

The VŠB-Technical University of Ostrava is searching for suitable candidates for post-doctoral research positions

The VŠB-Technical University of Ostrava is a technical and economic institution providing bachelor's, master's and doctoral levels of education, based on free and internationally oriented research. It has the right of conferring academic and scientific degrees, as well as doctoral honorary degrees.

The VŠB-Technical University of Ostrava ranks among the top technical universities in the Czech Republic. It is equipped with excellent research infrastructure and modern laboratory facilities. The scientific and teaching staff collaborate with research and academic institutions and experts on both national and international levels, number of multinational research teams evolve the science and development at the University.

Currently we offer 9 post-doctoral (postdoc) research positions on the following five themes (project modules), supported by the EU Operational Program Education for Competitiveness and the Czech state budget:

- C. [Energetics, efficiency and the environment](#)
(2 postdoc positions; contact: Assoc. Professor Ochodek, tadeas.ochodek@vsb.cz)
- D. [Measurement-taking, transmission and data processing in distributed industrial and biomedical applications](#)
(1 postdoc position; contact: Assoc. Professor Koziorek, jiri.koziorek@vsb.cz)
- G. [Development of new methods for the design, modelling and evaluation of the safety and reliability of steel structures](#)
(1 postdoc position; contact: Professor Strnadel, bohumir.strnadel@vsb.cz)
- H. [Advanced materials, preparation and technology of their processing](#)
(2 postdoc positions; contact: Professor Drapala, jaromir.drapala@vsb.cz)
- L. [Managing, decision-making and modelling of economic and financial processes](#)
(3 postdoc positions; contact: Professor Zmeskal, zdenek.zmeskal@vsb.cz)

The positions are open only for candidates who have not obtained the Ph.D. degree at The VŠB-Technical University of Ostrava.

A basic description of each project module, the contents of the postdoc's work and specific project module requirements for the candidate (expected education, knowledge, experience and skills) are specified below in [Part II](#).

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The positions will be located in Ostrava, the third-largest city in the Czech Republic. The employer will be The VŠB-Technical University of Ostrava. Postdocs will be employed full-time for a fixed period of up to 2 years. The gross salary ranges between 40 – 50 thousand CZK a month (EUR 1600 – 2000). The main postdoc activities are: participation in research activities in a relevant team of experts, preparation of new joint research projects, publication activities, teaching, active participation in workshops and conferences, foreign internships or internships in the application sphere for 3 – 6 months.

For informal enquiries about any aspect of the positions, please contact the relevant investigator mentioned in the parentheses above.

PART I: THE SELECTION PROCEDURE

The candidate shall apply to one main project module and can add one more project module as an alternative. If not selected for their main project module, the candidate will be evaluated for their alternative project module.

Interested candidates should send the following documents in the Czech or English language to daniela.vedrova@vsb.cz by no later than February 25, 2013:

1. An application containing the candidate's contact information incl. e-mail address, chosen project module (or alternative module) and additional specialization if it is mentioned in the chosen project module.
2. A Curriculum Vitae including a brief description of research and educational experience
3. A copy of their Ph.D. degree or similar degree if they studied abroad
4. A certificate proving their level of knowledge of the English language
5. A bibliography containing all information relevant to determine the value of partial evaluation criterion Nos. 1 and No. 2, in the marking and structure as below:
 - A.1 an article in an impact journal (stated on the Web of Science)
 - A.2 an article in a reviewed magazine (stated on the Scopus)
 - B. a professional book
 - D. an article in a collection of proceedings
 - P. patents
 - Z. pilot plants, verified technology, variety, breed
 - F. utility model, industrial patterns
 - G. prototypes, functional samples
 - H. results realized by the provider
 - N. certified methodology and procedures, specialized maps with expert contents
 - R. software
 - V. research reports that contain classified information

The articles accepted into print by the publisher or the articles sent to the publication may also be mentioned.

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6. Research plan (max. 3 000 letters) in which the candidate specifies his/her idea about the technical contents, focus and goals in the postdoc position and the candidate's motivation for seeking the particular position. The research plan is essential to determine the value of partial evaluation criterion Nos. 3 and No. 4.
7. Information (max. 2 000 letters) about attended internships that lasted a minimum 1 month in a foreign academic workplace (foreign candidates may state Czech workplaces): the name and the address of the workplace, the length of the internship, specialized contents, obtained knowledge and skills and the outputs of the internship. The information is essential to determine the value of partial evaluation criterion No. 5.

The selection procedure has two phases. In the first phase, the candidates' following qualifications will be verified:

1. If the candidate successfully completed and obtained a Ph.D. degree or similar degree if they studied abroad as defined by Czech regulation 111/1998, the Higher Education Act.
2. If the candidate successfully completed and obtained a **Ph.D. degree** or similar degree if they studied abroad **on or after March 29, 2008**; the decisive point is the day that the doctoral thesis was defended.
3. Good knowledge of the Czech or English language (CAE or the equivalent)
4. The minimum number of articles published in impact journals is **2**.
5. The minimum number of other outputs defined in the RIV¹ methodology is **3**.

Those candidates who do not meet the above mentioned criteria will be excluded from the selection procedure. Those candidates meeting these qualifications will be assessed by a special evaluation committee (the second phase). Selected suitable candidates will be invited for interviews taking place in Ostrava, Czech Republic (a specific date and location will be provided). Interviews will be held in Czech and/or English.

Candidate assessment criteria and the rates:

Partial evaluation criteria		Rate
No. 1	The number and quality of articles in impact journals	50%
No. 2	The number of other outputs defined in the RIV methodology	25%
No. 3	The quality of the presented research plan	10%
No. 4	The relevance of the theme / scientific importance	5%
No. 5	Internships in a foreign academic workplace	5%
No. 6	Language skills	5%

¹ For candidates, who don't have their outputs in RIV (Register information on the results), their outputs will be evaluated according to the structure and evaluation system in RIV.

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PART II: BASIC INFORMATION ABOUT THE PROJECT MODULES, POSITIONS AND REQUIREMENTS

C PROJECT MODULE C: ENERGETICS, EFFICIENCY AND THE ENVIRONMENT

C.1 A basic description of the project module

The project module is aimed at supporting human resources development in the research and development areas of the regional centre for Innovation for Efficiency and the Environment (INEF). It focuses on the issues of combustion and gasification and on energy security and related areas. Research is concentrated on equipment for heat production and cogeneration by using fossil fuels, especially biomass, in small decentralized units and the development of new technology for biomass gasification, including the production of second generation liquid fuels.

C.2 The contents of the postdoc's work

Specialization: Thermo-chemical conversion of alternative fuels

Research and development of methods and procedures for the preparation of liquid pyrolysis products respectively liquid fuels from synthesis gas, building an experimental facility for research and development of these processes, preparation and experimental verification of biomass and waste thermal processes treatment, passing domestic and international internships in the workplace dealing with similar issues. Outputs: pilot-plant, publications, functional sample.

Specialization: Testing of small combustion devices

Preparation and development of new methodologies in the area of small combustion devices testing, mainly burning solid fuels. Main activities are directed to methods of determining emissions of particulate and gaseous pollutants, the efficiency of combustion equipment, modification methodologies for their specification and more realistic results, update national emission inventory, passing domestic and international internships in the workplace dealing with similar issues. Outputs: publications, functional sample.

Specialization: Biomass and biochar energy utilisation

Solution of problems associated with energy utilisation of biomass and biochar, biochar possibilities of further use including the legal framework, the development of methods for the biochar transformation, changes in emissions production during the biomass utilisation from technical and regional perspective, the life cycle of biomass, the technology for commercial use of biochar, passing home and internships in the workplace dealing with similar issues. Outputs: publications, methods.

C.3 Specific project module requirements for the candidate (expected education, knowledge, experience and skills)

Specialization: Thermo-chemical conversion of alternative fuels

Postgraduate education in the field of energy or chemical sciences; experiences with thermo-chemical conversion of solid fuels; experiences in the identification of pollutants in products of thermo-chemical conversion of solid fuels and waste.

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Specialization: Testing of small combustion devices

Postgraduate education in the field of energy, environmental, or chemical science; experience in experimental work with small combustion devices incl. emission measurements; overview of the legislative requirements that are placed on small combustion devices, overview of different design of combustion devices.

Specialization: Biomass and biochar energy utilisation

Postgraduate education in the field of energy, environmental, or chemical science; experiences in thermochemical conversion of solid fuels; experience in the identification of pollutants in flue gas using solid fuels and wastes; overview of the legislative requirements for energy use of biomass.

D PROJECT MODULE D: MEASUREMENT-TAKING, TRANSMISSION AND DATA PROCESSING IN DISTRIBUTED INDUSTRIAL AND BIOMEDICAL APPLICATIONS

D.1 A basic description of the project module

Information technology in measurement-taking, transmission and data processing in distributed industrial and biomedical applications. The aim of the project module is to build a scientific research group dedicated to applied research in measurement-taking, transmission and data processing in distributed industrial and biomedical applications or in biomedical engineering. The group will participate in research and development activities with the aim of producing results according to the RIV methodology and their transfer into practice and also preparing new researchers for doctoral programs.

D.2 The contents of the postdoc's work

Research and development activities will be focused on biomedical engineering in biotelemetry systems in remote home care environments and measuring non-electric quantities in large distributed systems, the transmission of measured values, archiving and evaluating measured data. Expected results are R & D findings published in an internationally renowned impact journal and results subject to the protection of intellectual property rights according to the RIV methodology. Throughout the project, a number of work placements in institutions and companies engaged in biotelemetry research and development will also be provided both in the Czech Republic and abroad.

D.3 Specific project module requirements for the candidate (expected education, knowledge, experience and skills)

Specialization: The measurement of non-electric quantities

The candidate should have experience in measuring non-electrical quantities, communication systems, designing electronics based on microprocessors and basic knowledge on data archiving and processing. Candidate's previous research activities should be focused on the aforementioned areas and show the candidate's expertise in these areas. The candidate should have experience in national research projects and industrial projects. The candidate has to demonstrate working in research teams for at least 2 years. The candidate has to demonstrate experience with submitting research and educational projects in the aforementioned areas.

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Preferred are professional awards given by international organizations, international activities, requested lectures etc.

Requirements:

- At least 5 scientific publications in ISI WOK.
- Publications in journals with IF are advantageous.
- At least two registered intellectual property rights registered in the Office of Industrial Property (OIP) in the last three years.

G PROJECT MODULE G: DEVELOPMENT OF NEW METHODS FOR THE DESIGN, MODELLING AND EVALUATION OF THE SAFETY AND RELIABILITY OF STEEL STRUCTURES

G.1 A basic description of the project module

The project module involves research into new methods for evaluating the degree of material damage to structural components, structures and equipment for the purpose of increasing their reliability and more precisely determining their remaining lifespan. The research will devise new testing methods requiring only small samples of material to be taken in order to determine the material's micro-structural state and the properties of the entire structure. The results of the proposed tests and monitoring methods will lead to new proposals for methods of managed ageing of structures and equipment, bringing significant economic benefits. The key goal of the project module will thus be achieved: i.e. an increase in the quantity and quality of new findings in applied research with immediate opportunities for technical application. The project module incorporates interdisciplinary topics – encompassing materials mechanics, fracture mechanics, application of computation methods, methods of physical metallurgy, fractography, metallography, methods involving the processing of extensive data sets, and mathematical-statistical methods. The research will bring new, original findings in the design of steel structures and equipment used in the power industry and chemical production. The development of new methods to extend lifespan and increase reliability of steel structures and equipment by using new monitoring methods will lead to a significant reduction in material and energy consumption and will improve the functional properties of new products and equipment. Increased safety, speed, capacity and quality of data transfer systems used in the operation of steel structures and equipment – in order to maximize the strength characteristics and toughness of materials – is one of the most important benefits that will be brought about by the project module.

G.2 The contents of the postdoc's work

The position will involve research and development-related activities in the field of fracture mechanics, stress calculations, and predictions of structural lifespan. The results will be presented at international conferences and published in international impact-factor periodicals.

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G.3 Specific project module requirements for the candidate (expected education, knowledge, experience and skills)

Graduate of applied mechanics, materials engineering or related fields. The candidate must be capable of independent research work in fracture mechanics, numerical calculations of stress, and selected disciplines of materials engineering. The candidate must be able to plan scientific and technical tasks and experiments. The candidate must have experience of presenting research results at an international forum and publication of findings in widely renowned periodicals.

H PROJECT MODULE H: ADVANCED MATERIALS, PREPARATION AND TECHNOLOGY OF THEIR PROCESSING

An attention of the research team, which will be institutionally part of the vast regional research centre “Regional Materials Science and Technology Centre” (RMSTC), will be focused on the perspective of the occupied position, namely on applied research in technology special non-ferrous metals and steelmaking in accordance with the specified objectives.

H.1 A basic description of the project module

The development, preparation and evaluation of special alloys and intermetallic compounds with a defined structure and physical properties for applications in electronics, medical science, machinery and the chemical industry. The development and optimisation of processes of powder technologies for preparing selected kinds of materials (magnetic, friction, materials for automotive industry). Structural and microstructural analyses of experimental materials and products. The preparation of ultrafine grained and nanostructural metallic materials by severe plastic deformation; the study of their structure and properties.

H.2 The contents of the postdoc’s work

Specialization 1

The scope of work and planned outputs: the development, preparation, modelling and optimisation of alloys alloyed by other metals modifying service properties; the application of unconventional metallurgical technologies for the synthesis of special alloys of non-ferrous metals and their intermetallic compounds; the use of modern technologies in the future conditions of the production of special alloys; the conducting of tests and modelling of monitored processes; the technological interpretation of obtained experimental data and their use in practice by their utility design, attested technology, or by patenting. Internships abroad and in the application sphere: Technological centre Ostrava, Vítkovice Group, other industrial companies will be chosen in accordance with the orientation of the involved workers and current situation in industry.

Specialization 2

The scope of work and planned outputs: the development, preparation, modelling and optimisation of alloys alloyed by other metals modifying the service properties of

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biocompatible materials; the specification of modern metallurgical technologies for preparing defined alloys based on Ni-Ti, Ti-Al...; proposing procedures for centrifugal casting, mechanical treatment (forming) and heat treatment for optimising service properties of final products; model melting trials in various smelting units; the optimisation of processes of forming and heat treating alloys for biomedical applications; structural and microstructural analyses of experimental samples, including phase analyses; determining the porosity of alloys, evaluating mechanical properties; corrosion tests of products identified for biomedical applications; conducting industrial-scale tests of products (customers' companies); developing a unified procedure (methodology) for evaluating the structural and mechanical properties of the samples and materials manufactured in laboratory, pilot and industrial conditions; the technological interpretation of results and recommendations for practice by way of the utility model, attested technology or by patenting. Internships abroad in organisations that deal with the above mentioned types of materials. The Institution will be chosen after the completion of a selection procedure for the postdoc – his/her scope of work will consist of conducting tests on pilot and testing equipment. Internships in the application sphere: Medin, Polyclinics in Ostrava, etc. The scope of work of the postdoc will include comparing the obtained results with the requirements of practice and implementation of new types of alloys in practice.

Specialization 3

Research activities will be focused on investigating processes for creating ultra-fine grained microstructures (150 to 300 nm) by severe plastic deformation ($e = 4$ to 20). Physical-metallurgical substances for developing ultra-fine grained structures will be investigated, as well as the possibilities for maintaining its stability and mechanical properties related to it even at elevated temperatures. The following technologies will be investigated and used for preparing ultra-fine grained structures (nano-structures): extrusion through two channels connected at a 90° angle (Equal Channel Angular Pressing – ECAP); High Pressure Torsion – HPT; Accumulative Roll Bonding – ARB; combination of methods of rapid solidification and severe plastic deformation (SPD). Various ferrous and non-ferrous metals and alloys will be used for investigating and analysing the effects of severe plastic deformation. Internships abroad: the scope of work will include conducting tests on pilot and testing equipment. Internships in the application sphere: COMTES FHT, The Technical University in Liberec – The Institute of Nano-materials, The Central European Technological Institute CEITEC, Brno, The Institute of Nuclear Research. The study of nano-technologies, structure and properties of nano-materials.

Specialization 4

Development of physico-chemical and manufacturing fundamentals of the preparation of new-generation hard magnetic materials intended for of high-coercivity permanent magnets with the high temperature-time stability and preset combination of physical properties, in particular, adequate corrosion resistance, for the modern technology. The finding of principal parameters controlling the design of high-coercivity hard magnetic materials based on R₂Fe₁₄B intermetallic with the tetragonal structure (with R = rare-earth metals) with possible additions other elements which will exhibit the high

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magnetization and high temperature-time stability for modern engineering. Among such parameters are the residual inductance, the time-temperature stability. This is characterized by the temperature coefficient of induction over the operation temperature range (this parameter determines the constancy of useful signal at various temperatures), the coercive force determining the maximum operating temperature of material and its insensitivity to external electrical and magnetic fields, and physical and mechanical properties so that a magnets of any geometry can be prepared by powder metallurgy and withstand the mechanical treatment and pulsed magnetization without failure. The research will be focused on the effect of alloying method, the alloying composition, temperature-time treatment conditions on the structure (grain size) and magnetic properties of R₂Fe₁₄B-based magnetic materials, which will allow to develop processes and substantially to steadily realize the preparation of high-quality magnets, and, depending on application purposes to modify additions and heat-treatment conditions to manufacture magnets with different properties. Another aim is research and development of friction materials for automotive industry (powder metallurgy technology).

H.3 Specific project module requirements for the candidate (expected education, knowledge, experience and skills)

A Ph.D. degree in material engineering, chemical technology, physical metallurgy, or similar. Specialization 4: practical skills - structural analysis of materials with the use of techniques of light and electron microscopy, basic knowledge of Thermocalc and Dictra software.

PROJECT MODULE L: MANAGING, DECISION-MAKING AND MODELLING OF ECONOMIC AND FINANCIAL PROCESSES

L.1 A basic description of the project module

The project module is focused on all relevant applications of quantitative methods within economics and finance, but primarily in econometrics, financial modelling, and operational research – these are topics that receive permanent priority in research activities at the Faculty of Economics and are the basis of this research programme. As such, they should be publicised in top journals (with respect to IF factor) in applied mathematics, such as the European Journal of Operational Research, Fuzzy Sets and Systems, Information Sciences, Management Sciences or Cell Transplantation as well as journals focusing on local problems of economics (Eastern European Economics, International Finance, Czech Journal of Economics and Finance).

L.2 The contents of the postdoc's work

Initially, it is assumed that postdocs will work with senior researchers on their research tasks. Later, ie after the first year and according to achieved results, they might form their own groups by selecting PhD students and promising Master's students and choose their own research topics to work on that would result in publications for top journals.

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The postdocs should also be able to deliver seminars for PhD or Master's students related to their research topics. The positions include standard benefits, such as laptop usage, access to research books, conference trips and mid-term research visits abroad.

L.3 Specific project module requirements for the candidate (expected education, knowledge, experience and skills)

The candidates should have a PhD in economics, finance, applied mathematics or other related disciplines. Candidates with a strong background in programming and computational software skills will be preferred.

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