

The **Laboratory of Plant Biophysics and Biochemistry** in the **Biology Centre of the Academy of Science (BC CAS), České Budějovice, Czech Republic**, is looking for excellent, innovative & highly motivated candidates for the position of

1 doctoral (PhD) student

Position summary

The project is titled 'Mechanisms of beneficial and sublethally toxic effects of chromium and nickel in plants' and the work will be done under supervision of Prof. Dr. Hendrik Küpper and Dr. Filis Morina.

Research project: Trace elements are essential for plant growth and development, and for plant-environment interactions. They are involved in plant metabolism as cofactors of many enzymes, electron transport proteins and transcription factors, although for some of them an essential role has never been proven (Cr). Nickel is required only in minute concentrations for one known enzymatic function (urease) in higher plants but at least in hyperaccumulators it also functions against pathogens. Further, looking at toxicity mostly high, environmentally less relevant concentrations have been studied, so that the molecular mechanism of sublethal Cr and Ni effects remain less known. The project aims to elucidate i) the mechanisms of action of the less investigated effects of Cr and Ni and ii) their role in plant defence responses using model plants and pathogens. To achieve this, plants will be hydroponically grown under a range of metal concentrations (deficient, optimal, excessive) and subsequently exposed to pathogens under simulated environmental conditions. *In vivo* responses to the treatments will be monitored by imaging measurements of element distribution (μ XRF) and photosynthetic light reaction (chlorophyll fluorescence kinetics). Mechanisms of action will be further analysed by metabolomics, metalloproteomics and transcriptomics for screening, and selected candidate proteins will be characterised further after purification from native and heterologous expression. The prospective PhD student will be able to learn various molecular biology (biochemistry, biophysics and genetics) and plant physiology techniques including metalloproteomic analysis by HPLC-DAD/ICP-MS, protein purification from native and heterologous expression, fluorescence and absorption spectroscopy in the X-ray and UV/VIS energy ranges, qPCR, microscopy techniques, gas exchange by IRGA, and chlorophyll fluorescence kinetics.

Workplace

The Laboratory of Plant Biophysics and Biochemistry (PBB, head Prof. Hendrik Küpper, deputy head Dr. Filis Morina) is part of the Institute of Plant Molecular Biology (IPMB) within the Biology Centre of the Czech Academy of Sciences, (<https://www.bc.cas.cz/en/>). The lab provides excellent facilities to perform cutting-edge research, including high-end research instruments (e.g. sector-field ICP-MS, μ XRF imaging, imaging and spectrally resolved Chl fluorescence kinetics). The lab is generally interested in the physiology, biophysics and biochemistry (incl. molecular biology) of photosynthetic organisms (green/brown/red algae, terrestrial and submerged higher plants, cyanobacteria). The main focus is on metal metabolism in terms of uptake, physiological use, sequestration/complexation, detoxification, toxicity and interaction with plant immunity against pathogens. Further details about PBB: www.umbr.cas.cz/~kupper/AG_Kuepper_Homepage.html.

The accepted applicant will be enrolled in PhD studies at the University of South Bohemia, Department of Experimental Plant Biology. <https://www.prf.jcu.cz/en/structure/academic-departments/department-of-experimental-plant-biology.html>

The institute is located in České Budějovice, (which is 1:40h away from Prague by train) and is a city with over 750 years of tradition and breathtaking countryside around. It has a growing international expert community at the Biology Centre CAS and the University of South Bohemia. Check out our [Guide for Expats](#) to read about life in the city and the Czech Republic.

Conditions of contract

Employment can start on 1 April 2024, or later depending on mutual agreement. The contract will be initially for one month of probation period. Afterwards, if successful in the probation period, the candidate will take a University Entrance Exam in June before officially enrolling in PhD studies. The contract may be extended for up to four years total in which the PhD should be completed. According to Czech standards for doing a PhD, the student's full-time work on the project will be financed by the University through a PhD fellowship that is granted for up to four years, and by a part-time (initially 50%) working contract with the Institute at the Czech Academy of Science. In addition to the work on the project, the student has to attend PhD student courses at the University of South Bohemia and earn credits through exams in order to qualify for the award of the PhD. In this way, it should be clear that the work on the PhD is part of education and not a standard job, requiring dedication of the student.

Qualifications

We are looking for a highly motivated student interested in multidisciplinary life sciences with a focus on plant biophysics and biochemistry. Qualified candidates holding (or about to obtain) a Msc or equivalent degree in Plant Biology, Biophysics, Biochemistry, or a related field are encouraged to apply. Previous theoretical knowledge and practical experience in one or better more discipline(s) within biochemistry, biophysics, molecular genetics, microbiology and bioinformatics is an advantage. At least some basic understanding of each of these fields will be required. Intensive further learning of plant biology, biochemistry and biophysics will be expected during the PhD. The candidate is required to have a good knowledge of spoken and written English to be able to fluently communicate with the team, to learn, and to write scientific manuscripts for publication in international journals. Good communication skills and teamwork abilities are required.

Benefits

- We are an International team with many collaborations, e.g. via leading the COST Action "Trace Metal Metabolism in Plants, PLANTMETALS" (www.plantmetals.eu), also resulting in opportunities to travel,
- 5 weeks of paid holiday per year,
- subsidized lunches in our canteen,
- full health insurance,
- benefits from a Social fund, and student benefits.
- Free language classes are available: Czech for foreigners, English for Czechs (the capacity is limited).
- Support of career development through a mentoring programme is available.
- Administration provides support with relocation and settlement in the Czech Republic.
- Concessionary mobile tariff at the contractual operator
- Concessionary banking services at the contractual bank

How to apply

Interested candidates should apply before 28th of January 2024 by submitting the following documents and information **as one complete pdf file** to hendrik.kuepper@umbr.cas.cz:

- A cover letter (max. 1000 words) explaining why the candidate believes to be suitable for this post
- A detailed CV including lists of publications if any, other achievements and previous professional experience
- Academic transcripts and diplomas (scanned copies)
- A list of at least two referees

Evaluation procedure and Announcement of results

The position will be filled once the evaluation committee has found a well suitable candidate. We will contact only potentially successful candidates and invite them min. 3 days in advance for an interview to be held as a Skype or Zoom videoconference, and candidates will be informed of the result max. 1 month after the interview. The Biology Centre of the Czech Academy of Sciences holds the HR Excellence in Research Award. Our selection process is transparent, open, non-discriminating, and fair. For more information about the researchers' recruitment policy at our institution, see [OTM-R](#).