



INVESTMENTS IN EDUCATION DEVELOPMENT

**Faculty of Textile Engineering at Technical University of Liberec
within the project „Support of engineering of excellent research and development teams
at the Technical University of Liberec“, No. CZ.1.07/2.3.00/30.0065
announces the following
selection procedure for positions**

of Post-Doctorates

**at workplaces of Faculty of Textile Engineering, Faculty of Mechanical Engineering,
Faculty of Economics and Faculty of Science, Humanities and Education**

Description of the workplace

The Post-Doctorate will be working on scientific and research projects, will be preparing publications in cooperation with his/her mentor (a contact person and an excellence scientific worker). He/she will gain new international experience within the project by educational stays and active participation at international conferences. The important part of his/her scope of work will be preparing and realisation of educational activities within his/her workplace in one of the faculties of Technical University of Liberec (TUL): Faculty of Textile Engineering (FT), Faculty of Mechanical Engineering (FME), Faculty of Economics (FE), Faculty of Science, Humanities and Education (FSHE). Position requirements:

- 3 months research stay abroad or at the cooperative organisation.
- Teaching of students in the range of 3-5 hours per week.
- Administration of final works for students studying Bachelor studies and Master studies, consultations.
- Active participation in publishing of research results in journals and at the conferences under the patronage of TUL.

Postdoc positions are available in the following research areas and for the following number of vacancies:

A) FACULTY OF TEXTILE ENGINEERING

Specialisation: Mechanical properties of textile materials

Number of advertised positions: 1

Mentor: prof. RNDr. David Lukáš, CSc. (Department of Nonwovens, Faculty of Textile Engineering TUL)

Specific requirements: None.

Required education: Graduate of doctoral study in the fields of natural sciences (chemistry, physics), textile technologies.

Work description:

The Post-Doctorate will be working on research within the study of nanofiber materials, technology of nanofiber production, physical principles in their production and their properties (morphological, mechanical) and mechanical description by methods of computer simulation leading to a numerical solution. By using these methods, primarily by the finite element method (FEM), or other appropriate ways, he/she will be able to make virtual „experiments“, which are not possible to do with regards to e.g. small dimensions of the



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researched areas or non-existence of measurement appliances (e.g. measurement of contact pressures between the fibres).

Specialisation: Textile structures with multifunctional effects

Number of advertised positions: 1

Mentor: prof. Ing. Jiří Militký, CSc. (Department of Textile Materials, Faculty of Textile Engineering TUL)

Specific requirements: Recommending letter from the supervisor of doctoral study.

Required education: Graduate of doctoral study in the fields of natural sciences (chemistry, physics), polymer physics, textile engineering or technologies.

Work description:

The basic scientific activity for the Post-Doctorate will be design, preparation and characterization of nanocomposites with polymer matrix. Consequently, construction of products prototypes will be solved on basis of combination and nanocomposites and textile structures providing specific properties such as prevention of bacteria, mildew and fungus, improvement of humidity and heat drain, absorption and deactivation of smells, active surface cleaning (self-cleaning), release of active oxygen and increase in mechanical and thermal resistance. Next target will be preparation of such systems on nanoparticles basis, which reduce flammability, provide permanent effects, which are non-toxic and don't affect the using negatively.

Specialisation: Development and examination of external detector of clothing comfort

Number of advertised positions: 1

Mentor: prof. Ing. Luboš Hes, DrSc., Dr.h.c. (Department of Textile Evaluation, Faculty of Textile Engineering TUL)

Specific requirements: None.

Required education: Graduate of doctoral study in the field of thermomechanics, mechatronics, textile/clothing technology, with knowledge of programming languages and also partly electronics.

Work description:

The Post-Doctorate will be working on research of the analysis of heat and humidity transfer between human, clothing and surroundings. Furthermore he/she will be working on theoretical analysis of the problem within the frame of numerical model formation, which will include also heat transfer by radiation, eventually condensation of humidity in clothing layers. The experimental research will be focused on running of humidity in level of textiles and time of drying after sweat moistening of the textile. The last aim will be (with help of an electronics specialist) development and examination of external detector of heat comfort of a particular clothing on a particular person, who enables non-destructive and quick assesment of heat and eventually vapour resistance in different places of worn clothing.



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Specialisation: *Semi-permeable membranes on basis of nanofiber layers*

Number of advertised positions: 1

Mentor: prof. RNDr. Oldřich Jirsák, CSc. (Department of Non-woven Textiles, Faculty of Textile Engineering TUL)

Specific requirements: Recommending letters from 2 professors.

Required education: Graduate of doctoral study in the field of macromolecular chemistry, textile chemistry or in fields of similar specialisation.

Work description:

Work of the Post-Doctorate will include preparation of modified nanofiber layers with the goal of achievement of semi-permeable materials for sport and other special clothing products. The work will concern fields of electrospinning, modifications of nanofiber layers including plasma processes, evaluation methods of relevant properties of layers (water column, air and water vapour permeability, wind resistance, care effect etc.) and formation of composite materials which contain modified nanofiber layers. Part of the work will be preparation of technology for continual production of developed materials.

B) FACULTY OF MECHANICAL ENGINEERING

Specialisation: *Research and development of composite materials with specific properties*

Number of advertised positions: 1

Mentor: doc. Ing. Iva Petříková, Ph.D. (Department of Applied Mechanics, Elasticity and Strength, Faculty of Mechanical Engineering TUL)

Specific requirements: Recommending letter from the supervisor of doctoral study or the head of the workplace, good knowledge in mechanics of composite materials, failure mechanics, fracture mechanics, knowledge of experimental and laboratory measurements and evaluation of an experiment, experience with numerical simulation FEM (ANSYS, Comsol, Marc) will be preferred.

Required education: Graduate of doctoral study in the field mechanics of materials, applied mechanics or similar fields.

Work description:

The Post-Doctorate will be participating in research and development of composite materials with specific mechanical, electrical, magnetic and other properties, so called smart materials. Experimental and numerical research of their thermomechanical properties and their response to mechanical and other loads. Study of their strength, resistance to fatigue and damage, research of resistance to influence surrounding effects. Investigation of influence of particular components properties and form of their spatial layout and microstructure to final properties of the composite. Research of possibilities of application of developed composites.

Specialisation: *Fluid mechanics, thermodynamics*

Number of advertised positions: 1

Mentor: doc. Ing. Václav Dvořák, Ph.D. (Department of Power Engineering Equipment, Faculty of Mechanical Engineering TUL)

Specific requirements: Recommending letter from the supervisor of doctoral study or the head of the workplace, good knowledge in fluid mechanics, knowledge of experiment and laboratory measurements and evaluation of an experiment, experience with numerical simulation CFD (ANSYS/Fluent or OpenFOAM).



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Required education: Graduate of doctoral study in the field of applied mechanics or other related fields.

Work description:

The Post-Doctorate will be working on research of topics - innovation of jets and diffusers for ejectors by thermoacoustic engines and pulsating streams for control of current fields. He/she will apply experimental fluid mechanics by aerodynamics, experimental methods currently used in the field, e.g. wire anemometry (CTA – constant temperature anemometry) or laser anemometry (PIV – particle image velocimetry), knowledge of evaluative methods.

Specialisation: Textile machines and machines for production of nanofiber structures

Number of advertised positions: 1

Mentor: prof. Ing. Jaroslav Beran, CSc. (Department of Textile Machine Design, Faculty of Mechanical Engineering TUL)

Specific requirements: Experience with numerical simulation FEM, knowledge of experiment, knowledge of modelling in CAD.

Required education: Graduate of doctoral study in the field of machine design or applied mechanics or different related fields.

Work description:

The Post-Doctorate will be dealing with research and development of new systems of textile machines and machines for production of nanofiber structures. He/she will be searching for unconventional solutions of machines design for new technologies of production of nanofiber structures, providing special requirements specified for these structures and which also follow mechanical and physical properties of nanofibers. Except technology of electrostatic spinning, the focus will be held for example on equipment for nanofiber production by the method of centrifugation. Next activity of the post-doctorate will be analysis and optimisation of properties of investigated textile machines by the methods of computer simulation in confrontation with verifying experiments on realbodies, systems or prototypes of machines.

Specialisation: Ecological machining fluids

Number of advertised positions: 1

Mentor: prof. Ing. Alexey Popov, DrSc. (Department of Machining and Assembly, Faculty of Mechanical Engineering TUL)

Specific requirements: None.

Required education: Graduate of doctoral study in the field of Mechanical Engineering, especially of cutting tools.

Work description:

The Post-Doctorate will be working on research of project focused on new generations of ecological machining fluids in cooperation with an industrial partner. Part of this researched topic will be solved in cooperation with Department of Petroleum Technology and Alternative Fuels, Faculty of Environmental Technology (Institute of Chemical Technology in Prague).



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C) FACULTY OF SCIENCE, HUMANITIES AND EDUCATION

Specialisation: Characterization of piezoelectric and ferroelectric materials

Number of advertised positions: 1

Mentor: prof. Mgr. Jiří Erhart, Ph.D. (Department of Physics, Faculty of Science, Humanities and Education TUL)

Specific requirements: 2 recommending letters (including one from Ph.D. thesis supervisor), strong background in solid state physics, mainly with physics of dielectrics, preparation of computer controlled experiments and experimental data processing.

Required education: Graduate of doctoral study in the field of solid state physics, preferably in the measurement of properties of piezoelectricity and ferroelectricity.

Work description:

The Post-Doctorate will be working on research projects specified on description and measurement of properties of piezoelectric and ferroelectric materials in Piezoelectric laboratory. The main aim of the study is experimental characterization of piezoelectric and ferroelectric materials, their electromechanical and ferroelectric properties, theoretical modelling of effects and materials, development and realisation of computer controlled experiments for the material characterization techniques. Piezoelectric ceramic elements like resonators, transformers and actuators will be studied.

Specialisation: Matrix methods of numerical linear algebra

Number of advertised positions: 1

Mentor: prof. RNDr. Ivo Marek, DrSc. (Department of Mathematics, Faculty of Science, Humanities and Education TUL)

Specific requirements: None.

Required education: Graduate of doctoral study in the field of mathematics, modelling or natural sciences engineering with specialisation in numerical analysis or linear algebra.

Work description:

The Post-Doctorate will be dealing with basic research in the field of matrix methods of numerical linear algebra. In particular he/she will focus on study of problems arising during the analysis of Krylov methods and their application on so called ill-posed tasks. In case of hybrid methods of solving for ill-posed tasks solving, the Krylov method implementing external regularisation is combined with internal regularisation applied on the project problem. The Post-Doctorate will be dealing with these methods of regularisation. In particular he/she will focus on analysis of the whole problem of the least squares (and so called classical TLS algorithm) especially for tasks with more than one right sides. The Post-Doctorate will focus on low-rank analysis of Krylov methods for Lyapunov equations solving, which arise during the work of reduction of the model.

Specialisation: Statistic modelling in the field of extreme values

Number of advertised positions: 1

Mentor: doc. RNDr. Jan Píček, CSc. (Department of Applied Mathematics, Faculty of Science, Humanities and Education TUL)

Specific requirements: 2 recommending letters (including one from the thesis supervisor).

Required education: Graduate of doctoral study in the field of probability and mathematical statistics.

Work description:



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The Post-Doctorate will be dealing with the basic research of statistic modelling in the field of extreme values. He/she will study especially multivariate methods, models of extreme events with presence of trend in the data, „peaks-over-threshold“ method in connection with regression quantiles. Big attention will be given also to matter of theory and practical use of appropriate parameter estimations in studied models of extreme events based mainly on L-moments and non-parametric procedures.

D) FACULTY OF ECONOMICS

Specialisation: Information distribution in special situations

Number of advertised positions: 1

Mentor: doc. Ing. Klára Antlová, Ph.D. (Department of Informatics, Faculty of Economics TUL)

Specific requirements: Recommending letter from the supervisor of doctoral study or the head of the workplace, list of participations in solution of research projects and list of other provable outputs related to the particular position, experience from the field of process management, analysis and concept of information systems.

Required education: Graduate of doctoral study in the field of computer science or information management.

Work description:

The Post-Doctorate will be participating in research and development project operated by the Department of Informatics of Faculty of Economics TUL in the field of crisis communication and information distribution in special situations. The aim of this project is minimalisation of economic damage and using system solution in searching for appropriate technological tools and methodical procedures of crisis management. The outputs of the project will be applied in the concept of methodics specified for state administration and also for commercial organisations.

Specialisation: Research of business procedures

Number of advertised positions: 1

Mentor: doc. Ing. Miroslav Žižka, Ph.D. (Department of Business Administration, Faculty of Economics TUL)

Specific requirements: Recommending letter from the thesis supervisor, list of participations in solution of research projects and list of other provable outputs related to the particular position, interest in matters of quantitative methods in management.

Required education: Graduate of doctoral study in the field of business administration or management.

Work description:

The Post-Doctorate will be dealing with analysis of economical processes in the businesses by appropriate quantitative methods. He/she will be working on the research of possibilities of using quantitative methods in management with optimisation and modelling of business processes including evaluation of economic impacts on business management. The subject of the research will be searching for new methods for business processes management and development of existing methods for business processes management, e.g. in the field of logistics, production management, quality management.



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IMPORTANT INFORMATIONS

Required skills and experience

- Good knowledge of Czech or English language (CAE \geq B1 or equivalent).
- Experience with realisation or research and development projects in industrial or academic field.

Required education for all of the above-mentioned positions

- Fully finished doctoral study and acquired relevant degree of required doctoral study programme or similar certified study programme received abroad in term of 25th March 2008 – 1st September 2012.

Terms of employment

- Based on an employment contract.
- 100% load of work at TUL from January 2013 for the duration of the project until June 2015. (The employment contract will be signed for 1 year, after this period it will be prolonged until the project ends in case of proper fulfillment of working tasks and targets of the project.)
- Employment only in the Czech Republic during the project participating.

Salary

- A3 according to the internal wage structure of TUL.
- Salary 40 000,- CZK/month (1600 EUR); (in case of proper fulfillment of working tasks and targets of the project).

Starting date

- Starting date of work January 2013, eventually following mutual agreement and visa obligations.

We offer

- Flexible working hours.
- Possibility of university accommodation.
- Possibility of babysitting.

Working terms and salary classification are governed by the conditions of employment, Internal salary regulations of TUL, the Labour Code and Regulations of selection procedure for filling positions of academic workers and other employees of TUL.

Contact persons

Don't hesitate to contact us in case of any questions.

Organizational and personnel department: Ing. Alena Šírková (volnamista@tul.cz),

Manager of the project: Ing. Denisa Karhánková (denisa.karhankova@tul.cz).

The job application shall be marked “post-doctorate” and must be accompanied by the following documents

- Structured curriculum vitae according to Europass example, max. 2 pages size A4.



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- Officially certified copy of diploma, which represents successful finishing of study in doctoral study programme and acquirement of doctoral degree in term of 25th March 2008 – 1st September 2012.
- Letter of motivation not longer than 2 pages size A4 including description of targets in research and development.
- Brief description of previous professional, scientific and research activities including experienced educational stays, max. 4 pages size A4.
- List of the most important achievements published especially in journals and reactions to the work (reactions according to WoK or SCOPUS, H-index etc.).
Example: [1] KOVÁŘOVÁ, Jana and DVOŘÁK Radek. Textile smart materials for medical applications. *Name of the journal*. 2012, year 5, number 1, pages 8-16. ISSN 1234-6789.
- Summarisation of adequate activity in development with giving the evidence of practical realisation (patent, utility models etc., and officially certified documents proving the realisation in practice) and list of other provable outputs related to the particular position of the Post-Doctorate.
- In case that the applicant is not a Czech citizen, a certificate proving good knowledge of Czech or English language (CAE \geq B1 or equivalent) is needed.
- Short abstract from thesis not longer than 4 pages size A4.
- Recommending letters if requested in specific requirements of the particular position.

Process of selection procedure

The selection procedure for particular positions will be held in 2 rounds. In the first round the applicant will be evaluated on his/her qualifications and relevant work experience (based on the delivered documentation). At this stage the applicant will be considered if he/she fulfills the general requirements.

Applicants who don't fulfill above mentioned characteristics will be excluded from the selection procedure. Applicants who meet the qualification requirements will move up to the second round, which will be carried out by assessment committee consisting of minimum 3 persons. A mentor for the particular position of the Post-Doctorate is also a member of the assessment committee. Applicants will be evaluated by following criterias:

Criteria:	Importance of criteria
	Total 100%
Number and quality of articles in journal with impact factory, reviewed journals and other publications	max. 50 %
Development activity, knowledge of spectra of experimental techniques and methodologies from the particular field	max. 30 %
Individual specific qualification	max. 20 %

The best applicant for each of the criterias gains maximal amount of points and others gain its aliquot part according to their results. In case that the applicant will be evaluated also according to criterias which don't have the objective specified figures, which are evaluated subjectively (e.g. recommendation from the previous supervisor), every member of the



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assessment committee gives the points according to his/her consideration. Resulting number of points for the applicant will be arithmetic average of the point evaluation given by the particular members of the assessment committee, however, the average can't reach over the particular importance of the criteria.

Interview is not the condition of the assessment procedure, although the assessment committee can decide about the interview for the applicants who identically show the best results after evaluation of all criterias. It can be either in-person interview or on-line interview. Both rounds of the selection procedure can take place immediately one after another. An integrated committee will be established for each faculty, and during the evaluation the specifications of the particular fields and their publication possibilities will be taken into consideration. The committee will prepare recommended order of the applicants within the frame of each working position. This will be given to the rector of TUL for approval. The winning applicant of the selection procedure will be the one, who gains in the evaluation of particular criterias the highest number of points. All the applicants will be informed about the result 30 days after the end of the selection procedure at the latest. The results and protocols about the running of the selection procedure will be also published on websites of Technical University of Liberec. If any of candidates to any position do not meet the requirements of the tender, this tender may be cancelled.

Applications for the selection procedure including all requested documents in Czech or English language shall be delivered via e-mail or by post no later than 14th September 2012 to the following addresses:

**Technical University of Liberec
Organizational and personnel department
Studentská 2
461 17 Liberec 1**

Contact person: Ing. Alena Šírková, Organizational and personnel department
e-mail: volnamista@tul.cz

The selection procedure is published since 1st August 2012 on the Official Board of the Technical University of Liberec (http://www.tul.cz/urednideska/uredni-deska-tul/vyberovazeni-volna-mista_107) and the website of the Ministry of Labor CR (<https://portal.mpsv.cz/>, <http://portal.mpsv.cz/eures>). The selection procedure is also published on websites: www.phdjons.com, www.postdocjobs.com, www.euraxess.cz, www.academicpositions.eu, www.engineering.academickeys.com.