia dydaktyczne) October 2016
- [Award6] Łukasiak L., **President’s of the Republic of Poland Silver Medal for Long-Term Service** (Medal Srebrny za Długoletnią Służbę nadany przez Prezydenta Rzeczypospolitej Polskiej), 15 November 2016
- [Award7] Neneman K., Łuczyk A. W., Pleskacz W., **Outstanding Paper Award in 23rd International Conference Mixed Design of Integrated Circuits and Systems MIXDES 2016** (Wyróżnienie za prezentację na konferencji MIXDES 2016), 25 June 2016
- [Award8] Piotrkowicz U., **President’s of the Republic of Poland Silver Medal for Long-Term Service** (Medal Srebrny za Długoletnią Służbę nadany przez Prezydenta Rzeczypospolitej Polskiej), 15 November 2016
- [Award9] Piramidowicz R., **President’s of the Republic of Poland Silver Cross of Merit** (Srebrny Krzyż Zasługi nadany przez Prezydenta Rzeczypospolitej Polskiej), 15 November 2016
- [Award10] Piwowarska E., **President’s of the Republic of Poland Silver Cross of Merit** (Srebrny Krzyż Zasługi nadany przez Prezydenta Rzeczypospolitej Polskiej), 15 November 2016
- [Award11] Pleskacz W., Siwiec K., Marcinek K., Narczyk P., Borejko T., Kopanski J., Wielgus A., Plasota M., Boguszewicz P., Halauko A., **SILVER MEDAL at the International Exhibition of Economic and Scientific Innovations INTARG 2016** (SREBRNY MEDAL na Międzynarodowych Targach Innowacji Gospodarczych i Naukowych INTARG 2016), 15 June 2016
- [Award12] Szymańska A., **Medal of National Education Commission** (Medal Komisji Edukacji Narodowej), 15 November 2016
- [Award13] Zareba A., **“Golden Chalk” – Student Council of the Faculty Teaching Awards** (Nagroda “Złota kreda” przyznawana przez Samorząd Studentów Wydziału Elektroniki i Technik Informacyjnych PW za prowadzenie zajęć dodatkowych) September 2016

