

Annual Report **2022**



NATIONAL SCIENCE CENTRE
POLAND



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Layout Design and typesetting: PAPER CUT

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ABOUT THE
NATIONAL
SCIENCE
CENTRE



General information

National Science Centre (NCN) is a government executive agency funding basic research carried out at Polish research institutions. Basic research is defined as empirical or theoretical work seeking to expand knowledge of the fundamentals of phenomena and observable facts without any direct commercial use.

We have a rich offer of calls for proposals to fund projects and single research activities. Every researcher, regardless of their age, level of achievement, academic degree or title, or field of interest, will find a funding scheme matching their needs.

The funding is awarded to the best proposals, selected in the course of a two-stage peer review. The expert reviewers evaluate both the quality of the research and the applicant's achievements. We monitor the proper implementation of ongoing grants: we accept and verify annual reports on the projects under implementation, and we carry out audits at the host institutions for the projects.

Another area of our activities consists in inspiring funding of basic research from

non-state sources, propagating information on the funding opportunities we launch and initiating international cooperation. We are a co-ordinator of the QuantERA programme – a network of 39 agencies funding scientific research in the field of quantum technologies, and CHANSE, a programme organised by 27 institutions that fund research in Humanities and Social Sciences. Both programmes are funded from the resources of the EU Horizon 2020 Programme. We are also the operator of the Research area in the scope of basic research funded by the EEA and Norway Grants. We also co-ordinate domestic activities within the framework of the European Biodiversity Partnership Biodiversa+ co-financed by the European Commission.

Mission

Mission

Leveraging the quality and effectiveness of research through a competitive grant system and supporting the development of Polish research on the international stage

Goals

- Funding excellent research projects in basic research
- Supporting early stage researchers
- Inspiring the creation of large, interdisciplinary research teams which are able to compete internationally
- Fostering international cooperation in research.
- Creating new job opportunities in NCN-funded projects

Highlights 2022

17 January

adoption of the Global
Code of Conduct

16 February

publication of the results
of the survey on men and
women in science

28 March

launch of a special
programme for research-
ers from Ukraine to con-
tinue research in Poland

27 April

adoption of the Gender
Equality Plan 2022-2025

11-12 May

eight round of the NCN
Days in Białystok

6 July

event to promote NCN
initiatives for researchers
from Ukraine



26 July

special scholarship programme for students and early-stage researchers from Ukraine funded by the EEA and Norway Grants



20-21 September

strategic conference of the QuantERA network in Krakow

6 October

conference to promote the Basic Research programme funded by the EEA and Norway Grants in Gdańsk

12 October

NCN Awards ceremony to honor the winning researchers: Dr hab. Karolina Safarzyńska, professor at the University of Warsaw (HS), Prof. Dr hab. Michał Bogdziewicz (NZ), Dr hab. Piotr Wciśło, profesor at the Nicolaus Copernicus University (ST)



24-26 October

EOOSC Festival (the National Tripartite Event Poland) held at the NCN headquarters and online with the motto „Open Science for Better Science”

27-28 października

third Polish-German Scientific Meeting in Berlin with the participation of NCN representatives



12-13 December

first POLONEZ BIS kick-off meeting at the NCN headquarters

21 December

12 new NCN Council members appointed for 2022-2026

NCN structure



Director

The National Science Centre's executive officer is its director, selected in a competition by the Council of the NCN, and appointed by the Minister of Science and Education. The director is the NCN's representative, and is in charge of the NCN's statutory tasks and financial policy. Prof. Dr hab. Zbigniew Błocki served as the NCN Director between March 2015 and March 2023, and continued as acting director until the new director was appointed.

NCN Council

The NCN Council is a policy body consisting of twenty-four distinguished researchers representing different academic fields. The Council sets priority areas in basic research, decides on the type of programmes and specifies the call regulations. Its range of competencies also includes electing members of the expert teams responsible for evaluation of proposals.

NCN Office

The NCN Office is composed of departments and teams in three major divisions in charge of organisation, finances and grant management. On a daily basis, the Office is responsible for processing calls for proposals and organising meetings for experts at the peer review evaluation stage. Furthermore, the Office provides day-to-day support to the grantees who carry out projects; it manages the process of signing funding agreements, oversees their implementation, initiates international co-operation in the scope of research funding in co-operation with the Council and coordinators. They also disseminate information among research community on NCN calls, open science and other tasks requested by the Ministry of Science and Education.



NCN Coordinators

The Coordinators organise the work of the Expert Teams and conduct calls for research projects, making sure that they are correct, impartial and fair. They are selected in an open call and must be at least PhD holders. They work in three groups: Arts, Humanities and Social Sciences, Life Sciences, and Physical Sciences and Engineering.

The Coordinators perform eligibility checks of proposals and analyse experts' reviews to make sure that they are accurate and impartial. They cooperate with the NCN Council on research policy matters. The Coordinators organise information meetings and training courses for potential applicants to disseminate information on the calls for proposals among research community.

NCN Council in 2020-2022

Prof. Dr hab. Jacek Kuźnicki

President of the Council



Arts, Humanities and Social Sciences (HS)

Prof. Dr hab. Krystyna Bartol
Prof. Dr hab. Wojciech Dajczak
Dr hab. Joanna Golińska-Pilarek
Prof. Dr hab. Dariusz Markowski
Prof. Dr hab. Justyna Olko
Prof. Dr hab. Tomasz Szapiro
Dr hab. Joanna Wolszczak-Derlacz
Prof. Dr hab. Tomasz Zaleśkiewicz



Physical Sciences and Engineering (ST)

Prof. Dr hab. Stefan Dziembowski
Dr hab. inż. Krzysztof Fic
Prof. Dr hab. Grzegorz Karch
Prof. Dr hab. Jerzy Łuczka
Prof. Dr hab. Piotr Migoń
Prof. Dr hab. Bronisław Rudak
Prof. Dr hab. inż. Marek Samoć
Prof. Dr hab. inż. Teresa Zielińska



Life Sciences (NZ)

Prof. Dr hab. n. med. Jakub Fichna
Prof. Dr hab. Robert Hasterok
Prof. Dr hab. inż. Monika Kaczmarek
Prof. Dr hab. Barbara Klajnert-Maculewicz
Prof. Dr hab. Andrzej Sobczak
Prof. Dr hab. n. med. Anetta Undas
Prof. Dr hab. inż. Aneta Wojdyło

NCN Council 2022-2024

Prof. Dr hab. Robert Hasterok

President of the Council



Arts, Humanities and Social Sciences (HS)

Prof. Dr hab. Krystyna Bartol
Prof. Dr hab. Justyna Chodkowska-Miszczuk
Prof. Dr hab. Wojciech Dajczak
Dr Diana Dajnowicz-Piesiecka
Dr hab. Joanna Golińska-Pilarek
Prof. Dr hab. Piotr Kopiec
Prof. Dr hab. Mariola Łaguna
Dr hab. Bogustaw Przywora
Prof. Dr hab. Piotr Roszak
Dr hab. Bogumił Szady
Prof. Dr hab. Tomasz Zaleśkiewicz



Physical Sciences and Engineering (ST)

Prof. Dr hab. Tomasz Dietl
Prof. Dr hab. Stefan Dziembowski
Dr hab. inż. Krzysztof Fic
Prof. Dr hab. Grzegorz Karch
Dr hab. inż. Alicja Kazek-Kęsik
Prof. Dr hab. Bronisław Rudak
Prof. Dr hab. Adam Zajęc (until 12.01.2023 r.)



Life Sciences (NZ)

Prof. Dr hab. inż. Monika Kaczmarek
Prof. Dr inż. Stanisław Karpiński
Prof. Dr hab. inż. Barbara Klajnert-Maculewicz
Dr hab. inż. Krystian Marszałek
Prof. Dr hab. n. med. Piotr Skarżyński
Prof. Dr hab. n. med. Anetta Undas

NCN Structure

NCN Council

NCN Director NCN Deputy Director

Organizational Division

supervised by Head of
Administration Department

Administration
Department

IT Team

ICT Systems Analyst

Communications Team

Financial Division y

supervised by Chief
Accounting Officer

Finance and Accounting
Department

Finance Team

Accounting Team

Project Monitoring Department

Audit and Compliance Team

Independent position:
Controlling Officer

Project Division

supervised by Deputy
Director

Research Projects
Administration Department

The Arts, Humanities
and Social Sciences

The Physical Sciences
and Engineering

The Life Sciences

Proposal Processing Department

International Cooperation
Department

Evaluation Team

Expert Support Team

Electronic Submission System
Team

EEA and Norway Grants Team

Open Science Team

Commissioner for State Aid

Coordinators

The Arts, Humanities
and Social Sciences
Coordinator Unit

The Physical Sciences and
Engineering Coordinator
Unit

The Life Sciences
Coordinator Unit

Legal Team

Office of the NCN Council

HR Department

Chief Accounting Officer

Independent position:

Communication Officer
representing the NCN Director

Protection of Classified Information
Officer

Data Protection Officer

Health and Safety Officer

In-House Auditor

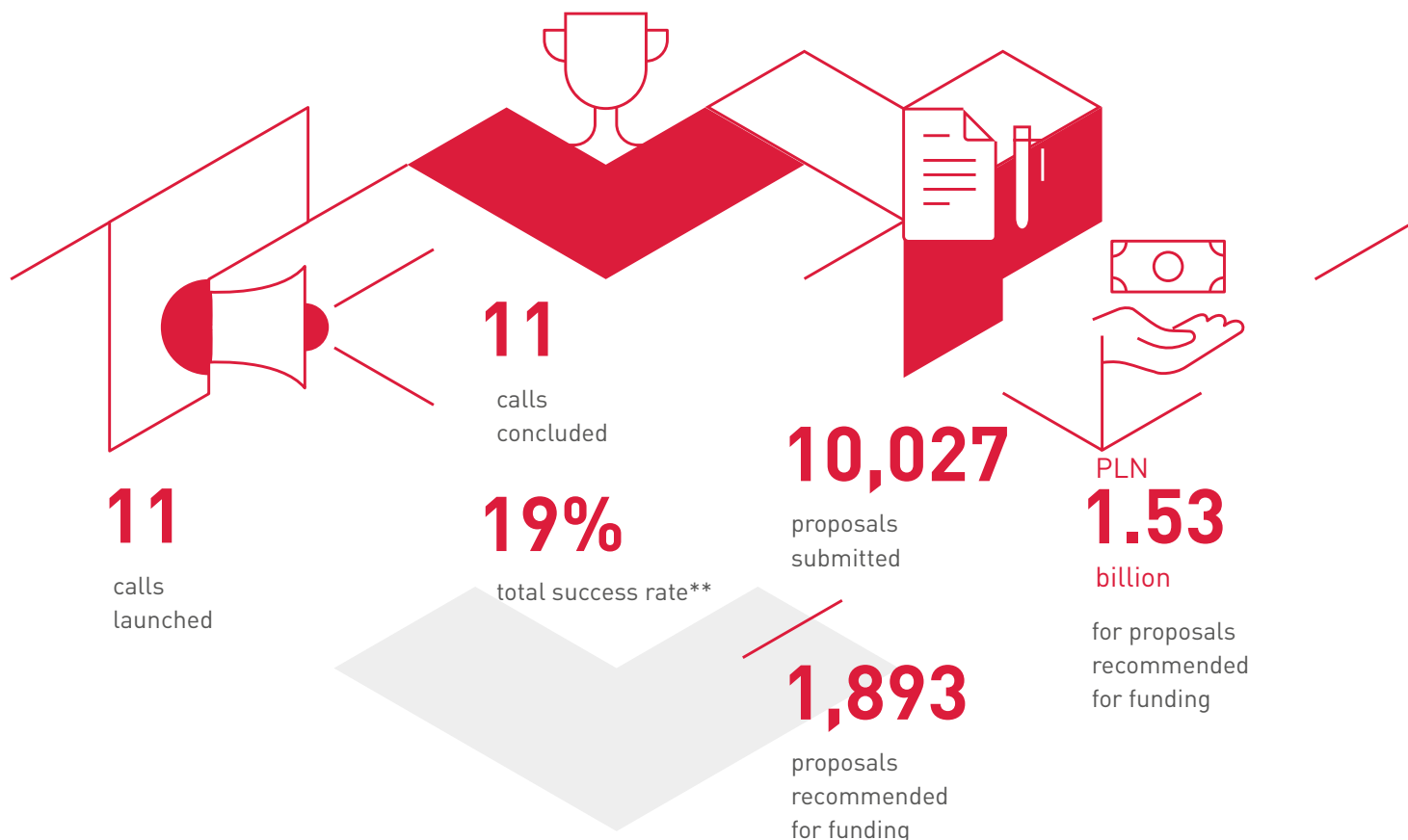


NCN
PERFORMANCE
IN 2022



NCN in figures

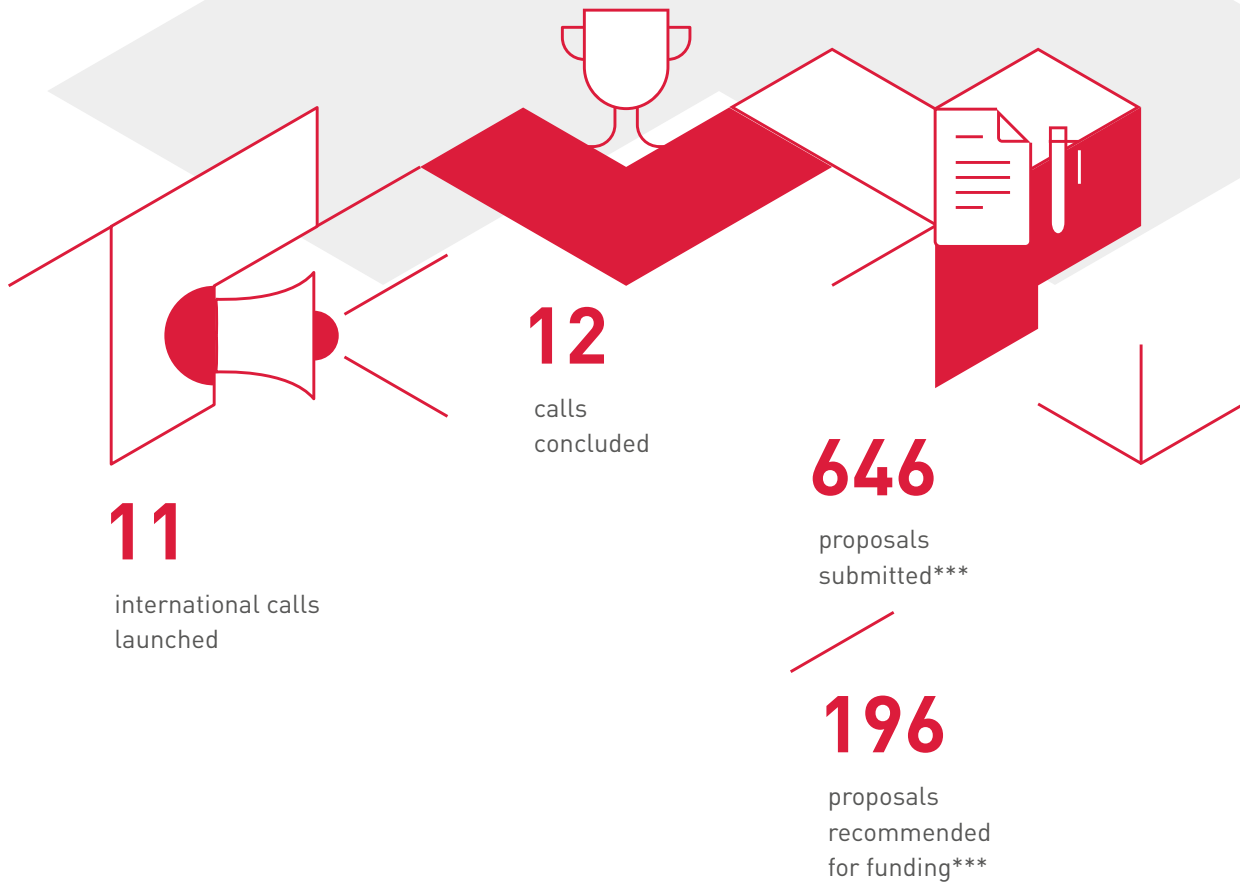
National calls concluded in 2022*



*The number of submitted proposals and projects recommended for funding, excluding calls launched in tandem with the Polish National Agency for Academic Exchange (NAWA).

** Success rate is the ratio of the number of the proposals recommended for funding against the number of proposals submitted, expressed as a percentage.

International calls concluded in 2022






*** For ongoing Weave-UNISON0 calls, state of affairs as at 31 December 2022.

NCN national schemes 2022

We finance basic research conducted as projects, single research activities, scholarships and post-doc fellowships. The funding schemes on offer match the diverse needs of the research community, from scholars embarking on their career in research to the most accomplished researchers. The funding is granted to the best research teams, whose principal investigators and members have the required experience and facilities prerequisite to the implementation of their projects. The NCN accepts proposals from all research disciplines on the NCN panels' list.






SONATINA

Call for research projects: employment at research institutions, funding for research projects and fellowships abroad

-  **Applicants:** researchers with a doctorate received within 3 years of submitting the proposal or those who will receive the degree by 30 June of the year of the call
-  **Duration:** 24 or 36 months, fellowship at a research centre abroad of 3 to 6 months
-  **Funding:** no cap on funding research projects, includes the funds to cover the cost of employment of the principal investigator, research project and foreign fellowship (travel and subsistence expenses)
-  **Open:** once a year

SONATA

Call for research projects: innovative research using state-of-the-art equipment or original methodology

-  **Applicants:** researchers with a doctorate received within 2 to 7 years of submitting the proposal
-  **Duration:** 12, 24 or 36 months
-  **Funding:** no cap on funding research projects
-  **Requirements:** extra investigators may be involved in the project, e.g. students, PhD students and post-docs selected in an open call.
-  **Open:** once a year



PRELUDIUM

Call for research projects



Applicants: stage researchers, without doctorate



Duration: 12, 24 or 36 months



Funding: PLN 70,000, PLN 140,000 or PLN 210,000 depending on the project's duration



Requirements: carried out under mentor's supervision



Open: once a year



PRELUDIUM BIS

Call for research projects carried out by PhD students at doctoral schools



Applicants: for entities operating doctoral schools; only researchers who meet the statutory requirements of a mentor may act as principal investigators



Duration: 36 or 48 months, including foreign fellowships of 3-6 months



Funding: up to PLN 300,000 for a research project, whereas the principal investigator may be a beneficiary of up to PLN 40,000; the project's budget also covers doctoral scholarships and indirect costs (up to 20% of total direct costs).



Requirements:


- PhD students must be selected in an open call procedure and enrolled in a doctoral school;
- research projects are carried out by PhD students as part of their doctoral dissertations;
- foreign fellowships for PhD students for a period of 3 to 6 months in a foreign research institution, the funding of which shall be requested by PhD students under programmes operated by the NAWA;
- a PhD must be awarded within 12 months of project completion.



Open: once a year

SONATA BIS

Call for research projects: establishing a new research team

 **Applicants:** researchers who have received their doctorate 5 to 12 years before submitting the proposal

 **Duration:** 36, 48 or 60 months

 **Funding:** no cap on funding research projects


 **Requirements:**

- apart from the principal investigator, the project team must not include any other members with a scientific degree, the title of professor, the scientific degree of habilitated doctor or any equivalent qualification, or members who have already collaborated with one another under a research project funded through the call system;
- PhD holders/candidates must be hired for a period of minimum 36 months;
- extra investigators may be involved in the project, including post-docs, persons in special auxiliary posts and students.

 **Open:** once a year


MAESTRO

Call for ground-breaking research projects, including interdisciplinary research, offering a substantial contribution to the advancement of science, seeking to go beyond that which is known, which may result in new discoveries

 **Applicants:** advanced researchers who are at least PhD holders and have met the terms of the call text in the period of 10 years prior to the proposal submission year, concerning publications, research project management, participation in conferences, awards and prizes, participation in scientific organisations and other scientific activities

 **Duration:** 36, 48 or 60 months

 **Funding:** no cap on funding research projects

 **Requirements:** the project team must include at least one investigator with a PhD degree and at least one PhD student for a total period of at least 36 or 72 months (depending on the call edition)

 **Open:** once a year



MINIATURA

Call for research activities for the purposes of future research projects submitted to the NCN calls or other national or international calls



Applicants: researchers who earned their PhD up to 12 years before submission of the proposal, who have not acted as the principal investigator in any of the projects funded by the NCN, who are not winning applicants of a call for doctoral scholarships or fellowships funded by the NCN, who are not an applicants, principal investigators or fellowship candidates under proposals submitted or recommended for funding under other NCN calls and whose scientific achievements include at least one paper published or at least one artistic achievement or achievement in research in art



Duration: up to 12 months



Funding: PLN 5,000 to PLN 50,000



Requirements:

- applicants must be employed by the host institution under an employment contract
- funding may be granted for the following activities: preliminary research, pilot studies, library and archive searches, fellowships, exploratory visits, consultancy visits;
- applicants may not seek funding for employment costs or scholarships, with the exception of personnel costs of collective investigators who are not employees of the MINIATURA host institution



Open: continuous call, fast track evaluation process



OPUS

Call for research projects



Applicants: all researchers, regardless of academic degree



Duration: 12, 24, 36 or 48 months



Funding: no cap on funding research projects



Requirements: wprojects may be performed by students and PhD students as well as post-docs and senior researchers



Open: twice a year

OPUS call launched in September 2022, was also open for research projects carried out by teams from Poland in cooperation with their partners from Austria, the Czech Republic, Slovenia, Switzerland, Germany, Luxembourg and Belgium-Flanders whose tasks were funded by the partner agencies of the National Science Centre based on the recommendations of the latter acting as the lead agency in charge of the merit-based evaluation of proposals.

NCN PROGRAMME FOR RESEARCHERS FROM UKRAINE TO CONTINUE RESEARCH IN POLAND

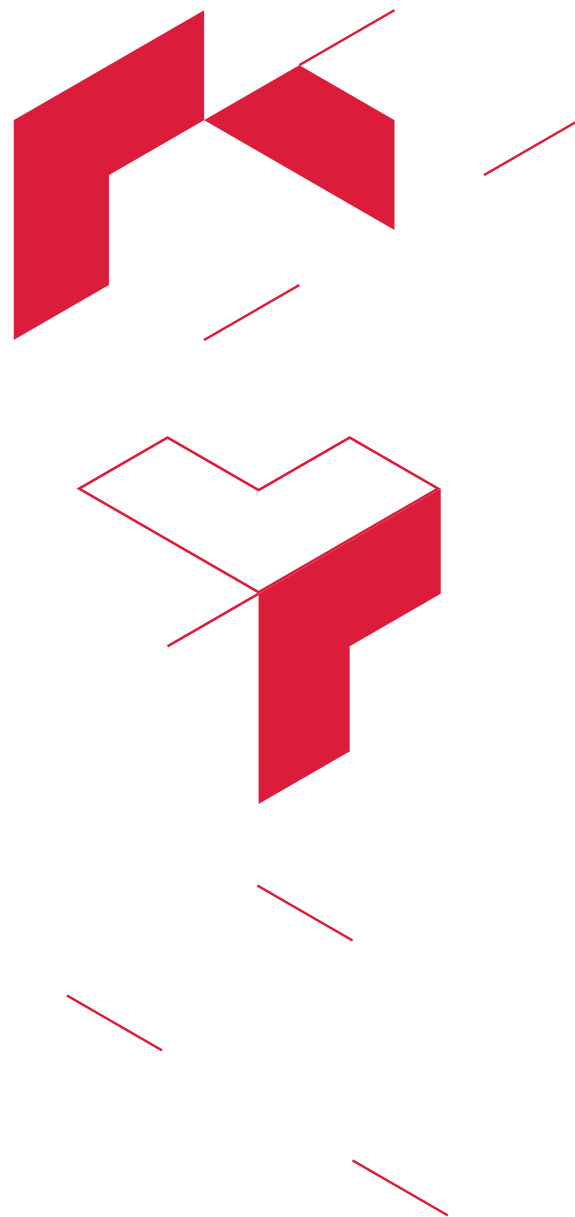
In 2022, following the request of the Ministry of Science and Education, the NCN launched a special programme to support Ukrainian researchers seeking refuge from war who were at least PhD holders (in Ukraine: Candidate of Science) and had worked at Ukrainian universities and research institutions before the war. The programme covered basic and applied research and the proposal submission procedure was simplified and fast.

NCN'S COOPERATION WITH OTHER NATIONAL GOVERNMENTAL AGENCIES IN THE RESEARCH SECTOR

In 2022, we continued to cooperate with the Polish National Agency for Academic Exchange (NAWA) under two NAWA programmes: Polish Returns and NAWA Chair. The purpose of the programmes was to encourage returning researchers to work in Poland. The NCN provides funding for other direct costs of basic research (the so-called research components) in the projects recommended for funding under the NAWA calls for proposals. Cooperation is also pursued

under PRELUDIUM BIS, under which PhD students must submit proposals for foreign fellowships under the NAWA programme and complete the fellowship during the PRELUDIUM BIS project duration.

In 2022, the National Science Centre cooperated with the National Centre for Research and Development under the ARTIQ programme aimed to finance projects that are likely to increase Poland's scientific and R&D potential in the area of artificial intelligence (AI). To this end, AI Centres of Excellences were to be created, i.e. highly specialised teams working at Polish host institutions and headed by high-class scientists (leaders) with international reputation and outstanding research implementation and organisation record. Basic research was funded by the NCN, while the NCBR funded industrial research, development and preliminary work, and supported the formation of special purpose vehicles. As a result of the ARTIQ call concluded on 21 September 2022, two AI Centres of Excellences will be created in Krakow.



NCN Panels



HS arts, humanities and social sciences

- HS1** Fundamental questions of human existence and the nature of reality
- HS2** Culture and cultural production
- HS3** The study of the human past
- HS4** Individuals, institutions, markets
- HS5** Norms and governance
- HS6** Human nature and human society



ST physical sciences and engineering

- ST1** Mathematics
- ST2** Fundamental constituents of matter
- ST3** Condensed matter physics
- ST4** Chemistry
- ST5** Materials *[in December 2022 changed to: ST5 Synthetic Chemistry and Materials Science]*
- ST6** Computer science and informaticse
- ST7** Systems and communication engineering *[in December 2022 changed to: ST7 Systems Engineering]*
- ST8** Production and processes engineering
- ST9** Astronomy and space science
- ST10** Earth sciences
- ST11** Materials Engineering *[added at the date of the calls launched in December 2022]*



NZ life sciences

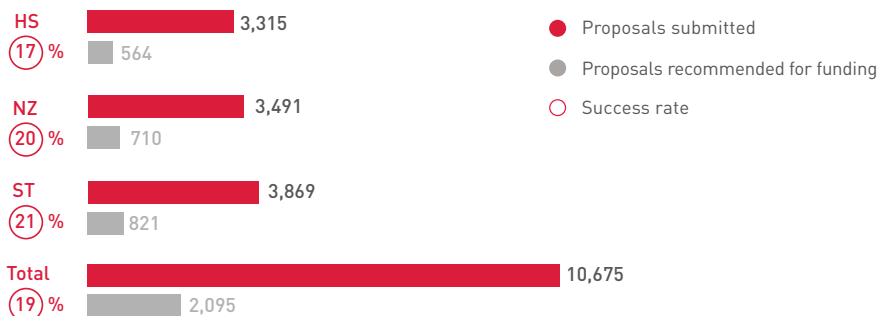
- NZ1** Molecular biology, structural biology, biotechnology
- NZ2** Genetics, genomics
- NZ3** Cellular and developmental biology
- NZ4** Biology of tissues, organs and organisms
- NZ5** Human and animal noninfectious diseases
- NZ6** Human and animal immunology and infection
- NZ7** Diagnostic tools, therapies and public health
- NZ8** Evolutionary and environmental biology
- NZ9** Fundamentals of applied life sciences and biotechnology

Funding of basic research

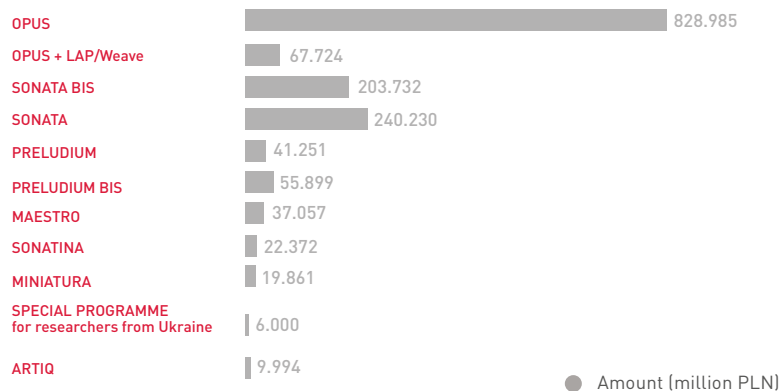
In national calls published in 2022, we received 9,916 proposals worth in total PLN 7.6 bln.

In calls concluded in 2022, funding was granted to 1,893 projects worth PLN 1.53 bln.

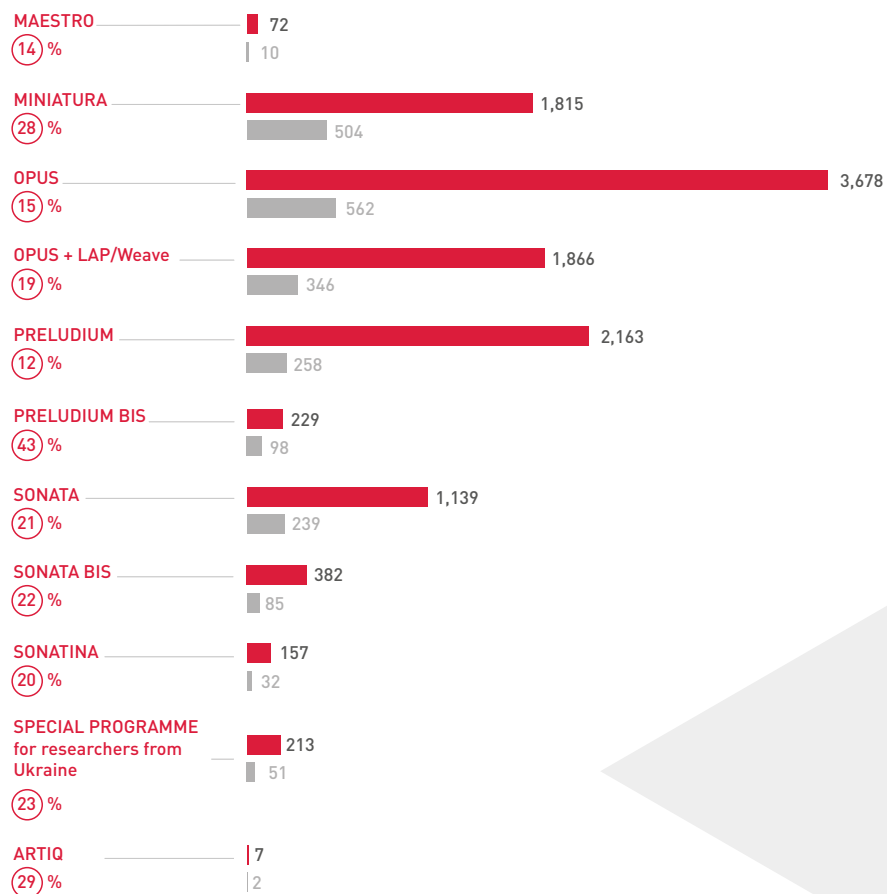
Number of proposals submitted and recommended for funding under the national calls concluded in 2022, broken down by discipline group, alongside their respective success rates



Funding awarded in national calls concluded in 2022, broken down by call types



Number of proposals submitted and recommended for funding under the national calls concluded in 2022, broken down by call type, alongside their respective success rate



- Proposals submitted
- Proposals recommended for funding
- Success rate

Leaders of the national call rankings in 2022

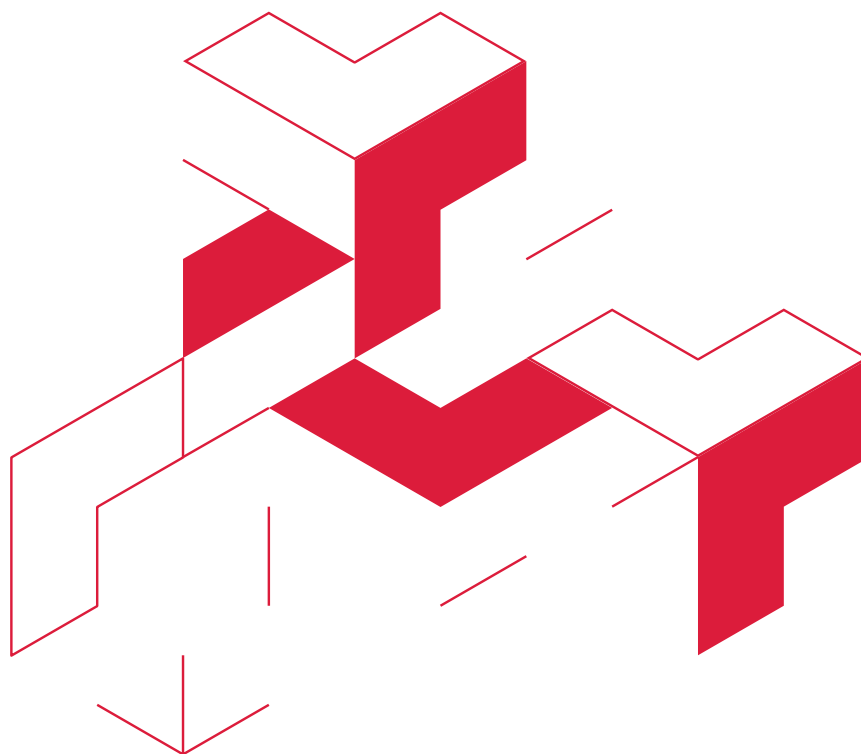
The chief beneficiaries of the national calls concluded in 2022 were:

- public and non-public higher education institutions (76% of all beneficiaries),
- research institutes of the Polish Academy of Sciences (20% of all beneficiaries),
- research institutes (3% of all beneficiaries).

Host Institution	Funding granted (million PLN)	Proposals recommended for funding	Success rate
Jagiellonian University	235.890	221	28%
University of Warsaw	150.072	196	27%
Adam Mickiewicz University in Poznań	79.185	114	23%
University of Wrocław	62.930	75	25%
Wrocław University of Science and Technology	50.500	70	23%
Nicolaus Copernicus University in Toruń	42.476	56	19%
University of Gdańsk	40.078	45	17%
AGH University of Science and Technology	39.939	55	19%
Institute of Biochemistry and Biophysics, Polish Academy of Sciences	37.984	22	41%
Warsaw University of Technology	37.521	43	20%
Nencki Institute of Experimental Biology, Polish Academy of Sciences	33.858	20	30%
Maj Institute of Pharmacology, Polish Academy of Sciences	33.095	18	44%
Gdańsk University of Technology	27.974	39	19%
Poznań University of Medical Sciences	26.174	20	15%
Institute of Bioorganic Chemistry, Polish Academy of Sciences	25.660	18	40%
Silesian University of Technology	24.456	32	17%

Host Institution	Funding granted (million PLN)	Proposals recommended for funding	Success rate
Poznan University of Technology	20.307	21	20%
University of Silesia in Katowice	19.696	39	12%
Medical University of Gdańsk	18.615	28	25%
Mossakowski Medical Research Institute, Polish Academy of Sciences	18.098	17	32%
Wroclaw University of Environmental and Life Sciences	17.692	26	21%
Institute of Animal Reproduction and Food Research, Polish Academy of Sciences	17.272	15	44%
Łukasiewicz Research Network - PORT Polish Center for Technology Development	16.787	12	46%
Institute of Nuclear Physics, Polish Academy of Sciences	16.589	21	21%
Institute of Low Temperature and Structure Research, Polish Academy of Sciences	16.276	13	30%
Institute of Physical Chemistry, Polish Academy of Sciences	16.061	18	32%
Cracow University of Technology	15.760	17	17%
Poznań University of Life Sciences	15.663	20	18%
University of Lodz	15.491	45	18%
SWPS University	14.984	16	28%
University of Maria Curie-Skłodowska in Lublin	14.543	29	17%
Lodz University of Technology	14.219	16	13%
The International Institute of Molecular Mechanisms and Machines Polish Academy of Sciences	13.410	5	42%
Medical University of Lublin	13.368	16	20%
Warsaw University of Life Sciences	12.742	27	11%
University of Agriculture in Krakow	11.931	17	18%
Institute of Hematology and Transfusion Medicine	11.124	4	80%
Institute of Plant Genetics, Polish Academy of Sciences	10.768	5	29%
University of Warmia and Mazury in Olsztyn	10.667	20	9%
Institute of Organic Chemistry, Polish Academy of Sciences	10.578	6	26%
Medical University of Warsaw	10.520	14	16%

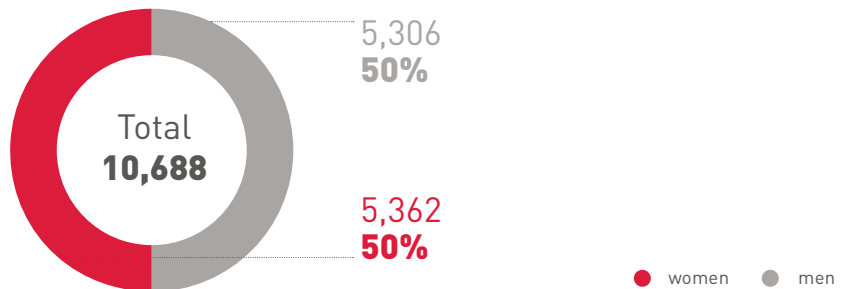
The table presents a ranking list of institutions that received more than PLN 10 million in funding from the NCN in 2022. Once again, the leaders, both in terms of funding and the number of projects and other research activities, were the Jagiellonian University with 221 funded projects and University of Warsaw with 196 funded projects. The success rate given in the table corresponds to the ratio of successful projects that were recommended for funding to the total number of proposals. The highest success rate among those who won grants of more than PLN 10 million in 2022 was 80%, achieved by the International Institute of Hematology and Transfusion Medicine, followed by the Łukasiewicz Research Network - PORT Polish Center for Technology Development with 46%, the Maj Institute of Pharmacology, Polish Academy of Sciences and the Institute of Animal Reproduction and Food Research, Polish Academy of Sciences, both with 44% success rate. Among universities, the highest rates were recorded by the Jagiellonian University (28%), the SWPS University (28%) and the University of Warsaw (27%).



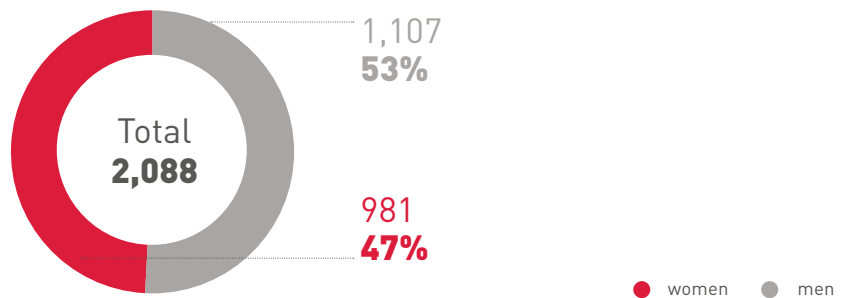
Principal investigators

In 2022, proposals submitted by women made up 50% of all applications. They were slightly less successful in applying for funding than their male colleagues; the success rates for the two groups were 17% and 20% respectively. Of the projects awarded funding in 2022, 47% had a female Principal Investigator.

The number of proposals submitted for funding in 2022, broken down by gender* of the Principal Investigator



The number of proposals submitted and recommended for funding in 2022, broken down by gender* of the Principal Investigator



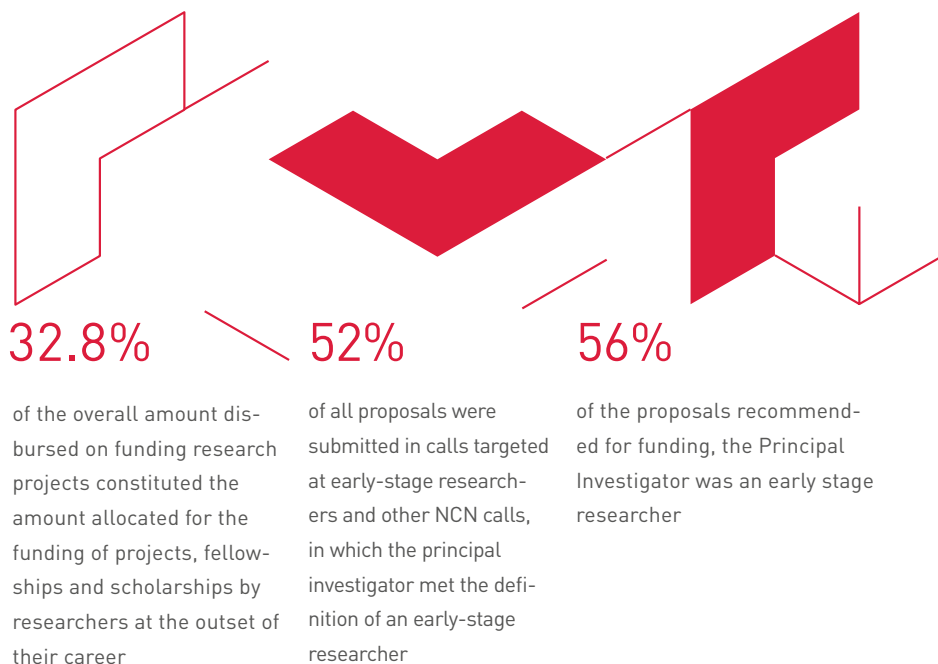
* Gender data based on the applicants' PESEL numbers. The data do not include the Principal Investigators without a PESEL numbers (foreigners).

Early-stage researchers

We are very serious about supporting early-stage researchers who have not yet earned their PhD or have done so within the last 7 years. The PRELUDIUM, PRELUDIUM BIS, SONATINA, SONATA, ETIUDA, where they do not need to compete against more experienced researchers, are specifically designed for this group. In 2011-2022, a total of 63 calls addressed to early-stage researchers were announced.

The NCN supports early-stage researchers by funding their research projects. In the national calls concluded in w 2022.

In the national calls concluded in 2022*:



* No data available for TANGO, calls launched in tandem with the NAWA and EXPRESS CALL TO FUND RESEARCH ON COVID-19

Evaluation process

The National Science Centre grants funding to top research projects selected through a two-stage peer review process. As a general rule, the NCN Council takes into account, in carefully considered proportion, both the quality of the project as such, and the achievements of the researchers involved.

The review procedure begins with a formal eligibility check performed by NCN Coordinators, which involves checking the completeness and correctness of the submission. The proposals then undergo a two-stage peer review by dedicated expert teams (groups of experts selected by the NCN Council among distinguished academics appointed by the NCN Director for the purpose of proposal evaluation).

STAGE 1

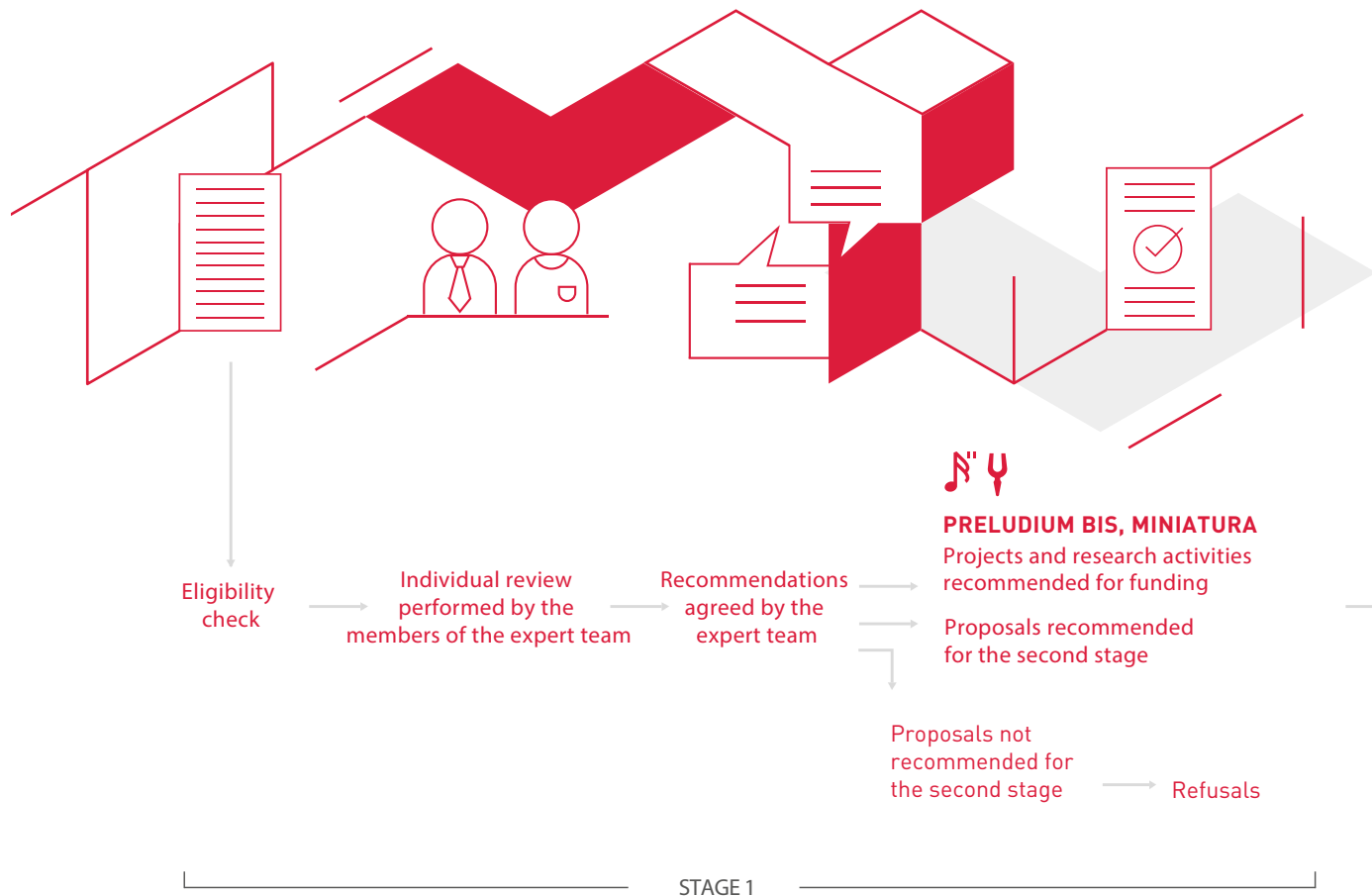
The proposals are first assessed individually by the members of expert team working independently. Individual evaluations serve as a point of departure for debate during the first team meeting. The decision to reject or approve the proposal is taken collectively by the team as a whole. Subsequently, the members prepare a shortlist of projects admitted to stage two of the peer review process or projects qualified for funding in PRELUDIUM BIS and MINIATURA (there is one-stage merit-based evaluation in these calls).

STAGE 2

Stage two may be conducted in one of two ways, depending on the type of call. Proposals submitted in the OPUS, PRELUDIUM and SONATA calls are evaluated by at least two external, often foreign, experts (reviewers) working independently, whose reviews are later discussed by the expert team during the second team meeting. Reviewers are nominated by NCN coordinators, based on the recommendations of team members. The second stage of the review process in the SONATINA, SONATA BIS, MAESTRO and POLONEZ BIS calls includes an interview with the principal investigator.

The proposal evaluation diagram is presented on the following pages.

Proposal evaluation diagram





**SONATINA, SONATA BIS,
MAESTRO**

Evaluation by reviewers and interview
with the principal investigator



OPUS, PRELUDIUM, SONATA

Evaluation by reviewers



STAGE 2

Experts

In 2022 as many as 2,136 reviewers were appointed, who assessed a total of 9,956 research proposals in the first stage of evaluation. Expert teams are appointed from among experts representing three research domains (ST, HS and NZ). Proposals may be evaluated by inter-domain teams (all domains represented in one team), by inter-panel teams (each domain has its own team) or by panel teams dedicated to specific thematic panels (ST 1-10, HS 1-6, NZ 1-9). Each team may review proposals in one or more calls of a given edition (the term edition refers collectively to all calls for proposals with the same deadline of submission). This means that for a specific thematic panel, one or more expert teams may be appointed. See the table below for more details.

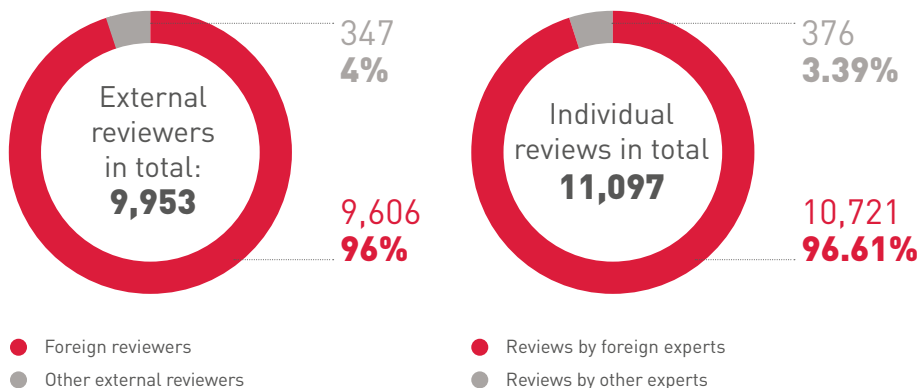
In the second stage of peer review, 9,953 external reviewers performed 11,097 individual evaluations. More than 96% of the external reviewers were experts from abroad, who performed 10,721 reviews.

Number of expert teams and number of proposals reviewed under the calls concluded in 2022

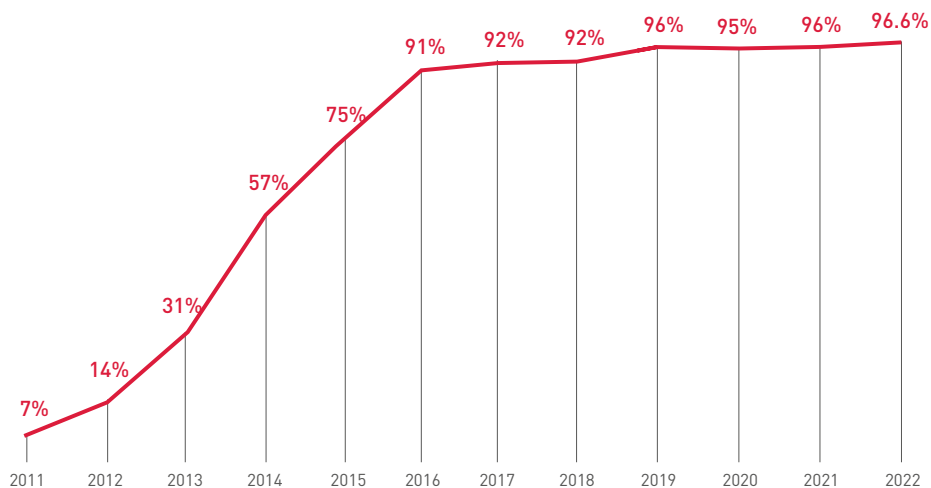
Call announcement	Number of expert teams	Reviewers in expert teams (including foreigners)	Proposals reviewed
15 June 2021	2 inter-panel teams for MAESTRO 13 (NZ, ST) 2 inter-panel teams for SONATA BIS 11 (NZ, ST) 1 inter-panel team for MAESTRO 13 and SONATA BIS 11 (HS)	95	421
15 September 2021	37 panel teams for OPUS 22+LAP/Weave, PRELUDIUM BIS 3, SONATA 17 2 teams in each panel: HS2, HS3, HS4, HS5, HS6, NZ5, NZ7, NZ9, ST4, ST5, ST8, ST10. 1 team in all the other panels 3 inter-panel teams for POLONEZ BIS 1	703	3,340
15 December 2021	3 inter-panel teams for SONATINA 6	50	157
16 March 2022	37 panel teams for OPUS 23, PRELUDIUM 21 2 teams in each panel: HS2, HS3, HS4, HS5, HS6, NZ5, NZ7, NZ9, ST4, ST5, ST8, ST10 1 team in all the other panels 3 inter-panel teams for POLONEZ BIS 2	741	4,257
1 February 2022	1 team for MINIATURA 6	547	1,781
TOTAL	89	2,136	9,956

Source: NCN Coordinators, based on own data.

Number of external reviewers and number of reviews they provided in 2022*



Percentage of foreign reviews in the years 2011-2022

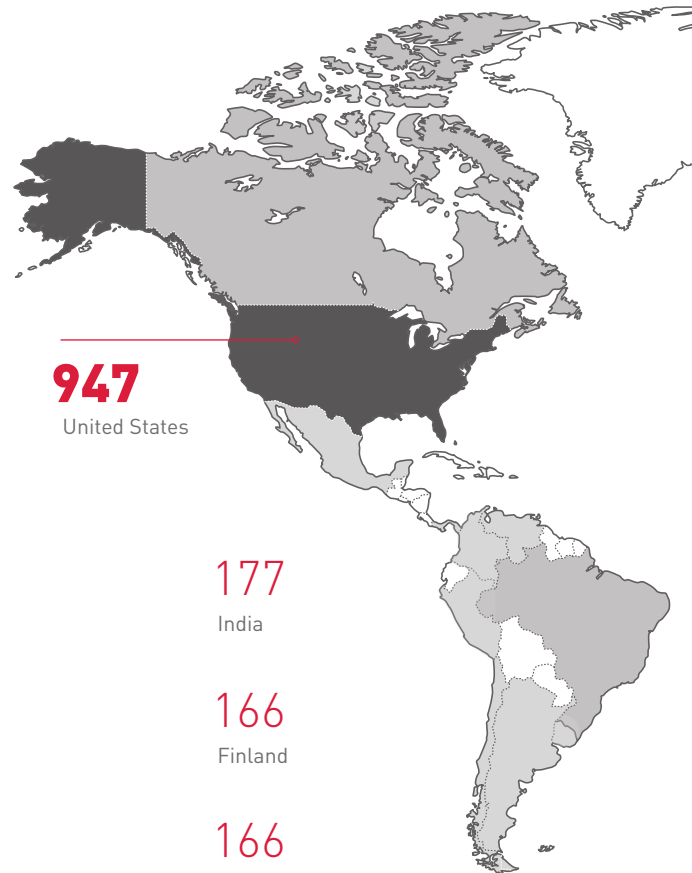


Source: NCN Coordinators, based on the data in the ZSUN/OSF system.

* Data does not include MINIATURA due to different evaluation procedure.

NCN foreign reviewers in 2022 by country of affiliation

32	Argentina	2	Armenia
31	Taiwan	2	Palestinian Authority
30	Malaysia	2	Georgia
30	New Zealand	2	Iraq
26	Mexico	2	Kazakhstan
24	South Africa	2	Kenya
21	Chile	2	Kuwait
19	Ukraine	2	North Macedonia
18	Egypt	2	Sri Lanka
17	Latvia	1	Belarus
17	Pakistan	1	Bosnia and Herzegovina
14	Bulgaria	1	Montenegro
13	Saudi Arabia	1	Democratic Republic of Kongo
11	Cyprus	1	Philippines
10	Luxembourg	1	Jordan
9	Indonesia	1	Cameroon
9	Nigeria	1	Malawi
8	Iran	1	Morocco
8	Columbia	1	Mauritius
8	Malta	1	Moldova
8	Vietnam	1	Namibia
8	United Arab Emirates	1	Oman
6	Bangladesh	1	Panama
6	Russia	1	Peru
5	Thailand	1	Puerto Rico
5	Tunisia	1	San Marino
5	Uruguay	1	Venezuela
4	Bahrain	1	Zimbabwe
4	Iceland		
4	Qatar		
3	Ghana		
3	Lebanon		



947

United States

370

China

177

India

283

Portugal

166

Finland

222

Netherlands

166

Sweden

196

Canada

154

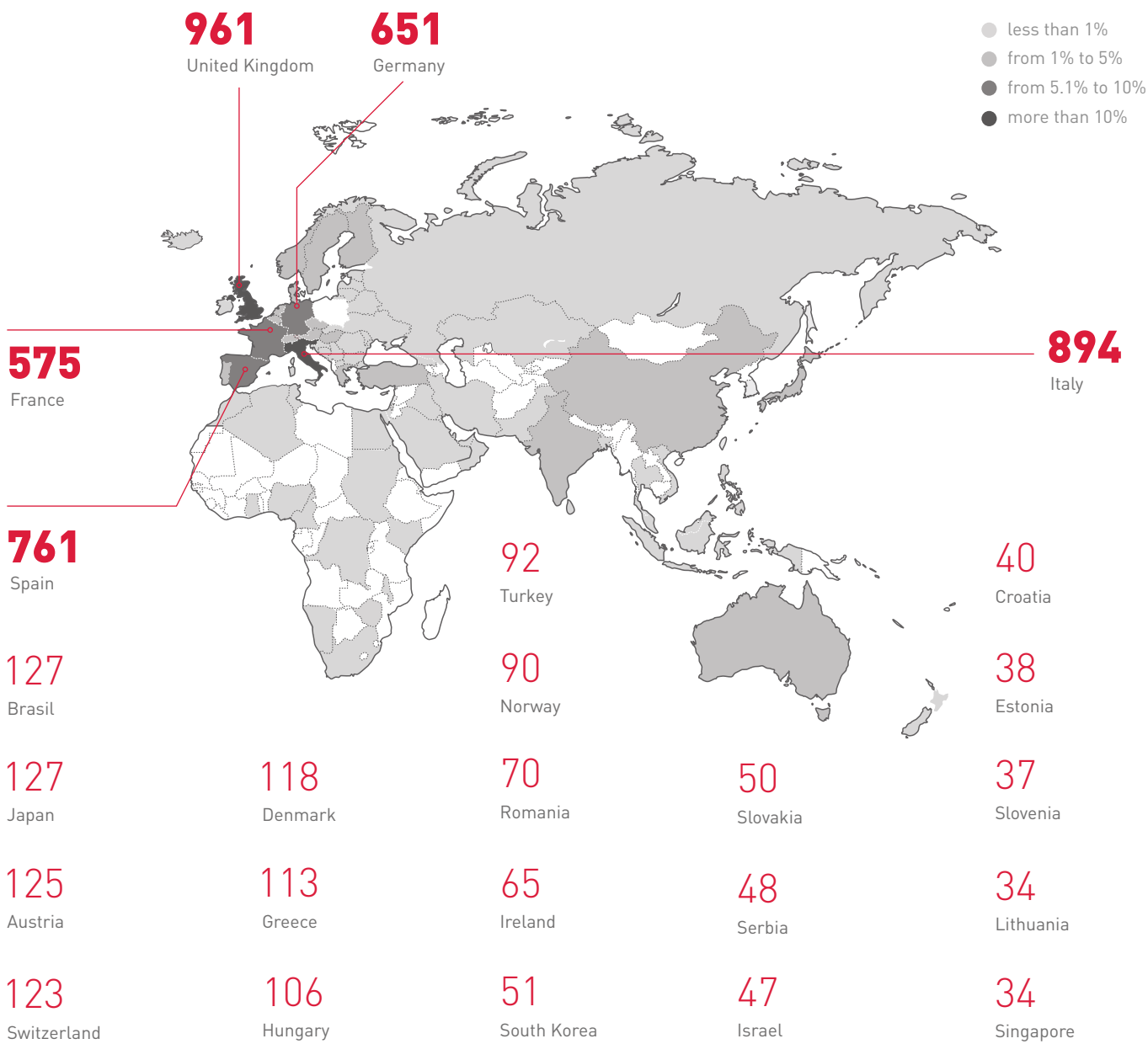
Czech Republic

181

Australia

153

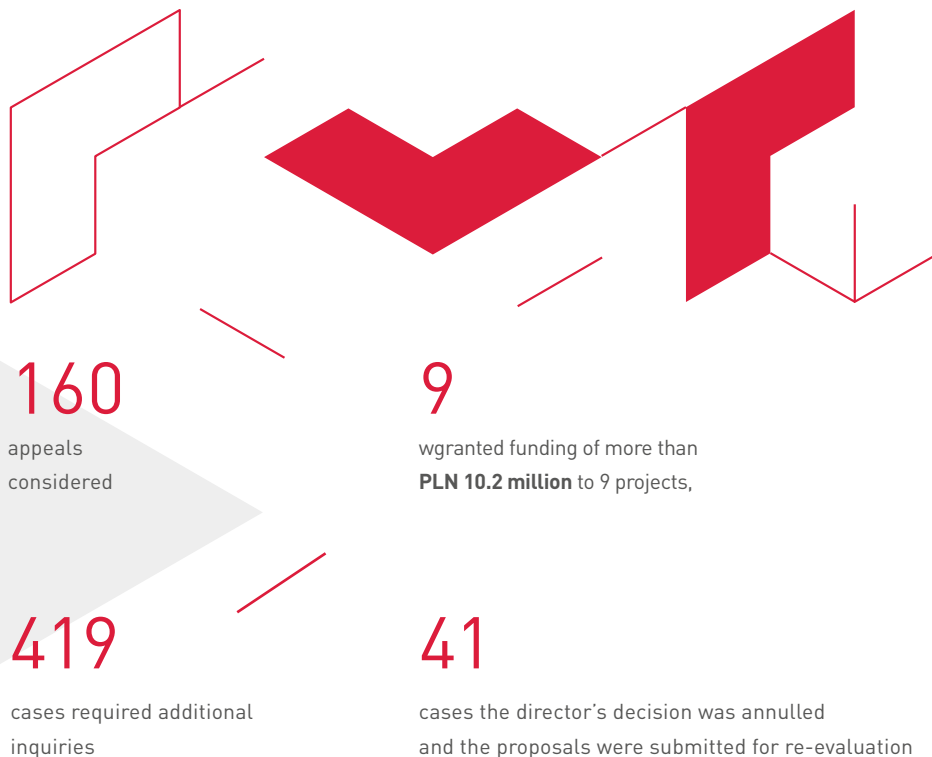
Belgium



NCN Appeal Committee

Applicants (institutions or natural persons) may appeal against decisions of the NCN Director which refuse funding within 14 days of the date of receiving the decision. The appeals are considered by the Appeal Committee, appointed by the Council of the NCN.

Work of the Appeal Committee in 2022



Supervising the research

Our tasks include supervising the implementation of research projects, fellowships, scholarships and research activities and the disbursement of the awarded funding. This consists in evaluating interim, annual and final reports on the completion of research projects, on-site audits at grantees' host institutions, and in the director's power to suspend or discontinue funding of an improperly implemented project. The procedure of evaluating and verifying the reports consists in examining the implementation of the project for formal and financial correctness, as well as the scientific evaluation of the project's results.

Reports on the projects' completion

In 2022, the following were submitted to the National Science Center:

5,190
annual reports for 2021

3,953
final reports



Source: Research Projects Administration Department, International Cooperation Department and Project Monitoring Department.

On-site audits

As another tool serving a supervisory function, the NCN may conduct on-site audits to verify the compliance of the project with the funding agreement. The audits are carried out by the Audit and Compliance Team in accordance with an annual audit plan. Our selection of the grants to be examined follows an analysis of risk factors involved in their implementation. Information on possible risks and alarming signals regarding the projects funded is collected and shared by the personnel of the Research Projects Administration Department, Finance and Accounting Department and NCN Coordinators.

The audit plan may, however, be extended to projects selected at random. Audits of such projects may be conducted in an ad hoc manner. Normally we take this measure when a project is reported to be carried out inappropriately, and such audit is usually limited in scope. The auditing team always comprises an officer of the Audit and Compliance Team and, depending on the programme and scope of the audit, may also include an NCN financial officer and an NC Coordinator.

69 audits were completed in 2022. Following the detection of various irregularities, the NCN demanded the reimbursement of more than PLN 470 thousand in total from the institutions in question.



International cooperation

In 2022, seven calls for proposals were launched in multilateral cooperation. We continued the multilateral Weave programme together with Austria, the Czech Republic, Germany, Slovenia and Switzerland and, since 2022, with Belgium-Flanders and Luxemburg, thus extending cooperation pursuant to the Lead Agency Procedure. The NCN invited proposals in two calls, depending on the lead agency in charge of a merit-based evaluation, i.e. Weave-UNISONO and OPUS 24 + LAP/ Weave.

On 15 March and 15 September 2022, we launched two calls under POLONEZ BIS. By the end of the year, 34 researchers awarded in the first call had started their projects in Poland. POLONEZ BIS allowed us to invite a total of 120 talented foreign researchers to Poland.

Bilateral cooperation

We regularly launch bilateral calls organised in cooperation with foreign research-funding organisations. The best among the research proposals prepared and submitted jointly by Polish and foreign teams are selected according to the terms agreed on by all partner agencies.

POLISH-CHINESE COOPERATION



On 15 December 2022, we launched a new round of the SHENG call organised in tandem with the National Natural Science Foundation of China (NSFC) pursuant to the parallel evaluation procedure. The third round of SHENG covered selected disciplines of Physical Sciences and Engineering (ST1-ST3, ST6-ST7, ST9-ST10) and Humanities (HS4). Only projects recommended by both the NCN and the NSFC can be funded.

Multilateral cooperation

Every year, we also announce multilateral calls organised in partnership with foreign research-funding agencies within the framework of international networks that support specific disciplines. In ERA-NET Cofund programmes, for instance, the budget consists of national funds and sources provided under the EU Horizon 2020 Framework Programme.

The calls for multilateral cooperation co-funded by European Commission are also carried out within the framework of the European Biodiversity Partnership Biodiversa+ under the Horizon Europe programme.

Other initiatives are funded exclusively from the national sources of individual agencies.



Projects funded under the "Horizon 2020" EU Framework Programme for Research and Innovation: CHANSE – grant agreement no 101004509 ; CHIST-ERA IV – grant agreement no 857925; JPCofuND2 – grant agreement no 825664; ForestValue – grant agreement no 773324; JPI-EC-AMR – grant agreement no 681055; JPIAMR-ACTION – grant agreement no 963864; M-ERA.NET 2 – grant agreement no 685451; NORFACE Governance – grant agreement no 822166; QuantERA – grant agreement no 731473, 101017733; InCoQFlag – grant agreement no 952223; BiodivERsA3 – grant agreement no 649307; BiodivClim – grant agreement no 869237; BiodivRestore – grant agreement no 101003777; EN-UAC – grant agreement no 875022; EN-UTC – grant agreement no 101003758; POLONEZ BIS – Marie Skłodowska-Curie Actions grant agreement no 945339
Biodiversa+ was co-funded within the framework of the EU Research and Innovation Funding Programme "Horizon Europe" – grant agreement no 101052342.

International networks in which the NCN participates

Name	Number of organisations	Number of countries	Network supports
BiodivERsA	39	25	research into environmental protection and sustainable management of biodiversity
Biodiversa+	74	37	support for the development and implementation of a new biodiversity protection policy in Europe, biodiversity monitoring
CHANSE	27	24	humanities and social sciences
CHIST-ERA	32	28	research in the scope of information and communication technologies
EqUIP	8	7 (Europe) + India	European-Indian collaboration in the scope of humanities and social sciences
ERA-CAPS	20	18	research into healthy, safe and sufficient food, plant-based products and sustainable agriculture, forestry and landscape
ForestValue	31	19	research in the scope of forest management; promoting increased innovation and competitiveness of the forest-based sector in Europe
HERA	26	25	research in the area of humanities responding to the social, cultural and political challenges of modern Europe
InCoQFlag	4	4	quantum technologies – by developing an international cooperation strategy in the field
JPIAMR	30	28	research into antimicrobial resistance
JPI Urban Europe	25	18	interdisciplinary research projects that respond to the challenges of modern cities and urban areas
JPND	29	24	research aimed at identifying causes of neurodegenerative diseases, early detection of their symptoms and appropriate forms of therapy
M-ERA.NET	49	35	research in the area of material science and material engineering
NORFACE	25	19	research in the area of social sciences (until now devoted, among others, to migration, future of the welfare state and social inequalities)
QuantERA	39	31	research in quantum technologies
Solar-Driven Chemistry	6	6	research in the scope of photochemical processes in solar light
Trans-Atlantic Platform (T-AP) for Social Sciences and Humanities	18	13	humanities and social sciences

QuantERA and QuantERA II

QuantERA (ERA-NET Co-fund in Quantum Technologies) is an international network coordinated by the National Science Centre. It connects 39 different research-funding agencies from 31 countries and aims to support quantum technology research and innovation in Europe by organising calls for international research proposals in the field. The programme has already allowed 77 international projects to be funded worth nearly EUR 89 million in total. The network is supported by the Strategic Council comprising eminent researchers, including Alain Aspect who was awarded the Noble Prize in Physics in 2022.

In 2022, 39 research consortia (15 of which included Polish partners) started working on their projects funded in the Call 2021 launched under QuantERA II.

QuantERA I was implemented over a period of six years which ended in October 2022 and was summed up in a report to the European Commission. Another report was drafted to evaluate the network's impact on QT environment in Europe.

In 2022, QuantERA's ongoing activities and project funding were promoted. Two articles on the Network were published in Science Business that focuses on public policies, science and industry. Many in-

terviews were conducted with female researchers, QuantERA project coordinators. A Portfolio of Winning Projects under Call 2021 was published.

At the end of the year, preparations began for a new call for international research projects scheduled for 2023.



www.quantera.eu

X: [@QuantERA_EU](https://twitter.com/QuantERA_EU)

Facebook: [@QuanteraCoFund](https://www.facebook.com/QuanteraCoFund)

InCoQFlag – Coordination and Support Action

The purpose of InCoQFlag (International Cooperation in Quantum Technologies) is to develop a strategy of cooperation with non-European countries in the field of quantum technology research. The project is coordinated by the French Alternative Energies and Atomic Energy Commission (CEA), and the National Science Centre acts as a partner responsible for the analysis of quantum technology funding schemes and public policies in Europe, Canada, United States, and Japan. In autumn 2022, the consortium partners met with the EC Advisory Committee to discuss the actions and of future work on the project.

CHANSE

Collaboration of Humanities and Social Sciences in Europe (CHANSE) is an ERA-Net Cofund programme coordinated by the NCN, launched on 1 January 2021. CHANSE is a network of 27 research-funding institutions from 24 European countries established with the goal of launching international calls for research proposals. The mission of CHANSE is to fund high-quality international research projects, inspire collaboration between scientists and various stakeholder groups, promote gender equality in science and strengthen the European Research Area, especially in countries with a less successful track record within EU Framework Programmes (known as the “widening countries”). The budget of the consortium is EUR 36.5 million, 10 million of which comes from the EU Horizon 2020 Framework Programme.

In 2022, the CHANSE consortium concluded the call: Transformations: Social and cultural dynamics in the digital age, launched in 2021 which attracted considerable interest from the European academic community. 366 proposals were submitted to the call, in which 168 Polish institutions took part. For more information on 26 winning projects, including 12 projects with the participation of Polish research teams can be found in the CHANSE Project Catalogue available in paper format and online as well as on the website of the programme.

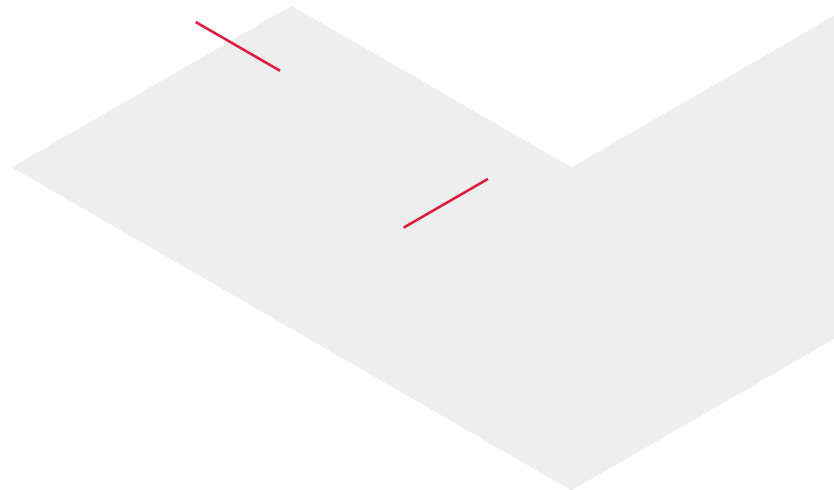
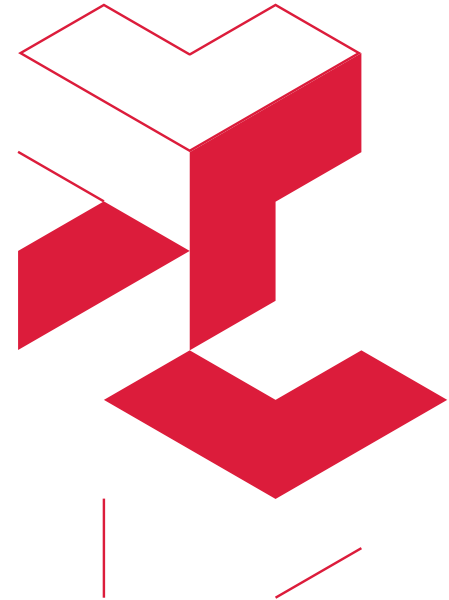
CHANSE supports collaboration cooperation researchers involved in the funded projects and knowledge exchange between project participants and non-academic stakeholders. In 2023, a call was announced for the Knowledge Exchange Facilitator who would coordinate and inspire such processes. A conference in June 2023, in Tallin, will bring together representatives of funded projects, the European Commission and the network’s co-funding agencies, as well as stakeholders from the worlds of science, culture and business.



www.chanse.org

X: [@euchanse](https://twitter.com/euchanse)

Facebook: [@euchanse](https://www.facebook.com/euchanse)



Calls announced under multilateral co-operation

Polish scientists in multilateral calls are awarded grants to carry out research projects in collaboration with foreign research teams. Institutions announcing a call jointly evaluate proposals and then provide funding to teams from their countries. Such projects are distinguished not only by their high scientific level, but also by collaboration in international consortia which often paves the way for yet further joint projects.

Apart from projects carried on from the previous year, 2022 also witnessed the launch of another five-year ERA-Net Cofund project, JPIAMR-ACTION, devoted to drug resistance.

Apart from projects carried on from the previous year, 2021 also witnessed the launch of another five-year ERA-Net Cofund project, JPIAMR-ACTION, devoted to drug resistance,



Calls for proposals concluded in 2022

Area	Network	Subject	Projects cofinanced by the NCN	Partner countries in projects with the participation of Polish researchers
INTERDISCIPLINARY	BiodivProtect	Supporting the protection of biodiversity and ecosystems across land and sea	3	Estonia, Finland, France, Lithuania, Latvia, Germany, Romania, Slovakia, Switzerland, Sweden, Ukraine, Italy
	EN-UAC China Call 2022	Urban Accessibility and Connectivity	2	China, Netherlands, Sweden, Spain
NZ	JPND (JPcofUND 2) (Call 2022)	Linking pre-diagnosis disturbances of physiological systems to Neurodegenerative Diseases.	4	Australia, France, Spain, Latvia, Germany, Portugal, Hungary, Italy, Switzerland, Turkey
	JPIAMR-ACTION (Call 2022)	Disrupting drug Resistance Using Innovative Design [DRUID]	1	Belgium, France, Israel, Germany
ST	CHIST-ERA IV (Call 2021)	Nano-Opto-Electro-Mechanical Systems (NOEMS) for ICT Foundations for Misbehaviour Detection and Mitigation Strategies in Online Social Networks and Media [OSNEM]	1	Belgium, Spain, Switzerland
	M-ERA.NET 2 (Call 2021)	<ol style="list-style-type: none"> 1. Modelling for materials engineering, processing, properties and durability; 2. Innovative surfaces, coatings and interfaces; 3. High performance composites; 4. Functional materials; 5. New strategies for advanced material-based technologies for health applications; 6. Materials for additive manufacturing. 	6	Czech Republic, Japan, Lithuania, German, Norway
	QuantERA (Call 2021)	<ol style="list-style-type: none"> 1. Quantum Phenomena and Resources (QPR) 2. Applied Quantum Science (AQS) 	10	Austria, Belgium, Denmark, Finland, France, Spain, Ireland, Israel, Luxembourg, Germany, Norway, Portugal, Slovenia, Switzerland, Italy
HS	CHANSE	Transformations - Social and Cultural Dynamics in the Digital Age	12	Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, Spain, Lithuania, Germany, Norway, Romania, Slovenia, Sweden, Switzerland, United Kingdom

Calls for proposals launched in 2022

Area	Programme	Topic	Call for proposals	Application deadline (preproposals)	Application deadline (full proposals)
INTERDISCIPLINARY	The European Biodiversity Partnership Biodiversa+ (BiodivMon Call)	Improved transnational monitoring of biodiversity and ecosystem change for science and society	8 September 2022	9 November 2022	5 April 2023
	JPI Urban Europe EN-UAC China (Call 2022)	Urban Accessibility and Connectivity	17 lutego 2022	12 April 2022	13 September 2022
	CHIST-ERA ORD Call	Open & Re-usable Research Data & Software	28 August 2022	-	14 December 2022
NZ	JPND (Call 2022)	Understanding the mechanisms of non-pharmacological interventions	4 January 2022	1 March 2022	28 June 2022
	JPIAMR-ACTION (Call 2022)	Disrupting drug Resistance Using Innovative Design (DRUID)	11 January 2022	16 March 2022	5 July 2022
ST	M-ERA.NET 3 (Call 2022)	<ol style="list-style-type: none"> 1. Materials for energy; 2. Innovative surfaces, coatings and interfaces; 3. High performance composites; 4. Functional materials; 5. New strategies for advanced material-based technologies in health applications; 6. Materials for electronics. 	15 March 2022	15 June 2022	17 November 2022
	CHIST-ERA IV (Call 2022)	<ol style="list-style-type: none"> 1. Security and Privacy in Decentralised and Distributed Systems (SPiDDS) 2. Machine Learningbased Communication Systems, towards Wireless AI (WAI) 	2 November 2022	-	2 February 2023

Multilateral cooperation based on the Lead Agency Procedure

In tandem with other European research-funding agencies, the NCN announces multilateral calls based on the lead agency procedure, which takes advantage of national calls organised by each partner institution in order to assess international projects. Bilateral and trilateral research proposals undergo merit-based evaluation at only one institution, the lead agency, appropriate for one of the project teams, and compete against other proposals submitted to the same call. Not unlike in other cases of cooperation between the NCN and its foreign partners, each agency funds the part of the project that will be carried out by the national team from its country.

WEAVE

In 2022, the National Science Centre continued to cooperate within the framework of the Weave initiative with agencies from Austria, Switzerland, Germany, the Czech Republic and Slovenia (FWF, SNSF, DFG, GAČR, ARRS), as well as Belgium-Flanders (FWO) and Luxembourg (FNR).

Bilateral or trilateral Weave proposals in all research disciplines may be submitted to the NCN under two calls, depending on the lead agency (foreign partner agency or the NCN):

- under Weave-UNISONO for proposals submitted and evaluated by foreign partner agencies acting as the lead agency;
- in the September edition of the OPUS call (in 2022: OPUS 24 + LAP/Weave) for proposals submitted by the NCN. OPUS LAP proposals are evaluated together with domestic proposals.

The results of Weave-UNISONO are published on a rolling basis, as the proposals are evaluated at lead agencies and depend on how long it takes for the evaluation to be approved by partner agencies. In the case of OPUS LAP, the results are published as and when the outcome of NCN's merit-based evaluation is approved by the partner institutions competent for the foreign research teams.

The group of foreign agencies cooperating with the NCN is expected to be further expanded.



POLONEZ BIS PROGRAMME

In 2022, the National Science Centre continued the Marie Skłodowska Curie POLONEZ BIS programme co-funded from the resources of the EU Horizon 2020 Programme for research and innovation. The programme was addressed at experienced foreign researchers willing to conduct their basic research in Poland for 24 months at the research institutions of their choice.

The NCN evaluated proposals submitted to POLONEZ BIS 1 concluded on 15 December 2021. The results were published in May 2022 and the first individual projects kicked off in September. The NCN organised a kick-off meeting on 12 and 13 December 2022 for the winning applicants and their mentors during which scientists could establish contacts with other Fellows, met institutional partners from the Startup Hub Poland Foundation and the Polish Women Scientists Network Foundation, and took part in the workshop on career development, conducted by POLONEZ BIS programme's third partner – CRAC-Vitae from the United Kingdom.

Pursuant to the 2022 call timeline, the NCN announced the next two editions of the call. POLONEZ BIS 2 was concluded in December 2022 and individual projects will kick off in 2023. POLONEZ BIS 3 will be concluded in June 2023. The NCN has recruited 120 experienced researchers in

the three editions of POLONEZ BIS who will work in the Polish research institutions.



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EUROPEAN BIODIVERSITY PARTNERSHIP BIODIVERSA+



In 2022, the NCN represented Poland in the European Partnership Rescuing Biodiversity to Safeguard Life on Earth (Biodiversa+) launched in Pillar II of Horizon Europe co-funded from the resources of the EU Commission. Biodiversa+ is a European platform connecting national and regional research & innovation programmes supporting protection of biodiversity on Earth. Within the framework of the Partnership, the National Science Centre launches calls for international research projects.

In 2022, the NCN launched the second Biodiversa+ Partnership call for international research projects focusing on the improvement of the monitoring system for biological diversity and ecosystem changes (Improved transnational monitoring of biodiversity and ecosystem change for science and society (BiodivMon)).

Much like in the first call concluded in 2022 (BiodivProtect - Supporting the protection of biodiversity and ecosystems across land and sea), the NCN alongside the French National Research Agency (ANR) assumed the role of the Call Secretariat coordinating the call for proposals and performing the merit-based evaluation of proposals submitted at international level.

In 2022, the NCN continued to cooperate with the Advisory Group created in 2021 and comprising national experts. Following the Group's recommendations, the NCN contributed to the update of the Partnership's Strategic Research and Innovation Agenda (SRIA), taking into account the assessment of the main research gaps and needs in Poland.

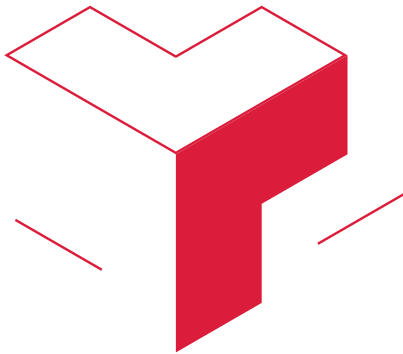
DIOSCURI



DIOSCURI is an initiative of the Max Planck Society (Max-Planck-Gesellschaft, MPG) designed to establish Centres of Scientific Excellence in Poland under the leadership of outstanding leaders who come to Poland, with the involvement and support of partners


from Germany. Each Dioscuri Centre will receive funding of EUR 1.5 million for a period of 5 years.


In four call editions, eight Dioscuri Centres of Scientific Excellence have been created at the Polish host institutions, specialising in various research fields. Each new Dioscuri Centre cooperates with a research partner from Germany and is awarded funding by the NCN secured by the Polish Ministry of Education and Research and the German Federal Ministry of Education and Research. The leaders of the Dioscuri Centers of Scientific Excellence form new research teams at the host institutions and raise funds for research within their centres.




Calls for proposals funded under The EEA and Norway Grants

In 2022, we continued work on the implementation of the Mechanism of the European Economic Area and the Norwegian Financial Mechanism 2014-2021 under the agreement signed in December 2017 between Poland and Iceland, Liechtenstein and Norway. Under the 3rd edition of the Basic Research Programme within the framework of the EEA and Norway Grants, three calls for proposals have been conducted:

 GRIEG – call for research projects carried out by Polish-Norwegian teams, with a budget of EUR 37.34 million,

 IdeaLab – call for innovative, interdisciplinary research projects that are a response to important social challenges and which are carried out by teams from Poland, Norway, Iceland and Liechtenstein, with a budget of EUR 4.43 million,

 POLS – call for proposals supporting researcher mobility with small grants, targeting foreign researchers wishing to carry out research in Poland, with a budget of EUR 7 million.

Under the GRIEG call, funding was awarded to 35 Polish-Norwegian research projects for a total of over PLN 198 million, while under the IdeaLab call, three projects for a total of PLN 17.5 million were recommended funding. Under the POLS call, funding of PLN 28 million was awarded to 37 projects.

On the initiative of the National Science Centre as the Basic Research Programme operator, a scholarship programme was launched in July 2022 to support Ukrainian students and researchers without a PhD degree. Allocation for the programme was from the bilateral fund from which PLN 2.18 million was paid to finance scholarships for 40 students and early-stage researchers

In 2022, EUR 1.27 million was allocated under the EEC Financial Mechanism to finance the pre-defined polar project CRIOS “Cryosphere Integrated Observatory Network on Svalbard”.

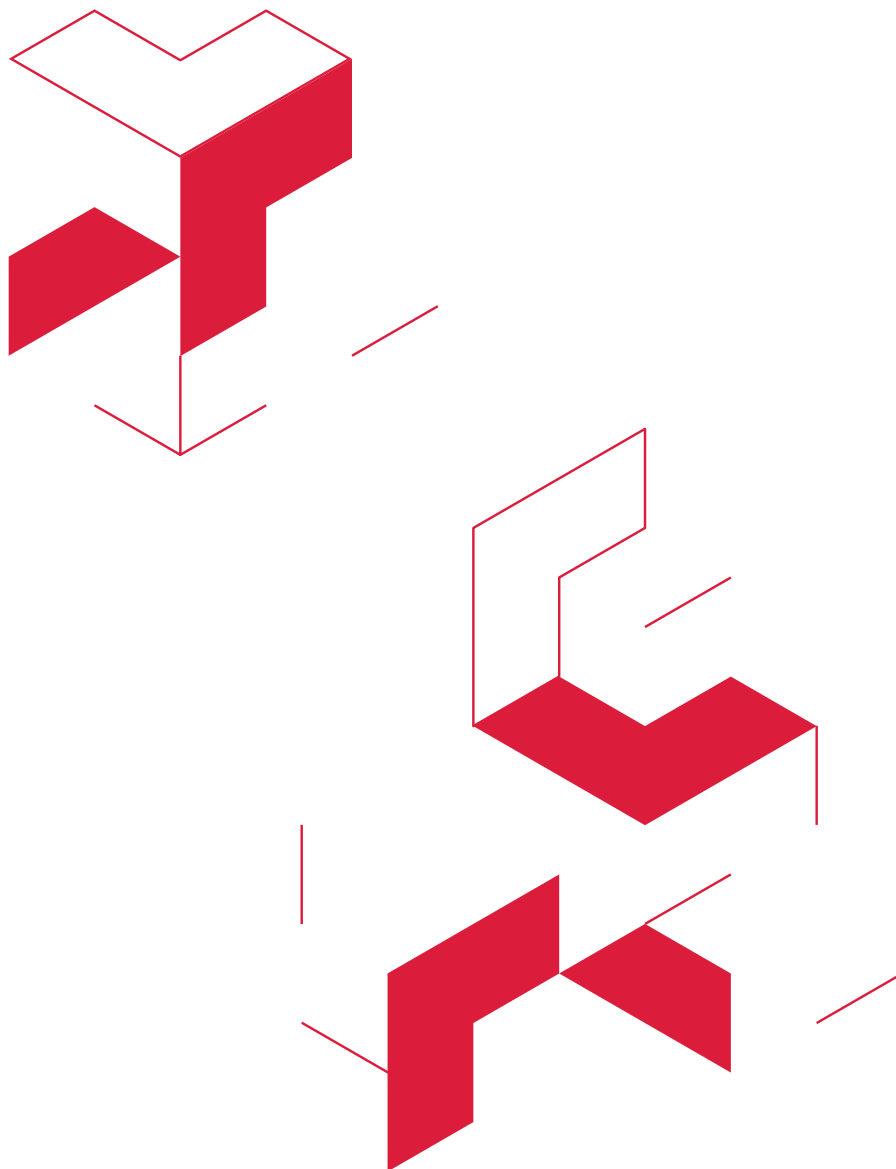

Iceland
Liechtenstein
Norway grants

European Open Science Cloud



In 2022, the National Science Centre continued to coordinate the European Open Science Cloud (EOSC). The EOSC is formed by an ecosystem of various infrastructures to keep and process research results in line with the EU's Policy of Open Science. The main aim of the EOSC initiative was to develop a trusted, virtual, federated environment that cuts across borders and scientific disciplines to store, share, process and reuse research digital objects, such as publications, data and software, following FAIR principles.

In 2022, the National Science Centre represented Poland as a mandated organisation in the EOSC Association and EOSC Steering Board. 1 June 2022 marked the start of the EOSC Focus project, which supports the EOSC partnership in its mission to establish open science as the "new norm". The NCN is a member of the consortium implementing the project.



Promoting our work



An important section of our efforts is oriented towards disseminating information on our funding opportunities in the research community. In 2022 we worked on that objective through a number of actions at home and abroad. We spread the news of the announced and concluded calls and NCN's initiatives both online and by means of traditional media; we organised and actively participated in a variety of initiatives for improving the publicity reach of science.

The NCN Open Days

On 11 and 12 May 2022, NCN staff travelled to Podlasie to take part in the eighth round of the NCN Days. The event was co-organised by the academic and research institutions from the Podlasie Region, i.e. the University of Białystok, the Białystok University of Technology, the Medical University of Białystok and the Mammal Research Institute of the Polish Academy of Sciences in Białowieża.

The opening meeting held on the first day was attended by representatives of the region's research community, NCN Directors and NCN Council. In addition to special occasion speeches, Prof. Barbara Malinowska from the Medical University of Białystok, winner of three OPUS calls, delivered a lecture "The secret to satisfaction and success". During the second part, NCN call winners, including Prof. Robert Bucki from the Medical University of Białystok, Prof. Dorota Mozyr-

ska from the Białystok University of Technology and Prof. Rafat Kowalczyk from the Mammal Research Institute of the Polish Academy of Sciences in Białowieża, talked about their research funded with grant money. All those interested in the NCN call portfolio could take part in the open meeting "My first grant, my next grant ...". At the same time, workshops for applicants were held in English.

On 12 May, three types of workshops were organised for administrative staff of research institutions, applicants (in Polish and in English) and for researchers interested in open science and data management in NCN projects. The agenda included a meeting on the POLONEZ BIS programme. As usual, the NCN Council met the region's scientific community.

NCN Award 2022

The Award of the National Science Centre was established by the NCN Council in 2013. It is a distinction for young researchers up to the age of 40 for significant achievements in basic research carried out in Poland evidenced by publications affiliated with Polish research institutions. The NCN Award has been awarded every year in three research areas: Arts, Humanities, Social and Sciences, Life Sciences, and Physical Sciences and Engineering. Nominees are selected by the Chapter, which includes the NCN Director and Council members.

On 12 October 2022, the tenth NCN Award ceremony was held at the Gallery of 19th-Century Polish Art in Sukiennice (branch of the National Museum). Dr hab. Karolina Safarzyńska from the Faculty of Economic Sciences at the University of Warsaw walked away with the award in Arts, Humanities and Social Sciences for her innovative theoretical models allowing to study the impact of limited rationality, preference diversity, and social interactions on climate policies. The award in Life Sciences went to Dr hab. Michał Bogdziewicz from the Faculty of Biology at the Adam Mickiewicz University in Poznań for his ground-breaking research on the impact of climate change on tree reproduction. Dr hab. Piotr Wcisło from the Faculty of Physics, Astronomy and Informatics at the Nicolaus Copernicus University in Toruń received the award in Physi-

cal Sciences and Engineering for developing a new method of searching for dark matter, using optical atomic clocks.

The award winners received PLN 50,000 each for outstanding basic research achievements.



NCN initiatives for Ukrainian researchers

On 6 July, a meeting was held to promote NCN initiatives for Ukraine. Ukrainian researchers who can work in Poland thanks to NCN grant money, talked about their research. Dr Olha Kryvosheia-Zakharova and her mentor, Prof. prof. Agata Wojtal, presented their project on biodiversity of selected water ecosystems in Poland. The project is performed at the Institute of Nature Conservation, PAS. Dr hab. Zofia Brzozowska and Prof. Halyna Naienko from the University of Łódź presented their project “Linguistic differentiation of Slavia Orthodoxa at the dawn of modernity: continuity and change. A Mixed-Methods study”, conducted by an interdisciplinary team of medieval and Paleo-Slavic scholars at the Faculty of Philology of the University of Łódź.

Events promoting international programmes and partnerships

On 21 and 22 September, a **Strategic Conference of the QuantERA network** was held in Krakow, bringing together principal investigators for projects selected in the QuantERA calls, members of the network’s Strategic Council comprising researchers and representatives of quantum industry, employees of the agencies co-funding the network, representative of the European Commission and Quantum Flagship Programme launched

by the European Commission. The participants discussed, *inter alia*, the strategies for the development of quantum technologies adopted by respective countries and possible commercialisation of quantum research. The outcome of projects funded under the first QuantERA call was presented, as well as the progress of work in projects selected in 2019. The principal investigators in projects awarded funding in 2021 talked about their plans and expected outcome of their research.

On 6 October, a conference promoting the **Basic Research Programme** financed under the third edition of the EEA and Norway Grants was held in Gdańsk. The conference was devoted to polar and climate research. During the conference, project teams and individual scientists from Polish academic institutions implementing projects under GRIEG, POLS and IDEALAB had the possibility to present their projects. Assumptions of a pre-defined CRIOS project, financed from the EEA Grants, were presented. The project aims to modernize and expand an automated monitoring network focused on the cryosphere of Spitsbergen. The meeting allowed for the exchange of experiences between participants in the field of polar and climate research. The speakers could present the outcome of their work.

Between 24 and 26 October, **the EOSC Festival – the National Tripartite Event Poland** was held at the National Science Centre and

online under the theme „*Open Science for Better Science*”. The purpose of the festival was, *inter alia*, to present the European Open Science Cloud (EOSC) and strengthen collaboration and dialogue between EOSC’s key stakeholders.

On the first day held under the theme “EOSC for Open Science”, panellists discussed the idea of the EOSC initiative, goals and challenges in the context of Open Science development in Poland and best practices for its implementation. Over the next few days, guests discussed the practical aspects of Open Science implementation: funding, infrastructure, skills, competences, tools and services.

Throughout the year, we have organised **training courses, workshops and webinars** for applicants intending to joint national and international NCN calls, administrative staff, and research institutions involved in the grant administration as well as training courses for data stewards and persons in charge of open access policy to publications and research data at the research institutions.

Informing the public about the NCN

The mainstay of our public communication is our website (www.ncn.gov.pl), featuring comprehensive information on programmes and all key data concerning the NCN and our activities. The service has versions in Polish and English.

Apart from updated information on national and international calls available in the NCN portfolio, the website also features data on all NCN-funded projects ([NCN Project Database](#)), as well as a listing of open positions in research projects funded by the NCN ([Job Offer Database](#)). In 2022, a new tab (“For Ukraine”) was added with comprehensive information on the opportunities for Ukrainian researchers who had to flee Ukraine due to the war. A database of job offers for Ukrainian researchers forms an integral part of the tab.

Information on new calls and top events was also disseminated via social media channels, including [Facebook](#) (over 17 thousand fans), [Instagram](#) (over a thousand followers), [Youtube](#) (over 300 subscribers), [Twitter](#) (over 4 thousand followers) and [LinkedIn](#) (almost 8 thousand followers) as well as our newsletter, KODA NCN (over 350 subscribers). Apart from actively promoting our work online, we printed official publications: brochures with information on the NCN call portfolio and its activities in two language

versions, Polish and English; the “Annual Report 2021”, which described NCN’s activities in 2021 (in Polish); QuantERA 2021 Call projects catalogue, CHANSE projects catalogue, and a set of NCN call leaflets in Polish and English. The NCN also published a 2023 wall calendar with photographs of NCN call winners at their workplaces or sites related to their research projects. The calendar is yet another way to promote the NCN call portfolio and the research projects it has allowed to fund. The above-mentioned publications are also available online. An electronic versions of the Annual Report 2021 (in English), Call Statistics 2020 and Call Statistics 2021 (in Polish) are published on our website.

Last year, we also recorded five films about the activities of the National Science Centre:

- a video report on the NCN Open Days 2022 in Białystok,
- 3 films about the winners of the NCN Award for 2022,
- a video report on the 2022 NCN Awards ceremony.

NCN in the media

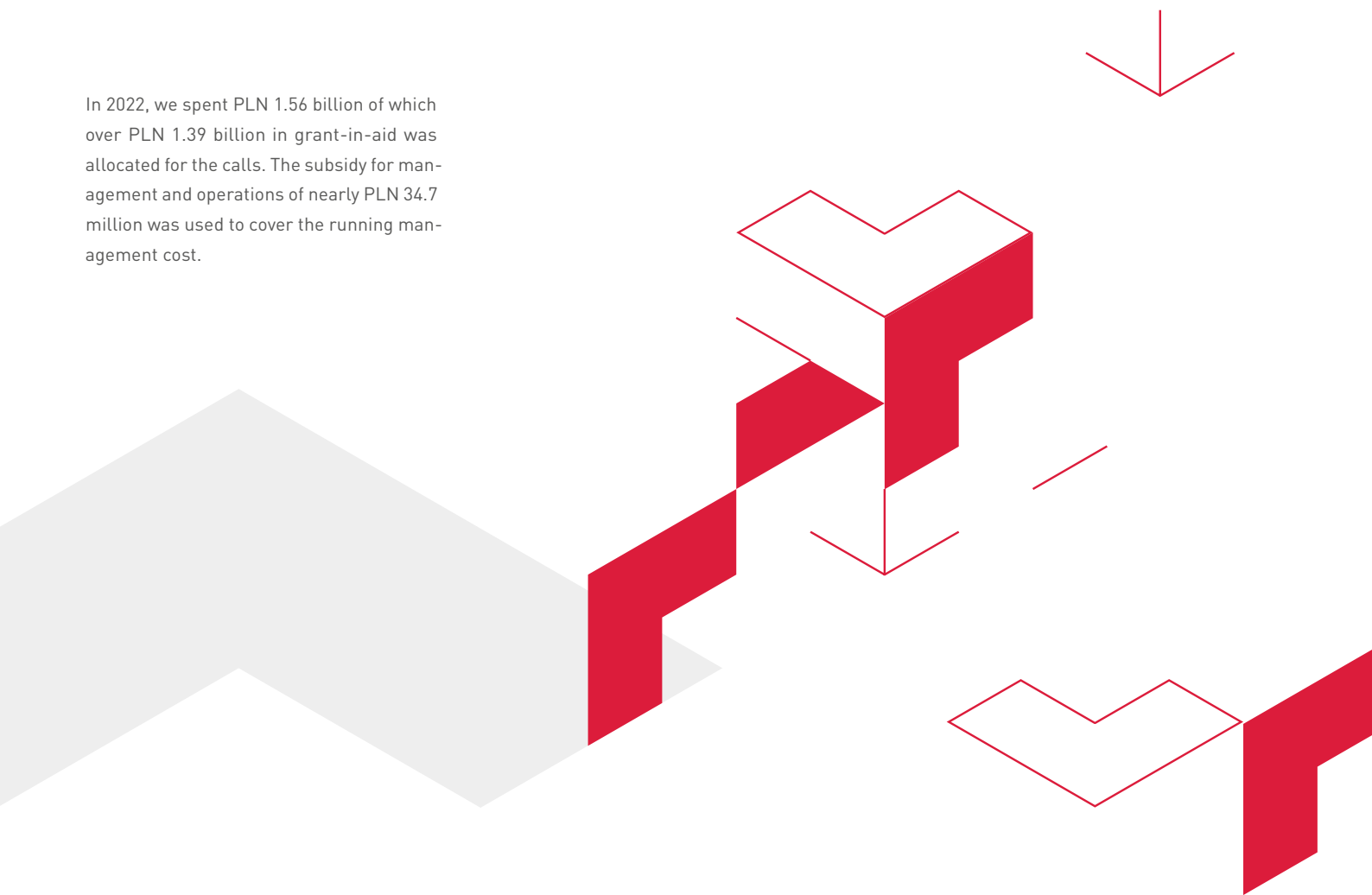
In 2022, 44 press releases were published in national, local, academic, and scientific media outlets which had been sent to approx. 750 e-mail addresses of editors, journalists, and university promotion departments.

In national and local press titles, as well as academic and scientific media outlets (e.g. the Polish Press Agency, "Gazeta Wyborcza", "PAUza Akademicka", "Forum Akademickie", "Dziennik Polski", "Gazeta Krakowska" and many others) published many articles about the NCN, penned either by journalists or NCN staff. The National Science Centre was mentioned or referred to in the press, on the radio and television 410 times, 4391 times on the websites and 3409 times in social media.

In 2022, the NCN Director gave 6 interviews on the agency's operation and grant portfolio, grant allocation principles and open science; President of the NCN Council gave one interview on the necessary modifications for the NCN; Prof. Teresa Zielińska, Chair of the Scientific Analysis Commission at the NCN Council gave one interview on the situation of women in research in the context of NCN survey on men and women in science and Anna Korzekwa-Józefowicz, chief specialist for information and promotion gave one interview on the database of NCN projects.

Budget

In 2022, we spent PLN 1.56 billion of which over PLN 1.39 billion in grant-in-aid was allocated for the calls. The subsidy for management and operations of nearly PLN 34.7 million was used to cover the running management cost.





RESEARCH STORIES





Principal Investigator:

Dr Alexandra Loginova, Institute of Oceanology
of Polish Academy of Sciences

Project title:

Microbial Dissolved Organic Matter
utilisation at the near-sediment waters in
the Baltic Sea Deeps (DOMUSE)

Call:

POLS announced on 16 March 2020

Panel:

ST10

Microbial Dissolved Organic Matter utilization

Classically, dissolved organic matter (DOM) in sediment pore waters was assumed to be chemically and biochemically stable. Recent findings, however, indicate that sediment pore waters might potentially serve as a source of bioavailable DOM for the overlying near-bottom water layer and water column. New research hypotheses posit that DOM released from sediments might stimulate microbial activity in the near-bottom waters. However, the role of bacteria and their heterotrophic activity in the zone between near-bottom waters and marine sediments has not been prioritised in research on the biogeochemical cycle of dissolved organic matter in seas and oceans thus far.

Siderophores are small organic compounds containing ferric ions, produced during phytoplankton blooms, which enable iron uptake by heterotrophic organisms and stimulate their activity in the marine environment. In this way, the labile fraction of DOM from primary production can be incorporated into what is known as the microbial loop, where some DOM is mineralised to inorganic carbon (CO and CO₂) and some transformed into dissolved organic compounds with high molecular mass. Siderophores have also been discovered in sediment pore waters in the Baltic Sea. We therefore posit that the DOM released from sediment may serve as a substrate for heterotrophic communities and microbial activity in the near-bottom waters. Our hypothesis is that microbial activity can be tracked by measuring the accumulation of dissolved siderophores.

The project aims to assess the bioavailability of DOM released from sediment and its potential stimulating impact on the activity of hetero-

trophic microbial communities. To this end, we will collect water samples to measure the concentration of dissolved organic carbon (DOC), DOM size distribution, and optical properties such as chromophoric (CDOM) and fluorescent (FDOM) DOM in pore sediment waters of the Baltic Sea Deeps and the water column. These measurements will help determine the initial feeding stream (return stream) and assess the initial qualitative composition of DOM. During lab experiments, we will incubate microbial organisms extracted from sediment core samples and measure their uptake of oxygen and nutrients, their population size, and changes in DOC, CDOM and FDOM. Ex-situ incubation will take place in an anaerobic atmosphere, with measurement samples taken at specific time intervals. DOC, CDOM and FDOM measurements will allow us to understand the quantitative and qualitative transformations of DOM over the incubation period. Additional measurements of siderophore accumulation, microbial population size, oxygen and nutrient uptake will provide a critical insight into the potential of DOM released from sediment to serve as a substrate for the life and growth of heterotrophic microbial communities. Our findings and progress will be disseminated via scientific journals and popular science articles and social media posts, e.g., via ResearchGate.

Dr Alexandra Loginova

Dr Alexandra Loginova is a young scientist and a working mom. She is currently a postdoctoral researcher at the Institute of Oceanology of the Polish Academy of Sciences and a leader of the research project funded by the Norway grants. Dr. Loginova has finished her PhD in the field of Biological Oceanography at Helmholtz Centre for Ocean Research Kiel in Germany in 2016. Her research focuses on dissolved organic matter cycling in areas that are affected by low oxygen conditions.



Principal Investigator:

Prof. dr hab. Jerzy Szwagrzyk, University of Agriculture in Krakow

Project title:

Impact of intense disturbances on the relationship between herbivores and natural forest regeneration

Call:

OPUS 16 announced on 14 September 2018

Panel:

NZ8

Impact of intense disturbances on the natural forest regeneration

The project explores the relationships that hold between intense disturbances (such as hurricanes or woodworm invasions), natural forest regeneration and the browsing of young trees by wild ungulates. Explaining the impact of natural disturbances on the process of forest regeneration under strong herbivore pressure will make an important contribution to the theory of forest community dynamics. Since extreme weather events are likely to become more common due to global climate change, the frequency and intensity of natural disturbances in forest communities will probably increase as well. Such intense disturbances kill many large trees, increasing the availability of light, water and soil resources, which accelerates the growth of the young generation. Thanks to the greater availability of light, the density of young trees increases; they also produce more shoots, which means that ungulate populations in the area have more food at their disposal.

Our assumption is that under conditions of greater resource availability, the growth of herbivore populations will be slower than the increase in the biomass of young trees. Because in the presence of ample light browsing pressure is distributed across a greater number of young trees and there are more opportunities for growth compensation, browsing does not stop the growth of the young generation. Consequently, even those species that would otherwise be strongly suppressed or eliminated by repeated browsing under abundant tree cover get a chance to grow into imposing trees in areas affected by natural disturbances. Our research covers four areas (the Tatra Mountains, Roztocze, Babia Góra, Puszcza Piska), where we have previously set up our outposts.

The goal of the project is to determine which environmental factors impact the spatial variation in ungulate browsing activity. The bulk of the project is carried out in Roztocze and the Tatra Mountains. The forests of the Tatras have experienced extensive natural disturbances in the past two decades, while the disturbances in Roztocze were few and far between and spatially limited. The species composition and forest regeneration dynamics in both areas show important similarities (a large proportion of beech and fir) and differences – spruce and rowan in the Tatras and hornbeam in Roztocze). Our research aims to estimate the number of shoots available to ungulates and analyse the intensity of browsing on young trees under different light conditions, ranging from compact forests to areas where the tree cover has been practically eliminated by hurricanes or woodworm invasions. We have fenced in 60 little research areas, where we measure the parameters of young trees (height, thickness, crown size) and record any damage caused by ungulate mammals. We also carry out parallel light intensity measurements and soil analyses. In order to determine which herbivore species feed in our area and when, we have set up automatic cameras to record animal presence and behaviour, which we hope will help us interpret the results of our measurements.

Preliminary project findings indicate that under conditions created by natural disturbances, species commonly considered as sensitive to herbivore pressure, such as sycamores and rowan trees, quickly grow to heights at which their crown tips are protected from browsing. With a lot of light available across extensive

areas, they are able to successfully compete against shade-resistant species and account for a large percentage of the young tree generation. As a result, young forests growing in such areas show greater species diversity than older forest stands. The results of our research may serve as an argument to refrain from interference with natural forest regeneration processes after natural disturbances.

Prof. Dr hab. Jerzy Szwagrzyk

Head of the Department of Forest Biodiversity of the University of Agriculture in Kraków. He studies the structure and dynamics of forest communities, regeneration processes and natural disturbances in forest ecosystems. He has authored more than 190 publications, carried out 12 research projects, and served as an advisor for 12 PhD dissertations. He is a member of the Committee of Environmental and Evolutionary Biology, PAS, scientific boards of the Institute of Environmental Protection, PAS and the Babia Góra Natural Park; he is also the Chairman of the Board of the Tatra National Park.



Principal Investigator:

Dr Zofia Boni, Adam Mickiewicz University
in Poznań

Project title:

Embodying Climate Change:
Transdisciplinary Research on Urban
Overheating (EmCliC)

Call:

IDEALAB announced on 16 September 2019

Panel:

HS6

Embodying Climate Change

The climate crisis is one of the main global threats today. Climate change, however, often seems abstract as one cannot easily smell, touch or see it. In EmCliC we bring together natural sciences and social sciences to study how the changing climate affects people today. We study how the physical, weather and climate events are connected with people's local knowledges and embodied experiences, to demonstrate how we already embody climate change.

Climate change means hotter, longer and more frequent heatwaves, also in Europe. Heat is exacerbated in cities and with increasing urbanization, heat stress severely affects people's health and wellbeing. However, not all city inhabitants experience heat in the same way. Certain population groups, such as adults above the age of 65, are more vulnerable than others. EmCliC brings together methods and approaches from disciplines such as social anthropology, sociology, environmental physics, meteorology, climatology, and epidemiology to study the multiple dimensions of urban overheating. We focus on older adults living in two European locations, Warsaw and Madrid. We chose two cities which, due to their varied climates have historically and culturally experienced and adapted to hot temperatures very differently.

To understand older adults' experiences of urban heat and their individual adaptation strategies we conducted extensive qualitative studies. This included focus groups in Warsaw with more than 80 participants. During the summers 2021 and 2022 we conducted ethnographic research with older adults living in Warsaw and Madrid, which consisted of participant observations, in-depth interviews,

participants filling out diaries, drawing maps of their surroundings and bodies, and taking photographs. In Madrid, the participants' narratives and their embodied experiences of heat-wave were captured in an ethno-fiction film 'The Wave'. Moreover, in both Warsaw and Madrid we conducted participatory workshops focused on the embodiment of heat. We also analysed public policy to see how public institutions approach and deal with urban heat. Ethnographic research was combined with the use of wearable sensors, which measured temperature and humidity and were carried by the participants all the time. We also installed a static sensor at the participants' homes collecting data about the indoor temperature. The goal of combining ethnographic research with the sensors is to understand individual experiences of thermal comfort and adaptation measures to urban heat, and how they are (dis)connected with the temperature measured by the sensors and the official meteorological information.

During the summer 2022, we conducted a thermo-survey with around 1000 older adults in Warsaw and in Madrid. During face-to-face interviews we asked about individual health and daily routines, socioeconomic situation, social relationships and how these might change when temperatures get hot. Interviews were combined with temperature readings outside and inside respondents' homes.

Moreover, we developed a framework combining high resolution climate projections with health and demographic data for mapping clusters of vulnerable groups within the city. The framework is designed to increase knowledge among local decision makers about particularly vulnerable

areas, with the purpose of informing targeted adaptation measures.

EmCliC approaches climate change and urban heat as both a physical and social phenomenon. We combine natural and social sciences to better understand how urban heat affects people's lives, how we can adapt to it, and how do we already embody climate change.

The team: Zosia Bieńkowska, Zofia Boni, Nuria Castell, Franciszek Chwaczyk, Amirhossein Hassani, Barbara Jancewicz, Iulia Marginean, Małgorzata Wrotek, Paloma Yáñez Serrano.

For more information see our website www.emcllc.com and follow us on Twitter [@EmCliC](https://twitter.com/EmCliC).

Dr Zofia Boni

A social anthropologist, Assistant Professor at the Institute of Anthropology and Ethnology at Adam Mickiewicz University in Poznań and a Research Fellow at UBVO at University of Oxford. For her postdoctoral research she studied the social dynamics of childhood obesity. Currently, she leads a project on older adults' experiences of climate change. Through conducting interdisciplinary research with most vulnerable groups, children and older adults, she provides a social and cultural perspective on topics dominated by biomedical and natural sciences.



Principal Investigator:

Prof. dr hab. Maciej Mitreęa, University of Economics in Katowice

Project title:

Power management in asymmetric B2B buyer-vendor relationships

Call:

OPUS 13 announced on 15 March 2017

Panel:

HS4

Power management in asymmetric B2B relationships

Qualitative research (case studies) and quantitative studies (surveys) have revealed the international and environmental factors that may have a strategic impact on power asymmetry between the two parties of a B2B relationship. Our research took the perspective of small and medium-sized enterprises working with large international entities and covered various sectors, international by different levels of internationalization, including B2B transport providers, furniture manufacturers and material suppliers for national and international corporations. The international pandemic crisis that erupted during the project created an additional context for our conceptual and empirical investigations.

Our research suggests that SMEs can effectively boost their economic results in cooperation with larger strategic partners by relying on specific skills that can be developed in different management areas. On the one hand, as they enter into asymmetric power relations with large foreign buyers, SMEs should adapt to their requirements, because this is the only way to learn, i.e. shore up their skills and assets in the area of management and production technology. On the other, they should strive to strengthen their independent position within international supply chains, which requires the ability to diversify their buyer portfolio over time by actively searching for new partners and reassessing existing relationships. Our research suggests that this ability is severely limited in situations of market crisis, especially for service providers who have not yet built a recognisable brand. However, even then, their economic position vis-à-vis large players can still be

enhanced via effective negotiation skills. Our research suggests that SMEs should develop different skillsets at different stages of their international market activities. Initially, their focus should be on meeting the requirements of strategic buyers; over time, however, they should move on to invest in their own brand and technology, which may gradually improve their position in international supply chains.

Prof. Dr hab. Maciej Mitreęa

Professor Mitreęa is a professor of social sciences, specialising in management and quality studies. He heads the Department of Organisational Relationship Management at the University of Economics in Katowice; he is also the Chair of the Scientific Committee of Management and Quality Studies. His research initially focused on marketing; today, he takes up a wide range of research problems related to contemporary organisational strategies adapted to dynamic network environments. He has published his findings and served as a guest editor in renowned international journals, such as *Industrial Marketing Management*, *Journal of Business Research* and *International Marketing Review*. He has also won a Marie Curie scholarship and served as an honorary member of the academic community at the University of Manchester.



Principal Investigator:

Dr inż. Joanna Grzelczyk, Łódź University
of Technology

Project title:

Identifying the beneficial anti-neurode-
generative, anti-diabetes and anti-cancer
effects of coffee seeds depending on seed
roasting degree, species and intake level

Call:

PRELUDIUM 15 announced on 15 March 2018

Panel:

NZ9

Coffee beans as an aid in the fight against diseases

Multiple studies have demonstrated that roasted coffee seeds contain not only bioactive substances with an overall positive effect on health, but also potentially harmful compounds, such as 5-Hydroxymethylfurfural (5-HMF) and acrylamide (AM). On the other hand, the polyphenols found in coffee considerably limit the pathogenesis of many modern chronic lifestyle diseases. The main goal of the project was to assess the health-boosting properties of coffee ingredients on physico-chemical and cell line models; the purpose was to determine their physiologically achievable levels and impact on selected signalling pathways and, subsequently, identify the specific coffee extracts and fractions that show the greatest beneficial health effects when digested and absorbed in the gastrointestinal system.

In order to achieve that objective, we prepared green, light- and dark-roasted coffee seed extracts from the Arabica and Robusta species and isolated fractions containing different polyphenol groups, free or bound with Maillard reaction products (MRP), as well as selected low-molecular MRPs, including AM and 5-HMF. These extracts and fractions were then subjected to in vitro enzymatic digestion with or without selected strains of probiotic lactic acid bacteria. We measured the absorption of polyphenols from the extracts or fractions in question in a model system consisting of a single layer of enterocytes, followed by the molecular modelling of these compounds via docking and calorimetric simulations, using body enzymes and receptors. The results of the modelling experiments were compared with cellular model assessments in order to confirm the activation of selected metabolic pathways in a more complex biological

system. We identified the extracts and fractions that showed the greatest beneficial effect on cells after digestion and absorption and determined their most beneficial physiological concentrations, corresponding to specific coffee intake levels.

The concentration of free polyphenols was observed to rise as they broke away from more complex structures, mainly in the large intestine, during the digestion of coffee extracts/fractions in the simulated GI tract. The presence of probiotic bacteria contributed to an increase in the levels of free polyphenols derived from chlorogenic acids, with high activity observed in the lower sections of the GI tract. Docking simulation studies of interactions and affinities with selected body enzymes and receptors showed that the latter created stable complexes with bioactive coffee compounds, with coffee ingredients competitively binding to enzyme/receptor active sites. When coffee extracts and fractions were digested in vitro, their affinity with enzymes/receptors, as analysed with the ITC method, increased in comparison with undigested material. This suggests that, when consumed, coffee extracts and fractions may effectively inhibit the activity of enzymes such as: acetylcholinesterase, butyrylcholinesterase, monoaminoxidase A, and topoisomerase II, or regulate the activity of the PPAR receptor. Among the samples studied in our in vitro research on cell lines, the highest bioactivity levels were observed for green coffee extracts, including chlorogenic acid fractions, which exhibited cytoprotective properties, protecting our model enterocytes (Caco-2 and HT29), nerve cells (SH-SY5Y), and pancreatic cells (MIN6) against the induced oxidative stress that con-

tributes to carcinogenesis. They reduced the activity of cellular β -secretase, which may prevent the formation of β -amyloid plaque that damages nerve cells. Coffee ingredients were also observed to reduce the release of pro-inflammatory cytokines by differentiated adipocytes (3T3-L1) and stimulate GSIS, which may contribute to the maintenance of metabolic homeostasis. At the same time, elevated coffee compound levels induced cell death via apoptosis, which confirmed their anti-cancer properties.

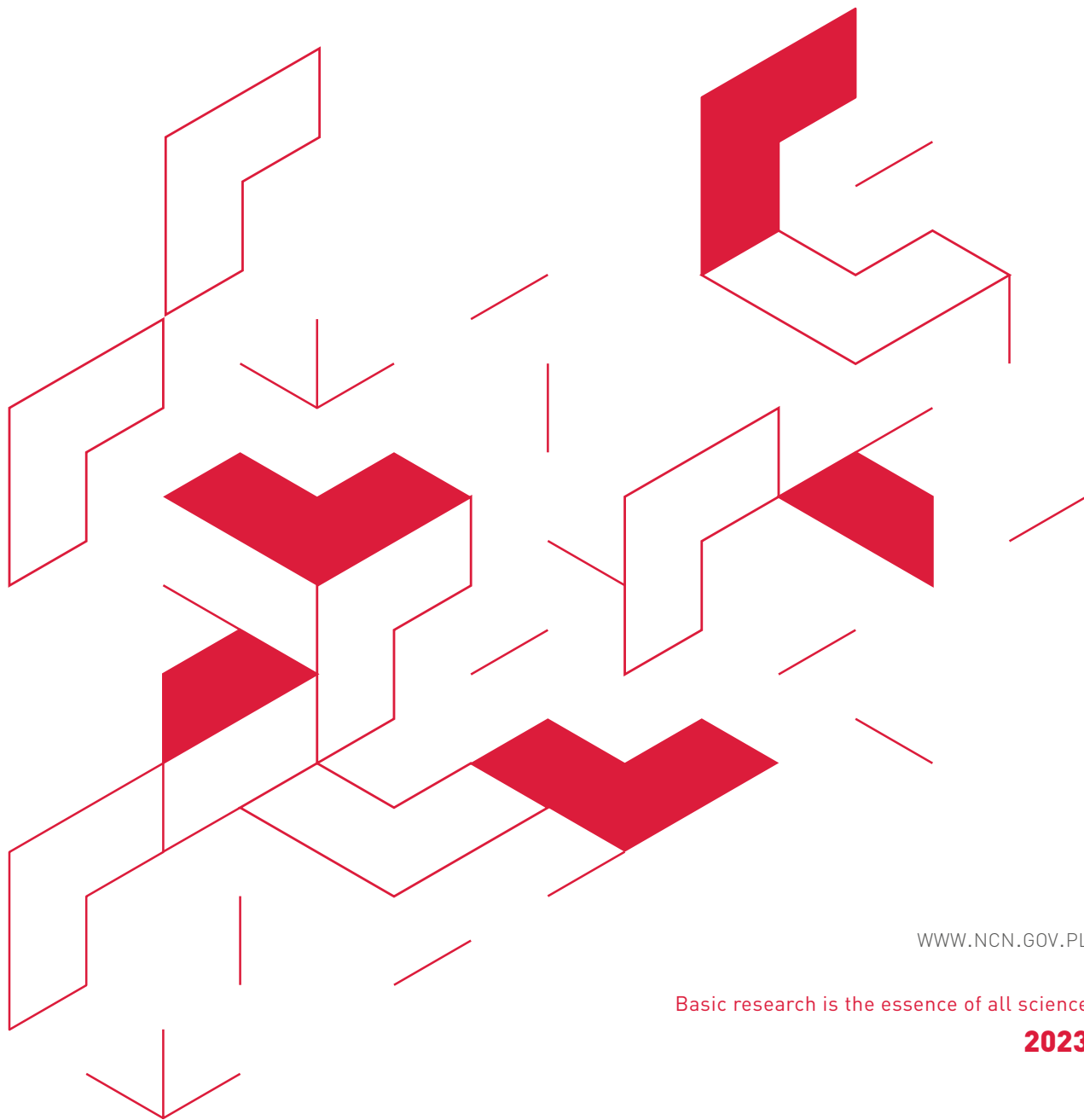
Dr inż. Joanna Grzelczyk

In 2021, she defended her PhD cum laude at the Institute of Food Technology and Analysis of the Łódź University of Technology. She is a winner of Preludium 15 and the Polmos Żyrardów competition for the best PhD dissertation. She has also won a distinction in the "Mam pomysł na startup" competition. In 2019, she completed a research fellowship at the McGill University in Montreal, Canada. She is the author of a number of papers in international journals and co-author of one patent and several patent applications. She works as an Assistant Professor at the Institute of Food Technology and Analysis of the Łódź University of Technology.



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Basic research is the essence of all science

2023