

ANNUAL REPORT

2022



NATIONAL SCIENCE CENTRE
POLAND

BASIC RESEARCH IS THE ESSENCE OF ALL SCIENCE

National Science Centre
ul. Królewska 57
Krakow, Poland 30-081
tel.: +48 12 341 90 00
fax: +48 12 341 90 99
e-mail: biuro@ncn.gov.pl
www.ncn.gov.pl

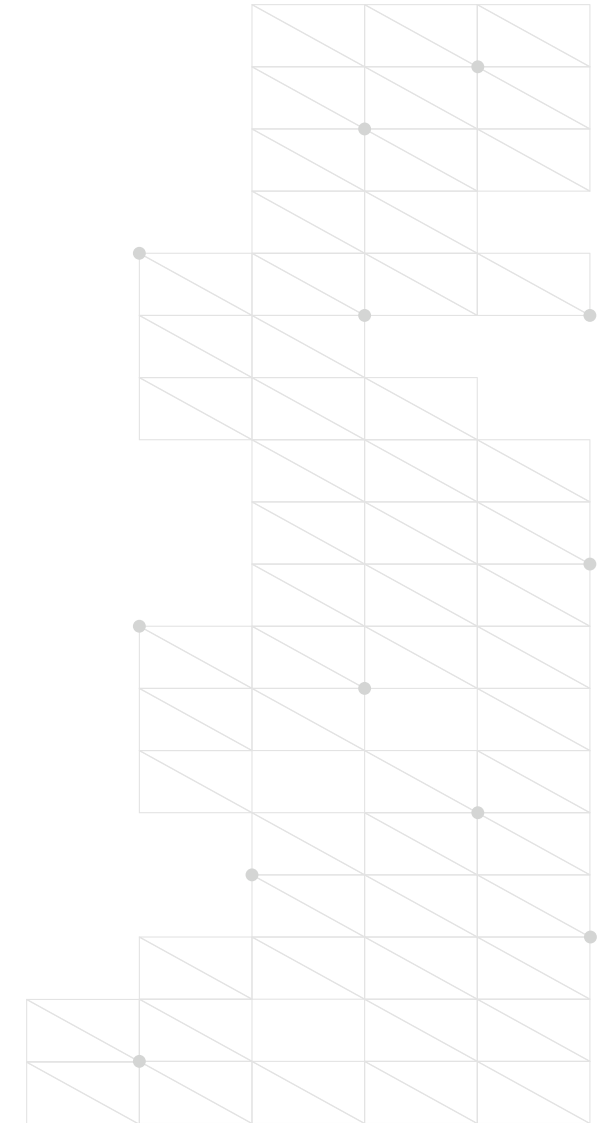
CONTENTS

About the NCN	6
2013 In a Nutshell	10
NCN Structure	12
Funding Opportunities	14
Funding Schemes	15
NCN Research Domains	18
NCN Award	19
NCN in Numbers	20
Facts and Figures	21
Proposal Evaluation Process	28
Peer Review Process	30
Experts & Reviewers	32
International Cooperation	36
Budget & Accounts	40
Research Stories	44

ABOUT THE NCN

The National Science Centre (Narodowe Centrum Nauki, NCN) is a government executive agency set up in 2010 to fund basic research. The primary task of the Centre is to support research projects – experimental or theoretical endeavours undertaken to gain new knowledge of the foundations of phenomena and observable facts.

The Centre fulfils its duties by catering for the needs of researchers at every stage of their research career and with different degrees of expertise. It finances basic research carried out in the form of research projects, scholarships for PhD students and post-doc internships. To ensure the excellent quality of the research selected for funding, the Centre has adopted a two-stage, peer review-based procedure of proposal evaluation. One important task of the Centre is to foster international cooperation in research and disseminate information on calls for proposals among researchers. The NCN also supports and monitors the progress of research projects financed under its funding opportunities through review and examination of annual and final reports, as well as on-site visits to selected host institutions.



OUR AIMS

Financing the best projects in the area of basic research.

Supporting researchers at the outset of their career.

Supporting researchers wanting to establish new research teams, including interdisciplinary endeavours capable of competing on the global stage.

Creating new employment opportunities in research projects.

Engaging in international cooperation in research.

OUR MISSION

Improving the quality of research in Poland by means of a competition-based system of funding opportunities, thereby furthering the advancement of Polish research throughout the world.

YEAR HIGHLIGHTS

MAY 8-9:

NCN OPEN DAY

The cities of Katowice and Gliwice host the first edition of the National Science Centre Open Day, an event composed of workshops, meetings and presentations, aimed at promoting NCN funding opportunities among Polish researchers.

JULY 2:

ETIUDA RESULTS

100 researchers receive scholarships to support their work on doctoral dissertations in the first edition of the ETIUDA funding opportunity.

DECEMBER 16:

FIRST EDITION OF TANGO

The National Science Centre and the National Centre for Research and Development launch the first call for proposals under the TANGO funding scheme – a joint initiative aiming to apply the results of basic research showing highly innovative potential.

APRIL 1:

CHIST-ERA

NCN joins CHIST-ERA – a European network focused on backing research in information and communication sciences and technologies.

MAY 9:

NCN AWARD

The NCN gives special awards to three outstanding young researchers in the fields of Arts, Humanities and Social Sciences, Life Sciences and Physical Sciences and Engineering, respectively.

JULY 23:

SYMFONIA RESULTS

Six interdisciplinary projects awarded funding in the first edition of the SYMFONIA funding opportunity designed for teams of excellent researchers wanting to carry out cross-domain research. The amount of grants totalled € 7,100,760.

2013

2013 in a nutshell

2013 was a year of starting a number of new initiatives and refining its peer review procedures for the NCN. For the first time the Centre conferred its NCN Awards and organised a National Science Centre Open Day. A new funding opportunity – TANGO – was launched in cooperation with the National Centre for Research and Development (NCBR). The new call enables scientists, engineers and scholars to turn their projects in basic research into solutions and products that may benefit populations and economies in a direct way. The NCN has further provided for the development of young researchers by adopting a policy of hiring at least one post-doc researcher and one PhD candidate in projects led by an advanced researcher. In addition, in order to conveniently simplify the application procedure, the number of paper documents required in the process has been reduced.

The NCN Director

The Director of the NCN is the institution’s executive who is responsible for financial management as well as correct and efficient completion of NCN tasks. The Director also acts as a formal and legal representative on behalf of the Centre. The NCN Director, **professor Andrzej Jajszczyk**, was selected by the NCN Council and appointed by the Minister of Science and Higher Education.

The NCN Council

The NCN Council is a policy making body consisting of 24 distinguished researchers representing different academic fields. The Council decides on the type of programmes, specifies call regulations, selects members of the Expert Teams responsible for proposal evaluation and allocates funding. The function of Chair of the NCN Council is held by **professor Michał Karoński**.

NCN COUNCIL IN 2013

prof. dr hab. Michał Karoński – Chair

ARTS, HUMANITIES AND SOCIAL SCIENCES

prof. Maciej Grochowski
prof. Janina Jóźwiak
prof. Ireneusz Kamiński
prof. Małgorzata Kossowska
prof. Teresa Malecka
prof. Wojciech Nowakowski
rev. prof. Andrzej Szostek

PHYSICAL SCIENCES AND ENGINEERING

prof. Zbigniew Błocki
prof. Tadeusz Burczyński
prof. Bożena Czerny
prof. Elżbieta Frąckowiak
prof. Janusz Janeczek
prof. Henryk Kozłowski
prof. Michał Malinowski
prof. Marek Żukowski

LIFE SCIENCES

prof. Jakub Gołąb
prof. Sergiusz Jóźwiak
prof. Krzysztof Jóźwiak
prof. Leszek Kaczmarek
prof. Tomasz Motyl
prof. Krzysztof Nowak
prof. Adam Torbicki
prof. Maciej Wołowicz

The NCN office

On a day-to-day basis the Office is responsible for processing calls for proposals and organising meetings for Experts at the peer review evaluation stage. In addition, it provides support to applicants and answers their queries. Its major responsibilities include the administrative and financial management of grant agreements and fostering international cooperation.

The NCN Coordinators

The NCN’s Coordinators are responsible for launching calls for proposals and managing the proposal evaluation process. Their responsibilities include evaluating the impartiality of the peer review process. Coordinators must hold a doctoral degree. They are appointed by open competition. In the NCN, there are three teams of Coordinators, each responsible for one critical area of study: Arts, Humanities and Social Sciences; Physical Sciences and Engineering; Life Sciences.

NCN
COUNCIL

DIRECTOR

NCN Structure

DEPUTY DIRECTOR
FOR RESEARCH

CHIEF ACCOUNTING
OFFICER

COORDINATORS FOR ARTS,
HUMANITIES AND SOCIAL
SCIENCES

COORDINATORS FOR PHYSICAL
SCIENCES AND ENGINEERING

COORDINATORS FOR LIFE
SCIENCES

RESEARCH AND DEVELOPMENT
DEPARTMENT

ARTS, HUMANITIES
AND SOCIAL SCIENCES

PHYSICAL SCIENCES
AND ENGINEERING

LIFE SCIENCES

INTERNATIONAL COOPERATION TEAM

PROGRAMME ANALYSIS
AND EVALUATION

COMPETITION AND STATE
AID OFFICER

FINANCE AND ACCOUNTING
DEPARTMENT

FINANCE

ACCOUNTING

HUMAN RESOURCES

ADMINISTRATION
DEPARTMENT

ADMINISTRATION

IT

OFFICE OF THE COUNCIL

LEGAL TEAM

AUDIT AND COMPLIANCE
TEAM

COMMISSIONER
FOR THE PROTECTION
OF CLASSIFIED INFORMATION

FUNDING OPPORTUNITIES

FUNDING SCHEMES

PRE-DOCTORAL RESEARCHERS

PRELUDIUM

researchers without doctorate (academic affiliation not required)

ETIUDA

PhD candidates with a commenced registration and conferment procedure for a doctoral degree

POST-DOC RESEARCHERS

SONATA

emerging researchers with up to 5 years since the award of PhD

SONATA BIS

researchers with a PhD obtained between 2 and 12 years prior to submitting the proposal

FUGA

researchers with a PhD obtained within 5 years prior to submitting the proposal

ADVANCED RESEARCHERS

MAESTRO

advanced researchers conducting pioneering research

SYMFONIA

eminent researchers running cross-domain projects

OPEN TO ALL RESEARCHERS IRRESPECTIVE OF THEIR RESEARCH EXPERIENCE

OPUS

a wide range of researchers at every stage of their research career

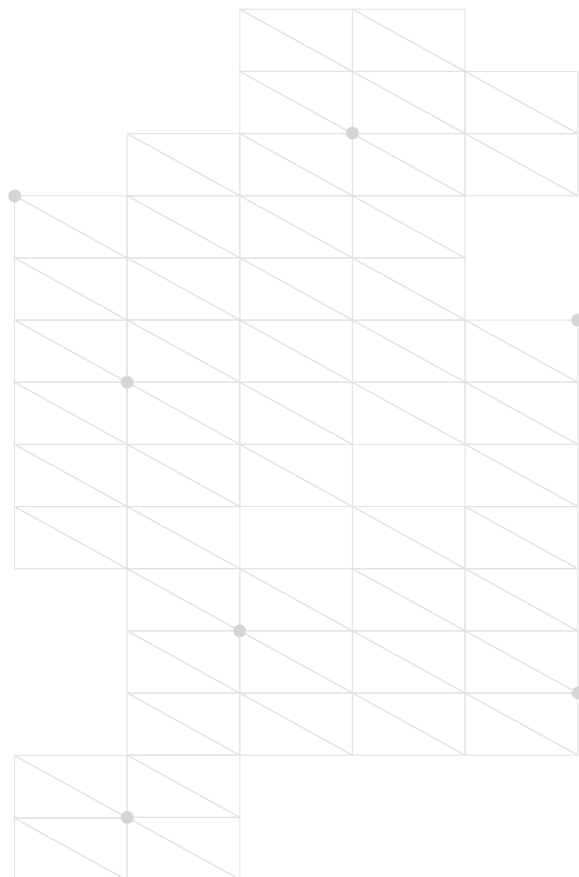
HARMONIA

researchers wanting to carry out projects in international cooperation

TANGO

researchers wanting to apply the results of basic research

The National Science Centre funds projects carried out by scientists, academics, Polish and international research teams, as well as doctoral scholarships and post-doctoral internships. Calls for proposals are issued four times a year. There are ten types of funding schemes, each addressed to a wide range of researchers at different levels of expertise.



♪ PRELUDIUM

Aimed at pre-doctoral researchers starting their career in research. This funding scheme seeks to inspire scientists, scholars and engineers to develop innovative ideas and helps them gain research experience, thus becoming a prelude to their future expertise.

♪ ETIUDA

This funding opportunity, addressed to doctoral candidates, intends to provide the best young researchers with financial support and optimal working conditions. The applicants in this scheme should plan a research stay abroad which will be funded solely by the NCN. The awardees will also receive a monthly salary and are obliged to take their doctoral degree within 12 months of completing the scholarship.

⌘ SONATA

Targeted at emerging researchers with up to 5 years scientific experience since the award of their doctorate. This funding opportunity is hoped to encourage researchers to create an innovative scientific approach or piece of equipment, thereby helping them become independent researchers.

⌘" SONATA BIS

Addressed to researchers with 2-12 years of scientific experience since their PhD award. This funding scheme gives researchers the incentive to build a new research team and become independent research leaders.

♭ FUGA

Targeted at researchers holding a doctoral degree; the scheme hopes to facilitate the mobility of Polish researchers between different research institutions in Poland and encourage the exchange of scientific ideas. Grantees will be employed in an academic unit or similar research institution on a full-time basis and will receive research funding.

⌘ MAESTRO

Designed for advanced researchers wanting to conduct pioneering research, including interdisciplinary research important for the development of science. Projects within this funding scheme should surpass the current state of knowledge, lead to the creation of new paradigms, or forge pathways to new frontiers in the field.

♪♪ SYMFONIA

Applicants in this funding opportunity should be advanced researchers wanting to carry out interdisciplinary or cross-domain research in collaboration with teams representing different areas of research. Projects submitted under this funding scheme are expected to go beyond current frontiers of knowledge and open new perspectives in science and humanities.

♪ OPUS

Intended for a wide range of applicants, irrespective of their research experience. Research proposals submitted under this funding scheme may include the purchase or construction of research equipment.

♪ HARMONIA

Aimed at applicants wanting to carry out research in cooperation with foreign partners. This funding scheme offers researchers the opportunity to develop scientific ideas in collaboration with international peers and gives them access to large-scale international research infrastructure.

♪ TANGO

Open to projects that plan to put into application the results of basic research showing significant innovative potential. Eligible to apply are Principal Investigators or investigators in projects in basic research awarded funding under nationwide or international calls. TANGO is a common initiative of the National Science Centre and the National Centre for Research and Development (NCBR), designed in order to help research institutions and universities introduce innovative solutions to the market.

NCN Research Domains

The NCN Council has adopted the following division of basic research into 25 thematic panels through which proposals are channelled.

HS – ARTS, HUMANITIES AND SOCIAL SCIENCES

HS1 Fundamental questions of human existence and the nature of reality

HS2 Cultures and cultural creativity

HS3 The study of the human past

HS4 Individuals, institutions and markets

HS5 Social norms and governance

HS6 Human nature and human society

ST – PHYSICAL SCIENCES AND ENGINEERING

ST1 Mathematics

ST2 Fundamental constituents of matter

ST3 Condensed matter of physics

ST4 Physical and analytical chemical sciences

ST5 Materials and synthesis

ST6 Computer science and informatics

ST7 Systems and telecommunications engineering

ST8 Products and processing engineering

ST9 Astronomy and space research

ST10 Earth system science

NZ – LIFE SCIENCES

NZ1 Molecular and structural biology and biochemistry

NZ2 Genetics, genomics

NZ3 Cellular and developmental biology

NZ4 Biology of tissues, organs and organisms

NZ5 Human and animal non-infectious diseases

NZ6 Human and animal immunology and infection

NZ7 Public health

NZ8 Evolutionary and environmental biology

NZ9 Applied life sciences and biotechnology

National Science Centre Award

The National Science Centre conferred, for the first time, its special award for excellent young researchers representing Arts, Humanities and Social Sciences, Life Sciences and Physical Sciences. This award is granted by a committee composed of the NCN Director, members of the NCN Council and representatives of the award funders.

ARTS, HUMANITIES AND SOCIAL SCIENCES

In Arts, Humanities and Social Sciences, the laureate was dr Anna Matysiak (Warsaw School of Economics). Dr Anna Matysiak conducts research into transformations of the family, in particular the processes of formation, development and dissolution of families as well as the factors determining those processes. In her research, dr Matysiak combines demography, labour economics and social politics, using a wide range of advanced methods of quantitative analysis. She collaborates with demographers from other countries. Anna Matysiak’s doctoral dissertation was later developed into *Interdependencies Between Fertility and Women’s Labour Supply*, published by Springer in 2011– the only comparative study of the relationship between the number of women active in the labour market and fertility rates where the countries of East-Central Europe have been presented symmetrically alongside countries with developed market economies.

PHYSICAL SCIENCES AND ENGINEERING

In Physical Sciences the laureate was dr hab. Piotr Garstecki (Institute of Physical Chemistry, Polish Academy of Sciences). Principal among Piotr Garstecki’s research

achievements is his contribution to the understanding of physics and the construction of innovative microfluidic systems. He was the first to explain the formation of droplets in microscale. His works concerned with this problem are among the most cited in the field. Dr Garstecki has created a research team at the Institute of Physical Chemistry, PAS, focused on the development of microfluidic techniques for use in automated tools for large-scale research in chemistry, biochemistry and microbiology. The projects he has carried out have resulted in many publications on the application of innovative tools in biochemistry and microbiology.

LIFE SCIENCES

The award for achievements in Life Sciences went to dr hab. Andrzej Stanisław Dziembowski (Institute of Biochemistry and Biophysics, Polish Academy of Sciences, University of Warsaw). Dr hab. Andrzej Stanisław Dziembowski is an eminent young molecular biologist whose particular achievement is having discovered the function of the human C16orf57 gene. Until recently the role of the gene in cells had remained entirely enigmatic despite its mutation incidence in such diseases as poikiloderma with neutropenia, Rothmund-Thomson syndrome or dyskeratosis congenita. Dziembowski and his collaborators found out that the protein encoded by the C16orf57 gene is the enzyme responsible for modifying the U6 snRNA particle, which plays a part in the process of the splicing of pre-mRNA. The process is crucial to the functioning of every living cell. In their research, the team, led by Andrzej Dziembowski, used a number of advanced experimental techniques, including yeast cell screening, biochemical tests of pre-mRNA splicing in vitro, or analyses employing RNA interference in human cell cultures.

NCN IN NUMBERS

Facts and Figures*

13 announced calls

14 concluded calls

2,433 projects
awarded funding

over **€ 237 M** allocated
for research projects



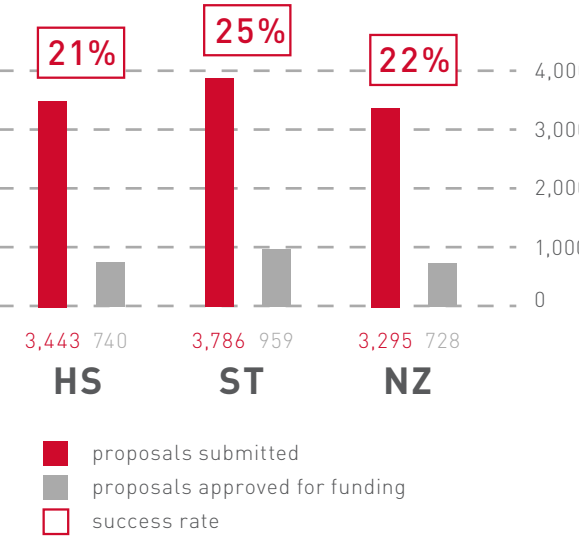
23% success rate**

* Statistics for NCN calls concluded in 2013

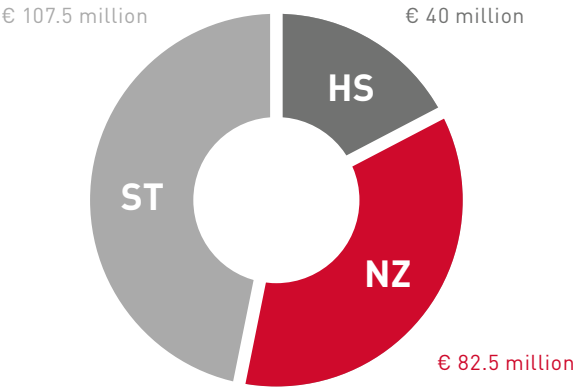
** success rate is the percentage of proposals that were awarded funding; it is calculated as the ratio of the number of proposals awarded to the number of proposals submitted

Under the calls concluded in 2013, the National Science Centre registered 10,564 proposals totalling ca. € 1 billion. The sum of awarded grants exceeded € 237 million distributed among 2,433 successful projects.

Number of proposals submitted and grants awarded in calls concluded in 2013 by research domain, including success rate*/**



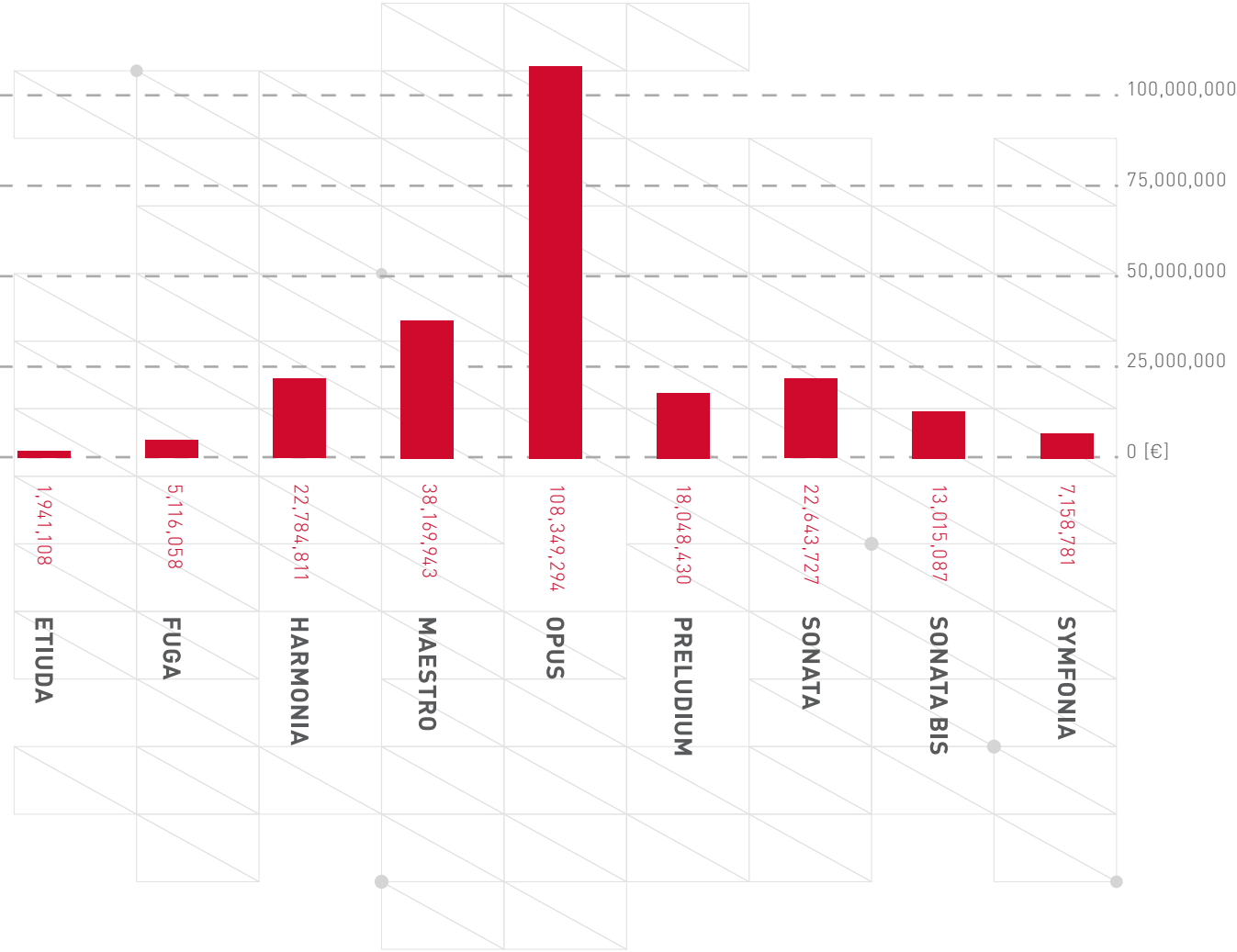
Resources awarded under funding schemes concluded in 2013, by research area*/**



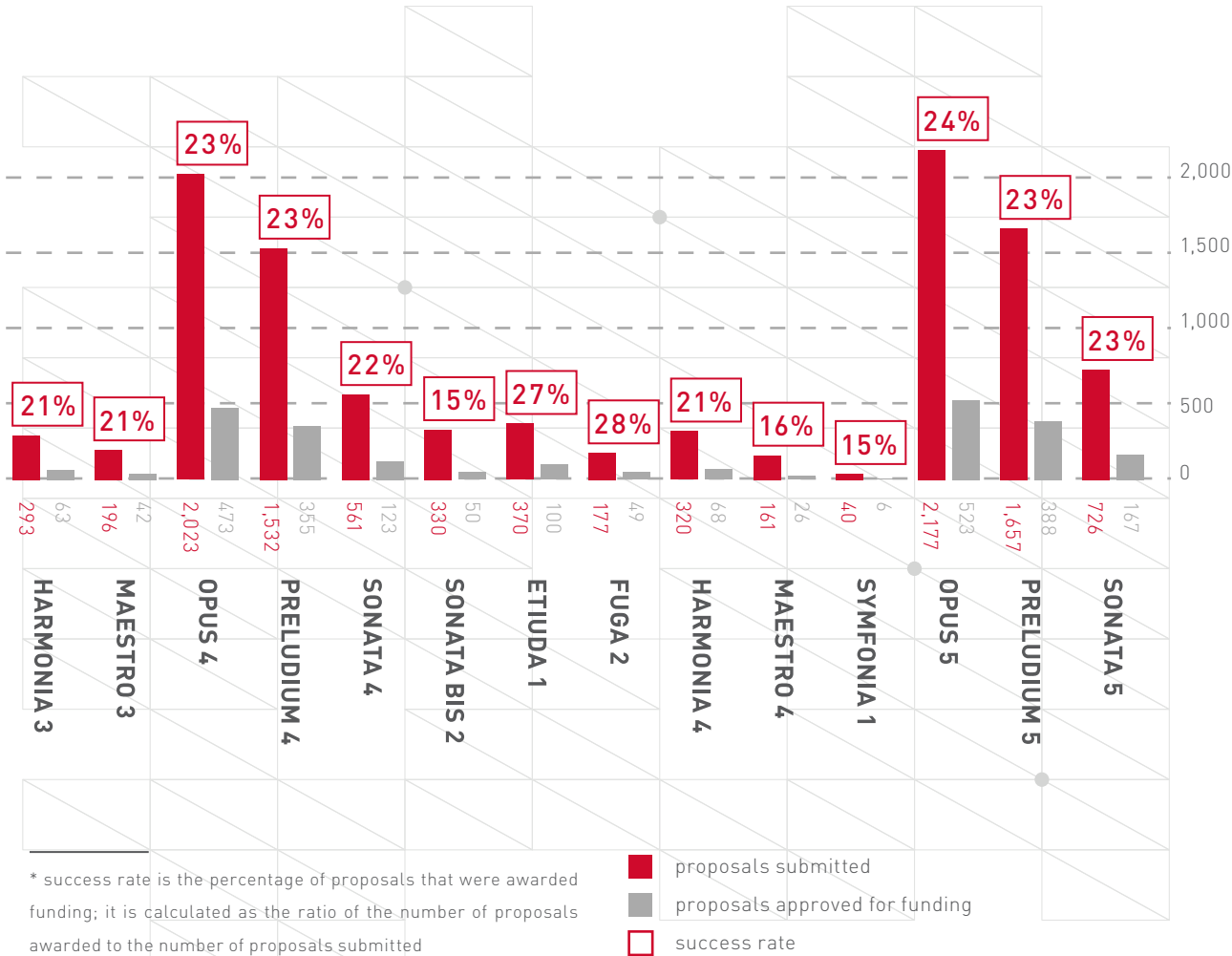
* the SYMFONIA funding scheme is not included here as research projects financed under this initiative are interdisciplinary in their nature

** success rate is the percentage of proposals that were awarded funding; it is calculated as the ratio of the number of proposals awarded to the number of proposals submitted

Resources awarded under funding schemes concluded in 2013, by type of call



Number of proposals submitted and grants awarded in calls concluded in 2013, by type of call, including success rate



NCN GRANTEES

Below is the 2013 ranking list of host institutions awarded funding in excess of PLN 20 M (€ 4.7 M). The indisputable leaders are the University of Warsaw and Jagiellonian University. As regards the sum of funding received, the top beneficiary is Jagiello-

nian University. Third position in the ranking is occupied by Adam Mickiewicz University followed by the University of Wrocław and Wrocław University of Technology and Warsaw University of Technology and AGH University of Science and Technology.

Best performing Polish Host Institutions

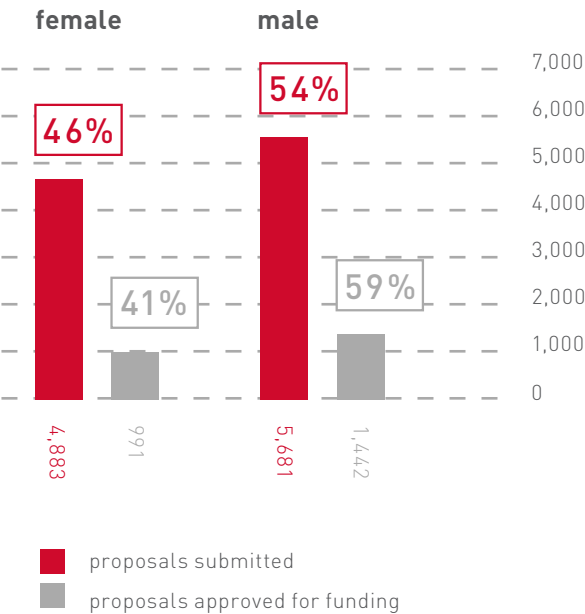
HOST INSTITUTION	NO. OF GRANTS	TOTAL FUNDING	SUCCESS RATE*
University of Warsaw	280	€ 25,566,748	41%
Jagiellonian University	263	€ 27,337,253	30%
Adam Mickiewicz University, Poznań	129	€ 10,407,309	26%
University of Wrocław	89	€ 7,839,699	30%
Wrocław University of Technology	63	€ 6,504,571	26%
Warsaw University of Technology	63	€ 5,936,251	23%
AGH University of Science and Technology	61	€ 5,593,029	21%
Nicolaus Copernicus University	60	€ 4,984,277	23%
University of Gdańsk	56	€ 4,864,972	24%
Łódź University of Technology	42	€ 5,578,152	19%
Nencki Institute of Experimental Biology, Polish Academy of Sciences	36	€ 7,643,705	55%
Institute of Pharmacology, Polish Academy of Sciences	25	€ 5,609,840	50%
Institute of Physics, Polish Academy of Sciences	25	€ 5,112,462	60%

* success rate is the percentage of proposals that were awarded funding; it is calculated as the ratio of the number of proposals awarded to the number of proposals submitted

The success rate presented in the table signifies the ratio of projects that qualified for funding compared to the projects submitted. Among the beneficiaries who were awarded more than € 4,7 million, the highest success rate of 60% was achieved by the Institute of Physics, Polish Academy of Sciences. The second best success rate (55%) was Nencki Institute of Experimental Biology, Polish Academy of Sciences, and the third – the Institute of Pharmacology, Polish Academy of Sciences (50%). Among universities, the three highest scoring were: University of Warsaw (40%), Jagiellonian University (30%), University of Wrocław (30%).

Regarding the number of grants awarded in 2013 per researcher, smaller institutes rank higher than large universities. No university has reached the average of more than 0.1 grant won by its full-time researcher, whereas this figure is 3-4 times higher in various institutes of the Polish Academy of Science.

Share of female and male Principal Investigators in proposals submitted



In 2013, proposals submitted by women accounted for 46 per cent of the total. The success rate* among women was lower than among men: 20.29% as compared to 25.38% for the latter. Of the projects approved for funding, 59% had male Principal Investigators and 46% had female Principal Investigators.

* success rate is the percentage of proposals that were awarded funding; it is calculated as the ratio of the number of proposals awarded to the number of proposals submitted

Early Career Researchers

High on the list of the Centre's duties is to support the growth of researchers on the pre-doctoral and doctoral level. In the calls concluded in 2013, more than half of all beneficiaries were no older than 35 (so-called young researchers).

24%

of the overall funding granted under NCN calls concluded in 2013 was allocated to research projects, research internships and scholarships of young researchers;

48%

of all proposals were submitted by young researchers;

50%

of all proposals awarded funding were submitted by young researchers.

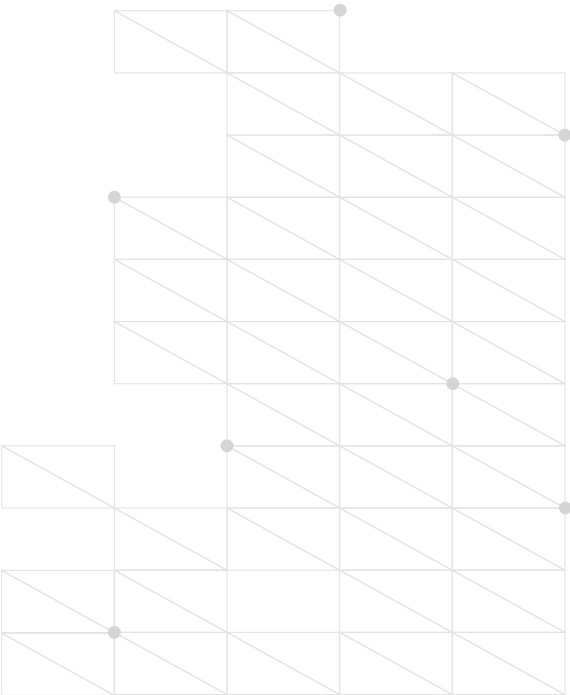
PROPOSAL EVALUATION

In order to select the very best proposals, the NCN employs an evaluation procedure based on a two-stage peer review process. The eligibility of research projects submitted to the NCN is examined by the NCN's Coordinators. The projects are afterwards peer reviewed by members of the NCN's Expert Teams and External Reviewers, both Polish and international. The approximate structure of the peer review process is described below.

STAGE ONE – each Expert Team has its Chair who is in charge of assigning the proposals for review to respective members of the Expert Team. The Expert Team members prepare individual assessments of the assigned proposals. Afterwards, the Team meets to discuss and assess the proposals based on the evaluation criteria, reach a consensus on individual reviews, calibrate their marks and draft a ranking list of proposals that qualify for stage two of the review.

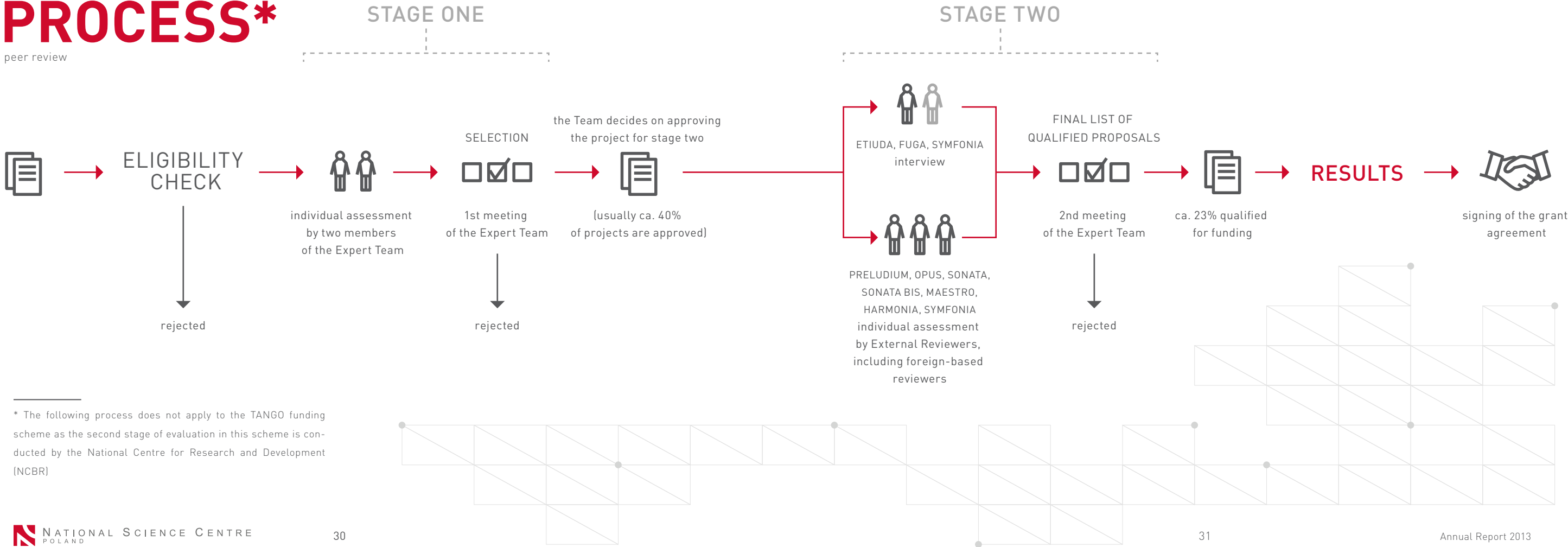
STAGE TWO – NCN Coordinators select external Expert Reviewers, based on the recommendation of the Chair of the Expert Team, taking into account respective fields of expertise. The External Reviewers work remotely, sending their reviews of proposals electronically; they do not take part in the meetings of the Expert Teams. Once the

external evaluation is completed, the Expert Team meets for a second time to consult with the external reviews, discuss them and draw up a final ranking list.



PROPOSAL EVALUATION PROCESS*

peer review



* The following process does not apply to the TANGO funding scheme as the second stage of evaluation in this scheme is conducted by the National Centre for Research and Development (NCBR)

EXPERTS AND REVIEWERS

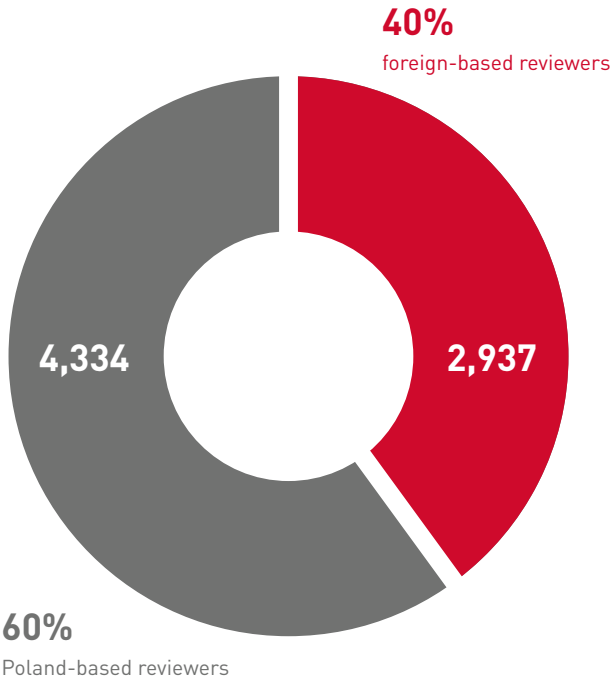
In 2013 there were 1,023 Experts in 102 Expert Teams. Proposals were evaluated as per critical study domain units: HS – 32 teams, NZ – 31 teams, ST – 38 teams. Below you can find the total number of Experts in each unit:

-  HS – 330 Experts
-  NZ – 314 Experts
-  ST – 379 Experts

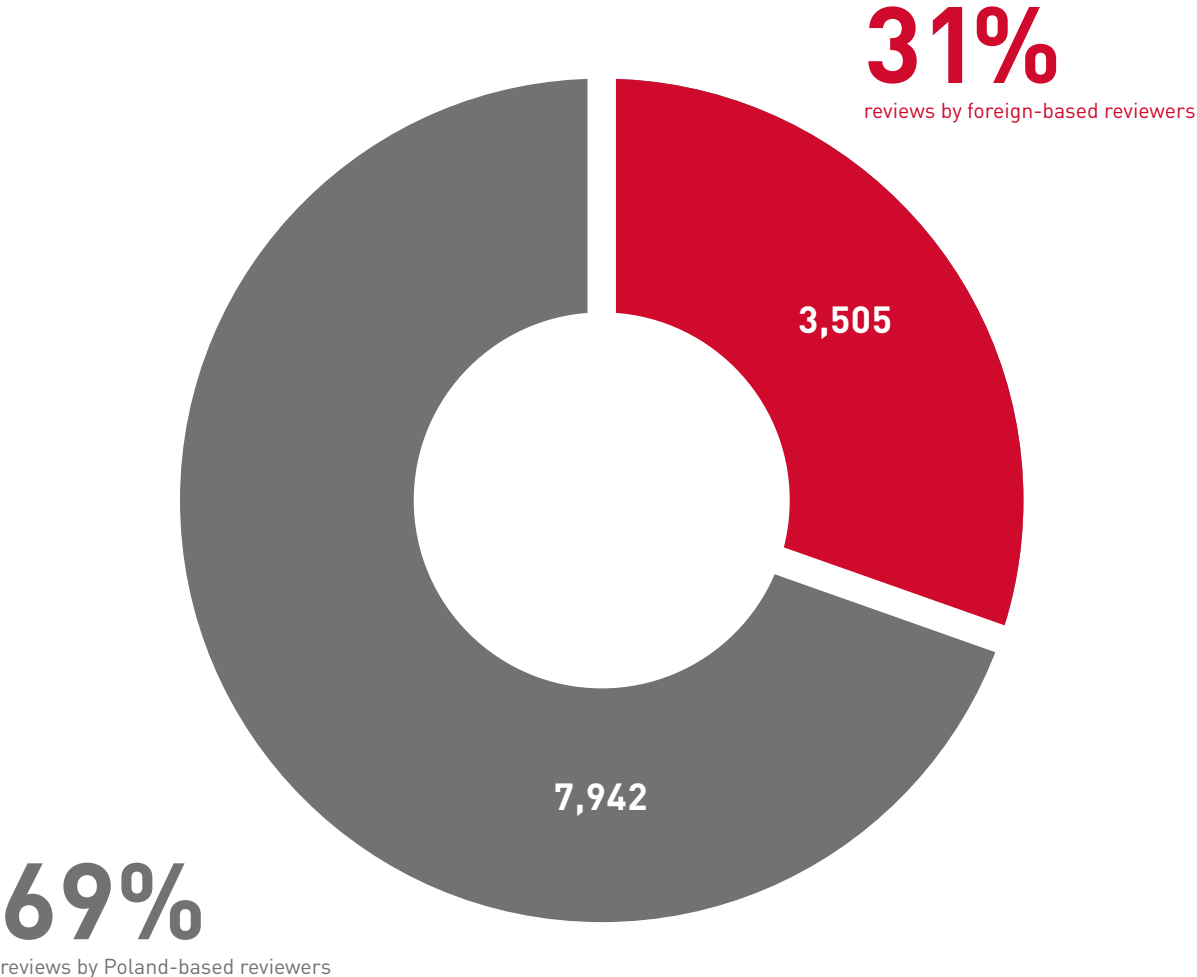
The second stage of evaluation was carried out by 7,271 External Reviewers, who contributed 11,447 reviews. 40 per cent of them were foreign-based reviewers, who contributed 3,505 reviews, which accounts for 31 per cent of all reviews.

Number of External Reviewers vs. number of reviews they contributed in 2013.

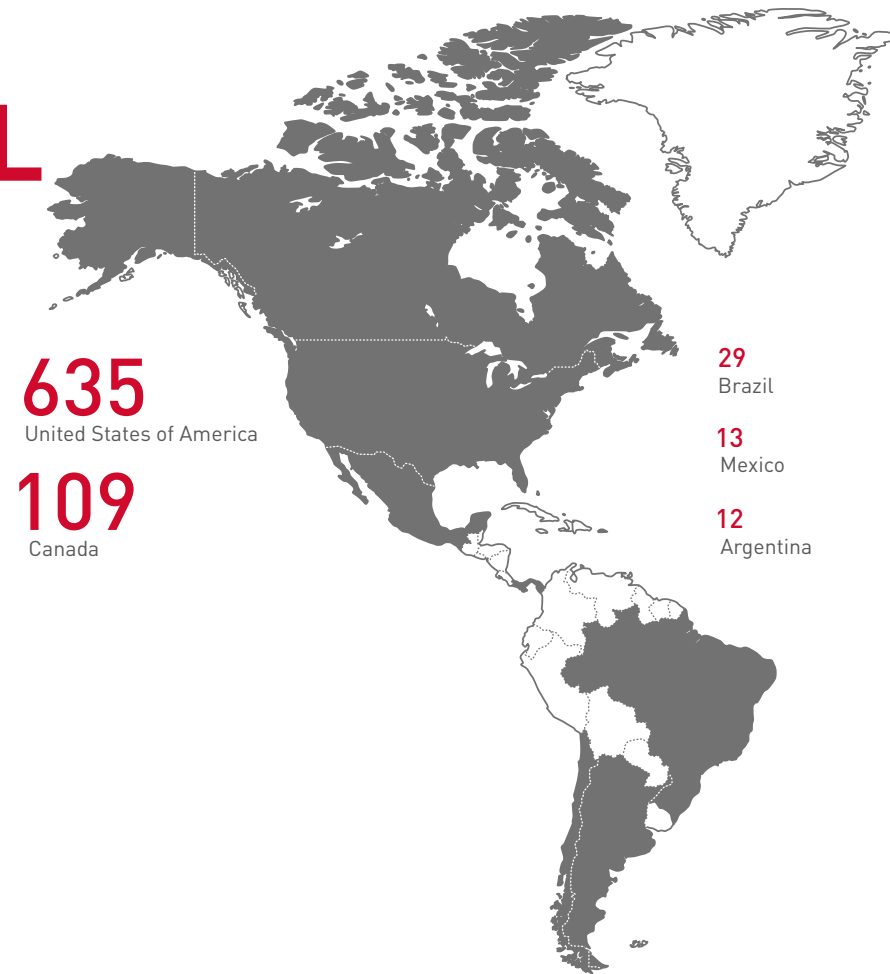
Number of External Reviewers: 7,271



Number of reviews: 11,447



FOREIGN-BASED EXTERNAL REVIEWERS



286
Germany

286
Great Britain

204
France

17
Republic of Ireland

16
New Zealand

15
Romania

15
Turkey

12
Serbia

14
Ukraine

11
South Africa

10
Slovenia

42
India

40
China

39
Portugal

37
Finland

31
Israel

27
Denmark

21
The Russian Federation

21
Norway

20
Slovakia

54
Belgium

50
Switzerland

49
Sweden

43
Greece

43
Austria

42
Hungary

179
Italy

162
Spain

69
Australia

67
The Netherlands

58
Czech Republic

58
Japan

INTERNATIONAL COOPERATION

It is one of the foremost objectives of the National Science Centre to significantly support research conducted by Polish researchers in cooperation with partners from abroad. In order to enable the exchange of Polish scholars and encourage them to cooperate with their peers from abroad, the NCN takes part in the proceedings of the ERA-NET consortia and the Joint Programming Initiatives (JPI). The ERA-NETs and JPIs, combining the efforts of European and national funding agencies, launch calls for proposals for international research projects carried out by teams of researchers from at least three different countries involved in the network.

Multilateral cooperation of the NCN in 2013 r.

NAME	SCOPE
ApPEC/ASPERA	Astroparticle Physics
CHIST-ERA	Information and Communication Sciences & Technologies
HERA	Humanities
Infect-ERA	Infectious Diseases
JPI CH	Cultural Heritage
JPND	Neurodegenerative Diseases
NORFACE	Social Sciences

INTERNATIONAL PARTNERS

Deutsche Forschungsgemeinschaft

In 2013, the National Science Centre initiated contacts with the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG). Due to the ever-increasing percentage of Polish-German proposals submitted under the NCN’s HARMONIA funding scheme, the NCN and DFG are planning to set up a joint funding programme in the Arts, Humanities and Social Sciences. Calls for proposals will be announced in the autumn of 2014.

Science Europe

In 2013, the NCN was also a contributor to the work of Science Europe (SE), an institution that brings together European agencies funding research. Science Europe is committed to boosting the relevance of the European research area through strengthening bonds between member organisations. It also strives to intensify cooperation with institutions supporting research beyond Europe and to seek solutions that allow for the best possible use of state-funded research that serves society and the economy.

ARTS, HUMANITIES AND SOCIAL SCIENCES

Humanities

In 2013, two international calls in the humanities launched by the NCN together with foreign funding agencies were concluded:

- *Cultural Encounters* together with the HERA consortium (Humanities in the European Research Area);
- *Increasing understanding of cultural values, valuation, interpretation, ethics and identity around all forms of cultural heritage (tangible, intangible and digital heritage)* – together with the Joint Programming Initiative on Cultural Heritage.

Among the grant-winning projects were five which saw contributions from Polish researchers:

HERA

1. Cultural Exchange in a Time of Global Conflict: Colonials, Neutrals and Belligerents During the First World War

Principal Investigator: prof. Hubert van den Berg

Host Institution: Adam Mickiewicz University in Poznań

Partners: King's College, London; Universiteit Utrecht; Zentrum Moderner Orient, Berlin

2. Music Migrations in the Early Modern Age: the Meeting of the European East, West and South

Principal Investigators: prof. Barbara Przybyszewska-Jarmińska and prof. Alina Żórawska-Witkowska

Host Institution: Institute of Art, Polish Academy of Sciences; University of Warsaw.

Partners: the Croatian Academy of Sciences; the Johannes

Gutenberg University in Mainz, Germany; the Brandenburg Academy of Sciences; the Slovenian Academy of Sciences and Arts.

3. Defining and Identifying Middle Eastern Christian Communities in Europe

Principal Investigator: dr Marta Woźniak

Host Institution: University of Łódź

Partners: University of St Andrews, Scotland; Roskilde University, Denmark; the Churches Commission for Migrants in Europe, the General Secretariat in Brussels, Belgium

4. Marrying Cultures

Principal Investigator: dr hab. Almut Bues

Host Institution: German Historical Institute in Warsaw

Partners: University of Oxford, UK; Herzog August Bibliothek, Germany; Umeå Universitet, Sweden

JPI CULTURAL HERITAGE

1. Values and Valuation as Key Factors in Protection, Conservation and Contemporary Use of Heritage – Collaborative Research of European Cultural Heritage

Principal Investigator: dr hab. Bogusław Szmygin

Host Institution: Lublin University of Technology

Partners: Vilnius Academy of Arts; Polytechnic of Milan; University of Macerata

Social sciences

The National Science Centre is a member of the **NORFACE** network (New Opportunities for Research Funding Agency Cooperation in Europe) supporting research in Social

Sciences. In 2012, the NCN announced NORFACE's call for international projects *Welfare State Futures*. Of the proposals submitted, 57 were sent by teams with Polish participation. The evaluation of proposals continued into 2013, with 10 Polish projects being shortlisted. The list of awardees will be announced in the summer of 2014.

PHYSICAL SCIENCES AND ENGINEERING

Astroparticle Physics

In 2013 the **ASPERA-2** (ASTroParticle ERAnet) consortium (of which the NCN is a member), supporting research in astroparticle physics, published the results of its call for proposals. The lists of awarded projects featured one carried out by researchers from eight countries – including a Polish team led by professor Tomasz Bulik of the Faculty of Physics, University of Warsaw. Having concluded its operations, ASPERA-2 continues its mission as the **ApPEC** (Astroparticle Physics European Consortium) initiative, of which the NCN is also a member.

Information and Communication Sciences & Technologies

In 2013, the National Science Centre joined the international network of **CHIST-ERA** (European Coordinated Research on Long-term Challenges in Information and Communication Sciences & Technologies – II), which encourages research in information and communication technologies. Under this scheme, Polish researchers will have the opportunity to apply for funding of projects carried out in collaboration with partners from member countries in two areas:

1. Adaptive Machines in Complex Environments (AMCE).

2. Heterogeneous Distributed Computing (HDC).

The results of the call will be known in the summer of 2014.

LIFE SCIENCES

Human Infectious Diseases

In 2013, Polish researchers could apply for grants in a funding opportunity devoted to the problem of infectious diseases, organised by the **Infect-ERA** (ERA-NET on Human Infectious Diseases), in two research areas:

1. Microbes' environment and infection including metabolism of microbes, molecular mechanisms and strategies of their pathogenicity.

2. Host-microbe interaction, co-infection, microorganisms transmissibility and host susceptibility factors.

Neurodegenerative Disease Research

A joint call was announced under the programme of *Cross-disease analysis of pathways related to Neurodegenerative Diseases* of the **JPND** (EU Joint Programme – Neurodegenerative Disease Research). The NCN is a member of the JPND. Results will be published in October 2014.

BUDGET AND ACCOUNTS IN 2013

The budget of the NCN in 2013 amounted to over € 209 million. This included a grant subsidy for financing re-search projects, which totalled over € 200 million. The operating expenses subsidy amounted to € 8.79 million, and the investment subsidy totalled ca. € 126,000. The NCN drew on 99.97% of the grant subsidy for its statutory tasks – including financing research projects.

Budget of the NCN in 2013

	FINANCIAL PLAN 2013 (IN THOUSANDS €)	RESOURCES EXPENDED (IN THOUSANDS €)	% OF PLAN ACCOMPLISHMENT
Subsidies:	209,471	207,125	98.88%
operating expenses	8,792	6,527	74.24%
grant subsidy	200,553	200,496	99.97%*
investment subsidy	126	102	80.81%

* upon return of unused project funds by some host institutions, and upon recycling those funds by the Centre, this item equalled 100.2% (€ 200.93 million)

Resources expended by the NCN from the grant subsidy

Amount	Allocation of resources by type of call
€ 200,496,120	TOTAL
€ 108,349,295	OPUS
€ 18,048,430	PRELUDIUM
€ 22,643,727	SONATA
€ 13,015,087	SONATA BIS
€ 22,784,812	HARMONIA
€ 38,169,943	MAESTRO
€ 5,116,058	FUGA
€ 1,941,108	ETIUDA
€ 7,158,782	SYMFONIA
€ 427,208	HERA
€ 66,067	ASPERA
€ 7,224	JPI CH
€ 81,721	Membership fees

€ 37,714,277 Research projects formerly financed by the Ministry of Science and Higher Education

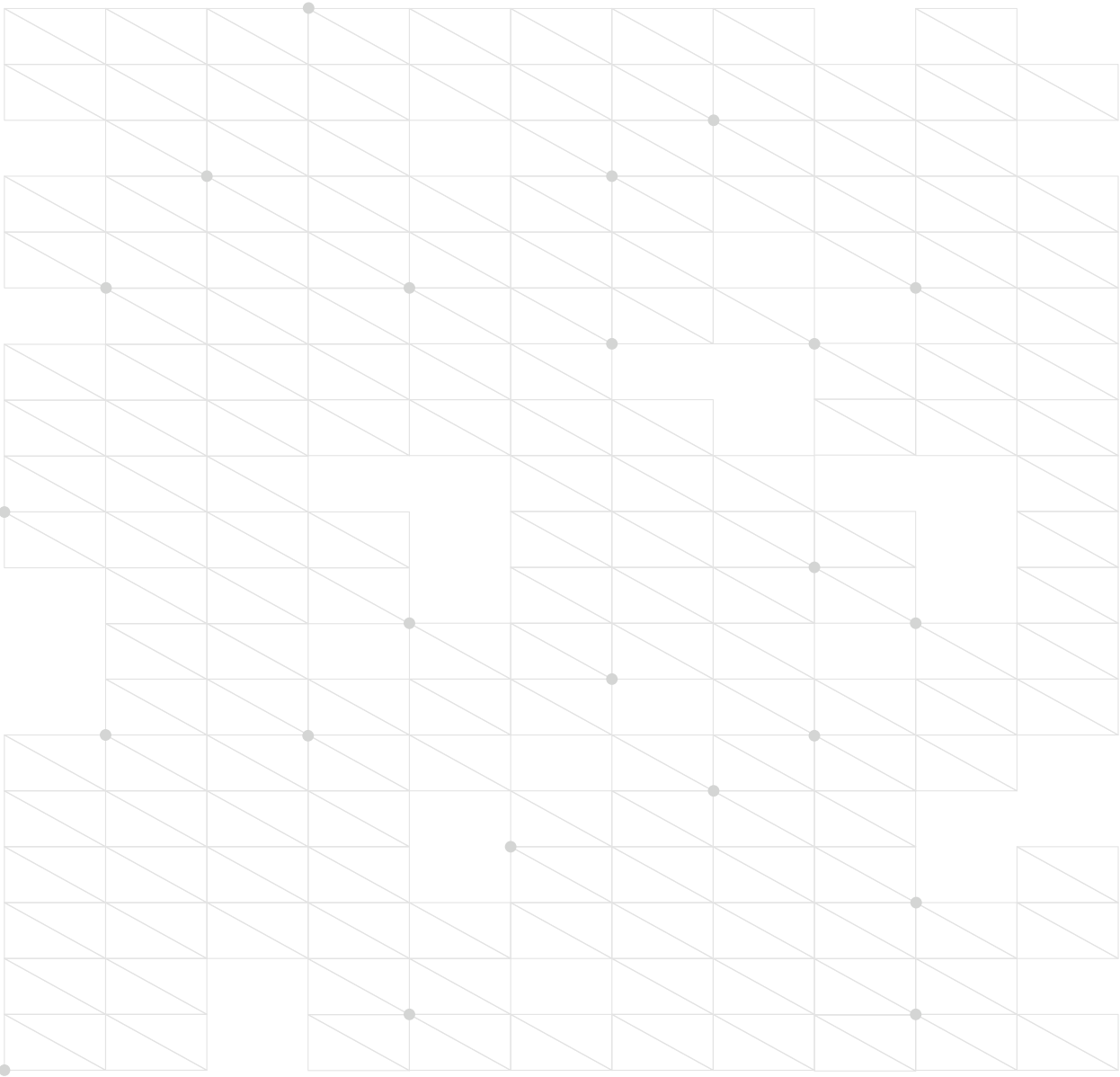
€ 4,596,860 Non-co-financed international projects

2013: some key facts

Research proposals received	10,564*
Grants awarded	2,433*
Staff	102
Operations of the office (incl. evaluation costs)	3.15%**
Salaries – staff	0.74%**

* statistics for the editions of funding schemes concluded in 2013

** as percentage of spending in 2013



RESEARCH STORIES



ETIUDA

Title: Studies of time dependent CP violation in charmed decays of beauty mesons

Principal Investigator: Agnieszka Dziurda M. Eng, The Henryk Niewodniczański Institute of Nuclear Physics, Polish Academy of Sciences

The Large Hadron Collider (LHC) is an international project devoted to unravelling the greatest mysteries of elementary particles. The project is carried out at the European Organization for Nuclear Research (CERN) in Switzerland, yet it involves the collaboration of physicists from around the world; Poland has its own substantial contribution to the project. The data from the LHC is collected by four enormous detectors, and analysed by their respective collaborations: ATLAS, ALICE, CMS and LHCb.

A fine antimatter to pursue

The equilibrium between matter and antimatter was broken in the first seconds after the Big Bang. In the next stage of the evolution of the Universe, the annihilation of pairs of particles and antiparticles occurred. The result of this process was the disappearance of antimatter particles; what survived was only a tiny amount of „extra” particles of matter: 1 in 10 billion, which nowadays constitutes our universe. LHCb is one of four detectors at work at the LHC. It is a unique spectrometer dedicated to solving the mystery of the asymmetry between matter and antimatter.

In the modern understanding of reality based on the so-called Standard Model (SM), at the smallest scale of objects available for study, matter is composed of six quarks and six leptons. The differences in mass of these basic components of matter equal several orders of magnitude. Matter around us is made up of the lightest quarks and leptons. Heavier particles decay through the weak interaction to their stable counterparts: this makes

them unstable, but very interesting to study. Thanks to the high-energy collisions of protons, we can create unstable particles and then look at their decay in the detector. This gives us the opportunity to compare the results with the SM predictions.

Standards put to test

The Standard Model requires a lot of input parameters which have to be determined empirically. Moreover, it describes only three of the four fundamental interactions, ignoring gravitation. In addition, the SM does not explain the volume of the matter-antimatter asymmetry. In the SM predictions, the allowed level of asymmetry is far below what we observe in nature. For this reason, it is generally accepted that this model is incomplete.

A pioneering experiment

In this research project, the decays of beauty mesons – particles created through collisions in the LHC which contain the large-mass b and s quarks – are analysed. Thanks to information obtained from a time-dependent analysis, it is possible to determine the parameters responsible for the asymmetry between particles and antiparticles and compare it to the SM predictions. Any discrepancy in the observed results may indicate physics beyond the Standard Model – so-called New Physics. The research project is the world’s first measurement of this decay.

Preparation of the Site Card, Joanna Mardas and Rafał Koliński, phot. Dariusz Pasecki



OPUS

Title of the Project: The Settlement History of Iraqi Kurdistan. The Aqreh-Bardarash Plain

Principal Investigator: dr hab. prof. UAM Rafał Koliński, Adam Mickiewicz University in Poznań

It might be hard to believe, but the territory of Iraqi Kurdistan has never been the subject of extensive archaeological research. This situation results from the political history of this part of Iraq which constituted the most dangerous areas of the country during the past century. The ongoing struggle of Kurds for independence has made it inaccessible for research since 1974. The security situation changed after 2003, and, during the last three years more than 40 archaeological teams have begun fieldwork in Iraqi Kurdistan. The project *The Settlement History of Iraqi Kurdistan* is being carried out in an area of c. 3,000 km² located on the eastern and western bank of the Greater Zab river. The aim of this pioneering research is to collect and analyse evidence on the heritage sites located in the study area, to increase knowledge of the history of Iraqi Kurdistan, including its settlement development and the potential for further research there. Last, but not least, the information collected by the project team will be passed to Kurdish authorities to allow for the creation of an effective heritage management policy. Similar projects are presently being carried out in Iraqi Kurdistan by other universities from Europe and the United States. Never before in the history of Near Eastern archaeology have surveys covered such extensive territory and Polish scholars have played a major role in research of this kind for the first time. The results of the project will be a constant reference point for all further archaeological research in the area. Why? The realisation of the project will provide an archaeological map of the surveyed area with the location of all the heritage sites identified, dating from the Paleolithic till the XXth cent. AD. Sites of all kinds: settlements, cemeteries, castles, civil structures (canals, aqueducts, bridges), art monuments (rock reliefs), and in-

scriptions will be carefully recorded, documented and dated by archaeological find. The project will be carried out in three stages. The first one consists of analyses of the available satellite imagery of the area, dating from the 1960s. The identified potential archaeological sites are then verified by reference to information from archaeological and geographical publications on the area as well as from accounts of European travellers. A very important reference is the Atlas of the Archaeological Sites in Iraq, which published information on archaeological sites kept in the archives of Iraqi State Board of Antiquities and Heritage prior to 1970 (published in 1976). Most important, however, is the second stage of the execution of the project – the fieldwork in Kurdistan. During three two-month-long field seasons carried out in subsequent years, the list of potential sites have been verified in the field, and additional sites have been discovered based on interviews with the local population and field walking. All the identified sites and monuments are fully documented by topographical surveying, photography and video, their location recorded by GPS, plotted on maps and recorded in GIS. Collected surface pottery material and other finds are used to determine the date of identified monuments. All the information is recorded in a database and published on the internet as *Site Cards*. The third stage of the research is comprised of the interpretation of the collected data and their comparison to similar data retrieved from neighbouring regions. The creation of a heritage map of the area is not the only aim of the project. As important, is the recording of the damage and threat to heritage sites and monuments resulting from the rapid development of Kurdistan, environmental causes, but also from vandalism and occasional robberies as well.

Zofia's Tomb, Wolfenbüttel, Germany



HERA CULTURAL ENCOUNTERS

Marrying Cultures: Queens Consort and European Identities 1500-1800

Polish Principal Investigator: Dr. Almut Bues, German Historical Institute in Warsaw

Project partners: Professor Helen Watanabe-O'Kelly (Project Leader), Oxford University, UK; Dr. Gillian (Jill) Bepler, Herzog August Bibliothek, DE; Professor Svante Norrhem, Umeå Universitet, SE.

Two or more European cultures meet whenever a king or prince takes a bride from another country. She often speaks a different language to that of her new court, professes a different version of Christianity, and has been brought up in a different court culture. Transported as she is to her new capital city and court, rarely to return home, she can either integrate by changing her beliefs and learning the language and ways of her new territory or she can become a source of friction, retaining an aura of *foreignness*, arousing hostility and even becoming a focus for conspiracy theories. In all cases she effects a transformation by her very presence, for she is usually accompanied by ladies-in-waiting, maids and grooms, often a chaplain, sometimes artists, craftspeople, musicians and actors.

She brings with her books, art objects, clothes, jewellery, and furniture – objects that are still to be found in Europe's museums and libraries. If she is interested in opera or theatre, she is often instrumental in establishing these art forms in her new country. She may also bring with her less tangible intellectual baggage too, such as religious, political, philosophical or scientific ideas and influences. The foreign consort often maintains an extensive correspondence with her birth family, which sometimes attempts to direct her actions from afar. If her sisters have also married into foreign courts, the network of transnational communication is further extended.

Cultural exchange in the Europe of the past

In order to investigate the role of foreign consorts as agents, instruments or catalysts of cultural transfer,

a team of scholars from the UK, Germany, Poland and Sweden will work on a number of transnational case studies, covering the period 1500 to 1800. Through these examples, the team will reveal cultural synergies between northern (Denmark, Sweden, Finland, Germany, Britain), eastern (Poland-Lithuania), and southern (Italy, Spain, Portugal) Europe and will interrogate modern notions of centre and periphery. They will investigate how texts, material culture, music and architecture are interconnected manifestations of the cultural encounters brought about by dynastic marriages and will peel back the map of Europe with its discrete nation states to reveal an earlier one with different linguistic, cultural and political borders to those of today.

Working with colleagues in historic palaces, in museums and in libraries, the project members will also consider how it is that certain consorts become embedded in national cultural memory and others do not. Through its work the project will be able to unlock the lost significance of important cultural artefacts and institutions.

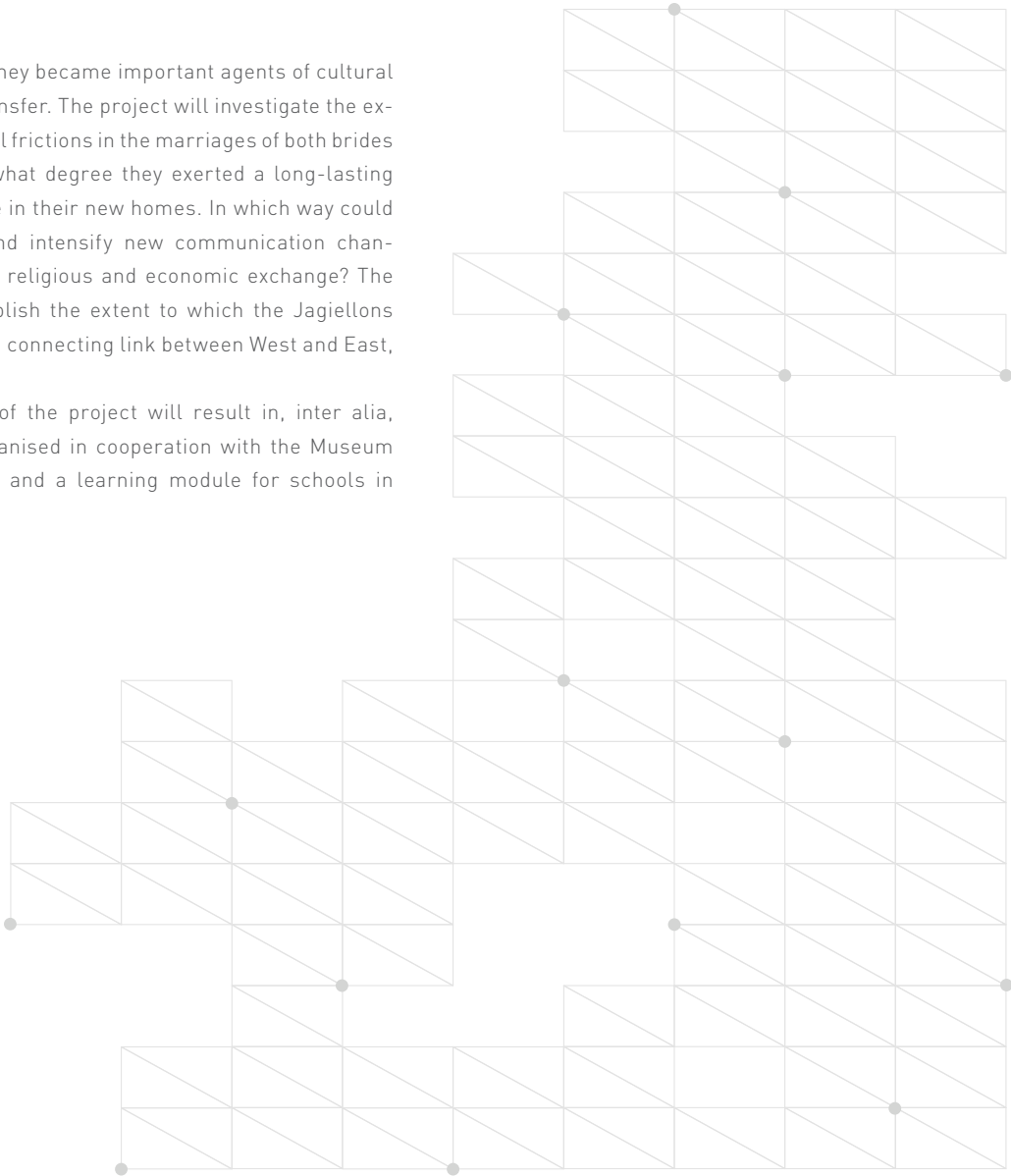
The Jagiellons impact on the cultural map of Europe

The Polish Principal Investigator will research the Polish princesses Zofia Jagiellonka, who married Heinrich II, Duke of Braunschweig-Wolfenbüttel, in 1556, and her sister Katarzyna Jagiellonka, who married Duke Johan of Finland (later Johan III, King of Sweden) in 1562.

The project will test the hypothesis that, even though the daughters of King Zygmunt I and the Milanese princess Bona Sforza had no noteworthy political power, through

their marriages they became important agents of cultural exchange and transfer. The project will investigate the extent of the cultural frictions in the marriages of both brides but also ask to what degree they exerted a long-lasting cultural influence in their new homes. In which way could they establish and intensify new communication channels for cultural, religious and economic exchange? The project will establish the extent to which the Jagiellons thereby became a connecting link between West and East, North and South.

The Polish part of the project will result in, inter alia, an exhibition organised in cooperation with the Museum of Polish History and a learning module for schools in Kraków.



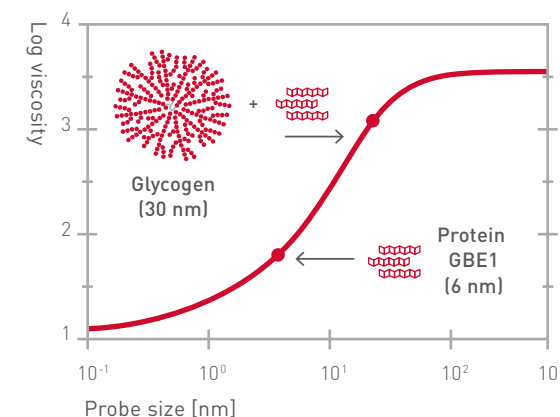


SYMFONIA

Title: Towards quantitative biology via the novel method of mobility measurement in a living cell: the interaction of proteins with intracellular structures of glycogen and mitochondria

Principal Investigator: prof. Jerzy Duszyński (Principal Investigator), Nencki Institute of Experimental Biology, Polish Academy of Sciences

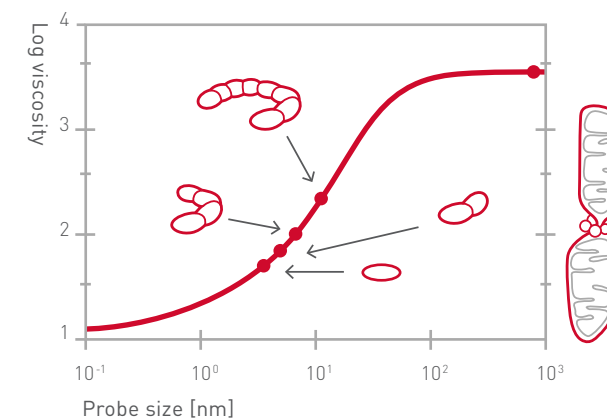
Investigators: prof. Robert Hotyst, Institute of Physical Chemistry, Polish Academy of Sciences



The inside of a living cell is unbelievably crowded. It contains densely packed proteins as well as numerous intracellular structures. There have been attempts at recreating this environment in vitro but such a study model has fallen short of recreating the in vivo situation inside a live cell. The research conducted under the SYMFONIA scheme project, led by Professor Jerzy Duszyński from the Nencki Institute of Experimental Biology, will deal with the mobility of proteins inside a cell and their interactions with various large intracellular structures such as glycogen and mitochondria. In particular, the study will address the GBE1 protein and glycogen, as well as the Drp1 protein and mitochondria. Glycogen resembles a glucose-built tree with many branches in which perch enzymes, such as GBE1, are active in its metabolism. Some of these glycogen enzymes remain still while others are more mobile, with some orbiting around glycogen freely. The research undertaken by the project will help determine whether genetic changes in organisms affect the

behaviour of the GBE1 enzyme, its mobility and its settlement on the glycogen particle. Some genetic changes of the GBE1 protein show a correlation with the occurrence of serious neurodegenerative diseases.

Are proteins' mutations behind severe diseases?

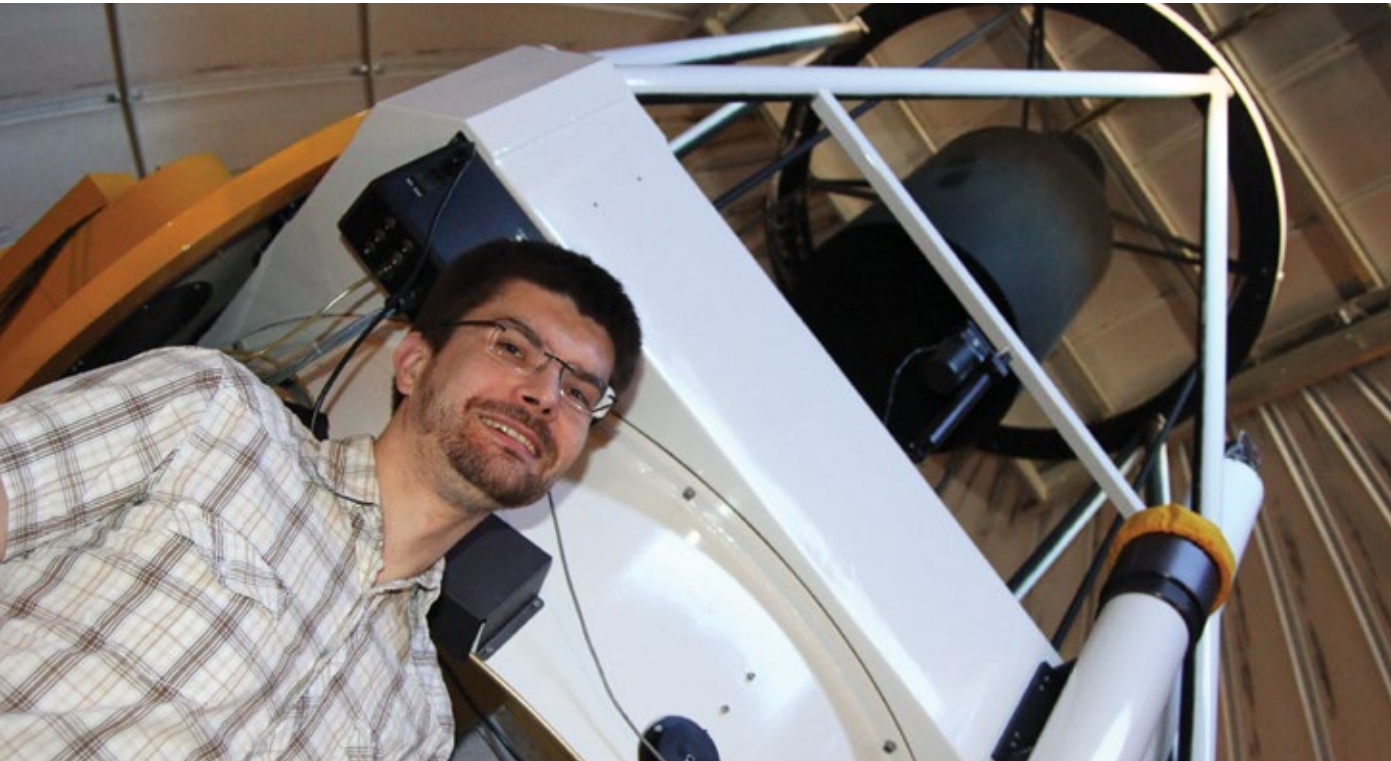
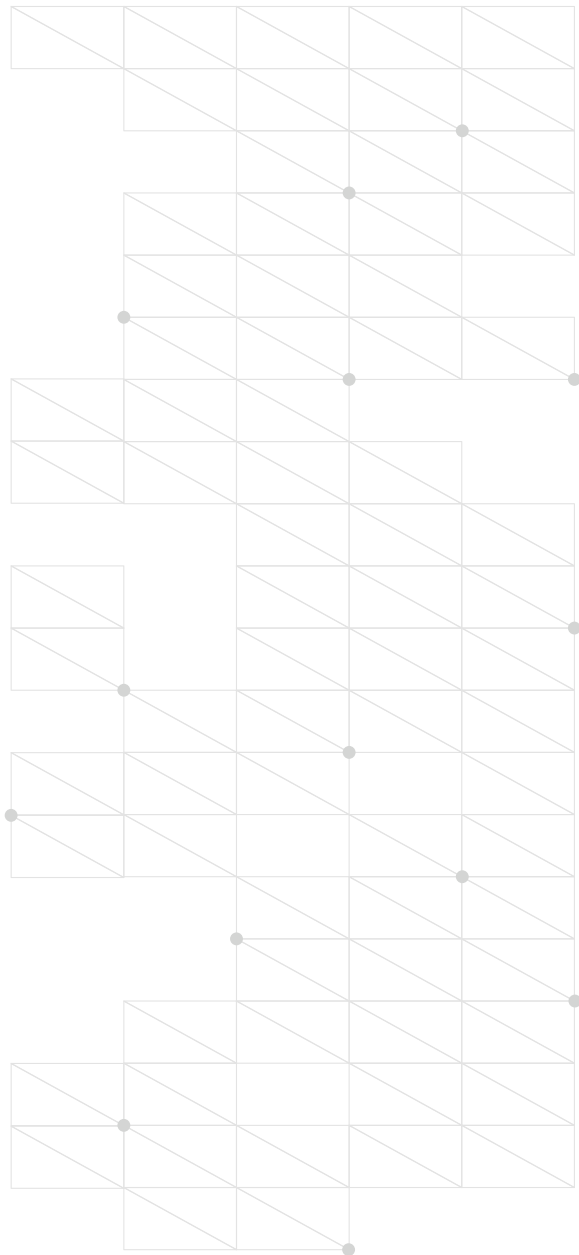


The Drp1 protein is a mechanoprotein. Its single particles form loops that can encircle mitochondria and, under favourable circumstances, tighten fast enough to split the mitochondrial reticulum into two or more parts. Drp1 is important to the dynamics of mitochondria as well as the process of continuous reconfiguration of their complex structure inside a cell. Some mutations of this protein cause disturbances in the proper progress of the continuous reconfiguration of mitochondrial structure. This seems to be one cause of such grave neurodegenerative conditions as Parkinson's or Alzheimer's disease.

At the frontiers

The research described above calls for an interdisciplinary approach. The SYMFONIA project brings together two research teams representing life sciences and physical sciences, respectively. The research team, led by Professor Jerzy Duszyński, is supported by a team led by Professor Robert Hołyst from the Institute of Physical Chemistry, Polish Academy of Sciences, whose contribution to the project is his expertise in complex fluid diffusion. In order to carry out the necessary analyses, fluorescently marked proteins have to be implanted in the cell. Once inside, they can be stimulated by a laser beam into emitting light. The analysis of the emission, using specialist equipment that is being constructed by Professor Hołyst's team, will allow researchers to study the mobility and interactions of proteins inside a live cell.

The research we are planning will enable us to learn more about the source of abnormalities in the functioning of proteins. Such knowledge may prove applicable in the future treatment of neurodegenerative diseases, says Professor Duszyński, the Principal Investigator. Interdisciplinary research, he points out, comes as an enormous challenge to scientists who, after all, represent two separate domains. There are plenty of differences, from the methodological languages we normally use to the knowledge we share while working on research. At the same time, it is precisely at these frontiers between domains of knowledge from whence new ideas and great discoveries emerge.



HARMONIA

Title: Astrometry of gravitational microlensing events with the Gaia space mission – a new window into studying Dark Matter in the Galaxy.
Principal Investigator: dr hab. Łukasz Wyrzykowski, University of Warsaw

Dark Matter remains one of the greatest mysteries of the Universe. There is proof for the existence of something we cannot see directly but clearly influences how stars behave in galaxies. The concept of Dark Matter was first proposed 80 years ago, however we still do not have any idea what it is. One of the ideas was that Dark Matter existed in the form of dark objects the size of planets or stars, dubbed Massive Astrophysical Compact Halo Objects (MACHOs).

Gravitational microlensing

In 1986, the Polish astronomer Bohdan Paczyński suggested a new method to test that hypothesis, using the phenomenon of gravitational microlensing. This effect, predicted by Albert Einstein, causes the bending of light rays of distant stars by the gravitational pull of compact and dark objects. Paczyński hypothesised that if our Galaxy contained a large quantity of MACHOs, then we should be able to see their signature as gravitational microlensing events, which are temporal brightenings of distant stars. However, monitoring of millions of stars over the last 20 years, in particular by the Polish OGLE (Optical Gravitational Lensing Experiment) project, run by the University of Warsaw, has revealed very few such events. This indicates that MACHOs the size of stars and planets are not as common as hoped and thus cannot account for any significant fraction of Dark Matter.

In search of black holes

Nevertheless, there still remains a window for a possible interpretation of at least a small portion of Dark Matter –

namely black holes that are more massive than regular stars. Black holes are very hard to detect and those found so far were detected thanks to their interaction with the environment or their stellar companions. The main aim of this project is to detect, for the first time, single non-interactive black holes and to derive their mass. For this purpose, we will use the effect of gravitational microlensing, which causes both temporal brightening and a subtle offset in the observed position of a distant source star. The shift in position is so minute that measuring it was unachievable so far with existing observatories. An opportunity will be provided by the European Space Agency's mission Gaia, launched in December 2013. Gaia should be able to detect tiny changes in the position of the lensed star, which should allow one to determine the mass of the lensing object when supplemented with the ground-based observations from the OGLE project. The heavier the lens, the larger the astrometric offset and the chance for detection of a black hole. Within this project, in co-operation with the Institute of Astronomy of the University of Cambridge, where the Gaia data will be processed, we will prepare dedicated software for the analysis of Gaia-collected data, which will enable us to identify a temporal astrometric anomaly. Moreover, we will initiate and co-ordinate the ground-based observations required for the anomaly confirmation and determination of the mass and distance of the lens. The results of this project will help determine the abundance of black holes in our Galaxy and provide new clues to the mystery of Dark Matter.

