**Registration form**

**This is a registration form for Host Institutions wanting to establish a Dioscuri Centre of Scientific Excellence within Dioscuri 4 call.**

**Registration form for Polish research institution**

1. Research institution data (name and address):

   Jagiellonian University; Faculty of Biochemistry, Biophysics and Biotechnology, ul. Gronostajowa 7, 30-387 Kraków, Poland

2. Type of research institution[1] (select one from the 9 listed options):

   **1) higher education institution**

3. Head of the institution: Prof. dr hab. Piotr Kuśtrowski, Vice-Rector for Research

4. Contact information of designated person(s) for applicants and the NCN: first and last name, position, e-mail address, phone number, correspondence address: Prof. dr hab. Artur Osyczka (Vice-Dean for Research and International Relations), e-mail: prodziekan.wspolpraca.wbbib@uj.edu.pl, +48 539 639 533

5. Research discipline in which the strong international position of the institution ensures establishing a Dioscuri Centre (select one from the 25 listed disciplines):

1 As specified in "Addressees of the call"

Natural Sciences and Technology

☐ Mathematics

☐ Fundamental constituents of matter

☐ Condensed matter physics

☐ Chemistry

☐ Materials

☐ Computer science and informatics

☐ Systems and communication engineering

☐ Production and processes engineering

☐ Astronomy and space research

☐ Earth sciences

Life Sciences

■ **Molecular biology, structural biology, biotechnology**

☐ Genetics, genomics

☐ Cellular and developmental biology

☐ Biology of tissues, organs and organisms

☐ Human and animal non-infectious diseases

☐ Human and animal immunology and infection

Diagnostic tools, therapies and public health

☐ Evolutionary and environmental biology

☐ Applied life sciences and biotechnology

Arts, Humanities and Social Sciences

☐ Fundamental questions of human existence and the nature of reality

☐ Culture

☐ The study of the human past

☐ Individuals, institutions, markets

☐ Norms and governance

☐ Human nature and human society

6. Description of important research achievements from the selected discipline from the last 5 years including a list of the most important publications, patents, other (*up to one page in A4 format*):

The Faculty of Biochemistry, Biophysics and Biotechnology (FBBB) was awarded a status of the **Leading National Research Centre.** Combines **17 Departments** and other **Research Units** conducting internationally recognized **multidisciplinary research** ranging from **atomic** and **molecular** to **tisssues** and **organism** levels.

Currently runs **133 grants** awarded by Polish and international funding agencies for the total sum of **150 mln PLN.**

Combines **basic** and **applied** research: publishes **~ 200 per-reviewed research papers** per year; filed **15 international patents** in the period 2015-2020.

In 2020 was included in the **National Road Map for Infrastructure Investments**

Belongs to the **Excellence Initiative – Research University** in the Structural and Translational Biology Priority Research Area (**BioS PRA**).

Selected recent publications:


- Sarewicz M, Bujnowicz L, Bhaduri S, Singh SK, Cramer WA, Osyczka A. Metastable radical state, nonreactive with oxygen, is inherent to catalysis by respiratory and photosynthetic cytochromes $bc_1/b_6f$. ***Proc. Nat. Acad. Sci. USA*.** 2017;114:1323-1328.
- Potempa J, Mydel P, Kozieł J. The case for periodontitis in the pathogenesis of rheumatoid arthritis. ***Nature Rev*. *Rheumatology.*** 2017;13:606-620.
- Stach N, Kalinska M, Zdzalik M, Kitel R, Karim A, Serwin K, Rut W, Larsen K, Jabaiah A, Firlej M, Wladyka B, Daugherty P, Stennicke H, Drag M, Potempa J, Dubin G. Unique Substrate Specificity of SplE Serine Protease from Staphylococcus aureus. ***Structure***. 2018;26:572.
- Kowalska E, Bartnicki F, Fujisawa R, Bonarek P, Hermanowicz PL, Tsurimoto T, Muszynska K, Strzalka W. Inhibition of DNA replication by an anti-PCNA aptamer/PCNA complex. ***Nucleic Acids Res***. 2018;46:25-41.
- Gulati GS, Zukowska M, Noh JJ, Zhang A, Wesche DJ, Sinha R, George BM, Weissman IL, Szade K. Neogenin-1 distinguishes between myeloid-biased and balanced Hoxb5(+) mouse long-term hematopoietic stem cells. ***Proc. Nat. Acad. Sci. USA.*** 2019;116:25115-25125.
- Szade A, Szade K, Nowak WN, Bukowska-Strakova K, Muchova L, Gońka M, Żukowska M, Cieśla M, Kachamakova-Trojanowska N, Rams-Baron M, Ratuszna A,

Dulak J, Józkowicz A. Cobalt protoporphyrin IX increases endogenous G-CSF and mobilizes HSC and granulocytes to the blood. ***EMBO Mol.Med.*** 2019; 11:e09571.

- Kordon MM, Zarębski M, Solarczyk K, Ma H, Pederson T, Dobrucki JW. STRIDE-a fluorescence method for direct, specific in situ detection of individual single- or double-strand DNA breaks in fixed cells. ***Nucleic Acids Res.*** 2020;20;48:e14.
- Szade K, Zukowska M, Szade A, Nowak W, Skulimowska I, Ciesla M, Bukowska-Strakova K, Gulati GS, Kachamakova-Trojanowska N, Kusienicka A, Einwallner E, Kijowski J, Czauderna S, Esterbauer H, Benes V, L Weissman I, Dulak J, Józkowicz A. Heme oxygenase-1 deficiency triggers exhaustion of hematopoietic stem cells. ***EMBO Rep.*** 2020; 21:e4789.

7. List of no more than 3 important research projects from the selected discipline awarded in national and international calls to the institution in the last 5 years (title, name of PI, source of funding, amount of funding):

Selected 3 international research projects of FBBB

1) Hear On chip based on human-induced pluripotent Stem cell Technology for personalized Medicine; PI: Józef Dulak, European Commission /Horizon 2020; 364 500 EUR;
2) New therapies for uveal melanoma; PI: Martyna Elas; European Commission /Horizon 2020; 7 971 101 EUR;
3) Searching for molecular interactions that regulate photosynthetic electron flow at the level of cytochrome b6f using optical and paramagnetic resonance spectroscopy; PI: Artur Osyczka; FNP/Team; 3 499 570 PLN.

8. Description of the available laboratory and office space for the Dioscuri Centre (*up to one page in A4 format*):

FBBB seeks to establish a **Bioinformatics Research Unit** aimed at providing expert bioinformatics conceptual and technical support to scientists from the various research groups of the FBBB .

FBBB will provide the laboratory and the office space for that unit. The laboratory will be equipped with computer hardware and software required for data processing, statistical analysis, integration and visualisation of disparate datasets, development of analysis workflows etc. The access to the Computer Centers will be provided (see section below).

FBBB is open for discussion with candidates on specifics of the equipment to be provided.

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

The Faculty of Biochemistry, Biophysics and Biotechnology (FBBB) combines highly specialized laboratories conducting research in broad areas covering: **Biochemistry/physiology/biotechnology (analytical, physical, plant, cell,**

**medical, comparative):** host-pathogen interactions, gene transcription regulation, post-transcriptional and post-translational modifications, inflammation and cancer, cellular signaling pathways, stem cells biology, vascular biology, hypoxia, photoreceptors

**Biophysics (cell, molecular, computational, photo-):** phototherapy, radiology, oxidative stress, bioenergetics, redox signaling, protein dynamics, DNA damage and repair, quantum mechanics and modeling, advanced optical and magnetic spectroscopies and imaging

**Immunology/microbiology:** regulation of immune response, bacterial infection, neutropenia, proteases and protein inhibitors, autoimmune diseases, periodontitis.

Each laboratory has access to specialized equipment at both basic and advanced levels. The newly established Laboratory of Metabolomics will specifically specialize in transcriptome and proteome analysis of different biological systems thus will be bound for further bioinformatics input.

FBBB is located near the Małopolska Centre of Biotechnology (MCB) that serves as a link between three different entities: scientists working on the high performance equipment, entrepreneurs commercializing basic science achievements and local societies interested in diagnostic tests. The Faculty members collaborate closely with MCB members. Among them are studies encompassing transcriptome and proteome profiles of different biological systems and structural biology.

The Faculty members may have an access to Academic Computer Centre CYFRONET AGH. This Center is established by the National Committee for Scientific Research as the unit leader in the operation and expansion of the hardware base of the high performance computers (HPC) as well as the urban and academic network (Metropolitan Area Network – MAN). The core network of the CraCow MAN is in the Old Town area, but the network also covers the academic campus of Jagiellonian University at Pychowice. MAN offers the users computing power, a wide range of network services, as well as disk and tape storage resources. The Cracow MAN is directly connected to the Upper Silesia, Warsaw and Rzeszów regions with 2x10 Gbps PIONIER links. The PIONIER network enables communication with major national and foreign computing centres. International connectivity is achieved through the GEANT scientific network. In addition to the GEANT network, the Centre is also connected to the TaliaSonera backbone via a 550 Mbps backup link. Details regarding the operation of the Academic Computer Centre CYFRONET AGH are presented with the link: www.cyfronet.krakow.pl/en/13080,artykul,about_us.html

10. List of the additional benefits (other than listed in call text) that the Institution declares to provide for the Dioscuri Centre (i.e.: additional funds, personal benefits, other) (*up to one page in A4 format*):

FBBB will provide:

- Unlimited access to collaborate with international research institutions and research groups that FBBB has already been interacting with;
- Additional funds for scientific research within the framework of its statutory operation on the same principles as that applied to all organizational units established within the Faculty;
- Financial support of scientific projects;
- Full freedom of selection of scientific issues to be addressed;
- Opportunity to interact with Polish and foreign students, supervise MSc and PhD projects, deliver lectures and conduct seminars;
- Funds for PhD scholarships according to the rules applied by the Faculty;
- Possibility to perform educational activity;
- Possibility to fully participate in all events organized by the Faculty and the Jagiellonian University;
- Administrative and financial support during the entire period of funding of the Dioscuri Center (and also if it continues to operate), especially at the beginning of its operation
- Administrative officer (who speaks English fluently) for the entire period of funding of the Dioscuri Center (and also if it continues its operation) to work full-time and only for the Dioscuri Center, employed at the expense of the scientific institution.

11. Other information about the internationalisation of the research institution, international researchers employed at the institution, the availability of English language seminars etc. (*up to one page in A4 format*):

Individual research groups of FBBB have established various long-term and short-term collaborations with top scientist around the world. This includes the joint research projects as well as the long-term and short-term exchange visits of scientists. FBBB participates in student-exchange programmes, including the ERASMUS programme, and joined the UNA Europa initiative.

FBBB conducts several courses in English for Polish and foreign students. It is leading teaching institution in Poland providing 4 independent studies programmes at undergraduate, MSc and PhD levels: Biotechnology, Biochemistry, Molecular and Cellular Biophysics and Molecular Biotechnology. First three, have individual courses in English, the fourth is entirely in English.

Several research meetings and conferences at FBBB are being organized in English. Examples of recently organized by FBBB international conferences/seminars include:

XIth International Workshop on EPR in Biology and Medicine (6-10 October 2019)

11th International Conference on Toxic Cyanobacteria (ICTC 11) (5-10 May 2019)

Periodontitis - Current State of Knowledge and Future Perspectives (26-27 October 2018)

4th Conference of the International Associated Laboratory CNRS (28-29 May 2018).

5th European Joint Theoretical/Experimental Meetings on Membranes (6-8 Dec 2017)
6th Central European Congress of Life Science (11-14 September 2017)

4D Nucleome – Cell Nucleus in space and time (14-17 May 2017)

Considering period from 2015, FBBB has hosted 14 visiting professors from various research institutions around the world (including USA, Japan, Brazil, Israel, Denmark Holland, Austria)

FBBB is opened to employ foreign researches that run independent research groups. One foreign PI is to be employed in the Department of Molecular Biophysics within the next few months.

Some members of the Faculty have joint appointments with foreign institutions. FBBB collaborates closely with the international groups in MCB (including the Max Planck joint laboratory).