Registration Form - declaration of willingness for establishing interdisciplinary Dioscuri Centres of Scientific Excellence

This is a registration form for Host Institutions wanting to establish an interdisciplinary Dioscuri Centre of Scientific Excellence within Dioscuri 5 call.

Registration form for Polish research institution

1. Research institution data (name and address):

   Institute of Geophysics, Polish Academy of Sciences; Księcia Janusza 64; 01-452 Warszawa

2. Type of research institution[1]

   scientific institutes of PAN

3. Head of the Institution: **Prof. dr hab. Paweł M. Rowiński**

4. Contact information of designated person(s) for applicants and the NCN: first and last name, position, e-mail address, phone number, correspondence address:

   Deputy director of Scientific affairs dr hab. Rafał Junosza-Szaniawski, +48 22 6915 756; rafal.szaniawski@igf.edu.pl

5. Research disciplines in which the institution ensures establishing of an interdisciplinary Dioscuri Centre (select two (and if necessary three) of the domains that should be combined; select two (or if necessary three) from the 25 listed auxiliary panels of disciplines). Provide two (and if necessary three) specific NCN subpanels according to the list[2].

[2] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

☐ **DOMAIN: Humanities, Social Sciences and Art Sciences** [3]

☐ Fundamental questions about human existence and the nature of reality

☐ Culture and cultural production

☐ The study of the human past

☐ Institutions, markets, space

☐ Law and political science

☐ Human nature and human society

☐ **DOMAIN: Life Sciences**[4]

☐ Molecules of Life: Biological Mechanisms, Structures and Functions

☐ Integrative Biology: from Genes and Genomes to Systems

☐ Cellular, Developmental and Regenerative Biology

☐ Physiology in Health, Disease and Ageing

☐ Neuroscience and Disorders of the Nervous System

☐ Immunity, Infection and Immunotherapy

☐ Prevention, Diagnosis and Treatment of Human Diseases

x Environmental Biology, Ecology and Evolution

☐ Biotechnology and Biosystems Engineering

[3] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

[4] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

☐ **DOMAIN: Physical Sciences and Engineering**[5]

☐ Mathematics

☐ Fundamental constituents of matter

☐ Condensed matter physics

☐ Chemistry

☐ Synthetic Chemistry and Materials Science

☐ Computer science and informatics

☐ Systems Engineering

☐ Production and processes engineering

X Earth sciences

☐ Materials Engineering

Description of important research achievements from the selected disciplines from the last 5 years including a list of the most important publications, data bases, series of workshops, patents, policy briefs, field work/ field site, exhibitions, other:

IGF PAS is Poland's leading institution in the continuous monitoring of global geophysical fields, including seismology, geomagnetism, and selected atmospheric physics parameters. The Institute operates long-term seismic networks, geomagnetic observatories, atmospheric observatories, and polar monitoring stations. The resulting datasets are essential for earthquake analysis, space weather studies, climate monitoring, and natural hazard assessment.

One of the Institute's internationally recognised achievements is the over 50-year ozone monitoring programme conducted at the Central Geophysical Observatory in Belsk. In addition to ozone observations, IGF PAS has carried out long-term solar radiation monitoring and atmospheric transparency studies, contributing to global climate datasets, research on ozone depletion, and a broader understanding of long-term atmospheric change. Data collected by the Institute are integrated into major international scientific databases and research infrastructures, including INTERMAGNET, EPOS, the World Data Centre for Geomagnetism, and the IGF PAS Data Portal.

[5] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

In recent years, a particularly dynamic area of research at IGF PAS has focused on climate change and the polar environment in Svalbard, especially in the vicinity of the Polish Polar Station Hornsund. Institute researchers have published extensively on glacier dynamics, Arctic fjord evolution, underwater acoustics, and the effects of climate warming on glacial and oceanic processes. A notable example is the 2022 publication by Oskar Głowacki, "Distinguishing subaerial and submarine calving with underwater noise," published in the Journal of Glaciology, which demonstrated the possibility of monitoring glacier calving processes in Hornsund Fjord using underwater hydroacoustics. The study introduced innovative methods for observing glacier–ocean interactions and constituted an important contribution to international Arctic climate research.

Another major achievement of IGF PAS has been the development of advanced methods for assessing anthropogenic seismic hazard through the transition from static to dynamic and predictive approaches. Researchers developed new theoretical and computational frameworks accounting for the non-stationary nature of induced seismicity, as well as alternative non-parametric methods that improve seismic hazard estimation beyond classical Gutenberg–Richter models. These solutions were implemented in the mines of KGHM Polska Miedź S.A. and applied to seismic hazard assessment in both Poland and Brazil. IGF PAS researchers also developed new metrics describing earthquake preparation processes and created digital twins of seismic activity integrating observational data, probabilistic models, and machine-learning algorithms for near real-time hazard forecasting. These solutions were implemented within the EPISODES platform developed under EPOS-ERIC and further expanded in the Horizon Europe project DT-Geo – A Digital Twin for Geophysical Extremes.

One of the Institute's most prestigious scientific achievements in 2026 was the research conducted by Dr Sylwia Dytłow on road dust and the transport of environmental pollutants, published in the Journal of Hazardous Materials (Q1, Impact Factor 11.3). The study demonstrated that the finest fractions of road dust form stable heteroaggregates containing microplastics, toxic organic compounds, and strongly magnetic anthropogenic particles, which is crucial for understanding pollutant migration into aquatic systems and ecosystems. The research also introduced innovative applications of magnetic methods and machine-learning techniques for the rapid identification of contaminated areas. The results received international recognition during the European Geosciences Union (EGU) General Assembly 2026 in Vienna, where the study was selected as one of the four most media-relevant and groundbreaking scientific reports among approximately 20,000 submissions. Dr Dytłow was the only representative of a Polish scientific institution invited to the official EGU press conference attended by media outlets including Nature, BBC, Reuters, and The New York Times.

6. List of no more than 4 important research projects from the selected disciplines awarded in national and international calls to the institution in the last 5 years (title, name of PI, source of funding, amount of funding):

Over the past five years, IGF PAS has been awarded several important research projects through both national and international funding schemes.

• One of the most significant projects is “At the Crossroads: Continental Connections with the Bunger Hills, East Antarctica”, led by Prof. Monika Kusiak and funded under the Maestro Programme of the National Science Centre (Poland). The project received funding of PLN 5,237,460 for advanced research in Antarctic geodynamics.

• Another key project is “Liquidice”, led by Dr Bartłomiej Luks and funded through the Horizon Europe programme. The project focuses on innovative approaches to ice–water interactions and is carried out by an international consortium bringing together partners from 18 countries. The total project budget amounts to EUR 7,498,531.25, with IGF PAS serving as the consortium leader.

• The Institute is also actively involved in large-scale international research infrastructures, including the European Plate Observing System (EPOS), funded by the European Union and supporting integrated solid Earth science data and services. In addition, IGF PAS has implemented projects under the Operational Programme Smart Growth with a total value exceeding PLN 71 million. The principal investigators were Dr Dorota Olszewska and Dr hab. Beata Górka-Kostrubiec.

• IGF PAS also participates in the Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS), an EU-funded initiative dedicated to advancing atmospheric research through coordinated observations and data sharing. The project is led by Dr hab. Aleksander Pietruczuk. Furthermore, through national funding, the Institute is currently implementing projects supporting the participation of Polish researchers in international research infrastructures, with a total budget of PLN 16,203,087, with IGF PAS acting as the project leader.

Together, these projects demonstrate the Institute’s strong engagement in high-impact geophysical and environmental research at both the national and international levels.

7. Description of the available office space, working space, laboratory for the Dioscuri Centre:

The Institute of Geophysics is housed in a modern, well-equipped research building with a total area exceeding 6,000 square meters, providing comprehensive facilities for scientific, administrative, and technical activities. Office space is organised into both single-occupancy and shared rooms, ensuring appropriate working conditions for individual research as well as collaborative team-based activities.

The building also includes several conference and meeting rooms that support internal scientific discussions, project meetings, as well as national and international workshops

and conferences. Video conferencing systems are available, enabling seamless remote collaboration with international partners.

The Institute hosts a wide range of specialised laboratories aligned with its core research areas in geophysics and environmental sciences. These facilities support research in seismology, geomagnetism, atmospheric physics, and hydrology, as well as technical laboratories dedicated to instrument calibration, data acquisition, and equipment maintenance.

In addition to its headquarters, the Institute operates a distributed network of field laboratories and observational stations located at key monitoring sites, including Belsk, Racibórz, Hel, and Spitsbergen. These facilities enable long-term, high-quality observations under diverse geophysical and environmental conditions.

This integrated infrastructure significantly enhances the Institute's research capacity and its contribution to national and international scientific programmes. It provides an excellent foundation for the activities of the Dioscuri Centre, offering access to state-of-the-art laboratory space, unique long-term datasets, and a well-established network of field stations supporting cutting-edge research in geophysics and Earth system sciences.

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

The list is available at the following address https://www.igf.edu.pl/en/science/research-infrastructure/

9. List of the additional benefits (other than listed in invitation call) that the Institution declares to provide for the Dioscuri Centre (i.e.: additional funds, personal benefits, other):

The Institute declares that employees of the Dioscuri Centre will be employed under standard full-time contracts, entitling them to a comprehensive package of social benefits provided through the institutional Social Benefits Fund. These benefits include, in particular, holiday subsidies and co-financing of recreational activities. Employees may also receive support for cultural and sports activities, such as tickets to cultural events or subsidies for fitness and wellness services.

The Social Benefits Fund additionally provides financial assistance in special circumstances, including one-time allowances in cases of difficult life situations or unforeseen events. Support is also available for employees' families, including subsidies for children's holidays, childcare, and educational activities. Employees may furthermore

benefit from preferential housing loans granted under favourable conditions for renovation or the purchase of accommodation.

Beyond social and financial benefits, the Institute provides access to state-of-the-art research infrastructure, technical facilities, and shared scientific resources, as well as professional administrative support in areas such as project management, accounting, procurement, and institutional procedures. Staff members of the Dioscuri Centre will work in a stable, collegial, and internationally oriented environment recognised for its collaborative culture and openness to interdisciplinary research.

Taken together, these additional benefits reflect the Institute's long-term commitment to supporting the well-being, professional development, and job security of all Dioscuri Centre employees. They complement the core elements of the Dioscuri programme and provide a strong foundation for the sustainable operation and further development of the Centre in line with the highest international standards.

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10. Other information about the internationalisation of the research institution e.g. international environment (international researchers community at the institution, internationalization of the management and administration), didactic in English, availability of Polish course for Foreigners etc.:

The Institute of Geophysics provides an increasingly international research environment that supports the integration of foreign researchers and promotes effective collaboration across cultures. The Institute hosts a diverse community of international scientists and actively advances the internationalisation of both its research activities and institutional practices.

Regular integration meetings and social events are organised to strengthen interactions among employees and foster a cohesive research community. As part of these initiatives, researchers from outside Poland are encouraged to present elements of their culture, traditions, and scientific perspectives, contributing to an inclusive and culturally diverse working environment.

The Institute also supports international staff through the organisation of Polish language courses for foreigners, facilitating both everyday functioning and long-term integration in Poland. In addition, selected seminars, meetings, and educational activities are conducted in English, ensuring accessibility for non-Polish-speaking researchers and strengthening the Institute's international profile.

Due to the significant presence of international employees, IGF PAS operates in a bilingual Polish–English environment in both scientific and administrative domains. Key administrative processes related to employment, project implementation, and daily institutional operations are accessible in English, reducing language barriers and

supporting the effective participation of foreign researchers in all aspects of institutional life.

An important element of the internationalisation of the Institute's governance and strategic development is the International Scientific Advisory Board of IGF PAS. The Board consists of distinguished scientists from leading international research institutions and provides independent expert advice to the Director of the Institute. Its activities focus on strategic research directions, long-term scientific development, international cooperation, and the dissemination and utilisation of research results, thereby supporting the alignment of the Institute's activities with the highest international standards of scientific excellence.