

FACULTY OF MATERIALS SCIENCE AND ENGINEERING WARSAW UNIVERSITY OF TECHNOLOGY



Dean:
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Research



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Waldemar
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Student Affairs

The former Institute of Materials Science and Engineering, with almost a century of experience in the teaching of materials science at the Warsaw University of Technology became a fully independent Faculty in 1976.



The main lecture theatres and research laboratories are located in a new building on the southern campus. The Faculty offers a BSc-equivalent and MSc degree education as well as doctoral studies, with places for about 350 undergraduates and 40 places in its doctoral program.

There are over **40** scientific and academic staff members, including: **16** professors and associate professors and **20** assistant professors. These are supported by **30** technical and administrative staff.

There is an elastic system of triple level education at Materials Science and Engineering Faculty since 1997.

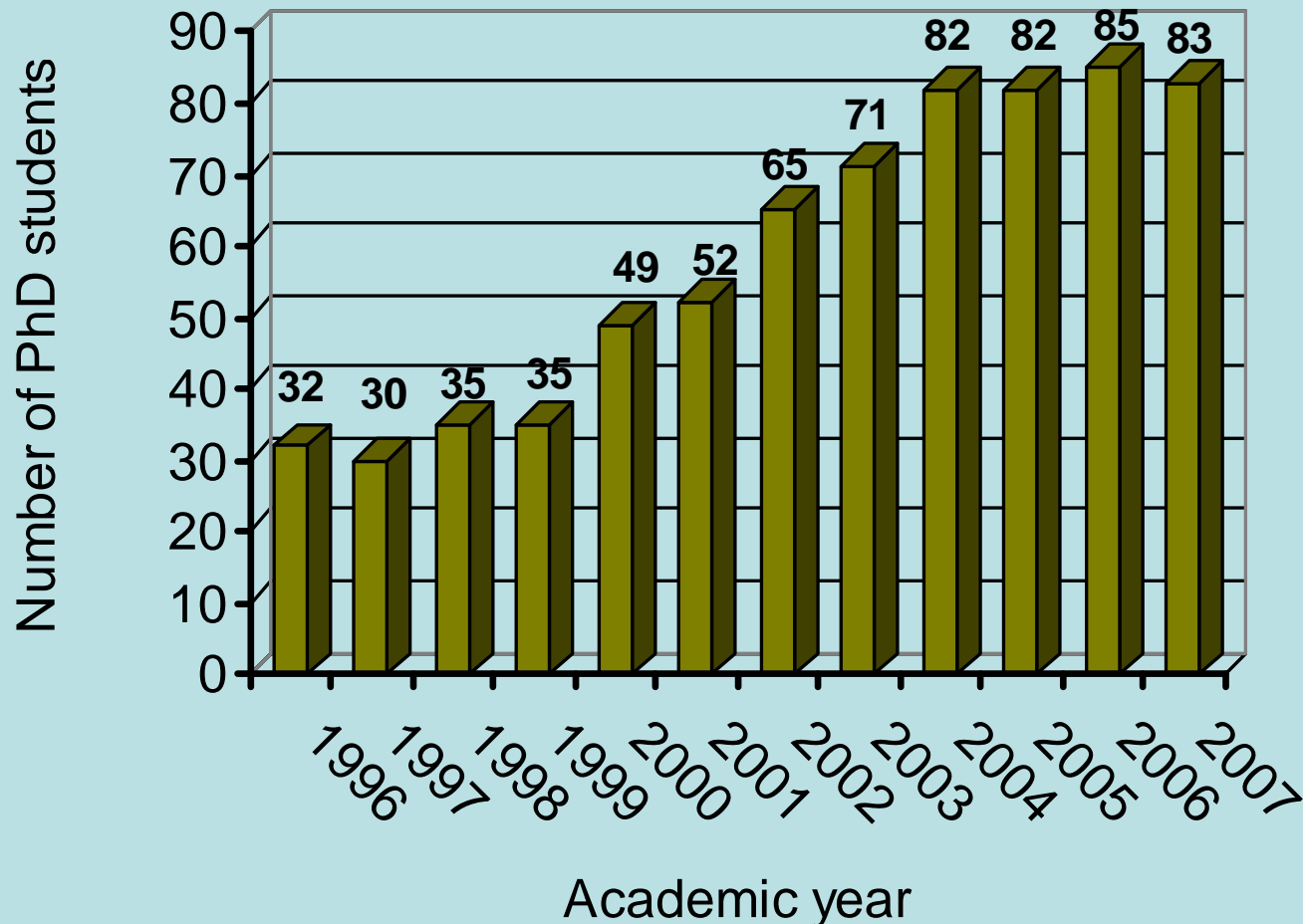
The system gives a possibility to obtain a diploma of Eng., MSc and PhD.

The Faculty offers:

- Engineering Level (3 years)
- Master of Science Degree (+2 years)
- PhD Degree (+4 years)
- Postgraduate Course
- Courses and Trainings

The Faculty offers:

- B.Sc. and M.Sc. education - 412 students (254 at M.Sc. course)
- Ph.D. studies (83 students)
- Awarding D.Sc. (Habilitation Doctor)



The Faculty's academic and scientific program is carried out in the four divisions that follow:

- The Division of the Fundamentals of Materials Science
- The Division of Surface Engineering
- The Division of Structural and Functional Materials
- The Division of Materials Design

The Division of the Fundamentals of Materials Science

- * advanced methods of structure and microstructure investigations
- * properties of interphase grain boundaries
- * micromechanisms of plastic deformation of metals
- * the effect of hydrogen on the mechanical properties of two-phase austenitic-ferritic steels

The Division of Surface Engineering

- * modern methods of surface engineering
- * impulse – plasma synthesis of nanocrystalline powders and intermetallics
- * corrosion protection



The Division of Structural and Functional Materials

- * magnetic materials
- * nonequilibrium structure materials obtained by rapid quenching or mechanical alloying
- * amorphous and nanocrystalline materials
- * materials for catalysis



The Division of Materials Design

- * material characterization and modelling
- * design and processing of new materials
- * failure and degradation of engineering materials
- * microstructure optimization
- * nanomaterials
- * intermetallics
- * advanced ceramic materials
- * polymer and composite materials



Centres of Excellence formed by the Faculty

NanoCentre - Nanocrystalline Materials: Fabrication, Structure, Modelling, Properties and Applications

PRESAFE - Centre of Competence in Safety of Pressure Equipment

CBT - Centre of Technical Safety

CAMAT - Centre for Advanced Materials and Technologies

ICMM - Interdisciplinary Centre for Materials Modelling

CDW - Centre of Hydrogen Degradation

In 2005 the Faculty of Materials Science and Engineering have formed

**International PhD School for High Performance Materials
Aimed at Sustainable and Environmentally Compatible
Applications**

in the cooperation with Empa, Swiss Federal Laboratories

for Materials Testing and Research in Switzerland

and

the Faculty of Materials Science and Ceramics of AGH-University of Science

and Technology

PhD School Director: Dr Jolanta Janczak (Empa)

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Deputy Director: Prof. dr hab. Krzysztof Sikorski (WUT)

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The Faculty is a participant of the Scientific International Network of Excellence formed in the 6th European Framework Programme:

KMM-NoE

„KNOWLEDGE-BASED MULTICOMPONENT MATERIALS FOR DURABLE AND SAFE PERFORMANCE”

NMP3-CT-2004-502243

36 participants from: Poland, Germany, Austria, France, Italy, United Kingdom, Bulgaria, Spain, Slovakia, Russia, Ukraine and Denmark

Tasks:

NRT0-1: Joining of Ceramics to Metals: New Concepts and Testing

Processing and testing of joined structures

NRT1-2: Thin Films and Intermetallic Layers

Process optimisation

Structure-property relationships from characterization studies

NRT2-4: Metal-Ceramic Nanostructured Bulk Composites and Coatings

Characterisation of nano- and microstructure

Mechanical and functional tests

Processing

NRT3-1: Tailoring FGMs for Biological Environments

Modelling of FGM organ-implant compound structure

ExtreMat

„NEW MATERIALS FOR EXTREME ENVIRONMENTS”

Integrated Project
NMP3-CT-2004- 500253-2

37 partners from: Poland, Germany, Austria, Italy, United Kingdom, France, Spain, Greece, Switzerland, Slovakia, Czech Republic, Belgium, Netherlands

Tasks:

SP1.3 Refractory based materials

- Microstructural and analytical characterisation of bulk materials (CrRe) with and without coatings as well as on (W-based) coatings for fusion applications
- Modelling of diffusion process and oxidation resistance of W-based material as well as aluminising and nano-structuring of CrRe material, including database compilation

SP2.3 Heat sinks with high temperature stability

- Developing of MMC with stable interfaces
- Structural characterisation of high conductivity and high temperature materials developed

FUSION

„FUNDAMENTAL STUDIES OF TRANSPORT IN INORGANIC NANOSTRUCTURES”

STREP

NMP3-CT-2005-01-014032

7 partners from: Poland, United Kingdom, Ireland, Greece, Finland, Netherlands

Aim:

- Fabrication, Structure, Modelling, Properties and Applications of inorganic porous materials for separation of gas mixtures: CO₂ / air, SO_x / air, NO_x / air, N₂ / O₂, H₂ / CH₄

STEPS

„A SYSTEMS APPROACH TO TISSUE ENGINEERING PROCESSES AND PRODUCTS”

Integrated Project

NMP3-CT-2005-500465

23 partners from: Poland, United Kingdom, France, Italy, Netherlands, Sweden, Switzerland, Spain, Ireland, Belgium, Austria, Latvia

Aims:

- Integration of various scientific domains (materials engineering, chemistry, mechanics, biology, medicine) into one effective system
- Creation of the risk valuation and risk affair
- Creation of the standards of clinic and economical efficiency of the cell engineering products
- Creation of the ground to clinical employment and commercialization of the cell engineering products

CellForce

„DEVELOPMENT OF A SINGLE CELL BASED BIOSENSOR FOR SUBCELLULAR ON-LINE MONITORING OF CELL PERFORMANCE FOR DIAGNOSIS AND HEALTHCARE”

STREP

No. FP6-016626

4 partners from: Switzerland, Germany, Spain

Aim: elaboration of a new biosensor for permanent monitoring of human cells behaviour

SICOM

„SIMULATION BASED CORROSION MANAGEMENT”

4 partners from: Switzerland, Germany, France, United Kingdom, Switzerland, Belgium, Greece, Italy

Aims:

- Application and integration of corrosion predictive tools for corrosion occurrence and corrosion propagation
- Developing of numerical model for prediction of galvanic corrosion behaviour

EURATOM

FU 06-CT-2004-00081

Tasks:

- Structural mechanical analyses in support of Wendelstein 7-X
- Studies of material erosion and re-deposition on plasma-facing components from the TEXTOR tokamak
- W-Cu composites fabrication route based on powder metallurgy, high current electric impulse sintering, plasma spraying and electrorystallization methods
- Hydrostatic extrusion as a method of grain refining in the steel EUROFER 97
- Simulation methods in the design of mechanical properties of W-Cu composites

Other EC grants:

NET

„NET EUROPEAN NETWORK – NETWORK ON NEUTRON TECHNIQUES STANDARDISATION FOR STRUCTURAL INTEGRITY”

42 participants from: Poland, Germany, France, Italy, United Kingdom, Spain, Switzerland, Czech Republic, Slovakia, Romania

- Aims:**
- Standardization of the neutron methods of material investigations
 - Increasing efficiency and safety of European power systems
 - Education of young scientists

MATERA – ERA-NET Materials

016102 MATERA (ERAC)

17 participants from: Poland, Germany, Belgium, Italy, Ireland, United Kingdom (Northern Ireland), Norway, Finland, Iceland, Switzerland, Slovenia, Lithuania, Luxemburg, Israel

- Aims:**
- Improving diffusion of knowledge transfer in Europe
 - Intensifying the innovation value chain from basic materials science to innovation related projects

JOIN(ED)T

„JOINED EDUCATION FOR TISSUE ENGINEERING: A MULTIDISCIPLINARY APPROACH TO REGENERATE JOINTS”

Marie Curie Early Stage Training Fellowships (EST).
MEST-CT-2005-021089

8 partners from: United kingdom, Sweden, France, Italy, Nederland, Spain

SUGRE

„SUSTAINABLE GREEN FLEETS”

INTELIGENT ENERGY – EUROPE PROGRAMME
SAUE – ALTENER, EIE/05/153/SI2.419858

26 partners from: Austria, Poland, Portugal, Slovenia, Germany, Italy, Spain, Greece, Hungary, Romania, United Kingdom, Sweden, Bulgaria, Iceland, Netherlands

- Aims:**
- Dissemination of experience and optimal used practice connected with alternative fuels and vehicles used such fuels
 - Promotion and support of the processes of traditional freight navies into alternative form of driving navies

Participation in COST projects:

- COST 533 (Biotribology: Materials for improved wear resistance of total artificial joints)
- COST 534 (New materials and systems for prestressed concrete structures)
- COST 535 (Thermodynamics of alloyed aluminides (THALU))
- COST 537 (Core Laboratories for the improvement of medical devices in clinical practice from the analysis of implanted prostheses)
- COST D30 (High Pressure Synthesis and Processing of Nanopowders)

Other international cooperation:

- Biocomposite for bone tissue regeneration – Singapore
- Desy – Ceramic Radiation Absorbers – Germany
- Ceramic Matrix Composites – Germany
- Nanocrystalline Alloys – Russia
- Gas Pipe Material Degradation – Ukraine
- Solar Energy Usage – Greece
- Pharmaceutical Substrates and Products Characterisation – Germany
- Polymers recycling - USA

National grants related to nanomaterials

- Metallic, nanomaterials: structure, properties and processes
- Nanocrystallization of Al-base metallic glasses
- Soft magnetic nanomaterials
- Nanocrystalline magnets for application in small electrical machines
- New methods of nanocrystalline powder sintering
- Anisotropy of elastic-plastic properties in highly deformed iron alloys
- Polymer-molecule type permanent magnet composites
- Phase and structural transformation occurred in steels under strains generated during mechanical milling and severe plastic deformation of powders
- Hard magnetic ferrites with increased magnetic properties
- Nanocrystalline BaTiO₃ compacts doped with mischmetal oxides
- Structure identification of the polymer-metal composites using Mössbauer spectroscopy
- Magnetic pseudo-super-networks formed by impulse plasma method

The extensive research program of FMSE is financed by:

- the State Ministry of Science and Higher Education (76 projects)
- the Ministry and industry (half to half) – 23 projects
- the EC funds (16 projects)
- industrial partners

PKN ORLEN - Polish Petroleum Concern

WSK PZL-Rzeszów

LOTOS Group

MOSTOSTAL SDL

Zakłady Mechaniczne-Rzeszów

Gasket Sp.z o.o.

Gass Suwałki

and others

Total value of the projects financed by the industry: ~ 4,7 mln PLN/year (~ 17 % of the Faculty's budget)

Didactic Cooperation (1)

Students

Erasmus-Sokrates

- Ecole des Mines de Saint-Etienne (France)
- University of Technology in Vienna (Austria)
- University of Technology in Delft (Netherlands)

Leonardo da Vinci

Bilateral agreements

Norwegian University of Science and Technology in Trondheim (Norway)

Didactic Cooperation (2)

Doctoral Students

International PhD School for High Performance Materials

- Empa, Swiss Federal Laboratories for Materials Testing and Research in Switzerland
- Faculty of Materials Science and Ceramics, University of Mining and Metallurgy, Cracow, Poland
- Faculty of Materials Science and Engineering, Warsaw Iniversity of Technology, Poland

European projects

KMMnoe

ExtreMat

International cooperation (1):

in the field of **nanomaterials**

- University of Oxford (Department of Materials)
- Institute National Polytechnique de Grenoble (LTPCM)
- University of Turin (Chemistry Department IFM)
- Defense Research Establishment, Stockholm
- CSIC (Department of Physical Metallurgy), Madrid
- Waterford Institute of Technology, Ireland
- University of Ioannina (Department of Physics), Greece
- Institute of Physics, Slovak Academy of Sciences
- Moscow State University, Russia
- Ufa State Aviation Technology University, Russia
- Condensed Matter Research Institute of Timisoara, Romania

International cooperation (2):

in the field of failure and degradation of materials

- Staatliche Materialprüfungsanstalt, Universität Stuttgart, Germany
- Aristotle University of Thessaloniki, Greece
- Karpenko Institute of Physics and Mechanics,
- National Academy of Science, Lviv, Ukraine
- Bay Zoltan Foundation for Applied Research, Hungary
- Welding Research Institute, Bratislava, Slovakia
- Bulgarian Academy of Sciences (IMS), Sofia, Bulgaria
- Faculty of Technical Sciences, Novi Sad, Yugoslavia
- Institute of Welding and Materials Testing, Timisoara, Romania

International cooperation (3):

in the field of magnetic materials

- Universidad Complutense de Madrid (Instituto de Magnetismo Aplicado), Spain
- Ecole Normale Supérieure de Caen, France
- Unité Mixte de Physique CNRS/Thales, Paris, France
- Imphy UGINE Precision, Puteaux, France
- Sporenberg Umweltschutz und Verfahrenstechnik GmbH, Bochum, Germany
- Research Institute for Solid State Physics and Optics, Hungarian Academy of Sciences, Budapest, Hungary
- University of Sheffield (Department of Engineering Materials), UK

International cooperation (4):

in the field of surface engineering

- Beijing Polytechnic University, China
- Laser Center Leoben (LZL) Joanneum Research Forschungsgesellschaft GmbH, Graz, Austria
- Werkstoff - Kompetenzzentrum Leoben Forschungsgesellschaft Materials Center, Leoben, Austria
- University w Ulsan, Department of Materials Science and Engineering, South Korea
- University w Metz, CLOES Laboratory, France

International cooperation (5):

in the field of grain boundaries properties

- Universite Paris-Sud, France
- Max Planck Institute fur Metallforschung, Stuttgart, Germany
- Institute of Physics, Czech Academy of Sciences, Czech Republic

in the field of materials characterisation

- Brunel University of West London (Dept. Mat. Science), UK
- Ecole Nationale Superieur des Mines de St-Etienne, France