



CHARLES UNIVERSITY

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List of Post-Doctoral Fellowships

Announced in 2020

New call for applications in 2020 has been open!

Applicants can apply in 2020 for positions in projects announced by following faculties/institutes:

- A. [Charles University Environment Centre](#) : 1 project
- B. [Faculty of Medicine in Pilsen](#) : 5 projects
- C. [Faculty of Arts](#) : 1 project
- D. [Faculty of Education](#) : 4 projects
- E. [Faculty of Science](#) : 6 projects
- F. [Faculty of Mathematics and Physics](#) : 7 projects
- G. [Faculty of Social Sciences](#) : 10 projects
- H. [Faculty of Humanities](#) : 1 project
- I. [Faculty of Physical Education and Sport](#) : 2 projects

Deadlines of submitting of applications you will find under each specific project!

More detailed information about general conditions of applying for positions funded by Post-doc Stays Fund you can find on the website: [Post-Doc Stays Fund](#).

A. Environment Centre

Title of the research project:

Modelling impacts of environmental, energy, and climate regulation at macro level

Description:

A prospective candidate will be responsible to contribute in building, enrichment, and application of the energy system optimisation model (TIMES) and/or a macro-structural model like computable general equilibrium model to assess the impacts of regulation on the economy, energy use, the environment, and the costs in the Czech Republic. Previous experience with an energy system model and/or a CGE model and using GAMS software is required. Good econometric skills are asset.

Funding:

Position will be co-financed from the EXPRO FEM3 project funded by the Czech Science Foundation (GAČR) and project supported by the Czech Technology Agency within its programme "Prostředí pro život 2".

Workplace/Institution: A prospective candidate will be involved in a research team at Environmental Economics and Sociology Unit at the Environment Center (Charles University).

Supervisor: Dr. Milan Ščasný

E-mail: milan.scasny@czp.cuni.cz

Phone: +420 220 199 477

Position available from: January 1, 2021

Deadline date for applications: July 25, 2020

Applicants must submit required documents to: Dr. Milan Ščasný - milan.scasny@czp.cuni.cz (project supervisor)

B. Faculty of Medicine in Pilsen

Title of the research project:

1. Antimicrobial resistance

The spread of MDR microbes has caused a public health crisis of global dimensions. MDR bacteria, and more specifically carbapenemase-producing Enterobacterales, *P. aeruginosa* and *A. baumannii*, have already been detected all over the globe, with a marked endemicity according to enzyme type. Genes encoding carbapenemases are usually associated with mobile genetic elements (MGEs) such as integrons, insertion sequences, transposons and plasmids. Plasmids play an important role in epidemiology of antibiotic resistance, since acquisition of various resistance genes on a replicon can result in resistance to multiple antibiotics of the host bacterial cell. Additionally, plasmids harbor various genes encoding virulence or adhesion factors, which offer an advantage to the bacterium for successful invasion and survival within the infected host. We are searching for a motivated researcher that is willing to investigate Antimicrobial Resistance (AMR) in clinical and environmental settings using WGS. Moreover, AMR and its association with microbiome and metagenomics will be investigated.

Applications are invited for appointment as Post-doctoral Fellow in Antimicrobial Resistance starting January 2021 for two years, with the possibility of renewal subject to funding availability and performance.

The appointee will work on a new long-term, multi-phased, international epidemiological and laboratory research programme on the etiologies of antimicrobial resistance. He/She will assist in managing a bacteriological research laboratory, run experiments, collect clinical specimens, analyse data, write academic papers and grant proposals, and perform other tasks as assigned by the supervisor.

Qualifications:

Ph.D. degree in biology, microbiology, bioinformatic or related disciplines. Max. 3 years from graduation!

Excellent English communication skills both in written and oral form.

You have knowledge about comparative genomics, 16S amplicon sequencing analysis or shotgun sequencing. You should show some experience with the processing of genome, 16S rRNA and / or metagenome data sets. Preferably, you can document experience with at least a few of the following bioinformatic tasks: multiple alignment, sequence searching (blast and variants), profile construction and searching (hmmer and variants), tree inference, sequence classification, orthology / pangenome inference, prophage detection.

You master basic computational skills to be able to do bioinformatics, such as the linux command line environment and the basics of programming (R and / or Python and / or Perl). You will be trained in our team but should be eager to learn.

Knowledge about molecular evolution is a plus: understand what a phylogenetic tree is and how you interpret it, know about orthologs, paralogs, core / accessory genome, horizontal gene transfer.

Experience in microbiome research will be highly advantageous.

The applicants should submit:

All documents required by the Fund - please see [here](#)

+ Brief description of prior research, skills and experiences.

Laboratory: Laboratory of Antibiotic Resistance and applications of Mass Spectrometry in Microbiology (Faculty of Medicine in Pilsen, Charles University)

Supervisor: Asst. Prof. Ibrahim Bitar, Ph.D.

E-mail: ibrahimbitar5@gmail.com

Phone: 00393888709500

Position available from: January 1, 2021

Deadline date for applications: July 20, 2020

Applicants must submit required documents to: Jitka Černohousová - Jitka.Cernohousova@lfp.cuni.cz

Title of the research project:

2. Circulating cell-free tumor DNA and its role in the management of solid cancers

Input premise

The optimal choice of cancer therapy depends upon analysis of the tumor genome for druggable molecular alterations. The spatial and temporal intratumor heterogeneity creates substantial challenges, as a molecular profile depends on the time and site of tumor tissue collection.

The molecular analysis of circulating cell-free tumor DNA (ctDNA) offers a novel, minimally invasive method that can be performed at multiple time-points and plausibly provide a better representation of the cancer's prevailing molecular profile. ctDNA assessment offers multiple clinically useful applications, such as the identification of molecular targets for cancer therapy, monitoring the tumor's molecular profile in real time, detecting emerging molecular aberrations associated with resistance to a particular therapy and determining the cancer's prognosis, as well as diagnosing cancer recurrence or progression.

The aim of the project is to develop and utilize a novel and highly sensitive assay for ctDNA analyses based on digital droplet PCR. The research is focused mainly on the early stages of solid tumors such as melanoma, non-small cell lung cancer and colorectal cancer. The analysis of ctDNA from patients' peripheral blood will be used as an additional and independent prognostic factor for the detection of minimal residual disease after surgery and early detection of potential cancer relapse.

This research will continue existing liquid biopsy projects. The main responsibilities of the successful applicant will be: assisting with sample collection and plasma processing, performing ctDNA isolation from plasma and available tissues (FFPE) and determining the presence of ctDNA using the ddPCR method. The successful applicant will participate in sequencing samples, a process that will also involve the use of next generation sequencing. The successful applicant will also participate in the interpretation of results and preparation of original articles, as well as grant applications. Involvement in preclinical research based on an experimental models of tumor cell lines will be also possible.

In addition to the Department of Histology and Embryology, research will be performed at the Department of Biology (supervisor: doc. RNDr. Martin Pešta, Ph.D.) and at the Central Laboratory for Immunoassays as well (supervisors: prof. MUDr. Ondřej Topolčan, Ph.D., doc. PharmDr. Radek Kučera, Ph.D.).

Required qualification:

Ph.D. (or equivalent) degree in medicine, life sciences, or related fields. Max. 5 years from graduation!

Technical skills in molecular biology (e.g., reverse transcription-qPCR, digital PCR, tissue sectioning, immunohistochemistry, western blotting).

High motivation, ability to conduct collaborative research.

Track record of publications in peer-reviewed journals: at least 3 publications in IF journals (IF 1.5 or more), at least one as a first author

Excellent English communication skills both in written and oral form

The applicants should submit:

All documents required by the Fund - please see [here](#)

+ Brief description of prior research, skills and experiences.

Main Department: Department of Histology and Embryology (Faculty of Medicine in Pilsen, Charles University)

Laboratory: Laboratory of liquid biopsy and molecular oncology

Supervisor: Ing. et Ing. Jiří Polívka, Ph.D.

E-mail: Jiri.Polivka2@lfp.cuni.cz (or polivkajiri@gmail.com)

Phone: +420 377 593 320

Position available from: January 1, 2021

Deadline date for applications: July 20, 2020

Applicants must submit required documents to: Jitka Černohousová - Jitka.Cernohousova@lfp.cuni.cz

Title of the research project:**3. Composite Hydrogels for Bone Tissue Engineering****Input premise**

Hydrogels are used in biomedicine due to its specific properties, as similarity to human tissue, biocompatibility, elasticity, or ability to absorb high amount of water. All these properties depend on hydrogel composition, structure and the type of crosslinking. Hydrogel properties should be adapted to the environment where it is as a scaffold for cells and other substances important for cell proliferation and differentiation. Hydroxyapatite, as a significant part of bone tissue, together with other synthetic or natural polymers should be used in composite material production. A suitable scaffold should be seeded with cells (osteoblasts, hMSCs) and their adhesion, proliferation and differentiation should be observed. The main aim is to prepare a composite material similar as much as possible to native biological tissue. This cell - seeded scaffold could be used as a promising substitution to restore and improve the function of bone tissue.

Required qualification:

Ph.D. (or equivalent) degree in chemistry, biochemistry, molecular biology or biomedicine. Max. 5 years from graduation!

Experience in tissue engineering, molecular biology or biomedicine.

Working with cells and tissue culturing.
Basic knowledge of polymers.
High motivation, ability to conduct collaborative research.
Excellent English communication skills both in written and oral form.
Experience with scientific publishing.

The applicants should submit:

All documents required by the Fund - please see [here](#)
+ Brief description of prior research, skills and experiences

Department: Department of Medical Chemistry and Biochemistry (Faculty of Medicine in Pilsen, Charles University)

Supervisor: Vlastimil Kulda, Ph.D.

E-mail: vlastimil.kulda@lfp.cuni.cz

Phone: +420 377 593 287

Position available from: January 1, 2021

Deadline date for applications: July 20, 2020

Applicants must submit required documents to: Jitka Černohousová - Jitka.Cernohousova@lfp.cuni.cz

Title of the research project:**4. Nanostructured titanium implants in biological environment****Input premise**

Titanium and its alloys are the most important materials used in dental implantology. The successful integration of the titanium dental implant into the bone depends mainly on the properties of its surface properties, such as topography, chemical composition, homogeneity of the crystal structure, roughness and wettability, which affect not only the ability of the cells to adhere to the implant, but also their future fate. The clinical success of the implant depends mainly on establishing direct contact between implant surface and surrounding bone.

Optimization of surface roughness leads to increased proliferation, optimization of surface wettability promotes initial adhesion. There are a number of methods that change the surface properties, such as sandblasting, laser ablation, chemical etching, anodic oxidation or adsorption of proteins and other organic molecules. Despite the excellent properties of recent titanium implants, there are still a significant proportion of implant rejections. To minimize the number of experimental animals, the biocompatibility of the modified surfaces is first tested in contact with the cell culture in vitro. Only successful materials are then tested in vivo to determine the degree of osseointegration.

The research will be focused on the in vitro phase of biocompatibility testing. The aim is to determine the relationship between biological activity (cell viability, adhesion, morphology, proliferation and differentiation) and the modified surface of the material.

Required qualification:

Ph.D. (or equivalent) degree in biochemistry, biology or biomedicine. Max. 5 years from graduation!

Technical skills in biochemistry, molecular and cell biology

High motivation, ability to conduct collaborative research.

Excellent English communication skills both in written and oral form.

Experience with scientific publishing.

The applicants should submit:

All documents required by the Fund - please see [here](#)
+ Brief description of prior research, skills and experiences

Department: Department of Medical Chemistry and Biochemistry (Faculty of Medicine in Pilsen, Charles University)

Supervisor: Jana Kolaja Dobrá, Ph.D.

E-mail: jana.dobra@lfp.cuni.cz

Phone: +420 377 593 285

Position available from: January 1, 2021

Deadline date for applications: July 20, 2020

Applicants must submit required documents to: Jitka Černohousová - Jitka.Cernohousova@lfp.cuni.cz

Title of the research project:

5. Impact of diabetes mellitus to autonomic nervous system innervating cardiovascular system.**Input premise**

Diabetes mellitus is a disease with high incidence and high socio-economic relevance. The prevalence of diabetes mellitus is an alarming global health issue. The cardiovascular system is among those organs whose functional and structural impairment during progression of this disease are limiting for life quality and survival.

Scientific activities of Laboratory of Laser Microdissection are mainly focused on study of effects of different physiological and pathological states on the heart innervation. The research projects aim to find mediators or their receptors responsible for symptoms of diabetic or cirrhotic cardiomyopathies. Methodological approaches, also, include analysis of gene expression and protein tissue distribution by means of RT-qPCR, Western blot, and immunofluorescence in separate heart compartments and autonomic ganglia. Additionally, laser microdissection is used in order to analyze effect of mentioned pathologies to cardiac ganglia.

The research will be focused on autonomic nervous system innervating the heart and vessels. Effect of type I and type II diabetes mellitus on these structures will be studied in animal models by means of real time PCR, immunohistochemistry and Western blotting.

Furthermore, the successful candidate will participate in the preparation of LCM samples from various pathological tissues in cooperation with other laboratories.

Required qualification:

Ph.D. (or equivalent) degree in physiology/biology/medicine. Max. 5 years from graduation!

Technical skills in molecular biology (e.g., reverse transcription-qPCR, tissue sectioning, immunohistochemistry, western blotting) – advanced experience.

High motivation, ability to conduct collaborative research.

Excellent English communication skills both in written and oral form.

Track record of publications in peer-reviewed journals: at least 3 publications in IF journals (IF>1.5), one as a first author.

The applicants should submit:

All documents required by the Fund - please see [here](#)

+ Brief description of prior research, skills and experiences

Department: Biomedical Center (Faculty of Medicine in Pilsen, Charles University)

Laboratory: Laboratory of Laser Microdissection

Supervisor: Magdaléna Chottová Dvořáková, M.D., Ph.D., Associate Professor of Physiology

E-mail: magdalena.dvorakova@lfp.cuni.cz

Phone: +420 377 593 343

Position available from: January 1, 2021

Deadline date for applications: July 20, 2020

Applicants must submit required documents to: Jitka Černohousová - Jitka.Cernohousova@lfp.cuni.cz

C. Faculty of Arts

Title of the research project:**Egyptian Imperialism in the Northern Levant and the Origins of Diplomacy**

The Czech Institute of Egyptology is seeking a highly qualified international post-doc researcher who would join the interdisciplinary team for two years focusing on ancient Egyptian foreign policy with special attention given to the evolution of the imperial policies of the Egyptian 18th Dynasty in the northern Levant (i.e. Syria and Lebanon), and how this eventually led to the origin of the diplomatic system of the Amarna letters.

The Egyptian sources of the 18th Dynasty, particularly during the reign of Tuthmosis III, unashamedly express the interrelation of imperialism and economics. Not only should this silence any doubt as to the economic motives of Egyptian imperialism, but it could also elucidate most aspects of the foreign policy of the 18th Dynasty. In fact, during the Second Intermediate Period, the 17th Dynasty based in Thebes was removed from the demand-supply chain of the international economy, since the pharaonic state needed control over the Nile Delta for access to the international trade networks and over Nubia for the supply of gold. The alliance between the Hyksos and the kingdom of Kerma, on the other hand, may well have constituted an economic superpower, combining the nexus of Mediterranean trade at Avaris and the gold ores of Nubia. The removal of the Hyksos rule in the Nile Delta, therefore, was the only viable move to reconnect the Egyptian monarchy to the trade and exchange systems of the Near East and the Mediterranean. Following a phase of pre-emptive warfare in the early 18th Dynasty and a phase of expansionism under Tuthmosis III and Amenhotep II, however, it became clear that permanent territorial annexation was not a viable strategy due to the geographic barriers and the

sociopolitical, ethnic, and linguistic complexity of the Levant, especially in its northern part. Instead of a territorial empire with spatial continuity, the pharaonic monarchy opted for a new policy aimed at establishing an economic network in the northern Levant, targeting wealthy polities located strategically at the intersection of major trade routes. The epistolary correspondence between the pharaonic monarchy and the local rulers in the Amarna archive, therefore, should be understood as the only available instrument to attempt at exerting political power and maintaining cohesion in what was a very loose system of governance. The research will focus on the combined analysis of the Egyptian records, the Amarna letters, and other archival cuneiform texts from the Levant in order to postulate the character of Egyptian "imperialism" in the region.

The researcher is expected to take part in teaching and run two seminars on undergraduate level per academic year. By the end of the first year the researcher is expected to submit a manuscript of a scholarly monograph on the topic of ancient Egyptian diplomacy with its publication in the second year. Other publications, such as articles in SCOPUS/Web of Science journals will be considered as asset. The researcher is also expected to take part in organizing international conference Megiddo, Kadesh, and the Aftermath, planned for September 2021.

Profile of an ideal candidate:

- Completed PhD degree (less than 5 years since graduation).
- Excellent knowledge of English (FCE equivalent or better).
- Strong background in Egyptology and ancient Near Eastern studies.
- High motivation and ability to conduct collaborative research.
- Previous participation in local and international projects.
- Previous experience in teaching on undergraduate and/or graduate level

The applicants should submit:

- All required documents by the Fund - please see [here](#)
- + Model syllabi of proposed seminars

Salary: equivalent of 2000 EUR/month

Workplace: Czech Institute of Egyptology (Faculty of Arts, Charles University)

Supervisor: Assoc. Prof. PhDr. Jana Mynářová, Ph.D.

E-mail: jana.mynarova@ff.cuni.cz

Phone: +420 221 619 608

Position available from: January 1, 2021 (for 24 months)

Deadline date for applications: July 15, 2020

Applicants must submit required documents to: jana.mynarova@ff.cuni.cz (project supervisor)

D. Faculty of Education

Title of the research project:

1. Professional vision of future teachers (noticing and knowledge-based reasoning)

Pre-service teachers must develop a range of skills, including a certain type of noticing skill that is different from lay people's skills. When observing a lesson, either live or on video, they are expected to notice aspects of the lesson that are deemed important for the development of pupils' knowledge. Yet the complexity of a lesson is such that if they direct attention to something, they do so at the expense of something else. Much research has been undertaken in recent years focusing on what it is that student teachers do and do not notice in a lesson, how they make sense of it and how their professional vision (noticing ability and knowledge-based reasoning) can be developed. We have used and investigated an impact of reflection-based programmes such as Lesson Study and video-clubs. Thus, we offer a cooperation on research aimed at reflection-based teacher education in general and on the possibilities of video-based courses for the development of professional vision in particular. Possible subjects are mathematics, English language teaching as a second language, art teaching, biology, elementary science etc.

Workplace: Department of Mathematics and Mathematical Education (Faculty of Education, Charles University)

Supervisor: Assoc. prof. RNDr. Naďa Vondrová, Ph.D.

E-mail: nada.vondrova@pedf.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

Applicants must submit required documents to: Lothar Filip Rudorfer - lotharfilip.rudorfer@pedf.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

2. Contextualized Secondary Data Analysis of International Large Scale Assessment Data (e.g. PISA, TIMSS)

International large-scale assessments (ILSAs - namely PISA, TIMSS, PIRLS, ICCs, TALIS, PIAAC) provide a unique source of data freely available for analysis and allowing international comparisons. Handling such data requires a substantive methodological knowledge, e.g. how to work properly with complex designs, use replication weights, properly work with plausible values, etc. We look for a post-doc with experience and good knowledge of working with such data, ideally using Mplus or R software for multilevel and/or structural equation modelling. Yet substantive quantitative knowledge needs to be backed up with knowledge of educational policy and country specific information, which allows to formulate policy-relevant research question for comparison. We offer the high knowledge of Central and Eastern European Countries and context for analysis of policy relevant issues based on the available ILSAs data which shall be the main emphasis of post-doc work. Also, data from ILSAs in post-Socialist countries are often not sufficiently analysed due to lack of researchers and methodological knowledge. The analysis could be oriented, but is not limited to, the following topics: the effects of early tracking, Big Fish Little Pond Effect, relationship between motivation and self-concept and achievement, socio-economic inequalities, rural-urban differences, gender inequity, class composition and peer effects, teacher quality and teacher beliefs. Applicant shall choose **one or two topics to specify in their post-doc application project proposal**.

Workplace: Institute for Research and Development of Education (Faculty of Education, Charles University)

Supervisor: PhDr. David Greger, Ph.D.

E-mail: david.greger@pedf.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

Applicants must submit required documents to: Lothar Filip Rudorfer - lotharfilip.rudorfer@pedf.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

3. Assessment of Student Teachers at the End of Undergraduate Teacher Training

Undergraduate teacher training plays an important role in the long-term process of becoming a teacher. At the end of the training, it is necessary to assess the qualification of individual students for the teacher profession and simultaneously provide students with formative feedback to help them continue with their further education in the desired direction. The Department of Pre-primary and Primary Education has long been asking itself how to adequately combine these two needs. On the one hand, we develop and verify tools for assessing students during their final continuous practice, and on the other hand, we verify innovated methods of testing in state final examinations. It will be the task of the post doc employee to find out how the actors themselves (both examiners in state final exams and students) and independent experts evaluate assessment models that are currently used. Concurrently, a longitudinal study will be established with the intention of finding out how the evaluation at the end of the studies at the Faculty of Education corresponds to the subjectively perceived success of teacher graduates after two and five years of practice in education. We have so far organized a series of professional seminars concerning the topic and furthermore we consulted the topic with Dr. Jane Jones (King's College London), who has been dealing with the evaluation of students and students in teacher training for a long time and will collaborate on the research.

Workplace: Department of Pre-primary and Primary Education (Faculty of Education, Charles University)

Supervisor: Assoc. prof. PhDr. Jana Stará, Ph.D.

E-mail: jana.stara@pedf.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

Applicants must submit required documents to: Lothar Filip Rudorfer - lotharfilip.rudorfer@pedf.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

4. STEM Teachers Education - Challenges and Perspectives

The foreign worker will be involved in research in the field of STEM Teachers Education, focusing mainly on the science component of this phenomenon, including ICT applications. The research will focus on the possibilities of using ICT resources in the teaching of science subjects and especially chemistry (or another area, which includes STEM). Specifically, it will deal with the implementation of ICT in support of inquiry-based science and technology education. It will examine the interaction of real and virtual environment, especially at the level of secondary science (integrated science, science and technology or focused on science or technology as part of STEM education). The created and optimized methodologies for the researched applications will belong to the results of the research stay of a foreign worker. The interaction of real and virtual environment in science education is one of the main research topics of the staff of the Department of Chemistry and Didactics of Chemistry. The topic requires a detailed empirical examination in terms of new methodological approaches that the candidate can bring to his internship.

Department: Department of Chemistry and Chemical Education (Faculty of Education, Charles University)

Supervisor: Prof. PhDr. Martin Bilek, Ph.D.

E-mail: martin.bilek@pedf.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

Applicants must submit required documents to: Lothar Filip Rudorfer - lotharfilip.rudorfer@pedf.cuni.cz (faculty coordinator of the Post-doc Research Fund)

E. Faculty of Science

Title of the research project:

1. Visualizing physiology of plant root cells

Plants are sessile organisms whose movements can be spotted only in time lapse movies. On the cellular level, however, plants are as dynamic as animals. Plant root cells respond to stimuli within seconds with changes in physiological parameters such as action potentials, cytoskeletal dynamics and cellular expansion. Our team focuses on mechanisms of gravitropism and the early responses of *Arabidopsis thaliana* to the phytohormone auxin.

The aim of this project is to extend the research beyond reaction of roots to auxin and to visualize and map early physiological responses of cells to hormonal and nutritional stimuli also using our newly established live cell imaging system that consists of vertical spinning disk microscope and a microfluidics setup.

The dynamics of early cellular responses can help reveal the nature of the underlying molecular pathways that power plant hormonal signaling.

Relevant literature from our and other groups:

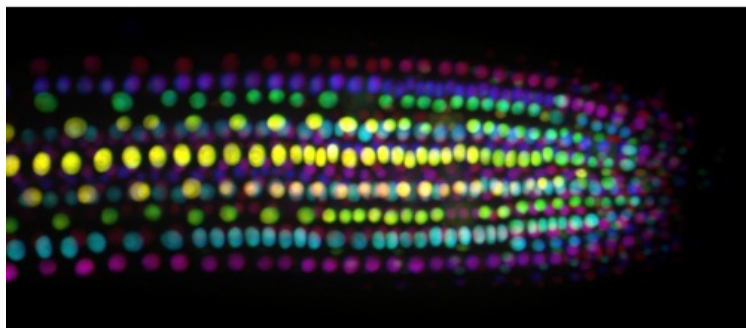
Fendrych, M., Akhmanova, M., Merrin, J., Glanc, M., Hagihara, S., Takahashi, K., Uchida, N., Torii, K.U. and Friml, J. (2018) Rapid and reversible root growth inhibition by TIR1 auxin signalling. *Nat. Plants*, 4, 453–459.

Wangenheim, D. von, Hauschild, R., Fendrych, M., Barone, V., Benková, E. and Friml, J. (2017) Live tracking of moving samples in confocal microscopy for vertically grown roots. *Elife*, 6.

Prigge, M.J., Platre, M., Kadakia, N., et al. (2020) Genetic analysis of the *Arabidopsis* TIR1/AFB auxin receptors reveals both overlapping and specialized functions. *Elife*, 9, 1–28.

Specific requirements set by the Faculty of Science:

The candidate should have a publication record in plant physiology, developmental biology or molecular biology. Experience with and passion for advanced microscopy methods is required.



Salary: co-founding 1000 EUR/month is ensured

Project supervisor: Matyas Fendrych, PhD

E-mail: fendryc1@natur.cuni.cz

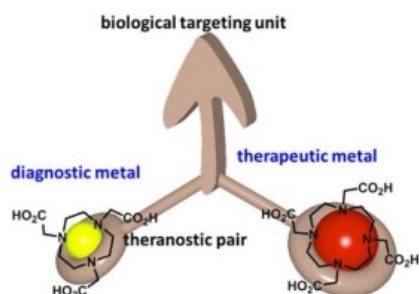
Position available from: January 1, 2021

Deadline date for applications: July 25, 2020

Applicants must submit required documents to: fendryc1@natur.cuni.cz (project supervisor)

Title of the research project:

2. Selective metal complexation by macrocyclic ligands as a way to dinuclear complexes for molecular imaging



Imaging techniques are essential part of current medicine. Almost all imaging methods require, or at least their efficacy is significantly enhanced by, contrast agents (CAs, also termed as tracers or probes). The methods involve mainly Magnetic Resonance Imaging (MRI), nuclear techniques (PET or SPECT) or optical imaging (fluorescence). The tracers are often based on complexes of metal ions as metal elements offers a number of physico-chemical properties which can be further tuneable by a ligand design. Role of imaging techniques, and appropriate imaging agents, is becoming even more important with a shift of modern medicine toward “personalized” approach which requires utilization of therapy/treatment tailored (= personalized) for a particular patient. The metal ions in their “free” form are generally toxic and, for potential in vivo use, they must be bound in stable complexes.

To design bimodal (= suitable for two imaging modalities) and/or theranostic (= for combined diagnosis and therapy) probes, there is necessary to combine two metal ions having different properties into one molecule. The metal ion properties should be specific for the imaging method or for possible combination of imaging and therapy. The goal can be accomplished by combination of two ligand molecules which each is selective for a particular metal ion. To ensure stability of the final metal complexes, the chelators have to be suitable macrocyclic ligands. The basis of the Project will be design of polyazamacrocyclic ligands which will be tailored (through a suitable choice of the macrocycle size and coordinating pendant arms) for a selective complexation of metal ions interesting for molecular imaging, mainly for PET or MRI. The ditopic ligands will enable mutual combination of metal ion pairs as Ln(III)-Cu(II), Ln(III)-Ga(III) or two different Ln(III) ions. Our ligand design often (but not only) includes utilization of phosphorus acid pendant arms which offer properties not available with other coordinating groups. The work will involve design of the chelators and their synthesis, followed by investigation of their coordination properties. Ligand/complex solution and solid-state structures (spectroscopies, X-ray) will be determined, and correlated with thermodynamic (potentiometry) and kinetic properties of the complexes which are decisive for the sought chelator selectivity for the particular metal ion. Individual ligand(s) will be investigated first to get chelators with right properties. The suitable ligands will be conjugated to get desired ditopic chelators. Through collaborations, their suitability for imaging (in vitro/in vivo) will be tested.

We offer work in a team with a long time experience in this area of chemistry and work with state-of-the-art equipment for this kind of research. Our approach to the research is multidisciplinary, with a help of established collaborations in Europe where we can employ techniques not available in our group. The fellowship offered by Charles University will cover well living expenses in Prague.

Specific requirements set by the Department of Inorganic Chemistry:

We expect that our new colleague will be able to work independently and will bring a new experience and ideas to our team. She or he should have a reasonable experience with organic synthesis and necessary purification techniques. She or he should be well familiar with spectroscopic techniques as multinuclear NMR, or UV-Vis and fluorescence spectroscopy. Previous experience with any aspect of molecular imaging is welcomed but not really necessary.

Salary: co-founding 1000 EUR/month is ensured

Department: Department of Inorganic Chemistry (Faculty of Science, Charles University)

Supervisor: Prof. Petr Hermann

E-mail: petrh@natur.cuni.cz

Position available from: January 1, 2021

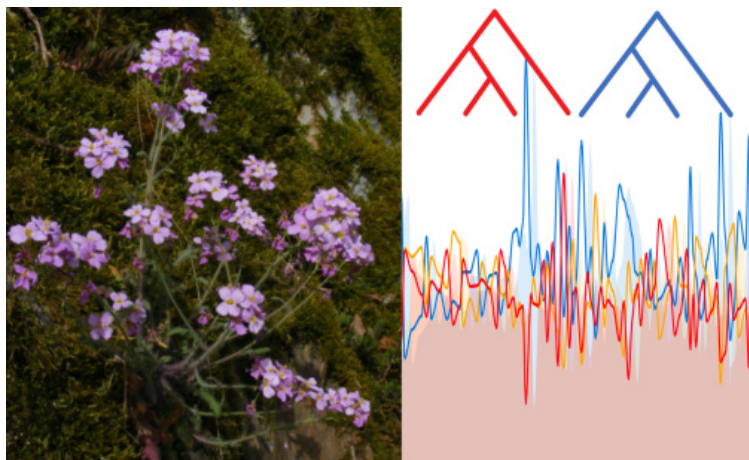
If you are interested in this Project, please **have a look on our [web page](#)** for our current papers and **contact the supervisor of the project** (see above) for more details before you apply.

Deadline date for applications: July 25, 2020

Applicants must submit [required documents](#) to: petrh@natur.cuni.cz (project supervisor)

Title of the research project:

3. Population genomic consequences of whole genome duplication in plants.



Whole genome duplication (WGD, polyploidization) is a dramatic genome-wide mutation whose ubiquity across eukaryotes suggests an adaptive benefit, although the underlying mechanism remains unknown. In the project, the successful applicant will test the hypothesis that WGD promotes formation and/or later accumulation of structural changes in a genome (gene duplications, inversions, repetitive DNA proliferation), potentially providing adaptive benefits when facing novel environmental challenges.

The project will build on our research in *Arabidopsis arenosa* that demonstrated that WGD can increase the capacity of its natural populations to accumulate adaptive variation, but the candidate will extend well-beyond this system to additional species to discern the generality of initial findings from the *A. arenosa* system. The core work will focus on analysis of population genomic data from field surveys of ploidy-variable systems (diploid-autotetraploid), providing replicates of the WGD process in natural conditions. The project will integrate state-of-the-art long-read sequencing approaches (PacBio, Oxford Nanopore) with available short read database including ~1000 genomes of outcrossing *Arabidopsis* species in order to comprehensively assess the landscape of structural variants in the target species. There will be possibility to expand to analyses of variation in experimental populations involving newly synthesized polyploids. General conclusions will be drawn taking advantage from replicated ploidy-variable plant species, which are partly already sampled and sequenced. Alongside the head-start with available data, the candidate is expected to be fully involved in the overall project design and lead the analytical part of the project. Student (co-) supervision and lecturing at the faculty is not required but supported as well as the development of further independent self-funded research projects.

The successful candidate will join the team of Ecological Genomics lead by Filip Kolář. This project will involve close collaboration with other labs focused on ecological and evolutionary genomics of polyploidy, Levi Yant (University of Nottingham, UK) and Christian Parisod (University of Bern, Switzerland). For overall info on the Starting ERC project DOUBLE ADAPT see this [web page](#).

Salary: co-founding 1000 EUR/month is ensured

Department: Department of Botany (Faculty of Science, Charles University)

Supervisor: Filip Kolář

E-mail: filip.kolar@natur.cuni.cz

Phone: +420 221 95 1645

Position available from: January 1, 2021

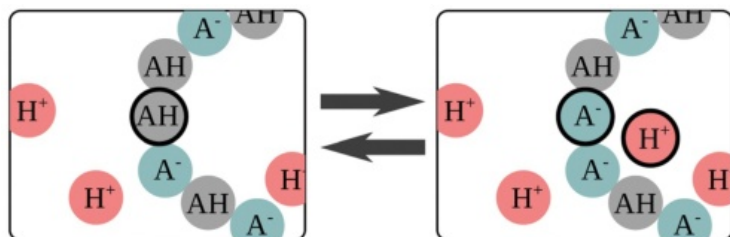
Deadline date for applications: July 25, 2020

Applicants must submit [required documents](#) to: filip.kolar@natur.cuni.cz (project supervisor)

Title of research project:

4. Simulations of reaction equilibria in polymer systems - method development and applications

Two-phase systems based on polyelectrolyte gels or coacervates are potential candidates for charge-based protein sequestration, while polymers modified by boronic acids are capable of sugar sensing. Their common feature is a chemical reaction inside the system, coupled to partitioning of solutes between the system and the bulk solution, illustrated in Fig.1. Experimental studies of such systems have long shown a deficit in theoretical support, partly due to the lack of suitable simulation methods.[1] However, we have recently introduced the Grand-reaction ensemble method which enables simulating reactive polymer systems in equilibrium with a reservoir.[2] Accordingly, within the current project, we will further develop this method and apply it to two-phase systems, addressing specific questions arising from experiments performed within the project, or raised by our external partners. This unique expertise in simulating reactive polymer systems will enable us to perform state-of-the-art simulations with a high level of chemical accuracy matched only by a few teams worldwide.



The task of the postdoctoral researcher will be to further develop, implement and apply the G-RxMC method for simulating complex coacervates, reversible polymer gels and partitioning of solutes. Computer simulations will be used to predict their structure, stability and ability to sequester ions at various pH. Ultimately, the simulation predictions will be used to explain specific experiments or to design new smart experimental systems.

References:

- [1] J. Landsgesell, L. Nová, O. Rud, F. Uhlík, D. Sean, P. Hebbeker, C. Holm, P. Košvan. "Simulations of ionization equilibria in weak polyelectrolyte solutions and gels." *Soft Matter* (2019), 15, 11551185 doi: 10.1039/C8SM02085J
- [2] J. Landsgesell, P. Hebbeker, O. Rud, R. Lunkad, P. Košvan, C. Holm "Grand-Reaction Method for Simulations of Ionization Equilibria Coupled to Ion Partitioning." *Macromolecules*, (2020) 53, 8, 3007–3020 doi: 10.1021/acs.macromol.0c00260

Features of an ideal candidate:

- Completed PhD or a fixed date of PhD defense before 31. 12. 2020
- Good knowledge of English (FCE equivalent or better)
- Strong background in soft matter and statistical mechanics
- Experience with molecular simulation, programming and Linux

Salary: co-founding 1000 EUR/month is ensured

Workplace: Department of Physical and Macromolecular Chemistry (Faculty of Science, Charles University)

Supervisor: Dr. Peter Košvan

E-mail: peter.kosovan@natur.cuni.cz

Phone: +420 221 591 029

Position available from: January 1, 2021

Deadline date for applications: July 25, 2020

Applicants must submit required documents to: peter.kosovan@natur.cuni.cz (project supervisor)

Title of research project:

5. Sensory receptors and brains - evolution of vision and olfaction in teleost fishes

Fish sensory systems are highly diverse, more than in any other vertebrate groups. Vision and olfaction are both essential sensory systems mediated by the G-protein-coupled receptor proteins responsible as such for processing visual or chemical signals. In evolution of fishes, receptor genes have been lost, duplicated or modified and numerous adaptations to different environments and life strategies occurred at the genomic level. Higher sensory processing is also enabled (and limited) by the capacity of particular brain parts. The ultimate goal of the project will be to understand the genomic basis of sensory systems in fishes, and eventually integrate it with the brain capacity for the selected species.

The project is focused on the selected teleost fish species and analysis of their whole genomes to screen and identify genes responsible for vision and olfaction. We will focus on the number and origin, i.e. recent and ancient duplications and losses, of the opsin genes (vision) and olfactory receptors (olfaction). The ~150 target species spanning the teleost phylogeny will be identified based on the list of species with sequenced whole genome of high quality (available in public databases or provided by our collaborators). Further we will identify mutations responsible for the modifications of the sensory systems and focus on the analysis of selection. The genomic results will be subsequently compared with the results on the brain capacity (number of neurons) provided by our collaborators. This project hence aims to uncover general molecular mechanisms contributing to the sensory evolution in fishes.

Salary: co-founding 1000 EUR/month is ensured

Workplace: Department of Zoology (Faculty of Science, Charles University)

Supervisor: Mgr. Zuzana Musilová, Ph.D.

E-mail: zuzana.musilova@natur.cuni.cz

Phone: +420 777 885 630

Position available from: January 1, 2021

Deadline date for applications: July 25, 2020

Applicants must submit required documents to: zuzana.musilova@natur.cuni.cz (project supervisor)

Title of the research project:

6. Translation initiation factors from the eIF4E family in cancer and development

Postdoctoral position is available for a molecular biologist / biochemist / cellular biologist to study a cellular role of cap-binding translation initiation factors of the eIF4E family in cancer and development. Human cells contain three eIF4E isoforms, each of them existing in several variants arising mainly due to alternative mRNA splicing. All the eIF4E isoforms have been shown to play an important role in development, cellular response to stress and cancer. eIF4E1 is a canonical cap-binding eukaryotic translation initiation factor. Its cellular level and activity are tightly regulated, the latter by mTOR and Mnk kinases. Over-expression of eIF4E1 can lead to cellular transformation and indeed, up to one-third of human cancers demonstrate an increase in the eIF4E1 level. eIF4E2 protein is mainly recognized for its role in mRNA silencing. Nevertheless, eIF4E2 also belongs among proteins, deregulation of which creates a part of metastatic cells signature. It has been also shown to substitute eIF4E1 as a main cap-binding translation initiation factor during hypoxia. Contrary to all of that, eIF4E3 has been proposed to act as a tumor suppressor protein. The objective of the suggested project will be to map and analyze active protein complexes in which the non-canonical members of the eIF4E family, factors eIF4E2 and eIF4E3, take place in human cells and/or mouse oocytes and early embryos. We readily use both models and both of them offer an excellent opportunity to investigate less known, yet important members of the eIF4E factors family. We offer an enthusiastic team and well equipped laboratories with access to the top-notch service facilities in [the Faculty of Science](#) and [Biocev](#). We also closely co-operate with several laboratories in EMBL, Heidelberg (mainly with the Genomics Core Facility) and for the high-demanding programming and computing with the Department of Computer Science of the Czech Technical University in Prague. We have developed several lines of study of the non-canonical eIF4E factors involving different biological models and a palette of approaches ranging from biochemical purification and characterization of the protein-protein and protein-RNA complexes to cell biology methods relying on microscopic techniques. A specific direction of the research will be discussed with the candidate taking into the account candidate's skills and scientific interests.

Qualification and experience:

We are looking for a highly motivated, enthusiastic and qualified researcher who would like to join our team and effort. Strong background in at least one of the following discipline will be required: biochemistry, especially purification of proteins and protein complexes, molecular and cellular biology using mammalian cell lines and/or mouse oocytes as models and/or confocal microscopy. If the latter, some experience with any advanced microscopic techniques, e.g. super-resolution microscopy, will be advantageous. Strong communication skills and the ability to interact and co-operate well with other scientists and students in the team are essential.

Visit our [Lab website](#)

See our [Publication list](#)

Salary: co-founding 1000 EUR/month is ensured

Workplace: Department of Genetics and Microbiology (Faculty of Science, Charles University)

Project supervisor: Martin Pospíšek

E-mail: martin.pospisek@natur.cuni.cz

Phone: +420 221 951 719

Position available from: January 1, 2021

Deadline date for applications: July 25, 2020

Applicants must submit [required documents](#) to: martin.pospisek@natur.cuni.cz (project supervisor)

F. Faculty of Mathematics and Physics

Title of the research project:

1. Call for PostDoc Position in the area of Terahertz and Optical Spintronics

*Post-doc position for **one-year period** from 1st January 2021 with possible prolongation to the second year*

Our research in Laboratory of OptoSpintronic is focused on the investigation of mechanisms that can be used for a manipulation with magnetic moments in ferromagnetic and antiferromagnetic materials on ultra-short time scales using laser pulses. The planned research will be focused mainly on investigation of materials applicable in antiferromagnetic spintronics [1] using ultrashort laser pulses [2] combined with electrical measurements. In particular, we will investigate CuMnAs-based memory devices [3] where we already demonstrated that optical [4,5] and terahertz [6] radiation can be used very efficiently for their investigation with a simultaneous high spatial- and time-resolutions.

The research will be performed in a group of prof. Petr Němec at Faculty of Mathematics and Physics, Charles University, in a close collaboration with a group of prof. Tomáš Jungwirth from Institute of Physics, AS CR.

The candidates need to have a doctoral degree in physics of related disciplines (optics, solid-state physics, or magnetism) and good experimental skills are expected. Previous experience with ultrafast spectroscopy, terahertz optics and/or electronic measurements is highly welcomed. An advantage is also knowledge of laboratory automation (LABVIEW) and data analysis (Matlab).

[1] T. Jungwirth, X. Marti, P. Wadley, and J. Wunderlich, Nature Nanotechnology 11, 231 (2016).

[2] P. Němec, M. Fiebig, T. Kampfrath, and A. V. Kimel, Nature Physics 14, 229 - 241 (2018).

[3] P. Wadley et al., Science 351, 587 (2016).

[4] V. Saidl, P. Němec et al., Nature Photonics 11, 91-96 (2017).

[5] Z. Kašpar et al., arXiv:1909.09071 (2019).

[6] K. Olejník et al., Sci. Adv. 4, eaar3566 (2018).

Workplace: Department of Chemical Physics and Optics (Faculty of Mathematics and Physics, Charles University)

Contact person: RNDr. Lukáš Nádvorník, Ph.D.

E-mail: nadvornik@karlov.mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: nadvornik@karlov.mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

2. Call for PostDoc Position in the area of Efficient Spectral and Bi-Spectral Authoring

*Post-doc position for **two-year period** from 1st January 2021*

Computer Graphics is widely used to generate images from virtual scenes: in prototyping, architectural visualisation, cultural heritage, or the entertainment industry. Achieving full realism in digital depictions requires, among others, accurate reflectance models to capture the appearance of real objects. Editing these virtual materials is of equal importance: most often, virtual scenes are manually created by artists and are not based on real measurements.

The Computer Graphics Group at CUNI in Prague focuses on introducing more accuracy into traditional graphics workflows, yielding what we refer to as the predictive rendering pipeline. The ultimate goal is a reliable and physically accurate pipeline that adheres to real-world constraints along all its steps, especially with regard to manufacturability. Current research topics span from light transport simulation, over spectral and bi-spectral (fluorescent) reflectance modelling, to appearance fabrication.

The candidate is expected to work on guided spectral and bi-spectral uplifting, that is, constructing plausible spectra from conventional tristimulus (RGB) inputs. State of the art spectral uplifting techniques [JH19] [JWH19] limit the control of an artist on the output spectra to predefined shapes. We want to propose a user-friendly framework for (bi-)spectral reflectance editing in which artists have full control over the spectral output (and in particular, the fluorescence aspects of it), while still performing editing in a designer-friendly colour space with a control on lighting conditions.

The candidate will later work closely with current PhD students on applying the proposed editing technique in a fabrication context, where further constraints arise from the manufacturing technology. There, previous work of our group has already shown how a careful arrangement of printing materials can improve texture sharpness and colour contrast [ESZ17] [SRB19].

An applicant should have a doctoral degree in computer graphics and shall be familiar with:

- appearance modelling,
- knowledge on fluorescent effects,
- spectral and volumetric rendering,
- colour science.

[JH19] Wenzel Jakob and Johannes Hanika - A Low-Dimensional Function Space for Efficient Spectral Upsampling - Computer Graphics Forum 2019

[JWH19] Alisa Jung, Alexander Wilkie, Johannes Hanika, Wenzel Jakob, Carsten Dachsbacher - Wide Gamut Spectral Upsampling with Fluorescence - Computer Graphics Forum 2019

[ESZ17] Oskar Elek, Denis Sumin, Ran Zhang, Tim Weyrich, Karol Myszkowski, Bernd Bickel, Alexander Wilkie, Jaroslav Křivánek - Scattering-aware Texture Reproduction for 3D Printing - ACM SIGGRAPH Asia 2017

[SRB19] Denis Sumin, Tobias Rittig, Vahid Babaei, Thomas Nindel, Alexander Wilkie, Piotr Didyk, Bernd Bickel, Jaroslav Křivánek, Karol Myszkowski, Tim Weyrich - Geometry-aware Scattering Compensation for 3D Printing - ACM SIGGRAPH 2019

Workplace: Computer Graphics Group (Faculty of Mathematics and Physics, Charles University)

Contact person: doc. Alexander Wilkie

E-mail: wilkie@cgg.mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: wilkie@cgg.mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

3. Call for PostDoc Position in the area of Molecular Simulations

*Post-doc position for **two-year period** from 1st January 2021*

Machine learning is quickly becoming a crucial tool in the computational treatment of molecular systems.

We have recently extended the methodology for neural network interatomic potentials using committee models (<https://arxiv.org/abs/2006.01541>) to enable the development of robust and accurate machine learning potentials.

The postdoctoral scholar will work on further developing our existing methodology and its implementation, including support for path integrals, ring polymer contraction, and inhomogeneous systems.

They will apply this methodology to build accurate and efficient models for hydrogen bonded systems in the condensed phase based on ab initio calculations and use these models to elucidate structural and dynamical properties of these systems.

Particular emphasis will be placed on systems with reactivity or proton defects and on the quality of the underlying ab initio methods.

The ideal candidate will have a PhD in computational physics or chemistry or a related field, strong background in molecular dynamics or ab initio calculations and a keen interest in machine learning.

Workplace: Institute of Physics of Charles University (Faculty of Mathematics and Physics, Charles University)

Contact person: RNDr. Ondřej Maršálek, Ph.D.

E-mail: ondrej.marsalek@mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: ondrej.marsalek@mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

4. Call for PostDoc Position in the area of Magnetism in Condensed Matter

*Post-doc position for **one-year period** from 1st January 2021*

The triangular lattice antiferromagnet is a well-known case of frustrated magnetism. We propose here to explore a rather new direction for the research on triangular lattice antiferromagnets by inducing anisotropic magnetic interactions, thanks to magnetic ions with a large spin orbit coupling. These anisotropic magnetic interactions enlarge the variety of possible ground state and may lead to the realization of a quantum spin liquid state (QSL). Rare-earth based triangular lattice antiferromagnets will be chosen for investigation among the families: AREX₂ (A=Na, K, Cs, RE=rare earth X=O, S, Se), REM₃X₃ (M=Zn, Cd X=P, As), REMAl₁₁O₁₉ (M=Mg, Zn), ABaRE(BO₃)₂ (A=Na, K, Rb) and RE(BaBO₃)₃ and they will be grown as single crystals. The magnetic ground state will be sensed by magnetization, specific heat, neutron diffraction or muon spectroscopy measurements under very low temperature. We will also perform magnetotransport and magnetoelastic properties measurements. Thus this project will enable an experimental drawing of the phase diagram of triangular lattice antiferromagnets in presence of strong spin orbit coupling together with the characterization of occurring magnetic phases.

The successful candidate will join the magnetism group in Prague and will be primarily responsible for the implementation of a project of experimental studies of frustrated magnetism in new triangular antiferromagnets with spin-orbit interaction.

The applicant should have a doctorate in condensed matter physics. Previous experience with experimental investigation of physical properties in magnetic fields and at low temperatures and related data analysis are desirable.

Workplace: Institute of Particle and Nuclear Physics (Faculty of Mathematics and Physics, Charles University)

Contact person: prof. Mgr. Pavel Javorský, Dr.

E-mail: javor@mag.mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: javor@mag.mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

5. Call for PostDoc Position in the area of Heterogeneous electron transfer in biohybrid assemblies

*Post-doc position for **two-year period** from 1st January 2021*

Applications are invited for a postdoc position at the Department of Chemical Physics and Optics. The project shall characterize heterogenous electron transfer in biohybrid assemblies of natural photosystems as electron donors and redox enzymes, to produce solar fuels and other high value products. Other, including nanostructured inorganic components, will also be employed to enhance performance of the assemblies. The candidate will use a wide range of spectroscopic and electrochemical techniques available in our department to assess electron transfer between the components of the assemblies to ultimately improve their effectiveness.

We look for a postgradual research fellow in the fields of physical chemistry, biophysics and/or photobiotechnology, with a Ph.D. degree in a related field.

Candidates should demonstrate strong potential for excellence. The project will be supervised by Jakub Psencik & Heiko Lokstein at the Faculty of Mathematics and Physics, Charles University.

Workplace: Department of Chemical Physics and Optics (Faculty of Mathematics and Physics, Charles University)

Contact person: doc. Dr. Jakub Psencik and Dr. rer. nat. habil. Heiko Lokstein

E-mail: psencik@karlov.mff.cuni.cz; lokstein@karlov.mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: psencik@karlov.mff.cuni.cz; lokstein@karlov.mff.cuni.cz (project supervisors) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

6. Call for PostDoc Position in the area of Advanced inorganic scintillation materials

Post-doc position for **one-year period** from 1st January 2021

The inorganic scintillators are used for the detection of high-energy radiation or high-energy particles, e.g. in medical modalities and many industrial systems that use the X-rays or gamma rays or energetic particles. The research project focuses on a new class of ultra-fast scintillation materials and the development of novel systems designed particularly for fast electron detection and for medical diagnostic techniques.

The successful candidate will join the group focusing on the scintillation properties of complex oxide systems. The program is particularly oriented to the synthesis and growth of epitaxial films of rare-earth doped garnets and perovskites, the development of novel material systems for ultra-fast applications, and for high resolution 2D-imaging scintillation systems where high quality thin epitaxial film is a key issue.

The applicant should have the PhD degree in physics, material science, or related discipline. Previous experience with scintillators and/or luminescence spectroscopy, luminescence kinetics is an advantage.

Informal inquiries concerning the position are welcome.

Workplace: Institute of Physics (Faculty of Mathematics and Physics, Charles University)

Contact person: Doc. RNDr. Miroslav Kučera, CSc.

E-mail: miroslav.kucera@mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: miroslav.kucera@mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

Title of the research project:

7. Call for PostDoc Position in the area of Growth and characterization of metal halide perovskites

Post-doc position for **one-year period** from 1st January 2021

Metal halide perovskites (MHP) have recently undergone a remarkable development as highly efficient and inexpensive optoelectronic materials. MHPs found a variety of applications, particularly solar cells, radiation sensors, light-emitting diodes, and photodetectors. Recent studies suggest that defects and trap-assisted recombination exist in MHPs despite their large carrier lifetimes. Understanding the defect properties and an optimization of the defect structure is of primary challenge in the field of MHP. Currently, such understanding is limited, restricting the power conversion efficiencies of MHP solar cells.

The proposed project is focused to the investigation of bulk MHP comprising complete technological process of their preparation. It starts with the growth of single crystals by the Bridgman method, preparation of samples including electric contacts manufacture and the characterization by versatile techniques installed on the place or accessible at cooperating laboratories. The post-doctoral fellow will join the Group of Optoelectronics and Magneto-optics in the Institute of Physics, Charles University and will be primarily responsible for the development of the perovskite technology conforming to particular properties of MHP.

The applicant should have a doctoral degree in the solid state physics or inorganic chemistry with specialization to semiconductors. Previous experience with the research of perovskites or growth of semiconductor single crystals is highly advisable. The candidate ought to be familiar with techniques used at the characterization of semiconductors like the Hall effect, resistivity, photoconductivity, and the time-of-flight. An acquaintance with other laboratory techniques used at the research of solids, theory of solid state, and computational background are welcome as well.

More detailed information may be provided on demand.

Workplace: Institute of Physics (Faculty of Mathematics and Physics, Charles University)

Contact person: prof. RNDr. Roman Grill, CSc.

E-mail: grill@karlov.mff.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 16, 2020

Applicants must submit required documents to: grill@karlov.mff.cuni.cz (project supervisor) and in a copy to brozkova@dekanat.mff.cuni.cz (faculty coordinator of the Post-doc Research Fund)

G. Faculty of Social Sciences

Title of the research project:

1. Media Literacy and its reflection on communication during the COVID-19 pandemic

Institute of Communication Studies and Journalism seeks a motivated post-doc with expertise in the field of media literacy education. We are looking for an independent researcher who will create her/his team or will collaborate with academics at the Institute.

Our goal is to analyze current media during the COVID-19 pandemic with a focus on media literacy, the object should be approached from an educational policy angle. Consequently, it should focus on analyzing two very interesting demographic groups - children and a very often neglected yet relevant group: seniors.

Their level of understating to various measures which have been imposed by governments should be contrasted to the level of how it was understood through the media.

With the COVID-19 pandemic and a myriad of websites offering health advice, it would be extremely important to understand how media literate seniors are. This would involve a look at how and for what reasons they use the internet and to what extent they have a critical relationship with the content they engage with online.

The outcome of the fellowship

Expected outcomes are team collaboration leading to two publications in academic journals (Jimp), grant application, and collaboration with colleagues at the Institute, we offer the possibility to lecture and get involved with our Ph.D. students.

Workplace: Institute of Communication Studies and Journalism (Faculty of Social Sciences, Charles University)

Contact: PhDr. Jakub Končelík, PhD.

E-mail: jakub.koncelik@fsv.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: Anna Shavit anna.shavit@fsv.cuni.cz

Title of the research project:

2. Innovative approaches to irregular conflicts

In an effort to further develop expertise in the area of irregular conflict, the Department of Security Studies seeks a post-doctoral candidate, with a Ph.D. preferably in Political Science, International Relations, Sociology, or Security Studies. The candidate is expected to exhibit a proven track-record linked to one or more of the following themes: civil war, (counter)insurgency, terrorism, radicalization, foreign fighters, as well as the terrorism and crime nexus. In the aforementioned context, the preferred research foci are micro-level research with emphasis on ethnographic methods (interviews, fieldwork) or quantitative methods. We seek innovative scholars with experimental leanings, willing to cross disciplinary boundaries. Expected outcomes of the post-doctoral fellowship include two high-quality journal articles (Jsc or Jimp), involvement in the training of Ph.D. candidates and mutually enriching interaction with other members of the Department. Upon further agreement, the post-doctoral fellow will also have an opportunity to be involved in existing teaching activities and is envisioned to prepare her or his general course on methodological approaches to the study of irregular conflict.

Workplace: Institute of Political Studies (Faculty of Social Sciences, Charles University)

Contact: PhDr. JUDr. Tomáš Karásek, Ph.D.

E-mail: tomas.karasek@fsv.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: tomas.karasek@fsv.cuni.cz (project supervisor)

Title of the research project:

3. Politization of Society and Public Controversies

The research topic focuses on varieties of the politicization of current societies. In sociology this general process has been identified since the collapse of communist regimes at the latest. It is related to a gradual erosion of the tried-out institutions of industrial modernity such as a social class, expert knowledge, modern city, and nation state-based democracy. Due to the interlinked influences of economic globalization, cultural amalgamation, and technological change, the very social structure of democratic societies has been undergoing a fundamental transformation resulting in new conflict lines between the winners and losers of these processes. The result is the return of political conflict to many spheres of society.

In politics so-called losers of globalization constitute a new constituency for populist forces, which form to stop further international integration and globalization. There are new parties and movements being organized around the issues of political integration, migration, and sovereignty. There have been many radical movements and parties established all over the world. New patterns of civic engagement can be seen not only on the levels of national and international politics, but also in urban spaces. Their manifestation can also be studied in both political and non-political issues such as health care, sport, and urban planning. New data are welcomed on the level of collective actors involved in the new controversies, as well as on the level of general public opinion. Projects aimed at small groups or regionally limited communities are also accepted.

Both traditional tools of social research and new media-based tools of digital sociology can be utilized as well as well as ethnography and other types of in-depth introspection based on participant observation and other socio-anthropological methods.

Deep introspection and understanding of the social processes of today's society which responds dynamically to current events (migration crisis, pandemic, subsequent recession, etc.) requires the ability of scientific networking, collective information sharing and creating flexible working groups focused on cases that the postdoctoral applicant decides to study. The already proven ability of academic work in the spirit of current academic trends will be one of the main criteria for selection for a postdoctoral position.

Workplace: Institute of Sociological Studies (Faculty of Social Sciences, Charles University)

Contact: doc. PhDr. Zdeněk Uherek, CSc.

E-mail: zdenek.uherek@fsv.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: zdenek.uherek@fsv.cuni.cz (project supervisor)

Title of the research project:

4. Dynamics of sports journalism in Central and Eastern Europe

Institute of Communication Studies and Journalism invites international post-docs to apply for a vacancy in the field of sports journalism research. The successful post-doc candidate will be a part of an established team researching sports journalism studies. The project would focus on dynamics of sports journalism within the Central and Eastern Europe. Sports myths and stereotypes (in relation to nationalism), celebritization and commercialization of sports journalism, especially connections between sports journalism and sports business are going to be analysed. All those topics strongly resonate within sports communication studies in broader European context, but have not been so far strongly mapped within CEE region.

Expected outcomes of the post-doctoral fellowship include two high-quality journal articles (Jimp), involvement in the training of Ph.D. candidates and mutually enriching interaction with other members of the team. Upon further agreement, the post-doctoral fellow will also have an opportunity to be involved in teaching activities regarding sports journalism.

Workplace: Institute of Communication Studies and Journalism (Faculty of Social Sciences, Charles University)

Contact: PhDr. Alice Němcová Tejkalová, Ph.D.

E-mail: alice.tejkalova@fsv.cuni.cz

Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: alice.tejkalova@fsv.cuni.cz (project supervisor)

Title of the research project:

5. Actors and democratic processes in Central Europe and the rise of new threats

During the first twenty years following the revolutions in Central Europe in 1989, we witnessed and analysed the consolidation of democracy (construction and stabilization of institutions, the institutionalisation of the parties and the party system, and so on). During this period, political science research focused mainly on questions such as transformation from the communist regime to democracy, on Europeanisation, and so on. But during the last decade, delineated approximately by the beginning of the economic and financial crisis, but also strongly influenced by the migration crisis, the COVID-19 pandemic crisis, we face some new questions or renewed one. Therefore, we are provided with the opportunity to study new themes and to change the scope of research. New phenomena have developed within our countries, including but not limited to novel concepts such as illiberal democracy; or some renewed ones, such as populism in its various forms, especially, but not only, linked to the new situation that arose with the coronavirus.

We are searching for a post-doc candidate that would focus on the general topic of the evolution of Central Europe from one or more national point(s) of view. The candidate should focus on specific aspects of this large phenomenon, such as political institutions in a broad sense, political actors (especially political parties) and political processes (including for instance the depoliticization of societies).

The candidate should be equipped with a strong theoretical and methodological background and be able to do field research in the considered countries. We can consider comparative research with some other relevant Western European cases, but the crux of the research has to lay within the Central European region.

Workplace: Institute of Political Studies (Faculty of Social Sciences, Charles University)

Contact: doc. Michel Perottino, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: michel.perottino@fsv.cuni.cz (project supervisor)

Title of the research project:

6. The Social Life of COVID-19

The Post-Doctoral Fellowship holder will develop and carry out a research project focused on the multiple effects of the COVID-19 pandemic. Drawing on the theoretical traditions of the sociology of scientific controversies and the sociology of public problems, the Post-Doc will investigate the socio-political dynamics of human life surrounding the COVID-19 pandemic.

The Post-Doc will explore how different social actors (medical experts, public health authorities, pharmaceutical companies, Nation-States, transnational associations and corporations, politicians and political parties, as well as scientists, journalists, citizens and activists, etc.) have, individually and collectively, produced accounts of the virus itself as well of its social, economic and political implications. Furthermore, the research project will analyse the interaction of the virus with bodies, human behaviours and social institutions. In a more general vein, the project will thoroughly investigate how different facets of the social life of COVID-19 are defined as public problems.

By examining the varieties of social constructions of certainty in the uncertain times, the research project will deal with the questions of scalability or time. More specifically, the following questions will be addressed: How this virus leads us to rethink the ties between the different scales of human agencies, from individual to global and environmental? Furthermore, how does this virus change the way we perceive our activities in the past, present, and future?

Although focusing on the COVID-19 case, the aim of the Post-Doctoral Fellowship will be broader. The examination of the specific COVID-19 case will contribute to the knowledge development in the areas of sociology of scientific controversies and the sociology of public problems. By participating in the research project, the Post-Doc will contribute to the development of one of the major research areas developed at Charles University under the framework of "Politicization of Society and Public Controversies."

Workplace: Institute of Sociological Studies (Faculty of Social Sciences, Charles University)

Contact: doc. PhDr. Dino Numerato, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: dino.numerato@fsv.cuni.cz (project supervisor)

Title of the research project:

7. Environmental Communication and the Construction of Nature

Environmental Communication is a growing subfield of Communication and Media Studies, with its own academic association (IECA) founded in 2011, and a plenitude of academic publications and journals. As climate change and environmental issues have forcefully demanded our attention, and communication is recognized as being part of both problem and solution, there are strong academic and societal needs to further strengthen this field, and fill some of the gaps that still trouble it.

This project aims to contribute to the strengthening of Environmental Communication by infusing it with the study of what is behind (and embedded within) communication, namely the discursive constructions of the environment and nature, and the ways that these discursive constructions circulate within a diversity of media outlets. Here, we have to keep in mind that a multitude of discursive constructions about nature exist (ranging from anthropocentric perspectives to so-called biocentric perspectives), and that they engage in discursive struggles with each other, in other to try to achieve a hegemonic position. These discursive constructions also have very material dimensions, as they can motivate and legitimate the destruction of natural resources through their over-exploitation, or can inspire a variety of activist interventions to try to counter this (some of which produce strong antagonisms and can thus be highly problematic as well). As the human-nature relations are currently being rethought and reconfigured, through these discursive struggles, studying how media communicate these different discursive constructions about nature is innovative and necessary at the same time.

The project will focus on 1/the identification of the discursive constructions of nature in the coverage of selected (mainstream and alternative) media outlets, 2/the analysis of (the media representation of) their discursive struggles, and 3/the role of media in facilitating (or disallowing) the communication of these constructions and their struggles. As a post-doc project, it will profit from the support of a local team of the Institute of Communication Studies and Journalism (ICSJ), that is involved in (and funded by) the Mistra Environmental Communication Research Programme. Through its involvement in this research programme, the ICSJ team is already doing research on Swedish media (and artistic) representations of the environment and climate change. At the same time, this post-doc project will also benefit the local team, as it will allow us to move away from a too exclusive focus on Sweden and to enrich our work with a multi-country approach.

Workplace: Institute of Communication Studies and Journalism (Faculty of Social Sciences, Charles University)

Contact: doc. Nico Carpentier, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: nico.carpentier@fsv.cuni.cz (project supervisor)

Title of the research project:

8. Artificial Intelligence and Journalism

Institute of Communication Studies and Journalism at Charles University seek a post-doctoral candidate in the field of Artificial Intelligence and Journalism. The candidate is expected to exhibit proven track-of-records linked to one of the following topics: AI and newsgathering, AI and news production, AI and news distribution or AI journalism ethics. We are looking for innovative scholar with potential to bridge the divide between social and technological domains. Expected outcome of the fellowship two journal articles (Jsc or Jimp) and involvement in the PhD training. Upon further agreement post-doctoral fellow will also have an opportunity to be involved in teaching.

Workplace: Institute of Communication Studies and Journalism (Faculty of Social Sciences, Charles University)

Contact: doc. Mgr. MgA. Filip Láb, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: filip.lab@fsv.cuni.cz (project supervisor)

Title of the research project:

9. Kitsch and class on social networks: disgusting, bizarre and odd in do-it-yourself cultural practices and its online extensions

The proposed topic follows up and expands the project on mediated social inequalities supported by Czech Science Foundation which established focus on representation of class and class-driven uses of media as one of the themes under study at the Institute of Journalism and Communication Studies. Whereas the existing research on class in media (mainly in Reality Television programs) aimed to map diverse aspects of the working class which stimulate stigmatisation and shaming, the proposed project strives to narrow down the focus and shed light on the connection between class and cultural capital as it is played out in the environment of social media and internet discussions.

As the to-date research proved, class-based shaming is often triggered not only by material and financial deficiencies of the working-class subjects but also by their (putative) lack of symbolic skills mitigating their navigation through complex realities of the globalised world (understanding of advertising, financial institutions, media, mastering foreign languages, cosmopolitan knowledge, etc.). This conclusion provides an impetus to the idea that interconnection between class and cultural capital as it materialises in online media contents and uses deserves further attention.

The proposed project would look at the category of taste (lack of it) in do-it-yourself practices, hobbies and creative activities which people follow in their private leisure time and simultaneously make publicly available via online platforms. The social media and other online contents relevant to this study would encompass pictures and texts presenting outputs of do-it-yourself practices which are found distasteful, ridiculous or disgusting by other users of the online platforms. These exchanges are typically found in the areas of cooking, decorating homes, making one's own fashion garments or jewellery, amateur photography, etc. Special focus will be put on the contents which are found extreme, freak and "hitting the new lows", such as pictures presenting cakes and food styling in the shape of male and female genitals or baby shower cakes mimicking the birth scenes. The project would analyse the contents in connection to how these particular contents are received by the online users. The main research focus would be on classed and gendered (the pertained subjectivities are often referred as "tvořilky", "bydlenky" or "vařilky") perspectives in reading of the above-mentioned do-it-yourself works which are found to be distasteful and/or bizarre.

The project would start from the theoretical background set by Pierre Bourdieu, who coined the concept of "cultural capital" as the dispositions and resources on the grounds of which distinctions between classes are formed and reshuffled. Beverly Skegg's works on class as cultural category will be pivotal steppingstone as well. Another inspiring and more focused theoretical angle is Imogen Tyler's (2013) perspective on classed subjectivities and bodies as rendered through the concept of abjection and waste.

References:

Bourdieu, Pierre (1984). *Distinction: A Social Critique of the Judgement of Taste*. Harvard University Press: Cambridge, MA.

Skeggs, Beverly (1997). *Formations of Class and Gender*. Sage: London.

Skeggs, Beverly (2004). *Class, Self, Culture*. Routledge: London.

Tyler, Imogen (2013). *Revolt Subjects: Social Abjection and Resistance in Neoliberal Britain*. London: Zed Books.

Workplace: Institute of Communication Studies and Journalism (Faculty of Social Sciences, Charles University)

Contact: PhDr. Irena Reifová, PhD.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

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Title of the research project:

10. International relations in the time of uncertainty

During several previous decades, world politics rested on an evolving, but still rather persistent type of an international order. This order was to a large extent based on the dominant position of the United States (USA). Yet it also involved several important normative elements, represented by liberal principles, intensive global economic cooperation, or international institutions. To a high extent, the US-led order was sustained by the demand coming from the other states, which saw it as an enabling arrangement for dealing with global problems such the spread of weapons of mass destruction, terrorism, global economic crises, or environmental degradation.

At this moment, this order that has so far characterized international politics is facing several important challenges. One of the factors that weaken it is the increasing activism and influence of some of the developing countries. Those countries often hold different views about the appropriate form of international order, putting a greater emphasis on the principles of sovereignty and justice. The unipolar arrangement is also questioned by the changing distribution of power in the international system, marked by the decreasing position of the USA and the strengthening of the so-called rising powers. Last but not least, a part of the turbulent development can be attributed to social and ideological changes taking place in the developed countries.

Within this topic, we are searching for a post-doc candidate that would identify and explore an important issue that has to do with the contemporary transformative processes in international politics. The candidate should definitely dispose with a strong theoretical and methodological background. This background should enable him/her to contribute to the international academic debates. As for a concrete research topic, we are rather flexible. The concrete topic would need to be in some way connected with the changing characteristics of world politics. In this context, we welcome proposals that may deal with the cooperative, as well as conflictual aspects of world politics. In terms of issue areas, we are ready to consider proposals that may be concerned with security issues, international economic relations, or any other substantive field of the contemporary international relations.

Workplace: Institute of Political Studies (Faculty of Social Sciences, Charles University)

Contact: doc. PhDr. Jan Karlas, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

Applicants must submit required documents or queries to: jan.karlas@fsv.cuni.cz (project supervisor)

H. Faculty of Humanities

Title of the research project:

Creating Urban Identities: Where Socialist Heritage Meets the Present

Since the fall of state-socialism in 1989, the fervent socio-political, economic, and cultural transformation defined the creation of new urban identities in the former Eastern Bloc. Once impenetrable socialist lands nowadays stand key factors in the scholarly study of twentieth- and twentyfirst- century events. However, while architectural historians study the Cold War architecture, and researchers in sociology and anthropology inquire into the present-day creation of identities and space, the link between the two periods, as well as an inquiry into contemporary urban negotiations of the state-socialist past, remain understudied and call for further examination.

To remedy this gap, Creating Urban Identities will inquire into the debates on state-socialist legacy in the Czech Republic, with a particular focus on the creation of post-socialist identities as pertaining to socio-political and cultural heritage. Specifically, this project will probe into the conversion of cities from socialist to capitalist and will inspect the creation of new urban identities in the aftermath of economic and political restructuring. Creating Urban Identities will seek to identify actors in the process of post-socialist societal shift—citizens, politicians, architects, and intellectuals—in an effort to connect the individual to whole, and vice versa. Finally, to weave the bonds between the past and present, this project will examine the role of collective memory and processes of memorialisation to analyse the problematic and agency of contemporary users of socialist urban heritage.

To conduct the analysis of the relationship between the state, its cities, and their people, as well as to examine the arising social and cultural pluralities unfolding in post-socialist spaces, this project will utilize transdisciplinary methodologies and will use theories from the fields of architecture, history and anthropology, sociology, and political science. Creating Urban Identities will study the existing scholarship, archival materials, newspapers and journals, and will entail an extensive oral history component and case-studies. The value of this project stands paramount in the contemporary political and cultural moment: in the era of rising nationalism, an analysis of state-socialist heritage and its role in present-day urban transformations expands the understanding of societal processes and their staunch links with the ever-present past.

Workplace: Department of Historical Sociology (Faculty of Humanities, Charles University)

Supervisor: doc. PhDr. Jiří Šubrt, CSc.

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Position available from: January 1, 2021

Deadline date for applications: July 22, 2020

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I. Faculty of Physical Education and Sport

Title of the research project:

1. Optimization of kinematic and musculoskeletal modeling of human sports activity

Kinematics and musculoskeletal modeling is the current trend in sports research and practice. Primarily, musculoskeletal models have been used to estimate the muscle and joint contact forces expressed during movement. One limitation of this approach, however, is that such models are computationally demanding, which limits the possibility of using them for real-time feedback.

One solution to this problem is to train a neural network or perform principal component analyses to approximate the performance of the model, and then to use the neural network to give real-time feedback. The project aims to achieve experimental measures of specific sport movements and create or improve the kinematic and musculoskeletal models of this action. By this approach, the project will stimulate both the laboratory and numerical skills of the applicant and other research teams on specific sports interests.

Workplace: Department of Sport games (Faculty of Physical Education and Sport, Charles University)

Contact: doc. PhDr. Petr Štastný, Ph.D.

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Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

Applicants must submit [required documents](#) or queries to: stastny@ftvs.cuni.cz (project supervisor)

Title of the research project:

2. Genetic and phenotype aspects of sports performance

The continuous and prospective collection of data from the testing of individual components of sports performance, including the monitoring of current performance and some environmental factors (stress, nutrition, etc.) will be acquired during our project. These tests will allow the evaluation of relevant body subsystems that have a direct relation to sports performance concerning the structure of the particular sports performance, thus with varying proportion of fitness component (morphological, muscular, motor, cardiorespiratory, metabolic). It has long been known that genetics has a strong influence on sports performance (e.g., cognitive abilities, cartilage volume, skills acquisition, and joint hypermobility up to 70%, the distribution of muscle fiber types and maximum oxygen consumption up to 50% and endurance skills or training adaptation 40%). Still, research into specific molecular genetic markers has only been a question for the last few years. The gradual integration of data from testing performance assumptions of sports phenotype and genetic markers enables us to study sports performance in its complexity. Data from the monitoring intervention can potentially clarify reactive and adaptive changes to the chosen training or environmental stimulus.

Workplace: Department of Physiology and biochemistry (Faculty of Physical Education and Sport, Charles University)

Contact: doc. PhDr. Miroslav Petr, Ph.D.


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Position available from: January 1, 2021

Deadline date for applications: July 26, 2020

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