REGISTRATION FORM FOR CZECH SCIENTIFIC INSTITUTION

1. Research institution data (name and address):

Biologické centrum AV ČR, v. v. i. (Biology Centre CAS)
Branišovská 1160/31
370 05 České Budějovice

2. Type of research institution:

Public research institution – Czech Academy of Sciences (veřejná výzkumná instituce – Akademie věd České republiky)

3. Head of the institution: prof. RNDr. Libor Grubhoffer, CSc., Hon. D.Sc., dr. h. c

4. Contact information of designated person(s) for applicants:

Prof. Dr. Jan Kubečka, CSc.
e-mail: kubecka@hbu.cas.cz, mobile phone: +420 604344267
Institute of Hydrobiology BC CAS v.v.i.
Na Sádkách 7, 37005 České Budějovice Czech Republic
http://www.hbu.cas.cz/

5. Research discipline in which the strong international position of the institution ensures establishing a Dioscuri Centre:

Life Sciences: *Evolutionary and environmental biology* - evolution, ecology, population biology, biodiversity, biogeography

6. Description of important research achievements from the selected discipline from the last 5 years including a list of the most important publications, patents, or other results:

The Institute of Hydrobiology, Biology Centre of Academy of Sciences of the Czech Republic, is the principal institution in the Czech Republic devoted to complex freshwater research of man-made reservoirs and natural lakes. The research portfolio includes the assessment of biotic interrelations and their interactions with abiotic factors. Limnological interactions are studied both within the waterbodies and within whole catchment. The institute performs research on different levels of interactions from the ecosystem, community, population, organismal, through cellular to molecular levels. The investigations combine regular long-term ecological research on selected Czech reservoirs, comparative and methodical studies and different scale experiments that allow scrutinizing the phenomena in different time- and space-scales. The institute applies a holistic approach from elementary chemistry to high trophic levels and societal effects on water systems. It acts as an advisory body for the assessment of the ecological potential of heavily modified and artificial waterbodies. Special investigations going beyond the investigations of lakes and reservoirs involve ponds, running waters and other aquatic environment. The main research areas encompass water chemistry, fish biology, production processes of freshwater ecosystems, microbial processes, interactions and diversity using classical limnological approaches and novel molecular and isotopic techniques.

Examples of publications:

Bulzu P.A., Andrei A., Salcher M., Mehrshad M.,., Ghai R. et al. (2019) Casting light on Asgardarchaeota metabolism in a sunlit microoxic niche Nature Microbiology 4: 1129–1137 . DOI: 10.1038/s41564-019-0404-y

Jarić I., Souza A.T et al.,. (2020). iEcology: harnessing large online resources to generate ecological insights. Trends in Ecology and Evolution 35(7): 630-639.

Mehrshad M., Salcher M.M., Šimek K., Andrei A., Ghai R. (2018) Hidden in plain sight—highly abundant and diverse planktonic freshwater Chloroflexi. Microbiome 6: 176.

Vystavna, Y. ;Schmidt, S. et al. (2019), Multi-tracing of recharge seasonality and contamination in groundwater: A tool for urban water resource management Water Research. 161); 413-422

Breinlinger S., Mareš J., Martinez Yerena J., , Kust A., et al. (2021) Hunting the eagle killer: A cyanobacterial neurotoxin causes vacuolar myelinopathy. *Science* **371**: 1335.

Jane S.F., C., Hejzlar J.,et al.. (2021) Widespread deoxygenation of temperate lakes. Nature 594: 66-70.

Nathan, R., Říha, M., Jarić, I.et al. (2022). Big-data approaches enable increased understanding of animal movement ecology. Science doi: 10.1126/science.abg1780

7. List of no more than 3 important research projects in the selected discipline awarded in national and international calls to the institution in the last 5 years:

Biomanipulation as a tool for the improvement of reservoir water quality

Project No.: CZ.02.1.01/0.0/0.0/16_025/0007417

Principal Investigator: Jan Kubečka,

Financial support: Ministry of Education, Youth and Sport of the Czech Republic administrate the support provided from EU funds, Approx. 2600 thousand EUR

Drinking WAter Readiness for the Future

Project No.: TO01000202

Principal Investigator: doc. Ing. Petr Porcal, Ph.D.

Financial support: TAČR and Norway Grants, Approx. 492 Thousand Eur

Pan-European Lake Sampling - Microbial Eco-genomics (PELAGICS)

Project No.: 20-12496X (Expro)

Principal Investigator: Rohit Ghai

Financial support: Czech Science Foundation, approx.. 2000 Thousand Eur

8. Description of the available laboratory and office space for a Dioscuri Centre:

At the Department of Aquatic Microbial Ecology, well-equipped microbiological laboratories are available allowing basic and advanced microbial analyses, such as isolation and cultivation of microbial strains, cell enumeration and biomass measurement of microbes (bacteria, protozoa, phytoplankton), CARD-FISH staining of bacteria and heterotrophic flagellates, qualitative and quantitative fluorescence techniques and general molecular biology (DNA/RNA isolation, PCR, qPCR). We also have specific equipment and know how for designing highly sophisticated manipulative experiments to address new questions emerging from the simultaneous applications of molecular and classical microbial ecology approaches.

The Department of Hydrochemistry and Ecosystem Modelling (HEM) of the Institute of Hydrobiology of the Biology Centre CAS studies biogeochemical cycles and processes that control composition and quality of surface waters. This interdisciplinary research is focused on the structure, functions, problems and management of aquatic environments like reservoirs, natural lakes and their catchments.

Our research is focused on the highest trophic levels in freshwater ecosystems, zooplankton and fish. The department is divided into six research groups investigating different aspects of fish and zooplankton ecology using diverse methodological approaches and advancements. https://www.hbu.cas.cz/en/structure/department-of-fish-and-zooplankton-ecology-fze-/ The staff also provide lecturing of aquatic and environment sciences at the University of South Bohemia and are engaged in advisory services on water quality and aquatic ecosystem functioning for water policy and water management.

Altogether 550 m^2 of laboratory space and 650 m^2 of offices are available.

9. List of the available research equipment for a Dioscuri Centre:

Automatic pH and titration unit (Radiometer TIM865), total and particulate organic carbon analyser (Shimadzu TOC-L with particulate organic module SSM 5000), organic carbon and total nitrogen analyser (Shimadzu TOC-L with TNM-L module), ion chromatography (Dionex ICS-5000+), elements CHNSO analyser (Elementar varioMICRO cube), ICP-MS spectrometer (Agilent 8800 Triple Quadrupole), UV-vis spectrophotometer (Shimadzu UV-2700), spectrofluorometer (Horiba, Duetta), artificial solar light simulation chamber (SolSim), acoustic doppler velocimeter (Son Tec, FlowTracker).

A fully automated fluorescence microscope with image analysis (Zeiss Axio Imager.Z2 with Axiocam 506, ZEN 2.5 software) for high-throughput evaluation of CARD-FISH stained microbial samples, a fluorescence microscope Nikon-90i, Image analysis system NIS Elements 5.1, microscopes Olympus IMT2 and BX51 with DP70 camera, inverted microscopes (Olympus IX71), a micromanipulator (Narishige MMO-202ND), and a microinjector (Narishige IM-9A). A CytoFLEX flow-cytometer (Beckman Coulter) with fully automated plate loader for high-throughput quantification of microbes.

Extended CEN Multi-mesh gillnets, basic sampling tools for qualitative and semiquantitative fish surveys. 16 meshes 5 0 to 135 mm About 7 km of nets). Beach seines for quantitative surveys (various mesh sizes,10 to 200 m seine lengths). Electrofishing: back-pack battery electroshocking devices used in smaller waters, and two special 6 m long electrofishing boats equipped with a powerful electroshocking device (power 20kW, output voltage up to 600 V) used for surveying deep-waters of reservoirs and lakes. Trawl nets (several types of frame, beam, otter and twin trawls up to 10 m height, up to 40 m width, including electrified ones) towed by one or two boats (Ota Oliva - length 8 m, engine power 64 HP, Thor Heyerdahl - length 12 m, engine power 200 HP). We also apply purse seines (various types, height up to 12 m, length up to120 m) distributed from a special catamaran ship.

Our hydroacoustic team has many years of experience with both acoustic estimates of abundance, biomass and fish stock composition In addition to fish and other aquatic animals, we also have experience with estimating ebullition of greenhouse gases, macrophyte,and sediment distribution and thickness. We use Simrad EK60 and wideband EK80 echosounders operating at central frequencies of 38, 120, 200, 333, and 400 kHz (supporting chirp and continuous wave of pulse forms) and dual-frequency identification sonar (DIDSON). We use the 3D acoustic telemetry Lotek Wireless Inc. system, we have 91WHS3250 receivers operating at 76 kHz. For monitoring the environmental background,we use HOBO Pendant® temperature and light dataloggers and a mobile weather station. We also use OregonRFID passive telemetry equipment to monitor the migrations of aquatic animals.

For direct visual underwater observations, we use remotely-operated cameras (Subsea Tech Observer, SplashCam DeltaVision HD), a self-operating camera systems (GoPro) and SCUBA divers.

10. List of the additional benefits (other than listed in the conditions for hosting a DC, see invitation) that the Institution declares to provide for a Dioscuri Centre (i.e.: additional funds, personal benefits, dual career options, relocation support or other):

Foreign applicants will receive support in transferring to the Czech Republic. The Institute can also help secure non-commercial accommodation at the campus shared by the Biology Centre and the University of South Bohemia and provide guidance with the administration concerning the transfer of both the DC Leader and their family.

Position includes standard health and social security benefits, support for onboarding, leisure and holiday activities, coverage of required travel and SW/HW. The employees have can opt for flexible working time and 25 days of paid holiday. The institution also runs a children's group for employees with small children. BC also runs its own mentoring programme.

BC closely cooperates with the University of South Bohemia. There are thus excellent opportunities for deepening or obtaining teaching experience and attracting prospective students for the Centre.

Ceske Budejovice is a medium-sized town ca. 150 km south of Prague with 100,000 inhabitants, a relaxed atmosphere, and a growing expat community. Both the town and the surrounding countryside provide numerous opportunities for research and leisure activities. Living costs are low by international standards.

11. Other information about the internationalization of the research institution, international researchers employed at the institution, the availability of English language seminars etc.:

In 2019, Biology Centre CAS was awarded a 'Human Resources Excellence in Research' Award of EU and, recently, the institution has also adopted a Gender Equality Plan. Biology Centre is an equal opportunity employer with highly developed care of Czech and a great number of foreign employees as 25 % of our researchers come from more than 30 different countries. The Department of Ecology is a diverse environment including undergrads, PhD students, postdocs and researchers from 11 nationalities.

In order to enable better communication at the institution, there are courses of English for Czech employees and courses of Czech for foreign employees available, free of charge. The institution has been translating all key documents and information into English.

The institution is also a member of the ALTER-net, ELIXIR, Czech-Bioimaging, Euro-Bioimaging and EFSA research networks.