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Message from the Director

These pages offer an overview of activities of the Institute of Fundamental Technological Research (IFTR). The Institute, with its staff of about 156 highly qualified researchers (of whom 32 are full professors, 23 associate professors and 101 senior researchers with the Ph.D. degree), is one of the biggest research institutions within the structure of the Polish Academy of Sciences (PAS). The main mission of PAS, and this Institute in particular, is to pursue high quality, up-to-date research activities. As its name suggests, the Institute is, and has always been since its foundation in 1953, oriented towards basic engineering research of both theoretical and experimental nature. Over the years the Institute has established itself as a leading research institution, making significant contributions to many science and engineering areas, promoting successfully novel research directions and enjoying high reputation both in and out of Poland.

The basic research disciplines at the Institute are theoretical, experimental and computational mechanics of materials, structures and fluids, acoustoelectronics and medical ultrasound, physics of continuum media, polymer physics, electromagnetic phenomena, applied information science, mechatronics and robotics, ecologically oriented structural engineering.

In order to concentrate the Institute's potential on the most promising and innovative research objectives an attempt has recently been made to set up certain highly specialized research groups known as Centers of Excellence. Four such Centers have been created and got institutional recognition by receiving special external funding for their operation.

The Center of Excellence for Advanced Materials and Structures (AMAS) has been created at the Institute in the course of a highly competitive international selection procedure. The Center aims at developing activities in three complementary areas: fundamental and technology-oriented research, education and training, as well as networking and co-operation with leading European research centers.

The Center of Excellence for Safety-Critical Pressure Systems has been established in cooperation with the Materials Science and Engineering Faculty of Warsaw University of Technology and three renowned industrial partners. The goal is to address theoretical and practical challenges of dealing with installations working under extreme variable pressure and temperature, as well as aggressive corrosive environment.

The Center of Excellence Applied Biomedical Modelling and Diagnostics (ABIOMED) is aimed at creating at the IFTR the multi-disciplinary area of applied and theoretical modelling and designing in modern biomechanical and bioengineering research. Three complementary areas of activity in co-operation with leading European research centres are planned: fundamental and application-oriented research, education and training, and interaction with R&D as well as clinical centers.

The aims of the Center of Excellence for Laser Processing and Material Advanced Testing (LAPROMAT) are innovative laser processing techniques like laser shaping, welding or surface modifying as well as modern strength testing techniques. Specialised conferences, workshops and seminars will be organised to get together researchers and industry engineers and provide them with information about new laser processing and testing techniques.

Wide experience of the Institute in international cooperation, particularly in the area of international Research and Technology Development projects (RTD) has resulted in establishing in IFTR the National Contact Point, responsible for information and advice concerning participation of Polish researchers and innovates companies in the 5th Framework Programme of the European Union.

The Institute has always attached great significance to different forms of cooperation with industry. In parallel with the research achievements we have managed to develop a wide range of innovative technologies, a good deal of original engineering and medical measurement and diagnostic equipment and a number of novel computer programs. Among our industrial partners we can proudly list many Polish and international companies of world-wide renown.

The Institute has traditionally been very active in operating its own post-graduate school in the framework of which over 570 Ph.D. degrees have been granted to young Polish and foreign researchers. Recently, it has been decided to expand the Institute's educational involvement. Consequently, agreements of mutual educational and research cooperation have been signed with a number of existing universities - many of the Institute's researchers have as a result a wide choice of challenging teaching options which rationally complement our regular research objectives.

The long and rich tradition of the Institute, its widely recognized excellence in research as well as the current policy towards transforming it into a truly modern institution combining theoretical and applied engineering research with broad industrial support and substantial teaching involvement make all of us at the Institute approach the „turn-of-the-century“ scientific and technological challenges with self-confidence and excitement.

Michał Kleiber,
Wojciech Nowacki

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Historical Outline

The Institute was established on 24 September 1953 on the basis of a few divisions in Department IV (Technical Sciences) of the Polish Academy of Sciences. The initial groups of scientists were dealing with mechanics of continuous media, electronics, theoretical electronics, vibrations and metals. Later, many other divisions were created for energy transformation, isotopes, astronautics and magnetics. In the next years, several divisions were transformed into independent units and left the IFTR.

During all the consecutive stages of organization the basic core of the Institute was formed by divisions carrying on research in the following fields:

- mechanics of continuous media,
- mechanics of structures and materials,
- fluid mechanics,
- physical acoustics and ultrasonics,
- mechanical systems,
- electromagnetic waves.

Several smaller groups dealt with polymer physics, composite materials, non-destructive testing methods, etc. These directions of research are still present at the Institute and several other specialized groups have been created, e.g. in computer science, biomechanics and robotics.

The development of the Institute was closely related to a few outstanding scientists who first created it and later worked with universally recognized results.

The following names should be mentioned: I. Malecki (physical acoustics), W. Nowacki (elasticity and thermoelasticity), W. Olszak (plasticity and structural mechanics), J. Bonder and W. Fiszdon (mechanics of fluids), L. Filipczyński (ultrasound in medicine), J. Groszkowski (electronics), W. Gutkowski (optimization of structures), J. Kaczmarek (machine design), S. Kaliski (technical physics), A. Krupkowski (metallurgy), Z. Mróz (plasticity and optimization of structures), P. Perzyna (viscoplasticity), J. Rychlewski (plasticity), A. Sawczuk (plasticity and structural mechanics), W. Szczepiński (plasticity, experimental mechanics), Z. Wasiutyński (optimization of structures), S. Ziemba (mechanical systems), H. Zorski (theory of continuous media). Many other eminent scientists have spent tens of years at the Institute where an atmosphere of stability and tolerance was combined with high level of research and innovative attitude.

Throughout its history Institute has had an important influence on the development of research in basic technical disciplines in Poland. This influence was exerted by different means:

- several outstanding papers and books were published every year to become known and appreciated all over the world and set down a comparative level for other national research centers,

- six scientific journals (in English) are published covering main directions of research and having large international diffusion,
- over hundreds of doctoral and habilitation degrees were conferred to young people who for a large part left the Institute to work at the universities and in the industry,
- several series of high level national and international conferences were organized in the above-mentioned fields,
- active participation of the Institute staff in all sectors of research development and organisation in Poland is recognized,
- rich collection of world journals and books is available to all those interested through the inter-library exchange.

For over forty years the Institute has strengthened its position as one of the leading world centers of research. Professors and younger scientists coming from the Institute are welcome at the most famous universities and laboratories.

From the beginning, the international co-operation was an important part of the activity. For shorter and longer periods members of staff visited most of the leading research centers of the world and joint research projects were carried out. Several researchers from different countries received their degrees here. Visits by eminent scientists and their lectures are very frequent at the Institute.

The basic research in several directions is always the main activity at the Institute. However, during all these years the application of the research results in practice was considered as very important and many groups were closely connected to the industry. Several patents were awarded and new prototypes were produced at the Institute, mostly for non-conventional testing of structures, materials and the human body.

Since 1991 the budget of the Institute has been funded by the Committee of Scientific Research and supplemented by grants for particular research projects and by contracts with industrial partners for various kinds of research services. Grants and contracts with foreign partners are increasing in number and value.

The history and tradition of the Institute are its bases for the present development when new possibilities are open but also new difficulties arise. Purpose-oriented research projects, high efficiency and openness to all new possibilities are always highly appreciated. Cooperation with the industry, joint programs with the research centers in Europe, North America and Japan and involvement in high education programs are the main directions of the present activity in which basic research is supported and combined with application.

Research Fields

Theoretical and experimental work carried out at the Institute covers several fields which contribute to basic engineering science and to modern technology.

The most important areas of the Institute's expertise include theoretical and applied mechanics, theory of coupled mechanical and physical fields, theoretical, experimental and computational mechanics of materials and structures, acoustoelectronics and medical ultrasound.

Extensive research is also conducted in several other branches of fundamental science and technology, such as: physics and thermodynamics of continua; plasma physics; stochastic dynamics; shock wave propagation in fluids and solids; the effects of laser radiation on metals; mechanical, thermal and electromagnetic effects in fracture and crack propagation; applied computer and information sciences; mechatronics and robotics.

In addition to fundamental research, intensive applied research is conducted at the Institute. The Institute plays an increasingly important role in the development of new technologies, in the construction of research equipment (particularly acoustic instrumentation) and development of modern methods of measurement. Laser shaping technology, ultrasonic stress measurement, acoustic and ultrasonic methods are among the most important achievements of applied research.

Key Words

- physics of continua,
- electromagnetic, thermal and mechanical interactions in solids,
- mechanics of materials and plasticity,
- fracture mechanics,
- mechanics of porous media,
- structural optimization,
- nonlinear dynamics,
- stochastic dynamics,
- rheology of polymers,
- mechanics of suspension,
- computational mechanics,
- ultrasound in medicine,
- ultrasonic diagnosis of materials,
- environmental acoustics,
- laser shaping technology,
- eco-building engineering,
- energy management in buildings,
- thermoelasticity,
- thermoplasticity,
- continuum electrodynamics,
- wave propagation,
- vibroacoustics,
- theory of defects.

SCIENTIFIC COUNCIL OF THE INSTITUTE (2003-2006)

Chairman: Prof. Kazimierz Sobczyk

Vice-Chairmen: Assoc. Prof. Tomasz Kowalewski, Prof. Henryk Petryk, Prof. Andrzej Styczek

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Prof. Janusz Kasperkiewicz
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Prof. Mariusz Nieniewski
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Prof. Andrzej Ziabicki
Prof. Henryk Zorski, Corresp. Member of PAS

*/ members of the Scientific Council not employed by the Institute

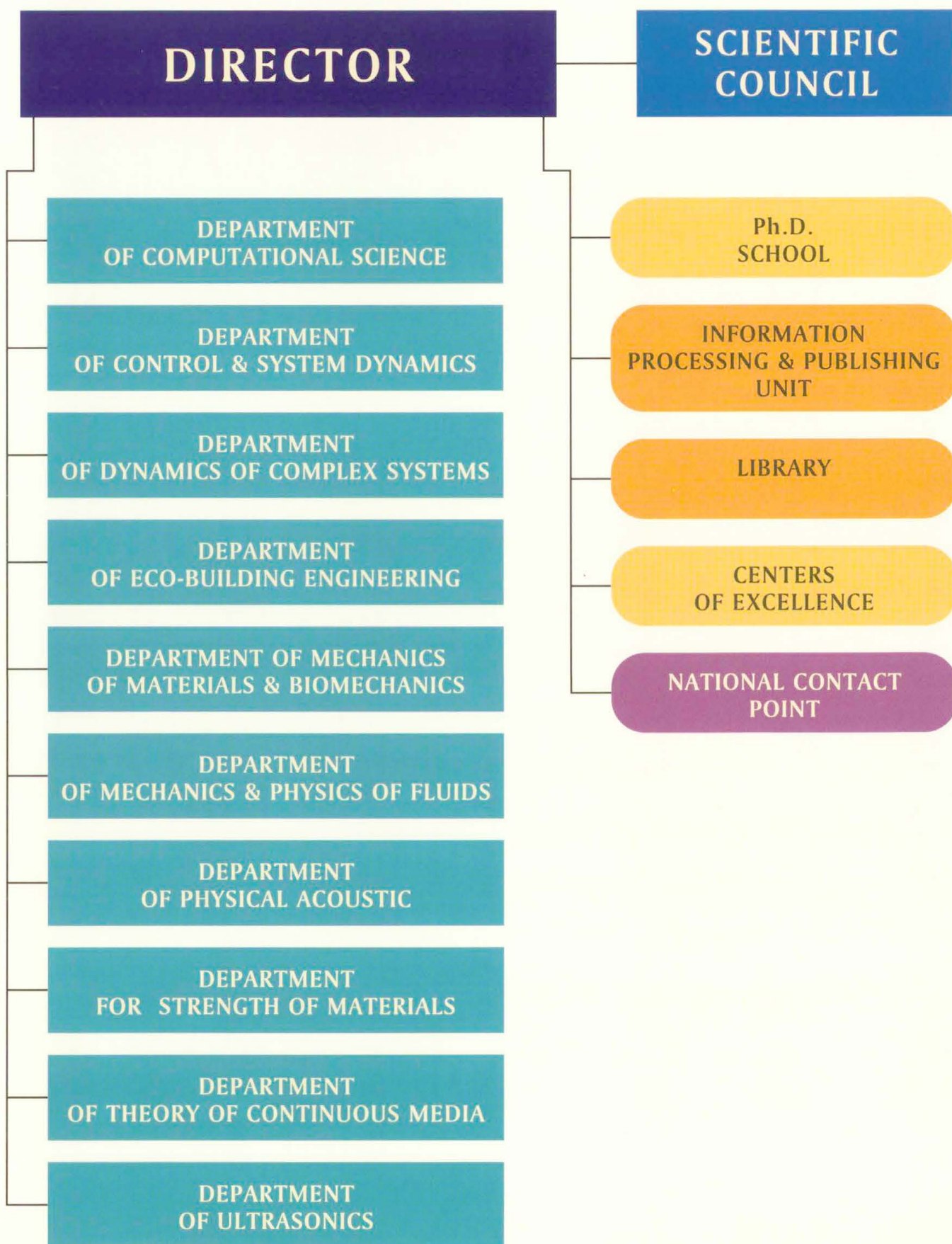
Degrees:

The Institute has the right to confer the Ph.D. and D.Sc. degrees (doctor and doctor habilitatus) of

1. mechanics and material engineering,
2. informatics,
3. automatics, robotics and machine building,
4. electronics (incl. acoustics) and material engineering,
5. mechanics,
6. civil engineering and structure mechanics.

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SCHEMA OF ORGANIZATION OF THE INSTITUTE OF FUNDAMENTAL TECHNOLOGICAL RESEARCH



DEPARTMENT OF COMPUTATIONAL SCIENCE

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- Numerical Methods of Reliability and Optimization
[Pracownia Metod Numerycznych Niezawodności i Optymalizacji]
(Prof. Stefan Jendo, Ph.D., D.Sc.)
- Smart Technologies
[Pracownia Technologii Inteligentnych]
(Prof. Jan Holnicki-Szulc, Ph.D., D.Sc.)
- Computational Methods in Nonlinear Mechanics
[Pracownia Metod Obliczeniowych Mechaniki Nieliniowej]
(Assoc. Prof. Włodzimierz Sosnowski, Ph.D., D.Sc.)
- Vision and Measurement Systems
[Pracownia Systemów Wizyjnych i Pomiarowych]
(Prof. Mariusz Nieniewski, Ph.D., D.Sc.)

and:

- Computational Material Science Group
[Zespół Metod Komputerowych Inżynierii Materiałowej]
(Assoc. Prof. Paweł Dłużewski)
- Inelastic Structures Group
[Zespół Konstrukcji Niesprężystych]
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Stefan Jendo, Ph.D., D.Sc.,
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Rafał Stocki, Ph.D.,
Dariusz Wiącek, Ph.D.

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Jarosław Knabel, M.Sc.,
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Piotr Tazowski, M.Sc.,

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Danuta Wincewicz, M.Sc.,
Tomasz Zieliński, M.Sc.

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Mirosław Statkiewicz, M.Sc.,
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Krzysztof Tyburek,
Nguen Hoang Viet,
Marcin Wikło.

Technicians:

Andrzej Dąbrowski,
Dariusz Wojciechowski.

Current Research Activities:

- Development of computational techniques for solid and structural mechanics applications.
- Modeling and finite element analysis of metal forming processes (deep drawing, extrusion, forming).
- Parameter sensitivity and optimization of nonlinear systems.
- Fire safety engineering.
- Multicriterion and reliability-based optimization.
- Hybrid reasoning techniques in qualitative analysis of physical systems.
- Diagrammatic knowledge representation and reasoning.
- Expert systems.
- Adaptive structures.
- Monitoring and safety assessment of historical structures.
- VDM-based sensitivity analysis and structural remodeling.
- Development of nonlinear multi-dimensional first - order optics formalism.
- Nonspecular theory of light interaction with nonlinear structures.
- Variational and numerical analysis of optical soliton excitation and propagation.
- Nonlinear spatio-temporal coupling and pulse compression.
- Mechanics, thermodynamics and electrodynamics,
- Analysis of inelastic bar and surface structures under extreme and repeated variable loads:
 - limit analysis, shakedown and incremental collapse of structures,
 - post-yielding behaviour of composite slabs, under restrained unstable flexure,
 - reliability oriented optimization and analysis of sensitivity of inelastic structures,
 - analysis of elastic-plastic plates.
- Structural Health Monitoring,
 - constitutive modelling of materials with finite speed of heat propagation. Second sound phenomena,
 - interfacial phenomena in continuum thermodynamics,
 - theory of dielectric waveguides and optoelectronic devices.
- Mathematic physics:
 - shock and acceleration wave propagation in dissipative materials,
 - analysis of quasi-linear hyperbolic systems of balance laws in continuum thermo-mechanics and electro-dynamics,
 - resonant interaction on nonlinear waves.

- Computer vision, image analysis, and artificial intelligence:
method of mathematical morphology, fuzzy image analysis, random fields, astronomical image analysis, analysis of mammograms, detection of surface defects, analysis of microstructures,
computer-assisted analysis of medical images,
optical methods for deformation and strain measurement,
fuzzy inference systems in classification and approximation problems, genetic algorithms.
- Structural optimization with continuous and discrete design variables.
- Seismoscopy.

Key Words:

- nonlinear mechanics, finite element method, optimization, reliability, adaptive structures, qualitative modeling, diagrammatic reasoning, nonlinear optics, photonics, planar nonlinear structures, propagation,
- safety, reliability,
- thermodynamics, interfacial phenomena, heat propagation, dissipative materials, shock waves, waveguides, opto-electronic devices, nonlinear waves, stereopsis,
- image processing, mathematical morphology, fuzzy sets, cancer detection, sun imagery, defect detection, granulometry, white light speckles, Moire photography, neural networks, genetic algorithms,
- structural mechanics, historical structures, structural optimization, nonlinear programming, discrete programming, graphs, waves,
- smart materials and structures,
- structural control,
- inelastic structures, limit analysis, shakedown, inadaptation, post-yield behaviour, optimization, reliability, incremental collapse.

DEPARTMENT OF CONTROL AND SYSTEM DYNAMICS

[ZAKŁAD STEROWANIA I DYNAMIKI UKŁADÓW]

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The Department has 2 Laboratories:

- Rolling Contact Dynamics
[Pracownia Dynamiki Kontaktu Toczego]
(Assoc. Prof. Czesław Bajer, Ph.D., D.Sc.)
- Vehicles and Active Structures
[Pracownia Pojazdów i Konstrukcji Aktywnych]
(Prof. Roman Bogacz, Ph.D., D.Sc.)

and 2 Research Groups:

- Aeroelasticity
[Zespół Aeroelastyczności]
(Assoc. Prof. Janusz Grzędziński, Ph.D., D.Sc.)
- Intelligent Systems
[Zespół Systemów Inteligentnych]
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Robert Konowrocki, M.Sc.,
Adam Osiak, M.Sc.,
Janusz Szuba, M.Sc.,
Nguyen Quoc Thanh, M.Sc.,
Piotr Tokaj, M.Sc.

Current Research Activities:

- Dynamics and stability of non-conservative structures.
- Dynamics and stability of discrete-continuous systems.
- Contact mechanics with friction (wheel-rail and track-train interaction).
- Multibody system dynamics.
- Active control of structures and machines.
- Wave propagation in periodic structures.
- Theory of plastic shells, crashworthiness of vehicles.
- Experimental tests in contact and friction.
- Railway systems, high speed trains.
- Unsteady aerodynamic forces acting on structures - analytical and numerical methods.
- Nonlinear aeroelastic systems.
- Control of autonomous mobile robots including such topics as mapping and navigation, sensor data fusion, application of neural networks.
- Development of multiagent systems, including reconnaissance and surveillance robots, co-operating transport vehicles.
- Development of knowledge-based tools supporting innovative design, including graph-based representation of the design knowledge, distributed environments and collaborative design, applying rough sets, learning on symbolic and sub-symbolic levels.

Key Words:

- stability of motion, periodic structures, friction, structural dynamics, structural stability, non-conservative systems, crashworthiness of vehicles, vehicle-infrastructure interaction, active control systems.
- aeroelasticity, flutter, unsteady aerodynamics, nonlinearities.
- mobile robots, mapping, navigation, path planning, neural networks, fuzzy systems, rough sets, graph grammars, knowledge-based design.

DEPARTMENT OF DYNAMICS OF COMPLEX SYSTEMS

[ZAKŁAD DYNAMIKI UKŁADÓW ZŁOŻONYCH]

Head: Prof. Kazimierz Sobczyk, Ph.D., D.Sc., Corresp. Member of PAS
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The Department has 3 Divisions:

- Stochastic Dynamics
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- Dynamics of Elastic Systems
[Zespół Dynamiki Układów Sprężystych]
(Prof. Józef Ignaczak, Ph.D., D.Sc.)
- Surface Waves
[Laboratorium Fal Powierzchniowych]
(Prof. Eugeniusz Danicki, Ph.D., D.Sc.)

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Ryszard Wojnar, Ph.D.

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Jurij Tasinkiewicz, M.,Sc.

Ph.D. Students:

Piotr Kotlarz, M.Sc.,
Kamil Kulesza, M.Sc.,
Krzysztof Mróz, M.Sc.

Current Research Activities:

- Stochastic dynamics of physical/engineering systems.
- Stochastic modeling and analysis of fatigue accumulation.
- Random material microstructures: modeling and degradation processes.
- Information dynamics: information flow in complex dynamic systems, maximum information entropy principle.
- Chaotic phenomena in nonlinear dynamic systems.
- Stochastic and chaotic dynamic systems and cryptography.
- Data analysis, statistical inference, optimal experiment design.
- Dynamics of mechanical discrete-continuous systems and engineering applications.
- Thermoelastic processes in composites.
- Microheterogeneity in thermoelastic materials.
- Thermodiffusion processes.
- Electronic applications of surface waves in piezoelectrics: theoretical and experimental research - applications to radioelectronic systems, filters, transducers of surface waves, etc.
- Propagation and scattering of electromagnetic signals in real wave conducting structures.

Key Words:

- Stochastic dynamics, stochastic differential equations, stochastic waves propagation, random material microstructures, fatigue crack growth models, reliability of structures, experiment design, cryptology, secure communication, nonlinear/chaotic dynamics, discrete - continuous systems.
- Electromagnetic waves/signals - propagation and diffraction, surface acoustic waves, transducers of surface waves, piezoelectrics.
- Thermoelastic waves in composites, thermodiffusion, thermo-piezoelectric composites.

DEPARTMENT OF ECO-BUILDING ENGINEERING

[ZAKŁAD PROBLEMÓW EKO-BUDOWNICTWA]

Head: Prof. Wojciech Dzieńiszewski, Ph.D., D.Sc.,
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The Department has 5 Sections:

- **Building Optimization**
[Pracownia Optymalizacji w Budownictwie]
(Prof. Wojciech Marks, Ph.D., D.Sc.)
- **Modelling of Structures and Environment**
[Pracownia Modelowania Struktur i Środowiska]
(Prof. Elżbieta Kossecka, Ph.D., D.Sc.)
- **Environmental Acoustics**
[Pracownia Akustyki Środowiska]
(Mirosław Meissner, Ph.D., D.Sc.)
- **Solar Energy**
[Pracownia Energetyki Słonecznej]
(Prof. Wojciech Dzieńiszewski, Ph.D., D.Sc.)
- **Strain Fields**
[Pracownia Pól Odkształceń]
(Prof. Janusz Kasperkiewicz, Ph.D., D.Sc.)

Staff:

Professors:

Andrzej M.Brandt, Ph.D., D.Sc. - emeritus,
Wojciech Dzieńiszewski, Ph.D., D.Sc.,
Janusz Kasperkiewicz, Ph.D., D.Sc.,
Elżbieta Kossecka, Ph.D., D.Sc.,
Wojciech Marks, Ph.D., D.Sc.

Associate Professors:

Michał A.Glinicki, Ph.D., D.Sc.,
Mirosław Meissner, Ph.D., D.Sc.,
Elżbieta Walerian, Ph.D., D.Sc.

Senior Researchers:

Dorota Bzowska, Ph.D.,
Dorota Chwieduk, Ph.D.,
Ryszard Janczur, Ph.D.,
Jan Jaworski, Ph.D.,
Hanna Jędrzejuk, Ph.D.,

Daria Józwiak-Niedźwiedzka, Ph.D.,
Maria Marks, Ph.D.,
Ryszard Wnuk, Ph.D.

Graduates:

Mieczysław Czechowicz, M.Sc.,
Włodzimierz Pomierny, M.Sc.,
Dariusz Załocha, M.Sc.

Ph.D. Students:

Abdraboh Al. -Garssi, M.Sc.,
Dariusz Alterman, M.Sc.,
Agnieszka Litorowicz, M.Sc.,
Maciej Zawadzki, M.Sc.,
Marek Zieliński, M.Sc.

Technicians:

Maciej Sobczak.

Current Research Activities:

- Modelling of heat and mass transfer processes in buildings and composed media.
- Modelling of mutual interactions between environment and buildings - its influence on thermal comfort and energy consumption saving.
- Optimization of the building shape and structure and their elements, static and dynamic optimization of heat source utilisation in building sector.
- Thermovision analysis of building envelope and building energy parameter estimation.
- Theoretical and experimental analysis of solar energy devices and energy storage systems; its application in building sector.
- Analysis of phase change for energy storage and transfer.
- Modelling of ground heat storage.
- Theoretical description of acoustical field in space with obstacles used for description of noise propagation in built-up areas.
- Theoretical and experimental investigation of aerodynamic noise generation in piping systems and research works on acoustic field parameters in rooms of complex shape.
- Theoretical and experimental investigation of composites with brittle matrix.
- Test and design methods of cement based materials.

Key Words:

- low energy buildings, heat and mass transfer, static and dynamic optimization, solar energy, renewable energy storage, simulation of thermal and climatic processes, active and passive solar systems, monitoring and diagnosis of building energy systems, wave propagation, noise control, aeroacoustics, sound generation, composites, brittle matrix, high performance concretes, fibre reinforced concretes, computer image analysis, neural network and other soft methods in materials design, optimization of materials.

DEPARTMENT OF MECHANICS OF MATERIALS AND BIOMECHANICS

[ZAKŁAD MECHANIKI MATERIAŁÓW I BIOMECHANIKI]

Head: Prof. Bogdan Raniecki, Ph.D., D.Sc.,
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The Department has 5 Divisions:

- Applied Plasticity
[Pracownia Plastyczności Stosowanej]
(Prof. Wojciech Krzysztof Nowacki, Ph.D., D.Sc.)
- Mechanics of Inelastic Materials
[Pracownia Mechaniki Materiałów Niesprężystych]
(Prof. Henryk Petryk, Ph.D., D.Sc.)
- Surface Layers
[Pracownia Warstwy Wierzchniej]
(Stanisław Kucharski, Ph.D.)
- Variational Methods and Biomechanics
[Pracownia Metod Wariacyjnych i Biomechaniki]
(Prof. Józef Joachim Telega, Ph.D. D.Sc.)
- Physics of Structured Matter
[Pracownia Fizyki Ośrodków Strukturalnych]
(Prof. Dominik Rogula, Ph.D., D.Sc.)

and 1 Laboratory:

- Thermoplasticity
[Laboratorium Termoplastyczności]
(Wiera Oliferuk, Ph.D., D.Sc.)

Staff:

Professors:

Zenon Mróz, Ph.D., D.Sc, Corresp.
Member of PAS,
Wojciech Krzysztof Nowacki, Ph.D., D.Sc.,
Piotr Perzyna, Ph.D., D.Sc., - emeritus,
Henryk Petryk, Ph.D., D.Sc.,
Bogdan Raniecki, Ph.D., D.Sc.,
Dominik Rogula, Ph.D., D.Sc.,
Józef Joachim Telega, Ph.D., D.Sc.

Associate Professors:

Michał Basista, Ph.D., D.Sc.,
Wojciech Dornowski, Ph.D., D.Sc.,
Wiera Oliferuk, Ph.D., D.Sc.,
Ryszard Pęcherski, Ph.D., D.Sc.,
Nguyen Huu Viem, Ph.D., D.Sc.

Senior Researchers:

Jarosław Bojarski, Ph.D.,
Stefan P.Gadaj, Ph.D.,
Antoni Gałka, Ph.D.,
Barbara Gambin, P.D.,
Andrzej Jarzębowski, Ph.D.,
Romuald Kotowski, Ph.D.,

Stanisław Kucharski, Ph.D.,
Tomasz Lekszycki, Ph.D.,
Jan Maciejewski, Ph.D.,
Zdzisław Nowak, Ph.D.,
Elżbieta Pieczyska, Ph.D.,
Jarosław Piekarski, Ph.D.,
Eugenia Radzikowska, Ph.D.,
Joanna Radziejewska, Ph.D.
Anna Sławianowska, Ph.D.,
Grzegorz Starzyński, Ph.D.,
Stanisław Stupkiewicz, Ph.D.,
Andrzej Ziółkowski, Ph.D.

Graduates:

Anna Bartoszewicz, M.Sc.,
Marcin Biały, M.Sc.,
Marcin Maździarz, M.Sc.,
Renata Żbieć, M.Sc.

Ph.D. Students:

Jakub Lengiewicz, M.Sc.,
Eleonora Kruglenko, M.Sc.,
Neonila Levintant, M.Sc.,
Michał Maj, M.Sc.,

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Artur Marciniszyn, M.Sc.,
Jerzy Podhajecki, M.Sc.,
Przemysław Sadowski, M.Sc.,
Maciej Stańczyk, M.Sc.,
Witold Węglewski, M.Sc.,
Jolanta Wołowicz, M.Sc.

Technicians:

Urszula Czubačka,
Robert Kopik,
Leszek Urbański,
Stefania Woźniacka.

Current Research Activities:

- Thermodynamics of pseudo-elasticity observed in shape memory alloys. Three-dimensional phenomenological theory and its experimental verification under complex stress state.
- Micromechanics of martensitic phase transitions and related aspects of stability. Thermodynamic equilibrium and motion of interfaces in the course of coherent phase transitions in solids. Transition from meso to macro level.
- Micromechanical aspects of instability, strain localization and fracture in inelastic solids. Constitutive modeling of metal polycrystals in the plastic range.
- Micromechanically-based phenomenological modeling of brittle deformation processes. Micromechanical analyses of damage proliferation in compact rocks under compression with frictional sliding and tension micro-cracking as the underlying mechanisms of energy losses. Damage modeling of concrete exposed to chemically aggressive ambience.
- Theoretical and experimental studies of the thermo-mechanical couplings and stored energy effects in metals under large deformations and high strain-rates: Compression-shear experiments Determination of the temperature distribution at the surface of deformed samples.
- Constitutive models for visco-inelastic response of materials under variable loading and their application. Discrete memory models. Sensitivity analysis and optimal design of structures accounting for damping effects and large configuration changes. Theoretical and experimental studies of delamination in visco-elastic composite elements.
- Mechanics of surface layers:
 - Modeling of contact friction and wear effects at interfaces.
 - Research on the influence of surface layer on fatigue life.
 - Computer simulation of development of local stress fields in surface layers due to penetrator indentation.
 - Ion implantation effect on surface layer properties of constructional materials.
 - Surface layer modification by alloy element insertion in a process of laser treatment.
 - Diagnostic of 3-D geometrical structure of technical surfaces.
 - Analysis of multiple loading effect on contact stiffness of elements with technological surface layer.
- Variational and asymptotic methods in solid and structural mechanics, extremum principles for nonpotential and initial value problems, variational inequalities in contact problems, convex and nonconvex duality, nonlinear anisotropic elasticity, deterministic and stochastic homogenization and determination of effective properties of porous media, elastic and cracked composites.
- Coupled fields in composites and homogenization,
- Young measures in micromechanics.
- Biomechanics:
 - Bone tissue, theoretical description of its properties including remodeling process.
 - Orthopaedic biomechanics.
 - Soft tissue modelling.

Cartilage as porous a multiphase material,
Thermal problems.

Synovial fluid as a liquid crystalline substance.

- Physics of field and ordered structures in condensed matter.
- Field-theoretic models of material structures with special attention paid to the topological physics of field and structures, continuum models of discrete structures, electromagnetic fields coupled with mechanical phenomena and transport processes including high temperature superconductivity.

Key Words:

- Thermodynamics and micro-mechanics of pseudo-elasticity, coherent phase transformations and plastic flow. Damage mechanics. Instability and Strain localization. Fracture Mechanics. Stored energy of cold-work.
- Constitutive models of plastic hardening and softening, cyclic loading, contact friction and wear, sensitivity analysis, optimal design,
- Mechanics and diagnostic of surface layer, micro-stereometry, laser beam machining, ion implantation, fatigue life , sphere indentation.
- condensed matter, electromagnetic fields, topological defects, distortion modes, topological quantization, order parameter, gauge field theory, solitons, quasi-particles, multicontinua, phase transitions, type II superconductivity, magnetic vortices, string networks, directional instability, geometric compatibility.

DEPARTMENT OF MECHANICS AND PHYSICS OF FLUIDS

[ZAKŁAD MECHANIKI I FIZYKI PŁYNÓW]

Head: Assoc. Prof. Tomasz Kowalewski, Ph.D., D.Sc.,
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The Department has 2 Divisions:

- **Mathematical Methods of Fluid Mechanics**
[Pracownia Metod Matematycznych Mechaniki Płynów]
(Assoc. Prof. Kazimierz Piechór, Ph.D., D.Sc.)
- **Viscous and Thermal Flows**
[Pracownia Przepływów Lepkich i Termicznych]
(Assoc. Prof. Tomasz Kowalewski, Ph.D., D.Sc.)

Staff:

Professors:

Zbigniew Peradzyński, Ph.D., D.Sc.,
Henryk Zorski, Ph.D., D.Sc., Member of PAS, -emeritus.

Associate Professors:

Zbigniew Banach, Ph.D., D.Sc.,
Tomasz Kowalewski, Ph.D., D.Sc.,
Kazimierz Piechór, Ph.D., D.Sc.,
Izabela Pieńkowska, Ph.D., D.Sc., - emeritus,
Eligiusz Wajnryb, Ph.D., D.Sc.,
Zbigniew Walenta, Ph.D., D.Sc., - emeritus.

Senior Researchers:

Maria Ekiel-Jeżewska, Ph.D.,
Bogdan Kaźmierczak, Ph.D.,
Jacek Kurzyna, Ph.D.,
Tadeusz Lipniacki, Ph.D.,
Hanna Makaruk, Ph.D.,
Karol Makowski, Ph.D.,
Robert Owczarek, Ph.D.,
Zbigniew Płochocki, Ph.D., - emeritus,
Barral Serge, Ph.D.,
Janusz Szczepański, Ph.D.,
Stanisław Tokarzowski, Ph.D.,
Andrzej Zachara, Ph.D., - emeritus.

Graduates:

Andrzej Cybulski, M.Sc.

Ph.D. Students:

Tomasz Michałek, M.Sc.,
Sławomir Błoński, M.Sc.,
Krzysztof Dekajto, M.Sc.,
Piotr Korczyk, M.Sc.,
Tomasz Michałek, M.Sc.,
Agnieszka Słowicka, M.Sc.

Current Research Activities:

- Kinetic theory of gases and some problems of dynamical systems.
- Dynamics of peptide and DNA chains, analysis of neuron response.
- Experimental and theoretical studies of laser sustained plasma in connection with space research.
- Hydrodynamics of laser welding.
- Asymptotic methods in partial differential equations with a particular stress on reaction-diffusion equations.
- Mathematical description of superfluidity with a particular stress on the role of quantum vortices.
- Numerical fluid dynamics, chaotic phenomena.
- Microfluidics and application of molecular dynamics for micro-flow simulation.
- Hydrodynamic interactions of a finite number of particles immersed in an incompressible, unbounded fluid. The attention is focused on the weak inertia effects appearing in the hydrodynamic interactions. The influence of the inertia effects on the fluid velocity field, and on the forces and torques exerted by the fluid on the particles is analysed theoretically.
- Theory of dispersed media (multi-particle hydrodynamic interactions in liquid suspension, rheology of suspensions in shear flows, effective transport coefficients, two-point Pad e approximants).
- Modeling of convective flow in the atmosphere, hydrodynamic interactions in clouds.
- Natural convections with phase transition. Experimental and numerical investigations of solidification (freezing of water, PCM materials) in presence of natural convection. Simulation of the crystal growth, modeling of casting problems.
- Vapour bubble growth, nonlinear droplet oscillations, instability of the liquid jets, electrospinning of nanofibres
- Image processing in fluid mechanics, Particle Image Velocimetry.
- Development of new experimental techniques: high speed video imaging, instantaneous measurements of temperature and velocity fields, non-intrusive measurements of the surface tension.

Key Words:

- Kinetic theory, non-ideal gases, dynamic systems, peptide chains, DNA chains, neuroscience.
- Material processing, laser welding, plasma, temperature measurement, reaction-diffusion equations, chaos, stability, singular perturbations, superfluid helium, phase transitions, topological vortex structures, geometric quantization, field theory, application of quantum groups in mechanics.
- Molecular dynamics, micro-fluidics.
- Rarefied gases, transition regime, shock waves, shock wave structure, interactions of shocks, shock wave focusing, hydrodynamic interactions.
- Dispersed media, hydrodynamic interactions, rheology of suspensions, effective transport coefficients, Pad e approximants.
- Phase changes, natural convection, experimental and numerical methods, Particle Image, Velocimetry, thermochromic liquid crystals, image processing, nanofibres, validation of CFD models.

DEPARTMENT OF PHYSICAL ACOUSTICS

[ZAKŁAD AKUSTYKI FIZYCZNEJ]

Head: Assoc. Prof. Feliks Rejmund, Ph.D., D.Sc.,
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The Department has 3 Laboratories:

- **Material Structure Research**
[Pracownia Badania Struktur Materiałowych]
(Assoc. Prof. Feliks Rejmund, Ph.D., D.Sc.)
 - **Acoustoelectronics**
[Pracownia Akustoelektroniki]
(Mikołaj Aleksiejuk, Ph.D.)
 - **Acoustic Emission Signal Processing**
[Pracownia Analizy Sygnału Emisji Akustycznej]
(Assoc. Prof. Zbigniew Ranachowski, Ph.D., D.Sc.)
- and 1 Research Group:
- **Speech Analysis and Synthesis**
[Zespół Analizy i Syntezy Mowy]
(Assoc. Prof. Ryszard Gubrynowicz, Ph.D., D.Sc.)

Staff:

Professors:

Ignacy Malecki, Ph.D., D.Sc., Member of PAS, - emeritus,
Wincenty Pajewski, Ph.D., - emeritus,
Ryszard Płowiec, Ph.D., D.Sc., - emeritus.

Associate Professors:

Ryszard Gubrynowicz, Ph.D., D.Sc.,
Piotr Kiełczyński, Ph.D., D.Sc.,
Zbigniew Ranachowski, Ph.D., D.Sc.,
Feliks Rejmund, Ph.D., D.Sc.

Senior Researchers:

Mikołaj Aleksiejuk, Ph.D.,
Andrzej Balcerzak, Ph.D.,
Piotr Gutkiewicz, Ph.D.,
Przemysław Ranachowski, Ph.D.

Graduates:

Tomasz Dębowski, M.Sc.,
Marek Szalewski, M.Sc.,
Piotr Żarnecki, M.Sc.

Technicians:

Tadeusz Krasicki,
Tomasz Dominiewski.

Current Research Activities:

- Relations between the parameters of structures and the elasticity constants of ceramic and composite materials investigated by ultrasonic measurements.
- Application of acoustic emission for phase transitions and sol-gel processes monitoring.
- Investigation of the effects of pseudoplasticity of ceramic materials by acoustic emission method.
- Crispness testing of cereal-based food.
- Acoustic emission measurements in metal shaping processes, friction process in tribometers and damage monitoring in constructional elements under mechanical load.
- Structure investigation of liquids, polymer and supramolecular solutions by application of shear and longitudinal ultrasonic waves.
- Ultrasonic measurements of viscosity of liquid systems (homogeneous liquids, emulsions, suspensions and other multiphase systems).
- Acoustic fields of ultrasonic transducers with non-homogeneous distribution of vibration.
- Investigation of Langmuir-Blodgett films properties and their application for the surface acoustic wave (SAW) sensors.
- Acoustic surface waves (Love, Bluestein-Gulyaev) and bulk shear waves for viscosity measurements of resins and liquid crystals.
- Studying the physical properties and technology of nanolayers using acoustic methods.
- Acoustic emission in PZT ceramics generated by electric fields of high amplitude and low frequency.
- Development of new methods, instrumentation and computer software for nondestructive acoustic and electromagnetic measurements of material and construction properties.
- Acoustical sensors for detection and concentration measurements of chemical compounds (particularly flammable and harmful).
- Adaptation of acoustic methods for estimation of ceramic technology, food quality testing, chemical processes and pollution of environment.
- Design of the equipment and the experimental setups for the measurements of the acoustic emission.
- Speech pathology and clinical application of acoustic methods to speech rehabilitation and revalidation.
- Database of normal and pathological speech.
- Polish language speech synthesis.

Key Words:

- ultrasonic waves, acoustic surface waves, shear waves, acoustic emission, ultrasonic measurements, nondestructive testing, digital processing of acoustic signals, phase transition, sol-gel processes, gelation, food quality testing, ultrasonic transducers, nanolayers, structure of ceramic materials, elastic constants of ceramics, piezoelectric ceramics, computer software for nondestructive testing, punching of steel, friction processes, acoustic chemical sensors, viscosity of liquid systems, acoustic properties of liquid crystals, monitoring of technological processes using acoustic emissions, acoustic setup for measurements, Langmuir-Blodgett films, Polish language speech synthesis, rehabilitation of speech, speech pathology.

DEPARTMENT FOR STRENGTH OF MATERIALS

[ZAKŁAD WYTRZYMAŁOŚCI MATERIAŁÓW]

Head: Prof. Lech Dietrich, Ph.D., D.Sc.,
phone: (48-22) 826 12 81 ext.: 262, e-mail: ldietr@ippt.gov.pl

The Department has 3 Divisions:

- **Mechanics of Plastic Flow**
[Pracownia Mechaniki Plastycznego Płynięcia]
(Prof. Józef Miastkowski, Ph.D., D.Sc.)
- **Experimental Mechanics**
[Pracownia Mechaniki Eksperymentalnej]
(Zbigniew L.Kowalewski, Ph.D., D.Sc.)
- **Technological Laser Applications**
[Pracownia Technologicznych Zastosowań Laserów]
(Assoc. Prof. Zygmunt Szymański Ph.D., D.Sc.)

and:

- **Strength Laboratory**
[Laboratorium Wytrzymałości]
(Grzegorz Socha, Ph.D.)

The Department constitutes a part of the Centre of Excellence for Safety-Critical Pressure Systems nominated by the State Committee for Scientific Research and is also nominated by the European Commission as the Centre of Excellence for Laser Processing and Material Advanced Testing „LAPROMAT”.

Staff:

Professors:

Lech Dietrich, Ph.D., D.Sc.,
Józef Miastkowski, Ph.D., D.Sc.

Associate Professors:

Zbigniew L.Kowalewski, Ph.D., D.Sc.
Zygmunt Szymański, Ph.D., D.Sc.

Senior Researchers:

Jacek Hoffman, Ph.D.,
Wojciech Kalita, Ph.D.,
Dominik Kukła, Ph.D.,
Jan Malinowski, Ph.D.,
Zygmunt Mucha, Ph.D.,
Grzegorz Socha, Ph.D.,
Karol Turski, Ph.D.

Graduates:

Urszula Dejnarowicz M.Sc.,
Tomasz Mościcki, M.Sc.,
Andrzej Szałkowski, M.Sc.,
Jacek Wiłłaszewski, M.Sc.

Technicians:

Andrzej Chojnacki,
Witold Cieślak,
Erwin Grzebielichowski,
Piotr Dąbrowski,
Dariusz Jędrych,
Tadeusz Sokołowski,
Romuald Śliwka,
Wiktor Raszpla.

Current Research Activities:

- Experimental investigations of mechanical properties of materials and structural elements under uniaxial and complex stress states, including:
 - determination of yield surface changes due to plastic deformation induced by constant, monotonous and cyclic loadings of standard and novel engineering materials including functional materials,
 - determination of plastic anisotropy and its variations due to plastic deformation and time,
 - creep behaviour of materials,
 - evaluation of the influence of plastic deformation history on creep characteristics of materials,
 - cyclic behaviour of materials under proportional and non-proportional loading paths,
 - evaluation of the effect of strain rate on the mechanical properties of engineering materials,
 - fatigue, fracture and damage of materials,
 - identification of mechanical properties of materials.
- Investigations of phenomena in laser material processing:
 - Laser welding: process engineering problems, plasma role, keyhole oscillations, optical and acoustic signals emitted during welding,
 - laser surface modification of metals and alloys,
 - laser forming of metal elements,
 - sensing and monitoring; welding, surface modification, forming,
 - optical and acoustic monitoring of laser material processing,
 - modification of global metal element strength by local laser treatment.

Key Words:

- plasticity, creep, dynamic and cyclic loading, load carrying capacity, fatigue, fracture, damage, strain localization, technological laser, laser material processing, laser cutting, laser welding, laser hardening, laser surface processing, laser forming.

DEPARTMENT OF THEORY OF CONTINUOUS MEDIA

[ZAKŁAD TEORII OŚRODKÓW CIĄGŁYCH]

Head: Assoc. Prof. Marek Matczyński, Ph.D., D.Sc.,
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The Department has 4 Sections:

- Theory of Structural Defects
[Pracownia Teorii Defektów Strukturalnych]
(Assoc. Prof. Marek Matczyński, Ph.D., D.Sc.)
- Analytical Mechanics and Field Theory
[Pracownia Mechaniki Analitycznej i Teorii Pola]
(Prof. Jan J. Sławianowski, Ph.D., D.Sc.)
- Ultrasonic Testing of Materials
[Pracownia Ultradźwiękowych Badań Materiałów]
(Prof. Julian Deputat, Ph.D., D.Sc.)
- Polymer Physics
[Pracownia Fizyki Polimerów]
(Prof. Andrzej Ziabicki, Ph.D., D.Sc.)

Staff:

Professors:

Julian Deputat, Ph.D., D.Sc.,
Wiktor Gambin, Ph.D., D.Sc.,
Józef Lewandowski, Ph.D., D.Sc.,
Jan J. Sławianowski, Ph.D., D.Sc.,
Marek Sokołowski, Ph.D., D.Sc., - emeritus,
Andrzej Ziabicki, Ph.D., D.Sc.

Associate Professors:

Leszek Jarecki, Ph.D., D.Sc.,
Marek Matczyński, Ph.D., D.Sc.,
Jacek Szelażek, Ph.D., D.Sc.,
Andrzej Trzęsowski, Ph.D., D.Sc.,
Andrzej Turski, Ph.D., D.Sc. - emeritus,
Andrzej Wasiak, Ph.D., D.Sc.

Senior Researchers:

Barbara Atamaniuk, Ph.D.,
Włodzimierz Domański, Ph.D.,
Katarzyna Kowalczyk, Ph.D.,
Wiesław Larecki, Ph.D.,
Sławomir Mackiewicz, Ph.D.,
Beata Misztal-Faraj, Ph.D.,
Jerzy P. Nowacki, Ph.D., (on leave),
Janina Ostrowska-Maciejewska, Ph.D.,
Sławomir Piekarski, Ph.D.,
Paweł Sajkiewicz, Ph.D.,
Małgorzata Seredyńska, Ph.D.,

Artur Szczepański, Ph.D.,
Ewa Turska, Ph.D.,
Zygmunt Zawistowski, Ph.D.,
Krzysztof Żuchowski, Ph.D.

Graduates:

Andrzej Brokowski, M.Sc.,
Arkadiusz Gradys, M.Sc.,
Krzysztof Mizerski, Eng.

Ph.D. Students:

Anna Blim, M.Sc.,
Barbara Gołubowska, M.Sc.,
Grzegorz Jakimowicz, M.Sc.,
Igor Kanatchikov, M.Sc.,
Vasyl Kovalchuk, M.Sc.,
Agnieszka Martens, Ph.D.,
Marek Muszyński, M.Sc.,
Ewa Ołdak, M.Sc.,
Ewa E. Rożko, M.Sc.,
Ewa Wawrzynowicz, M.Sc.

Technicians:

Anna Godlewska,
Mieczysław Grzęda,
Jacek Ścibrowski,
Zbigniew Zawadzki.

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Current Research Activities:

- Theoretical foundations of the microcrack nucleation processes in metals, vacancy hypothesis of microfracture of metals, influence of temperature on the crack propagation, mechanics of brittle fracture of solids, partial opening and closure of cracks, convergence of the evaluation procedures in the analysis of consolidation and brittle fracture, staggered numerical algorithms, analysis of structural defects (dislocations) in piezo-electric materials, phase transformations in ferro-electric media, propagation of thermoelastic waves.
- Nonlinear dynamics of continuous and discrete systems.
- Relativistic theory of continua with astrophysical aspects.
- Relativistic thermodynamics and statistical mechanics, mechanics of media with internal degrees of freedom and defects, generalized nonlinearities of the Borne-Infeld type, generally covariant and gauge-invariant models of the classical field theory, foundations of Hamiltonian mechanics and Hamiltonian systems with symmetries and collective degrees of freedom, constitutive modelling of dissipative bodies, transport theory, over-determined sets of conservation laws.
- Theory of tensors and tensorial functions.
- Fractals as models of material bodies.
- Mechanics of complex media, mathematical description and design of material properties for complex media, mechanics of nonhomogeneous materials, strongly anisotropic composites.
- Plasticity of materials with crystallographic texture.
- Mechanics of metal surface layers, plastic effects in rails,
- Ultrasonic nondestructive testing, ultrasonic extensometry, ultrasonic stress measurements, residual stresses.
- Electrodynamics of deformable bodies and field interactions, in particular fracture of dielectrics under influence of electromagnetic fields, electromagnetic stability of liquid crystals.
- Micropolar models of electromagneto-gravitational interactions.
- Generalized Dirac equation and invariance problems.
- Theoretical and experimental studies of thermodynamics and kinetics of structure formation in complex external conditions (deformation, external field, variable temperature).
- Theory of polymer crystallization, molecular orientation, phase transitions.
- Mathematical modeling of industrial processes.

Key Words:

- brittle fracture mechanics, microcrack nucleation, dielectric structures, phase transformations, thermoelastic waves, variational methods, contact problems, composite mechanics, coupled fields,
- defects, dislocations, disclinations, pseudo-Riemannian geometry, micromorphic medium,
- tensorial functions, fractals, anisotropy, composites, gradient media, capillarity, large elastic-plastic strains, crystallographic texture,
- deformable body, electromagnetic field, electromagneto-elastic interaction, liquid crystals, electromagnetic fracture, stability, gravitation, Dirac equation, quantum mechanics, invariance,
- nondestructive testing, ultrasonic extensometry, residual stresses,
- polymers, crystallization, molecular orientation, nucleation of phase transitions, dynamics of polymer processing.

DEPARTMENT OF ULTRASONICS

[ZAKŁAD ULTRADŹWIĘKÓW]

Head: Prof. Andrzej Nowicki, Ph.D., D.Sc.,
phone: (48-22) 826 65 08, 826 12 81 ext.: 185, 315,
e-mail: anowicki@ippt.gov.pl

The Department has 3 Divisions:

- Doppler Methods
[Pracownia Metod Dopplerowskich]
(Assoc.Prof. Grażyna Łypacewicz, Ph.D., D.Sc.)
- Acoustic Microscopy
[Pracownia Mikroskopii Akustycznej]
(Jerzy Litniewski, Ph.D.)
- Ultrasonic Angiography
[Pracownia Angiografii Ultradźwiękowej]
(Prof. Tadeusz Powałowski, Ph.D., D.Sc.)

and 1 Laboratory:

- Probe Testing
[Laboratorium Badań Głowic Ultradźwiękowych]

Staff:

Professors:

Andrzej Nowicki, Ph.D., D.Sc.
Tadeusz Powałowski, Ph.D., D.Sc.,
Leszek Filipczyński, Ph.D., D.Sc., Member of PAS - emeritus,

Associate Professors:

Grażyna Łypacewicz, Ph.D., D.Sc.,
Wojciech Nasalski, Ph.D., D.Sc.,
Janusz Wójcik, Ph.D., D.Sc.

Senior Researchers:

Jerzy Etienne, Ph.D.,
Tamara Kujawska, Ph.D.,
Jerzy Litniewski, Ph.D.,
Zbigniew Trawiński, Ph.D.

Graduates:

Krzysztof Dynowski, M.Sc.,
Roman Dynowski, Eng.,
Paweł Karłowicz, M.Sc.,
Ziemowit Klimonda, M.Sc.,
Marcin Lewandowski, M.Sc.,
Wojciech Secomski, M.Sc.,
Bogusław Zienkiewicz, M.Sc.

Ph.D. Students:

Igor Trots, M.Sc.

Technicians:

Andrzej Lamers,
Kazimierz Krawczyk,
Ryszard Tymkiewicz.

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Current Research Activities:

- Developments of Doppler instrumentation for blood flow measurements (2-32 MHz).
- Noninvasive determination of the elasticity of artery walls and the input vessel impedance in the system of human peripheral arteries using the ultrasonic Doppler method.
- High-frequency ultrasonography (30 MHz) for skin and eye examinations.
- Ultrasonic microscopy (C-scan) over the frequency range 30-200 MHz applied for imaging the surface and interior of biological materials and solids. Measurements of acoustic properties of materials based on interpretation of microscopic images. Investigation into the mechanical properties of the surface layer of materials by means of generation and detection of surface waves [V(z) technique].
- Ultrasonic microdefectoscopy (B-scan) over the frequency range 30-100 MHz.
- Design and measurement of ultrasonic transmit-receive transducers (PZT and PVDF foil, composites).
- Basic research on acoustic streaming, heat effects in ultrasound beams, the acoustic shade behind pathological structures in ultrasonography.
- Hematocrit estimation using Power Doppler.
- Ultrasound in diagnostics of osteoporosis.
- Nonlinear acoustics.
- Modeling of optical and acoustical beam/pulse generation propagation, detection and shaping.
- Coded ultrasonography.

Key Words:

- ultrasonic, medical diagnostics, ultrasonography, ultrasonic Doppler, shock wave, lithotripsy, contrast agents, ultrasonic microscopy, bone examination, microsonography, ultrasonic transducers, ultrasonic waves in lossy media.

Post-Graduate School

[STUDIUM DOKTORANCKIE]

Head: **Prof. Wojciech Marks, Ph.D., D.Sc.**,
phone: (Secretary): (48-22) 826 97 77, 826 12 81 ext.: 151,
fax: (48-22) 826 98 15,
e-mail: wmarks@ippt.gov.pl

- The Post-Graduate School began its activity in 1968 as one of the first such organizations in all the institutions attached to the Polish Academy of Sciences and the universities.
- The object of post-graduate studies in this organized form is:
 - to develop the faculty of perceiving, formulating and solving scientific and engineering problems;
 - to master modern instruments and methods of research, both theoretical and experimental;
 - to form a view on the motive forces and the role of science in the modern world, its connection with development in the domain of production and social progress.
- Thus, the object of the studies is seen to be wider than the submission of the doctor's thesis, which is of course their direct result. The title of the doctor's thesis which sometimes seems very specialized conceals knowledge which was necessary for the solution of the problem and which can be used in many domains of human activity.
- The Ph.D. degree can be obtained at the Institute in the following fields:
 - mechanics,
 - material engineering,
 - machine building,
 - electronics (incl. acoustics),
 - automatics and robotics,
 - informatics,
 - civil engineering.
- The form of the studies is individual, depending on the qualifications of the candidate (university and technical university graduates) and his expected future employment (both fundamental and technological research or industry). At the outset, the candidate receives an individual curriculum of studies. A similar programme is received at the beginning of each semester. The implementation of this programme is discussed with the student's scientific adviser.
- Participation in lectures etc. is, with prescribed exceptions, obligatory (and controlled by examinations. In addition to lectures (sometimes with exercises) there are seminars, laboratories and lectures outside the Institute (at a university, for instance). The second half of the studies is devoted to the preparation of the doctor's thesis.
- The studies last four years. Post-graduate students of the regular studies obtain a stipend but must not work elsewhere. Every candidate has to pass admission exams in mathematics, foreign language (preferably - English) as well as in their field of specialization.
- The present number of post-graduate students is (as of February 1, 2003)
 - 30 - persons at the first year of studies,
 - 14 - at the second,
 - 17 - at the third,
 - 15 - at the fourth year and
 - 7 - at the fifth year.

<http://rcin.org.pl>

Information Processing and Publishing Unit

[Dział Informatyki i Wydawnictw]

Head: Jerzy Supel, Ph.D.,

phone: (48-22) 826 98 12, 826 12 81 ext: 351, fax: (48-22) 826 98 15

e-mail: jsupel@ippt.gov.pl

The Unit has 3 Sections:

- Networking
[Zespół Eksploatacji Sieci Komputerowej]
(Mikołaj Dybko, M.Sc., e-mail: mdybko@ippt.gov.pl)
- Information Processing
[Zespół Przetwarzania Informacji]
(Joanna Żychowicz-Pokulniewicz, e-mail: jzychow@ippt.gov.pl)
- Publishing
[Zespół Wydawnictw]
(Zofia Krawczyk, M.Sc., e-mail: publikac@ippt.gov.pl)

Staff:

Krystyna Afanasjef,
Bogumiła Borkowska,
Rafał Gudziński,
Ewa Jaczyńska,

Bożena Król,
Paweł Piecyk,
Andrzej Trojanowski.

Current Research Activities:

- Operating and maintaining local computer network and ensuring access to Internet.
- Operating specialized network services.
- Operating e-mail service.
- Technical support for LAN users.
- Operating Internet domain gov.pl;
- Operating website www.ippt.gov.pl;
- Creating and maintaining databases on research and publishing activities.
- Typesetting periodicals and books.
- Publishing periodicals and books.

Key Words:

- website, server, computer network, database;
- typesetting, computer graphics, printing;
- editing, editorial office.

Editorial Committees:

1. Archives of Mechanics - Editor: Prof. Henryk Petryk - (bimonthly), <http://am.ippt.gov.pl>; is a refereed international journal of greatest value to our Institute, edited permanently since 1949. It provides a forum for original research on mechanics of solids, fluids and discrete systems, including development of mathematical methods for solving mechanical problems. The journal encompasses all aspects of the field, with the emphasis placed on:

- methods and problems in continuum mechanics;
- general theory and novel applications,

<http://rcin.org.pl>

- thermodynamics, structural analysis, porous media, contact problems
 - dynamics of material systems,
 - fluid flows and interactions with solids.
2. **CAMES (Computer Assisted Mechanics and Engineering Sciences)** - Editor: Prof. Michał Kleiber - (quarterly), <http://comes.ippt.gov.pl>;
is a refereed international journal providing a scientific exchange forum and an authoritative source of information in the field of computational mechanics and related areas of applied science and engineering. The range of contributors covers the broadly understood field of computational mechanics including:
- solid and structural mechanics,
 - multi-body system dynamics,
 - fluid dynamics,
 - structural control and optimization,
 - transport phenomena,
 - heat transfer,
 - coupled problems.
- Articles describing novel applications of computational techniques in engineering practice and education are also welcome.
3. **Engineering Transactions** - Editor: Prof. Lech Dietrich - (quarterly), <http://et.ippt.gov.pl>,
is a refereed international journal founded in 1952. It promotes research and practice in engineering science and provides a forum for interdisciplinary publications combining mechanics with:
- material science,
 - electronics (mechatronics),
 - medical science and biotechnologies (biomechanics),
 - environmental science,
 - photonics,
 - information technologies,
 - other engineering applications.
- The Journal publishes original papers covering a broad area of research activities including:
- experimental and hybrid techniques,
 - analytical and special approaches.
4. **Journal of Technical Physics** - Editor: Prof. Zbigniew Peradzyński - (quarterly) in cooperation with Military University of Technology, <http://jtp.ippt.gov.pl>,
is a refereed international journal founded in 1959. It is devoted mainly to the application of the phenomenological and continuum physics idea in:
- mechanics,
 - thermodynamics,
 - electrodynamics,
 - coupled mechanical, electromagnetic and thermal fields,
 - plasma physics,
 - superconductivity.
- Papers published in the journal are original contributions of the authors or survey articles dealing with theoretical or experimental aspects of physical problems listed above.
5. **Archives of Acoustics** - Editor: Prof. Tadeusz Powałowski - (quarterly) in cooperation with the Committee on Acoustics PAS and Polish Acoustical Society,

<http://www.acoustics.org.pl/aa.html>,

is a refereed international journal founded in 1985. It is devoted to problems in acoustics and its applications, in particular in the fields of:

- linear and nonlinear acoustics,
- ultrasonics,
- quantum acoustics,
- physical and chemical effects of sound,
- acoustical measurement and instrumentation,
- speech production and perception,
- speech processing and communication systems,
- transduction,
- noise and vibration,
- architectural, building and environmental acoustics,
- underwater acoustics, bioacoustics,
- psychological acoustics,
- musical instruments.

6. **Archives of Civil Engineering** - Editor: Prof. Wojciech Radomski - (quarterly) in cooperation with the Committee for Civil Engineering PAS, is a refereed international journal founded in 1955 and it publishes original papers on the theoretical, experimental and numerical aspects of engineering problems in the fields of:

- structural mechanics,
- soil mechanics and foundation engineering,
- concrete and metal structures,
- roads, railways and bridges,
- building physics,
- production and construction materials,
- construction of civil engineering structures,
- computer-aided design.

7. **IFTR Reports** - Editor: Prof. Józef Joachim Telega

8. **Book series:**

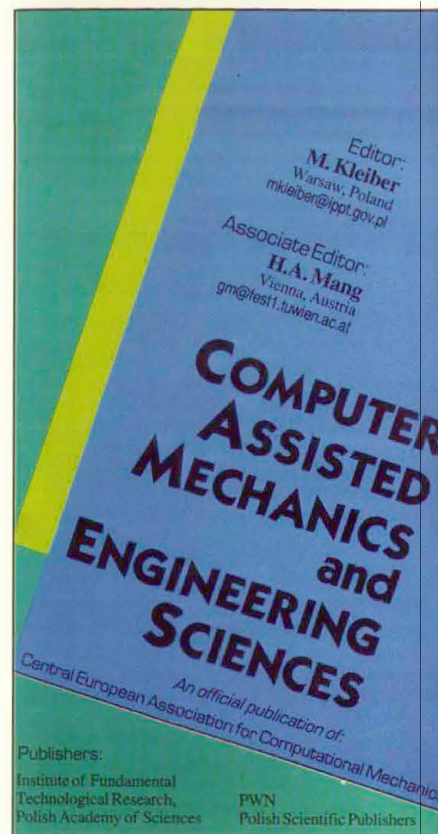
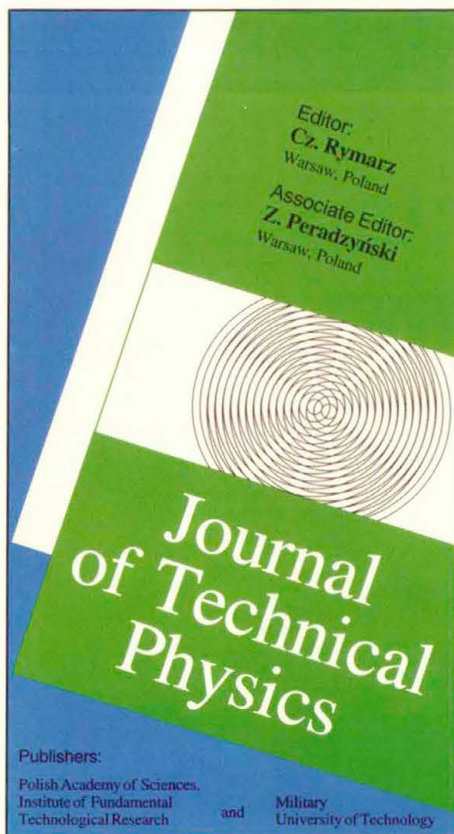
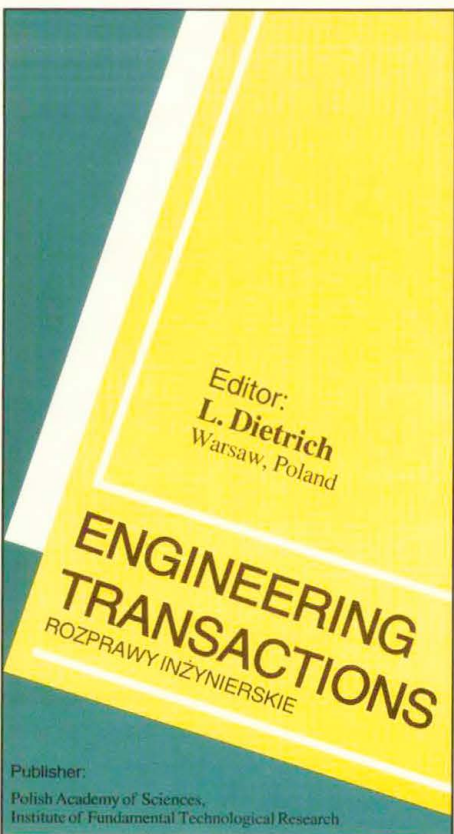
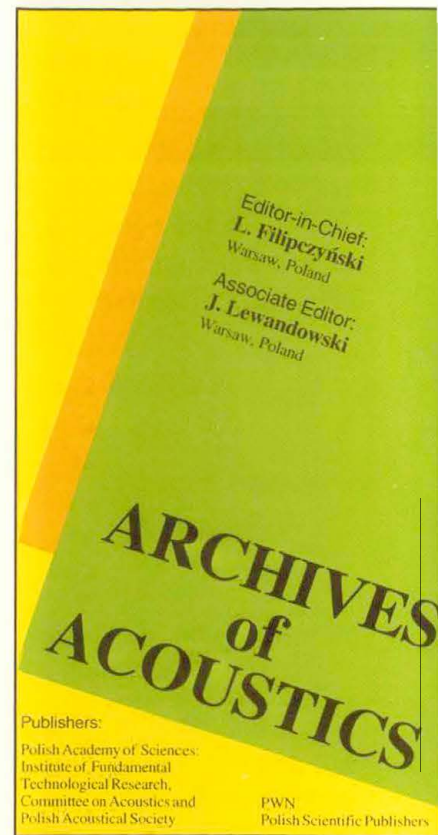
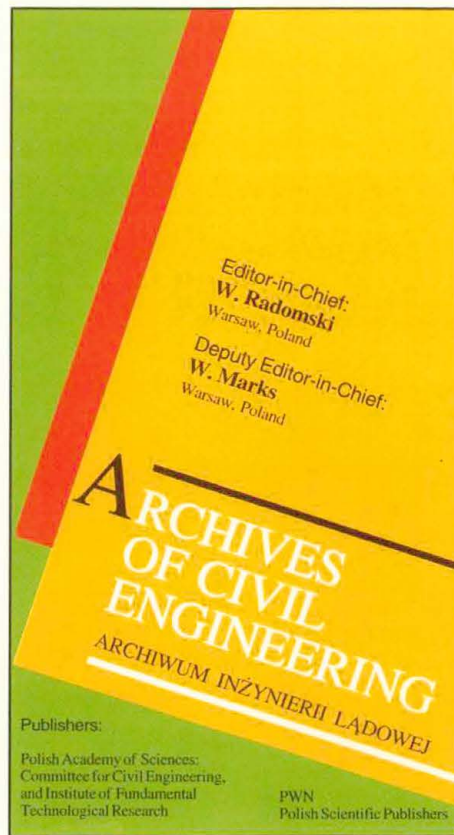
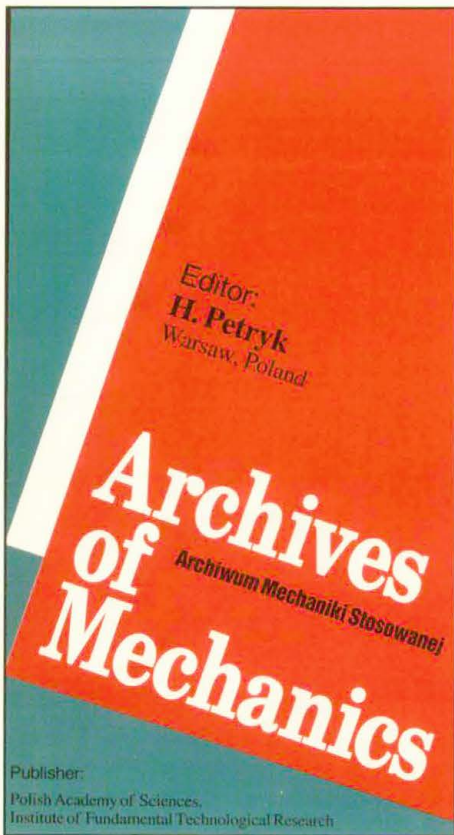
Library of Applied Mechanics - Editor: Prof. Zenon Mróz

Library of Acoustics and Ultrasound - Editor: Prof. Andrzej Nowicki

The editorial activity of the IFTR started at the very beginning of the existence of the Institute, i.e. over 40 years ago.

However, the Editorial Office of the IFTR was officially organized in 1967, its duties consisting in the preparation and realization of annual and long-term editorial plans, in cooperation with the corresponding Editorial Committees (nominated by the Director of the Institute) of the individual journals and book series.

- In addition, an irregular journal **Studies in Engineering** is currently published in Polish, and two book series entitled **Library of Applied Mechanics** and **Library of Acoustics and Ultrasound** (most of them in Polish) have appeared.
- Moreover, some of the publications are prepared and printed (using simplified printing techniques) directly at the Institute. These are e.g. the **IFTR-Reports**, volumes of abstracts of papers presented at various conferences organized by the IFTR, bulletins, etc.



Books Published at the Institute Publishing Section in the last fifteen years

- M. Kleiber, „Introduction to the Finite Element Method“, 1989 (in Polish), PWN.
- A. Nowicki, „Doppler Echography“, 1989 (in Polish), PWN.
- J. Ranachowski (Ed.), „Problems and Methods of Modern Acoustics“, 1989 (in Polish), PWN.
- Z. Wesołowski, „Acoustics of Elastic Body“, 1989 (in Polish), PWN.
- J. Klamka, „Controllability of Dynamic Systems“, 1990 (in Polish), PWN.
- J. Holnicki-Szulc, „Distortions in Structural Systems; Analysis Control, Modelling“, 1990 (in Polish), PWN.
- R. Płowiec, „Viscous and Elastic Properties of Liquids Determined by the Method of Ultrasonic Shear Waves“, 1990 (in Polish), PWN.
- A. Hanyga, „Contemporary Thermodynamics of Continuous Media“ 1991 (in Polish), PWN.
- J. Ranachowski (Ed.), „Problems of Contemporary Acoustics“, 1991 (in Polish).
- S. Owczarek, „Shape Optimization of Energy-Conservation Buildings with Polygonal Plans“, 1992 (in Polish), Studies in Engineering No. 32.
- K. Pieńkowski, A. Stempniak, „The Use of Heat Storage Ability of a Building in the Work of a Central Heating System“ 1992 (in Polish), Studies in Engineering No. 33.
- Z. Świącki, „Bioceramics for Orthopaedy“, 1992 (in Polish).
- A. Czkwianianc, M. Kamińska, „Methods of Nonlinear Analysis of One-dimensional Reinforced Concrete Members“ 1993 (in Polish), Studies in Engineering No. 36.
- L. Laskowski, „Passive Solar Heating Systems, Problems of Operation and Energy Effectiveness“, 1993 (in Polish), Studies in Engineering No. 34.
- W. Opydo, J. Ranachowski, „Electrical Properties of Vacuum Insulation Systems under Alternating Current“, 1993 (in Polish), PWN.
- A. Sawczuk, J. Sokół-Supel, „Limit Analysis of Plates“, 1993, PWN.
- A. Sawicki, D. Leśniewska, „Reinforced Soil; Theory and Applications“, 1993 (in Polish), PWN.
- J. Skubis, „Acoustic Emission in the Analysis of Insulation of Electrical Equipment“, 1993 (in Polish), PWN.
- W. Szczepiński, „Introduction to the Calculus of Dimensional Tolerances in Mechanical Engineering“, 1993 (in Polish), PWN.
- M. Wolna, „Photoelastic Materials“, 1993 (in Polish), PWN.
- B. A. Zawada, „Analyzing of Heat Energy Utilization Process in Industrial Buildings Exploitation“, 1993 (in Polish), Studies in Engineering No. 35.
- A.M. Brandt (Ed.) „Optimization Methods Applied in Material Design of Composites with Cement Matrices“ 1994 (in Polish), Studies in Engineering No. 38.
- „Analysis, Synthesis and Identification of Speech Signals in Automatics, Informatics, Linguistics and Medicine“, (coll. paper), 1994 (in Polish).
- D. Chwieduk, „Heating Systems Applying Solar and Ground; a Question to Analysis of Operation and Thermal Performance“, 1994 (in Polish), Studies in Engineering No. 37
- W. Dzieniszewski, „Thermal States of Multicell Structures in Heat Conduction Processes“, (in Polish), 1994, IPPT PAN
- R. Gryboś, „Dynamics of Turbo-Machines“, 1994 (in Polish), PWN.
- M. Leszczyńska-Sydor, „The Dynamic Thermal Insulations of Building Structures“, 1994 (in Polish), Studies in Engineering No. 39.
- J. Ostrowska-Maciejewska, „Mechanics of Deformable Bodies“, 1994 (in Polish), PWN.

- M. Gryczmański, „An Introduction to Elasto-plastic Models for Soils“ 1995 (in Polish), Studies in Engineering No. 40.
- A. Nowicki, „Basics of Doppler Ultrasonography“, 1995 (in Polish), PWN.
- W.J. Chmielnicki, „Energy Control in Buildings Connected to Urban Heating Sources“ 1996 (in Polish), Studies in Engineering No. 41.
- „Fracture and Strength of Ceramics, Bones and Concrete“ (coll. paper), 1996 (in Polish).
- W.K.Nowacki (Editor), Podstawy Termomechaniki Materiałów z pamięcią kształtu, Seria: Współczesne Trendy Mechaniki Materiałów, vol.1, IPPT, Warszawa, 1996 (in Polish).
- B. Borowa, A. Flaga, M. I. Kazakiewicz, „Problems of Aerodynamic Interference of Two Circular Cylinders“ 1997 (in Polish), Studies in Engineering No. 42.
- B. Florkowska, „Incomplete Discharges in High-tension Insulation Systems“, 1997 (in Polish).
- O. Kapliński, „Modelling of Construction Processes“ 1997, Studies in Engineering No. 43.
- E.Kossecka, „Problems of Thermal Dynamics of Bulding Walls“, 1998 (in Polish), Studies in Engineering No. 45.
- Z. Kotulski, W. Szczepiński, „Error Analysis with Applications in Engineering“, 1998 (in Polish), PWN.
- „Modern Ceramics, Selected Technologies and Research Methods“ (coll.paper), 1998 (in Polish).
- J. Wyrwał, J. Świrska, „Problems of Moisture in Building Walls“ 1998 (in Polish), Studies in Engineering No. 44.
- M. Boutryk, „The Role of Vibration in Creating Properties of Cement Dispersion Media“ 1999 (in Polish), Studies in Engineering No. 48.
- W.Marks, S.Owczarek (Eds.) „Multicriteria Optimization of Energy-Saving Buildings“, 1999 (in Polish), Studies in Engineering No. 46.
- S. Grzeszczyk, „Rheology of Cement Suspensions“ 1999 (in Polish), Studies in Engineering No. 47.
- „Acoustics in Technology, Medicine and Culture“, (coll. paper), vol. I, 1993; vol. II, 1995; vol. III, 1999 (in Polish).
- „New Trends in Technology and Materials Researches“ (coll. paper), 1999 (in Polish).
- M.Basista, W.K.Nowacki (Editors), Modelling of Damage and Fructure Processing in Engineering Materials, Series: Trends in Mechanics of Materials, vol.2, IPPT, Warsaw, 1999.
- J.Kubik, M. Cieszko, M. Kaczmarek, „Foundations of Dynamics of Saturated Porous Media“ 2000, IPPT PAN.
- M. Marks, Analysis and Optimisation of Composites Reinforced by Two Families of Fibres, 2000 (in Polish), Studies in Engineering No. 49.
- W.K.Nowacki, J.R.Klepaczko (Editors), New Experimental Methods in Material Dynamics and Impact, Series: Trends in Mechanics of Materials, vol.3, IPPT, Warsaw, 2001.
- K. Roźniakowski, Application of Laser Radiation for Examination and Modification of Building Material's Properties, 2001 (in Polish), Studies in Engineering No. 50.
- B.Raniecki, Thermodynamics of Batch Consolidation of Suspensions, Trends in Mechanics of Materials, vol.4, IPPT, Warsaw, 2002.
- A. Stolarski, W. Cichorski, Modelling of Static and Dynamic Behaviour of Reinforced Concrete Deep Beam, 2002 (in Polish), Studies in Engineering No. 51.
- S. Biedugnis, P. Podwójci, M. Smolarkiewicz, Optymalizacja gospodarką odpadami komunalnymi w skali mikro i makroregionalnej, 2003 (in Polish), IPPT PAN.
- A.Seweryn, Metody numeryczne w mechanice pękania, 2003 (in Polish), IPPT PAN.

Library

Member of the Consortium of Libraries of PAS

[BIBLIOTEKA]

Chief Librarian: **Bogusława Lewandowska, Ph.D., M.A.**
phone: (48-22) 826 01 29; 826 12 81 ext: 247
e-mail: blewando@ippt.gov.pl

Deputy-Chief Librarian: **Małgorzata Trojan, M.A.**
phone: (48-22) 826 12 81 ext: 126
e-mail: mtrojan@ippt.gov.pl

Overall Structure of the Library:

Library contains two special collections of books:

- The special collection of books devoted to Mechanics
- The special collection of books devoted to Acoustics

Stock of the Library:

Number of bound volumes: about 80 000
Number of current periodicals: 300
Number of dissertations: 600
Number of CD-ROMs: 20
Databases available online: 25

Subject index

Subject topics:

- The special collection of books devoted to Mechanics
 - mathematical and physical foundations of the theory of solid material media, mechanics of solids and fluids, strength, fatigue and fracture of materials, physics of plasma, biomechanics, theory of structures, rheology, theory of mechanical systems, civil engineering, ecology in civil ecology engineering, electrodynamics of continua, theory of electromagnetic waves, physics of polymers, material engineering, automatics and robotics, informatics.
- The special collection of books devoted to Acoustics
 - nondestructive testing, physical acoustics, aeroacoustics, acoustoelectronics, noise control, acoustics of speech and music, psychoacoustics, acoustics of environment, urbanistic and civil engineering, hydroacoustics, quantum acoustics, non-linear acoustics, acoustic emission, ultrasounds in biology, medicine and industry.

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- Literature on mathematical methods in technical physics and CAM/CAD is collected in both collections.

Activities of the Library:

- The Library subscribes to 68 foreign and to 82 Polish journals. About 150 foreign journals are obtained on an exchange basis and as gifts from the employees of the IFTR. The Scientific Committee (the head of the Committee - Prof. Józef J. Telega, Ph. D., D. Sc.) is responsible for purchasing decisions on books and serials. The Classifier-Expert is Prof. Józef Lewandowski (Ph. D., D. Sc.)
- The Library provides register users with loan services, interlibrary loan services. The library services cover also utilizing MAN, online publishing, electronic information and creating data bases using an integrated program.

Internet:

<http://www.ippt.gov.pl/library.html>

Fax: (022) 826 98 15

The lending library and the reading-room of the special collection of books devoted to Acoustics:

Tel. (022) 826 12 81 ext. 126

E-mail: mtrojan@ippt.gov.pl

The lending library and the reading-room of the special collection of books devoted to Mechanics:

Tel. (022) 826 01 29

E-mail: library@ippt.gov.pl

The department of exchange publishing:

Tel. (022) 826 12 81 ext. 126

E-mail: exchange@ippt.gov.pl

CENTERS OF EXCELLENCE

[CENTRA DOSKONAŁOŚCI]

- **CE for Advanced Materials and Structures (AMAS)**

Scientific Coordinator: Prof. Zenon Mróz, Ph.D., D.Sc.

e-mail: amascoe@ippt.gov.pl

website: <http://www.ippt.gov.pl/amas/>

The Center of Excellence for Advanced Materials and Structures (AMAS) has been created at the Institute in the course of a highly competitive international selection procedure. The Center aims at developing activities in three complementary areas: fundamental and technology-oriented research, education and training, as well as networking and co-operation with leading European research centers.

- **CE for Safety-Critical Pressure Systems**

Scientific Coordinator: Prof. Lech Dietrich, Ph.D., D.Sc.

e-mail: ldietrich@ippt.gov.pl

The Center of Excellence for Safety-Critical Pressure Systems has been established in cooperation with the Materials Science and Engineering Faculty of Warsaw University of Technology and three renowned industrial partners. The goal is to address theoretical and practical challenges of dealing with installations working under extreme variable pressure and temperature, as well as aggressive corrosive environment.

- **CE Applied Biomedical Modelling and Diagnostics (ABIOMED)**

Scientific Coordinator: Prof. Józef Joachim Telega, Ph.D., D.Sc.

e-mail: jtelega@ippt.gov.pl; abiomed@ippt.gov.pl

website: <http://www.ippt.gov.pl/abiomed/>

The Center of Excellence Applied Biomedical Modelling and Diagnostics (ABIOMED) is aimed at creating at the IFTR the multidisciplinary area of applied and theoretical modelling and designing in modern biomechanical and bioengineering research. Three complementary areas of activity in co-operation with leading European research centers are planned: fundamental and application-oriented research, education and training, and interaction with R&D as well as clinical centers.

- **CE for Laser Processing and Material Advanced Testing (LAPROMAT)**

Scientific Coordinator: Prof. Lech Dietrich, Ph.D., D.Sc.

e-mail: ldietrich@ippt.gov.pl

The aims of the Centre of Excellence for Laser Processing and Material Advanced Testing (LAPROMAT) are innovative laser processing techniques like laser shaping, welding or surface modifying as well as modern strength testing techniques. Specialised conferences, workshops and seminars will be organised to get researchers and industry engineers together and to provide them with information about new laser processing and testing techniques.

<http://rcin.org.pl>

NATIONAL CONTACT POINT

[KRAJOWY PUNKT KONTAKTOWY PROGRAMÓW BADAWCZYCH UE]

Head: **Andrzej Siemaszko, Ph.D.**

phone: (48-22) 826 25 02, 828 74 81, fax: (48-22) 828 53 70,

e-mail: andrzej.siemaszko@kpk.gov.pl

- The National Contact Point (NCP) of the Fifth Framework Programme for Research, Technological Development and Demonstration was established in 1999 by the decision of the State Committee for Scientific Research (KBN) as a result of an open call for tenders. Dr Andrzej Siemaszko was nominated as the Director of the NCP. In 2002, by the decision of KBN, responsibility of the NCP was extended to the Sixth Framework Programme.
- The main task of the NCP is to disseminate information about EU research programmes and to help Polish research teams in active participation in EU Framework Programmes, through training, aid and consultancy, partner search service as well as promoting the international co-operation and encouraging to create multi-partner project consortia.
- The creation of the National Contact Point followed the adoption by the Council of Ministers of Poland, on 22nd July 1999, the resolution accepting the rules and conditions of Poland's participation in the EU research programmes. This means, in practical terms, actual integration of Poland with the European Union in the sector of research and technical development. As the associated country, financially contributing to the common EU RTD budget, Poland has acquired full right to benefit from the EU Framework Programmes.

To carry out all the tasks mentioned above, the 3-level, country-wide NCP Network was developed, consisting of:

- 11 Regional Contact Points,
- 41 Thematic Contact Points,
- ca 200 Local Contact Points,

with the National Contact Point performing co-ordinating role, closely co-operating with the State Committee for Scientific Research, the European Commission, and other key partners both in Poland and abroad. The Polish NCP Network is considered as one of the best NCP systems in Europe.

The services provided by the NCP include, among others:

I. Information services

- Internet information service concerning general issues, thematic priorities, selection results, information and training events as well as other international programmes open for Poland's participation, is available at the webpage: www.6pr.pl; www.fp6.pl
- Other Internet services, e.g. training, group work mechanisms, Intranet, reproduction of digitally recorded international conferences, co-ordination of Networks of Excellence.
- Development and maintenance of databases about NCP activities, Polish research teams participating in the FP5, FP6 Expression of Interest of Polish applicants, address lists of persons and institutions.

The monthly number of visitors of the webpage approximates 100.000 while the data transfer reaches 2.2 GB.

<http://rcin.org.pl>

II. Training activities

Organizing Info-days, training events, specialised consultations and workshops, concerning project management and finances, Marie Curie fellowships, training for SMEs, organised both in Warsaw and in all regions of Poland.

On average, ca 250 major information events per year are being organised by the NCP and the NCP Network. The coordinators of NCP offer direct e-mail, telephone and individual consultations.

III. Conferences

Organizing International conferences concerning Polish participation in the EU Programmes, with the presence of high-level officials from the European Commission, Members States and Associated States:

IV. Editorial activities:

The NCP participates in editing and re-editing of several newsletters:

- Wiadomości KPK - Granty Europejskie (NCP News - European Grants) - 6600 copies printed + webpage http://www.6pr.pl/s5o/gr_europ/index.html
- Nowości CORDIS (CORDIS News) - <http://www.6pr.pl/s5o/kurier/cordis/index.html>
- Nowości KOWI (KOWI News) - <http://www.6pr.pl/kowi/index.html>
- Biuletyn 'eNews' - <http://www.6pr.pl/s5o/enews/index.html>

The staff of the National Contact Point amounts to 40. The NCP budget is covered principally from the resources of the State Committee for Scientific Research and the accompanying measures provided by the European Commission. A number of proposals have been submitted, of which following 9 projects received financing: Polnet, Polda, Fellows for Industry, Partners for Life, Idealist-5PR, Train-Net, CEeB, NONAC, CE-NET, NASFP6-LAUNCH.

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P4 Aeronautics - M.Sc. Zbigniew Turek, e-mail: zbigniew.turek@kpk.gov.pl

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P7 Knowledge Society - Ph.D. Wiesław Studencki, e-mail: wieslaw.studencki@kpk.gov.pl

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JRC - Ph.D. Jacek Kuciński, e-mail: jacek.kucinski@kpk.gov.pl

International Scientific Co-operation

(within official bilateral agreements)

Aichi Institute of Technology, Japan,
American Concrete Institute, USA,
Cement and Concrete Institute, Stockholm, Sweden,
Delft University of Technology, Holland,
Drexel University, PA, USA,
Dniepropetrovsk Institute of Building, Ukraine,
Faculte Politechnique de Mons, Belgium,
Institute of Problems in Mechanics, Moscow, Russia,
Institute de Mechanique de Grenoble, France,
Institute of Aerotechnique, France,
Institute of Applied Physics, Minsk, Belarus,
Institute of Mechanics, Hannover, Germany,
Izrael Technion, Haifa, Izrael,
Joffe Institut, St.Petersburg, Russia,
Laboratoire d'Aerothermique, Meudon, France,
Laboratoire d'Informatique pour la Mecanique, Orsay, France,
Pennsylvania State University, USA,
Royal Institute of Technology, Stockholm, Sweden,
Universite de Franche-Comte, Besancon, France,
Universite de Provence, France,
Universite in Metz, France,
Universite Paul Sabatier, Toulouse, France,
University of Akron, USA,
University of Florence, Italy,
University of Limburg, Maastricht, Holland,
University of Tokyo, Japan,
University of Notre Dame, USA,
Universidad Politecnica de Cataluna, Barcelona, Spain.

Members in Editorial Committees of Foreign Scientific Journals:

Acta Mechanica (Z.Mróz),
Acta Mechanica Sinica (Z.Mróz),
Applied Mechanics Review (Z.Mróz),
Archive of Applied Mechanics (K.Doliński),
Archives of Acoustics (A.Nowicki),
Archives of Computational Methods in Engineering (M.Kleiber, Z.Mróz),
Bulletin of the International Association for Shell and Spatial Structures (W.Gutkowski),
Cement and Concrete Composites (A.M.Brandt),
Computational Mechanics (M.Kleiber),
Computers and Structures (M.Kleiber, Z.Mróz),
Engineering Applications of Artificial Intelligence (M.Kleiber),
Engineering Computations (Z.Mróz),
Engineering Mechanics (M.Kleiber),
Engineering Optimization, (W.Gutkowski)
European Journal of Mechanics A: Solids (Z.Mróz, H.Petryk, P.Perzyna, K.Sobczyk),
European Journal of Ultrasound (A.Nowicki),
Fiber and Textiles (A.Ziabicki),
International Journal Engineering Analysis and Design (M.Kleiber, Z.Mróz),
International Journal for Numerical and Analytical Methods in Geomechanics (Z.Mróz),
International Journal of Applied Electromagnetics in Materials (J.P.Nowacki, Z.Peradzyński),
International Journal of Computer Applications in Technology (M.Kleiber),
International Journal for Numerical Methods in Engineering (Z.Mróz),
International Journal of Space Structures (W.Gutkowski),
Journal of Engineering Mathematics (T.Kowalewski),
Journal of Non-Newtonian Fluid Mechanics (A.Ziabicki),
Journal of Sound and Vibration (W.Szemplińska),
Journal of Thermal Stresses, (J.Ignaczak, Z.Mróz),
JSME International Journal, Mechanics and Materials Engineering (P.Perzyna),
Mechanics of Structures and Machines (An Int.Journal) (Z.Mróz),
Materials and Structures (France) (A.M.Brandt),
Mechanics of Materials (Z.Mróz),
Mechanics Research Communications (Z.Mróz),
Nonlinear Dynamics (W.Szemplińska),
Open System and Information Dynamics (K.Sobczyk),
Probabilistic Eng. Mechanics (K.Sobczyk),
Reports on Mathem. Physics (K.Sobczyk, J.J.Sławianowski),
Revista Internacional de Metodos Numericos para Calcula y Diseno en Ingenieria (M.Kleiber),
Science and Engineering of Composite Materials (A.M.Brandt),
Space Structures An. Intern.Journal (W.Gutkowski),
Structural Engineering and Mechanics (M.Kleiber),
Technische Mechanik (M.Kleiber),
Theoretical and Applied Fracture Mechanics (M.Sokołowski),
Ultrasound in Medicine and Biology (A.Nowicki)