

DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

list of proposed research topics offered for preparation of the doctoral dissertation, academic year 2020/2021

ACADEMIC DISCIPLINE: AUTOMATION, ELECTRONIC, AND ELECTRICAL ENGINEERING

Supervisor	Faculty	Research topic
Prof. Andrzej Dobrucki dr inż. Maciej Walczyński	W4	Analysis of vibroacoustic energy flow in complex continuous systems by the Statistical Energy Analysis method
Prof. Ryszard Klempous	W4	Selected methods of examining the degree of human fatigue when working in a sitting position
Prof. Ryszard Klempous	W4	Models and algorithms for tag detection in sword fencing training evaluation problems using Motion Capture techniques
Prof. Ryszard Klempous	W4	Possibility Analysis of the of using Virtual Reality (VR) for poststroke rehabilitation
Prof. Grzegorz Mzyk	W4	Identification of Hammerstein-Wiener (N-L-N) systems
Prof. Grzegorz Mzyk	W4	Multi-level identification of systems with complex structure
Prof. Grzegorz Mzyk	W4	Nonparametric identification of nonlinear systems with general structure
Prof. Paweł Wachel	W4	Mixing strategies in nonlinear system modeling
Prof. Krzysztof Tchoń Prof. Alicja Mazur	W4	Variational methods of image registration in robotics
Prof. Ireneusz Jabłoński	W4	Miniaturized flexible sensor for acoustic body sounds monitoring

Prof. Ireneusz Jabłoński	W4	The schemes of statistical learning for the multisensor data fusion
Prof. Ireneusz Jabłoński	W4	Solution characteristics measurement in anomalous diffusion regime
Prof. Adam G. Polak	W4	A method for the automatic selection of parameters in indirect measurements
Prof. Adam G. Polak	W4	Analysis of respiratory impedance measurements during normal breathing
Prof. Paweł Kabacik	W4	Power minimization potential in E-SSA and 5G signal implementation to uplink and downlink of satellite platforms
Prof. Paweł Kabacik	W4	Increasing sensitivity of ocean and ice ocean surface remote sensing with monostatic and bistatic GNSS-R operating at aerospace platforms
Prof. Paweł Kabacik	W4	Methods determining distribution of excitation coefficients in electromagnetic systems integrated into ice cover of seas and oceans
Prof. Paweł Kabacik	W4	Determination of statistical and geometrical parameters for water surface featuring waves or whirlpools with signal processing techniques applied to analysis of reflected and scattered electromagnetic waves from the water surface
Prof. Paweł Kabacik	W4	High Degree of microwave circuit integration into lightweight conformal antenna arrays featuring adaptive beamforming
Prof. Paweł Kabacik	W4	Mechanical and temperature load effects on polarization and radiation pattern properties of electromagnetic reflectarrays
Prof. Paweł Kabacik	W4	Optimizing resources required by digital signal processing at broadband satellite onboard receivers operating at various CCSDS frequency bands
Prof. Ryszard Makowski dr inż. Robert Hossa	W4	Optimization of the hybrid methods of speech feature extraction for ASR
Prof. Krzysztof Abramski dr inż. Grzegorz Dudzik	W4	Development and design of man-machine interface using nerve signals muscles

Prof. Krzysztof Abramski dr inż. Grzegorz Dudzik	W4	Techniques for designing of electronic circuits to improve the automatic diagnosis of medical devices on the example of an impedance spectroscopy
Prof. Krzysztof Abramski dr inż. Grzegorz Dudzik	W4	Development of installations for the production of chemically activated materials for applications in additive techniques
Prof. Grzegorz Soboń	W4	Femtosecond lasers in the visible and near-infrared spectral range for multiphoton microscopy and biomedical imaging.
Prof. Jarosław Sotor	W4	Free-running fiber lasers for dual-comb spectroscopy
Prof. Jarosław Sotor	W4	Ultrafast solid state lasers operating at 2 μm spectral range
Prof. Robert Lis	W5	Virtual Power Systems
Prof. Robert Lis	W5	Electric energy storage and its tasks in the integration of wide-scale renewable resources
Prof. Mirosław Łukowicz	W5	Bandpass admittance based methods of high impedance fault detection in distribution MV grids
Prof. Waldemar Dołęga	W5	Assessment of energy efficiency in electric power installations
Prof. Waldemar Dołęga	W5	Planning of electrical power substations
Prof. Waldemar Dołęga	W5	Planning of electric power network infrastructure with large saturation of renewable energy sources
Prof. Waldemar Dołęga	W5	Planning of electric power network infrastructure with regard to energy supply security
Prof. Kazimierz Wilkosz	W5	State estimation of a power system with FACTS devices
Prof. Kazimierz Wilkosz	W5	Load flow in a power system
Prof. Kazimierz Wilkosz	W5	Stability analyses of a power system

Prof. Kazimierz Wilkosz	W5	Location of additional reactive power sources in a power system
Prof. Marcin Kamiński	W5	Fault tolerant control of electric drive – application of techniques based on artificial intelligence
Prof. Marcin Kamiński	W5	Hybrid speed controllers for electric drive with compound mechanical part
Prof. Marcin Kamiński	W5	Nature-inspired algorithms in design process of electric drives
Prof. Mateusz Dybkowski	W5	Detection and compensation of selected faults in the vector controlled AC drive system
Prof. Mateusz Dybkowski	W5	AC motor drives control resistant to the sensors faults
Prof. Teresa Orłowska-Kowalska	W5	Diagnosis of electrical faults of the PMSM drives using advanced signal processing methods and neural networks
Prof. Teresa Orłowska-Kowalska	W5	Stability problems of selected observers of state variables and parameters of the induction motor in a wide range of speed and load torque
Prof. Teresa Orłowska-Kowalska dr inż. Paweł Ewert	W5	Diagnosis of selected mechanical faults of the PMSM drive using advanced signal processing methods and neural networks
Prof. Krystian Chrzan	W5	Measuring methods of leakage current on outdoor insulation
Prof. Krystian Chrzan	W5	Insulators for compact high voltage lines
Prof. Krystian Chrzan	W5	Electrical strength of hydrophobic or hydrophilic surfaces
Prof. Krystian Chrzan	W5	On-line diagnostics of surge arresters
Prof. Krystian Chrzan	W5	Diagnostic of high voltage apparatus by means of thermo-vision camera or UV camera
Prof. Krystian Chrzan	W5	Energy loss in power system caused by leakage current on outdoor insulation

Prof. Krystian Chrzan	W5	Impulse flashover voltage of medium voltage insulators and high voltage insulators
Prof. Krystian Chrzan	W5	Influence of climatic conditions on parameters of surge arresters with multiple air gaps
Prof. Krystian Chrzan	W5	Lightning protection of outdoor medium voltage lines and high voltage lines
Prof. Krystian Chrzan	W5	Modern methods of electrical field control on insulators
Prof. Jacek Rezmer	W5	Analysis of the integration of mining networks in the microgrid system with the energy storage
Prof. Krzysztof Wieczorek	W5	Complex voltage surges in electrical strength tests of high-voltage insulation systems
Prof. Maciej Jaroszewski	W5	Nano-liquids based on transformer organic esters
Prof. Maciej Jaroszewski	W5	Pre-breakdown and breakdown phenomena in organic transformer esters in the aspect of dissolved water content
Prof. Przemysław Janik	W5	Computational intelligence in energy management of prosumers installations
Prof. Ryszard Kacprzyk	W5	Piezoelectric, Elastic, Gas-Electret-Elastomer (GEE) Transducers
Prof. Ryszard Kacprzyk Prof. Jan Ziąja	W5	Elastic, Carbon Nano-Tube Filled Conductive Composites
Prof. Ryszard Kacprzyk dr. inż. Tomasz Czapka	W5	Charge decay in granulated materials
Prof. Ryszard Kacprzyk dr. inż. Tomasz Czapka	W5	Energy released by brush discharges from dielectric objects
Prof. Ryszard Kacprzyk dr. inż. Tomasz Czapka	W5	Charge decay in non-conductive composites
Prof. Ryszard Kacprzyk dr. inż. Tomasz Czapka	W5	Optimization of the High Voltage Rectifier operating at elevated frequencies

Prof. Zbigniew Leonowicz	W5	Applications and evaluation of the effectiveness of artificial intelligence algorithms to control energy distribution in multi-source power supply systems
Prof. Zbigniew Leonowicz	W5	Modeling, management and control of an energy storage system to integrate renewable energy sources
Prof. Zbigniew Leonowicz	W5	Solving electromagnetic field problems using artificial intelligence methods
Prof. Zbigniew Leonowicz	W5	Virtual power plants with energy storage and renewable sources
Prof. Artur Wiatrowski	W12	Selective adaptive filters based on layers of transition metal oxides using electrochromic structures
Prof. Artur Wiatrowski	W12	Studies of glow discharge plasma parameters produced by a magnetron sputtering source during high-energy impulse sputtering
Prof. Artur Wiatrowski	W12	Studies of the impact of technological parameters of the pulsed magnetron sputtering on the properties of functional layers of oxides
Prof. Damian Wojcieszak	W12	Analysis of the properties of multifunctional optical coatings for optoelectronics application
Prof. Damian Wojcieszak	W12	Multifunctional coatings for application in photovoltaics
Prof. Michał Mazur	W12	Studies of the properties of thin-film metal oxides for application as gas sensors
Prof. Michał Mazur	W12	Studies of the optical properties of metal oxides with various distribution of elements for application in optoelectronics
Prof. Ryszard Korbutowicz	W12	Thermal synthesis of metal oxide nanostructures at atmospheric pressure for sensor applications
Prof. Ryszard Korbutowicz	W12	Gaseous chemical sensors based on metal oxides
Prof. Ryszard Korbutowicz	W12	Core-shell structures of metal oxide nanowires as a base for gaseous chemical sensors
Prof. Danuta Kaczmarek	W12	Influence of temperature on electrical and optical properties of thin films based on titanium and copper oxides

Prof. Jarosław Domaradzki	W12	Analysis of the properties of heterostructures based on metal oxides destined for transparent electronics
Prof. Andrzej Dziedzic	W12	Properties of film structures and passive components in the low temperature range
Prof. Karol Malecha	W12	Optimization of the production process of Gas Electron Multipliers in industrial conditions
Prof. Karol Malecha	W12	Multi-channel charge measurement system in the femtocellulos range for use in X-ray detectors
Prof. Paweł Knapkiewicz	W12	Miniature robots for specialized study of celestial bodies
Prof. Paweł Knapkiewicz	W12	MEMS sensors for positioning nanosatellites
Prof. Sergiusz Patela	W12	Application of spectroscopic ellipsometry for investigation of micro and nano photonic structures
Prof. Sergiusz Patela	W12	Delivering Precise Synchronization over Optical Transport Networks
Prof. Sergiusz Patela	W12	Design, analysis and measurements of fiber-optic microstructures
Prof. Sergiusz Patela	W12	Efficient multi-wavelength singlemode optical coupling for integrated photonics in electro-optical packages
Prof. Rafał Walczak	W12	Technology and properties of monolithic and hybrid microactuators fabricated by 3D printing techniques
Prof. Rafał Walczak dr inż. Karolina Łaszczyk	W12	Technology and properties of submillimeter actuators developed by used of 3D printing techniques
Prof. Artur Wymysłowski	W12	Hybrid power systems - acquiring and accumulation of energy
Prof. Artur Wymysłowski	W12	Artificial intelligence technologies in the industry 4.0.
Prof. Artur Wymysłowski	W12	Mechatronic systems in automation, electronics and electrical engineering

Prof. Damian Pucicki	W12	Investigation of the influence of the substrates on the properties of layers and structures of two-dimensional van der Waals crystals
Prof. Damian Pucicki	W12	Structural and optical properties of III-V quantum dots in silicon matrix
Prof. Jarosław Serafińczuk	W12	Electrical, mechanical and optical investigations of the structures based on monochalcogenides of group III and IV
Prof. Jarosław Serafińczuk	W12	Structural and optical investigations of the perovskites for photonics applications
Prof. Jarosław Serafińczuk	W12	New planar semiconductor junctions based on the van der Waals crystals
Prof. Jarosław Serafińczuk	W12	Structural and optical studies of new types of epitaxial quantum dots for infrared applications
Prof. Łukasz Gelczuk	W12	Electrical and optical investigations of perovskites for photovoltaics application
Prof. Łukasz Gelczuk	W12	Spectroscopy of electrically active defects in van der Waals crystals
Prof. Łukasz Gelczuk	W12	Deep-level defects in III-V-Bi structures grown at low temperature
Prof. Tomasz Piasecki	W12	Two-dimensional materials in NEMS/MEMS
Prof. Tomasz Piasecki	W12	Electrostatically actuated NEMS
Prof. Tomasz Piasecki	W12	Algorithms for impedance spectroscopy measurement control and result analysis
Prof. Teodor Gotszalk	W12	Nanometrology of materials and devices for energy harvesting.
Prof. Teodor Gotszalk	W12	Quantum transducers for nanometrology.

Legend:

W4 – Faculty of Electronics

W5 – Faculty of Electrical Engineering

W12 – Faculty of Microsystem Electronics and Photonics