

THE HUMAN RESOURCES STRATEGY FOR RESEARCHERS (HRS4R)  
AT THE HENRYK NIEWODNICZAŃSKI INSTITUTE OF NUCLEAR PHYSICS  
POLISH ACADEMY OF SCIENCES (IFJ PAN)  
WITH RESPECT OF THE PRINCIPLES OF THE EUROPEAN CHARTER FOR RESEARCHERS  
AND THE CODE OF CONDUCT FOR THE RECRUITMENT OF RESEARCHERS

ACTION PLAN FOR 2022 - 2025



Based on the state of implementation of the principles of the Charter and Code at IFJ PAN



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## Introduction

### General information about IFJ PAN

The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences (acronym IFJ PAN) is an individual public and non-profit research organization that is funded by public subsidies. It is located in the Bronowice western district of Kraków and covers a territory of 8 ha. Today, IFJ PAN is the second largest scientific unit in the Polish Academy of Sciences.

The Institute conducts research in both fundamental and application domains. In the area of basic research, the driving force for IFJ PAN is the desire to unravel the nature of the matter constituents and the interactions between them on the smallest possible scale, to understand the fundamental properties of physical objects made of these constituents, and, ultimately, to determine the emergent complex structures of different forms of matter. Research related to applications is also very ambitious and versatile. It encompasses, in particular, a large variety of techniques originating from nuclear physics, particle physics, and solid state physics, which were harnessed to studies in biology, medicine, dosimetry, environmental protection, but also to such “remote” topics as linguistics, the behavior of financial markets or preservation of cultural heritage. The Institute cooperates with the largest and most important scientific centers in the world. It is actively involved in the development and construction of future scientific infrastructure, both in Europe and worldwide, as well as in the construction of detectors for international experiments. The Institute is open to young, ambitious, and creative people, fascinated by the greatest mysteries of humanity.

The Institute’s average annual yield of publications amounts to 700 scientific papers, reports and conference contributions. Out of them, more than 600 publications appear in the master international journals listed in the Journal Citation Reports published by Thomson Reuters.

The Institute belongs to the topmost research centers in Poland. The Minister of Science and Higher Education in Poland has granted the Institute the prestigious status of the Leading National Research Centre (KNOW) in physics for the years 2012-2017 (together with other members of the Marian Smoluchowski Kraków Research Consortium: “Matter-Energy-Future”). In the two recent national evaluations of scientific units in 2013 and 2017, IFJ PAN was awarded A+ Category (leading level in Poland) in science and engineering.

The Institute employs close to 600 people, including 29 professors, 61 associate professors and 95 doctors. The Scientific Council of the IFJ PAN is entitled to confer the Ph.D. and the Habilitation degrees. So far more than 370 young researchers have been awarded a PhD degree in physics, and more than 180 researchers have been awarded a habilitation degree by the IFJ PAN Scientific Council. PhD students who received a PhD degree had been graduates of the International PhD School (acronym MSD) run by IFJ PAN in the field of physics since 1983. In 2019, following a new law on higher education and science introduced in 2018, an interinstitutional, interdisciplinary doctoral school was created to train PhD students in the



domain of physics, chemistry, medical sciences, and materials engineering under the auspices of IFJ PAN: the Krakow School of Interdisciplinary PhD Studies (KISD). Currently (academic year 2021/2022), 84 students (14 foreigners) are enrolled at KISD, out of which 33 (12 foreigners) are preparing their theses under supervision of the members of the IFJ PAN research staff.

## History

The Institute was formed in 1955 as a branch of the Institute of Nuclear Research (Warsaw). It became an independent scientific unit as the Institute of Nuclear Physics (INP) in 1960. The Institute received the name of its founder, professor Henryk Niewodniczański, in 1988. In 2003 INP was granted the status of a research institute of the Polish Academy of Sciences (PAS) under the name of: The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Science, with the official acronym IFJ PAN. The major milestone in the most recent history of IFJ PAN was the implementation in 2016 of the proton radiotherapy, currently based on the modern infrastructure of the Cyclotron Centre Bronowice (CCB).

## Structure

At IFJ PAN, research is carried out in six scientific Divisions, which are subdivided into 30 Departments. The Division of Particle and Astroparticle Physics studies the fundamental constituents of matter and forces with which they interact. The Division of Nuclear Physics and Strong Interactions investigates atomic nuclei and the physics of strongly interacting matter. The Division of Condensed Matter Physics concentrates in particular on novel magnetic compounds, soft materials (glasses) and nanomaterials. The scientific activity of the Division of Theoretical Physics concerns fundamental issues addressed at understanding the structure and dynamics of the Universe at all scales, from the smallest up to the largest possible. The Division of Applied Physics and Interdisciplinary Research studies broad areas of physics aspects of life and health, energy, and environmental hazards. Finally, the Division of Applications of Physics focuses on radiation and radiation transport physics, dosimetry, and development of new techniques for proton radiotherapy.

The Division of the Cyclotron Centre Bronowice (CCB) is engaged in the application of cyclotrons in scientific research and tumor proton radiotherapy. Over the years 2011-2015, a proton beam of the in-house developed AIC-144 isochronous cyclotron with an energy of 60 MeV was used to irradiate patients with eyeball cancers. Since autumn 2015, CCB is equipped with a modern Proteus-C235 cyclotron using a proton beam of variable energy in the range of 70-230 MeV. This cyclotron uses Pencil Beam Scanning technology and two rotating therapy stations (gantry), which direct proton beams onto a treated area in any part of the patient's body. The infrastructure enables very precise irradiation of a treated volume while



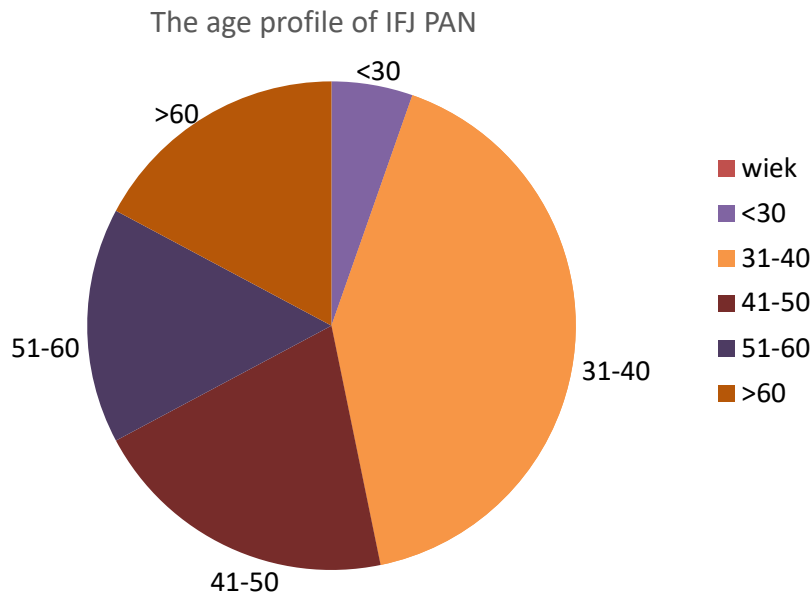
saving surrounding healthy tissue from damage. The irradiation of first patients treated in the gantry financed by the National Health Fund started in November 2016. “National Centre for Hadron Radiotherapy – The Cyclotron Centre Bronowice”, funded by the European Innovative Economy Operational Program, is a unique facility in Poland offering its services to patients from all around the country. The scientific program of CCB covers nuclear physics, medical physics, radiobiology and material engineering.

Engineers and technicians of the Division of Scientific Equipment and Infrastructure Construction (DAI) have been involved in many international projects and those carried out at IFJ PAN. Their activity covers the assembly and installation of large systems (ATLAS experiment at the Large Hadron Collider (LHC) at CERN, T2K experiment in Japan, Wendelstein 7-X reactor (W7-X) in Greifswald/Germany, SPIRAL2 project at GANIL/France, European Spallation Source (ESS) in Lund/Sweden), quality assurance (LHC, the European X-Ray Free Electron Laser (XFEL) in Lund/Sweden, ESS), engineering and prototyping of mechanical and electronic/electrical equipment (LHC, T2K, W7-X, Cherenkov Telescope Array (CTA) observatory, International Thermonuclear Experimental Reactor project (ITER), CCB, HiLumi-LHC, the Pierre Auger Observatory) and also software engineering, LabView programming and web application development (LHC, XFEL, ESS).

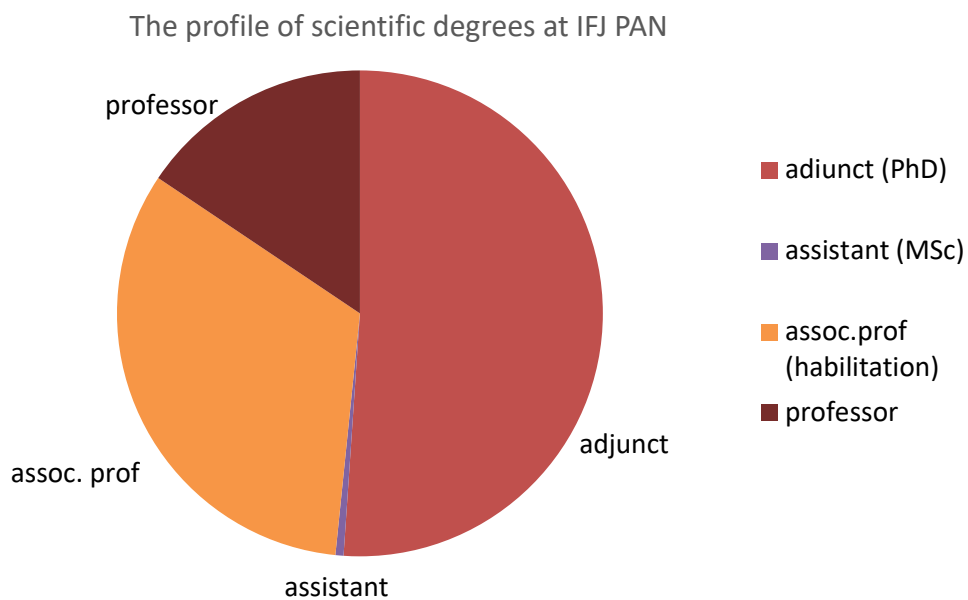
A broad range of radiometry services is offered by four accredited laboratories: the Laboratory for Calibration of Dosimetry Instruments, the Laboratory of Individual and Environmental Dosimetry, the Laboratory of Radiometric Expertise and the Laboratory of Radioactivity Analysis. In addition to internal services, they provide external customers with certified measurements of radioactivity and spectra of radiation isotopes in the air, soil, or water.

## Demography

There are currently **554** employees at IFJ PAN (**246** women and **308** men). The respective numbers for researchers are **186** (**58** women and **128** men). This group is relatively young with the following age profile:



The distribution of researchers w.r.t. their scientific positions is given below:





## The mission of IFJ PAN

Our mission is:

- to carry out research of the highest quality and at an international level, especially with the use of large research infrastructure and in broad cooperation with other prominent research institutions, with the goal to deeply understand the fundamental structure of matter.
- to accumulate knowledge that would allow us to solve problems and challenges that modern science, society and economy are facing today, and to communicate that knowledge to the general public.
- to pay particular attention to broadly defined applications of physics and to the transfer of technology in the service of society and economy.
- to ensure the professional development of our academic, administrative and technical staff based on such qualities as harmony, versatility, equality of opportunities and balance between professional and private life.
- to fast-track the scientific career of our doctoral students and young scientists.

## International cooperation under agreements

### Internationalization

The scientific research program pursued by the majority of the research groups at our Institute is carried out with participation in leading physics projects undertaken by large international collaborations at world's best experimental facilities. The high level of internationalization in the area of scientific research is therefore a main strategic goal, strongly supported by the Institute's management. The achievement of this goal will further strengthen the position of the Institute, both in Poland and abroad.

For many years, the Institute has been operating under an active policy of attracting foreign researchers and PhD students to perform their studies and advance their scientific careers at IFJ PAN. Since 2015 an increase in the share of foreigners among researchers has been observed and in the last

two years they contributed to the level of 15-18% of the Institute's scientific staff (see Table 1). The non-nationals come from Ukraine, France, Italy, Germany, Greece, the Netherlands, India, Mexico, Nepal and South Korea. Foreign researchers are mainly young post-docs employed in positions of assistant professor (adjunct positions). They are well integrated with the research staff of the Institute and with the Polish community in general. Many of the foreigners employed in the past had advanced their scientific careers following Polish regulations and received habilitation degrees. They are currently employed in positions of associate professors, which gives them an opportunity to apply for supervisory and managerial positions as well as to be selected to the Scientific Council of the Institute (in fact one of them has already been elected to the Scientific Council).

Table 1: information on number of foreign researchers

Year	2015	2016	2017	2018	2019	2020	2021
Number of foreign researchers	15	25	21	20	19	26	34
% of foreign researchers in the overall number of researchers	6.5	11.7	9.9	9.8	10,3	14,5	18

Table 2 illustrates the participation of foreigners in the International Post-Graduate Study program. Foreign PhD students constitute about 10-12% of the total number of students and currently there are 6 persons from Ukraine (2), Italy (2) and Iran (2), and 2 from France and India.

Table 2: information on number of foreign students.

Year	2015	2016	2017	2018	2019	2020	2021
Number of foreign PhD students	7	10	8	8	15	12	7
% of foreign PhD students in the overall number of PhD students	8	11.8	10	9.5	22	22,6	18

In order to improve the internationalization, the Institute's employees are actively involved in the organization and co-organization of international conferences and meetings of large scientific collaborations in Poland. Table 3 indicates the number of conferences organized in the last three years together with the number of foreign participants and talks given by foreign participants.



Table 3: Information on conferences organized and co-organized by Institute's employees.

Year	Number of conferences organized by IFJ PAN	Number of conferences co-organized by IFJ PAN	Number of participants from abroad	Number of talks given by foreign participants
2015	15	3	814	556
2016	16	3	549	391
2017	12	2	635	443
2018	18	13	1262	1062
2019	13	10	493	343
2020	10	2	582	97
2021	5	7	648	154

This activity is further complemented by active and frequent participation of the IFJ PAN employees and PhD students in the international conferences held both in and outside of Poland, as indicated in Table 4.

Table 4: Participation of the IFJ PAN employees in international conferences.

Year	Number of conferences	Number of talks given by IFJ PAN employees	Number of talks given by PhD students
2015	237	302	59
2016	285	396	42
2017	262	366	63
2018	404	679	56
2019	315	522	49
2020	150	199	20
2021	242	290	54

Foreign researches are also frequently invited to visit our Institute. Table 5 lists the number of foreign scientists visiting IFJ PAN in the past years. On average, about 220 – 300 visitors came to IFJ PAN per year until 2019. Starting from 2020, the number of visitors has decreased drastically because of the COVID19 pandemic. The most popular countries of their origin are France, Italy, Germany and

Switzerland, which is due to active collaboration with institutions from these countries as well as well-established bilateral exchange programs (e.g. COPIN, Polonium). The main purpose of these visits was to discuss and consult joint research programs and to participate in experiments carried out at CCB.

Table 5: Foreign scientists visiting IFJ PAN.

Number of visitors	2015	2016	2017	2018	2019	2020	2021
Total	298	263	226	235	321	15	40
From France	91	60	56	35	54	0	5
From Italy	35	25	29	33	78	2	9
From Germany	28	17	48	36	38	1	4
From Switzerland	14	19	9	7	4	0	0
From Spain				4	5	0	11

The international standing of research can also be assessed by the number and quality of scientific publications in international, widely known scientific journals, which are authored or co-authored by researchers from IFJ PAN. Scientists from IFJ PAN publish the results of their research predominantly in scientific journals of international reach. This is illustrated in Table 6 below, which shows that more than 90% of all publications in the last years have appeared in the Journal Citation Reports database.

Table 6: Scientific articles published by IFJ PAN employees.

Year	Total number of publications	Papers published in the Journal Citation Reports	Fraction of publications in JCR
2015	673	560	83%
2016	731	620	85%
2017	705	602	85%
2018	723	628	87%
2019	755	647	86%
2020	720	669	93%
2021	699	641	92%

### Participation in international projects of scientific-research programs

IFJ PAN has many years of significant experience in successful applying for funds from the European Commission and in implementing many R&D projects within the Framework Programmes, including Marie-Curie program, as well as projects financed by other international programs, such as



NATO, COST, International Visegrad Fund, Polish-Norwegian Research Programme, Polish-Swiss Research Programme, JINR, EURATOM programs, Fusion for Energy. The Institute has been distinguished three times in Poland for the active participation of its employees in the 6th and 7th Framework Programmes (2004, 2006, 2013). The Institute's employees are also very successful in obtaining complementary funding from different national sources, granted on a competitive basis. Only in the years 2010-2021 the Institute conducted nearly 50 internationally-funded projects, not to mention the projects supported within the European Cohesion Funds (24 projects, 5 of them investment projects).

The Institute is also successful in attracting young researchers from all over the world, especially from the European Union, thanks to investments in unique and state-of-the-art scientific equipment (for instance the Proteus C-235 cyclotron with an energy to be downgraded continuously to 70 MeV). Currently, owing to Cyclotron Centre Bronowice (CCB), IFJ PAN enjoys the status of the international research infrastructure offering scientific equipment to researchers from abroad. Over the years 2016-2021 CCB was visited by more than 180 foreign researchers using the cyclotron at CCB in international experiments, some of them within the Horizon 2020 European funded projects.

The cyclotron is used also for proton radiotherapy. The cooperation with patients and the medical community should be seen as a chance to broaden the cooperation between science and other stakeholders in the future.

IFJ PAN is also one of the contractors by the European Spallation Source. The scientific facility is under construction in the city of Lund, in southern Sweden. The scientific staff and engineers from the Institute work on site and support this international enterprise.

Taking into account the fact that IFJ PAN is a scientifically visible worldwide institute, the number of international projects is insufficient. In almost all projects carried out by IFJ PAN in the last years, the Institute had the status of a partner, and only 2 projects were coordinated by IFJ PAN. Many researchers prefer to apply for national projects as in national calls for grants the success rate is incomparably higher than for instance in the Horizon calls. The analysis of the group working on this problem suggests that the reason for the lower than expected number of applications for international grants and the lower success rate is not a lack of international contacts but rather a lack of knowledge how to work on grant application effectively. IFJ PAN has no professional department that could provide substantial assistance in the process of proposal writing. Department of Foreign, Structural and Domestic Projects Financial Management (DPN) provides only financial guidance. Even the National Contact Point and other scientific institutions in Poland offer no such assistance; however, in some areas the situation has improved over the last years. Self-teaching seems to be the only way to gather experience, because professional courses focus rather on financial matters and do not tackle the problem at hand. Trying to get in touch with people having experience in effective proposal writing – for instance people who evaluate proposals in Brussels - using scientific contacts would be a great opportunity to benefit from this experience. The other way to widen our experience is to use more effectively the National Contact Point in the areas where they have substantial expertise.



## **Implementation of international scientific-research grants**

IFJ PAN, having a long-term experience in applying and conducting the grants financed within the international programs, has developed internal structures and procedures that should facilitate the implementation of projects, especially in terms of controlling and supervising the financial and administrative flow of external funds. The essence of this supervision is cooperation with all administrative departments within the Institute that participate in the controlling process. The key role in these processes is played by two departments that deal with the financial implementation of externally funded projects: European Cooperation Unit (DWE) that deals with international projects, and Economic Planning (DEP) that supervises national projects. Due to the fact that funding streams have been evaluated in last years and in order to facilitate the supervision of the internal funding, IFJ PAN has decided to combine both departments into one - Research Project Service Department (DPN). This should allow us to shorten and facilitate the administrative procedures and increase the competences of employees of both departments.

## **International mobility of scientific employees**

The Institute recognizes the value of mobility of researchers as an important step in the advancement of their scientific careers. The researchers are supported and encouraged to be professionally mobile and to apply for temporary posts at national and international scientific institutions. A broad spectrum of national and international collaborations in which the Institute's employees participate forms a firm footing to support and facilitate the mobility of researchers.

In the years 2015 – 2021, more than 6 500 foreign trips were undertaken by the Institute's employees and PhD students. The most popular purpose of the trips was to attend international conferences, followed by scientific research visits, participation in various advisory boards and international committees, trainings, scholarships and internships. Among the most frequently visited countries were France, Switzerland, Germany, and Italy. This is due to the fact that IFJ PAN cooperates with many scientific institutions from these countries. Particularly valued are longer stays in foreign institutions to get experience by working in international teams and to tighten collaboration with world-class research centers. Table 7 below gives details of visits longer than 3 months carried out in the years 2013 – 2016, and, separately, in the years 2018-2021. A huge drop in the number of travels to CERN, DESY, ZIBJ was caused by the COVID pandemic.

Table 7. Visits longer than 3 months carried out in years 2013 – 2021

Countries	Institutions CERN, DESY, ZIBJ	Institutions from the list of Academic Ranking of World Universities	Other institutions (e.g., KEK, Paul Scherrer Institute, Centre CEA de Saclay)
2013-2016			
France, Italy, USA, Germany, Japan, Denmark, Switzerland, Russia Spain, Kuwait, Great Britain, Austria, USA	78	16	17
2018-2021			
USA, Romania, Germany, Japan, Belgium, France, Switzerland, Italy, Great Britain, Sweden, Norway, Slovenia	7	15	19

Young researchers are particularly strongly pushed to apply for foreign internships and postdoc positions. The mobility of young researchers is positively valued in the recruitment procedure and in their scientific advancement. In the last six years, 170 longer (over 3 months) research stays were completed in such countries as Austria, Denmark, France, Hong Kong, Japan, Canada, Germany, Switzerland, USA, Great Britain, Italy.

## The most important scientific-research achievements

In the period of 2016-2021, the IFJ PAN's scientific activities continued with vigor in both fundamental and application research. In the area of basic research, the driving force for IFJ PAN is the desire to unravel the nature of the matter constituents and the interactions between them on the smallest possible scale, to understand the fundamental properties of physical objects made of these constituents, and, ultimately, to determine the emergent complex structures of different forms of matter. IFJ PAN is strictly following this path by being involved in the most advanced international research projects carried out at large research infrastructures spread out around the globe, such as CERN (Geneve), ILL (Grenoble) or GANIL (Caen), etc. Engineers from IFJ PAN are world's renowned specialists who contribute with great success to the construction of new research infrastructures, like recently to the E-XFEL (Hamburg), and now to the ESS (Lund) and ITER (Cadarache).

History has shown that fundamental research, by generating knowledge verified in experiments,

can enrich our understanding of the Universe, creating at the same time new avenues for technological development, which have a very beneficial impact on society. The Cyclotron Centre Bronowice at IFJ PAN is a particularly spectacular demonstration of this strong connection between basic research and applications. It is a state-of-the-art proton therapy center and a research laboratory, operating a proton 230 MeV Proteus C-235 cyclotron. The whole-body treatment is performed on two rotating gantries with Pencil Scanning Beam, while the treatment of eye cancer takes place in a dedicated room. The number of treated patients is constantly growing. The other pillar of the CCB activity, that is basic science research, encompasses experiments in nuclear physics, medical physics, dosimetry, microdosimetry, radiobiology and materials engineering.

The results of scientific research are published annually in over 600 scientific articles in high-impact international journals.

The following awards are an expression of recognition of the Institute's achievements:

- IFJ PAN belongs to the topmost research centers in Poland – our Institute proudly holds the highest A+ grade in the nation-wide categorization of research institutions.
- The Institute, as a member of the Marian Smoluchowski Krakow Scientific Consortium “Matter – Energy – Future”, also obtained the status of the Leading National Research Centre (KNOW) for the years 2012–2017.
- The Institute is one of the six institutes from Poland placed in the NTU RANKING – a ranking list of universities and scientific institutions based on bibliometric indicators. Within the discipline of physical sciences, IFJ PAN was ranked 141st together with the university of Warsaw, which is the highest position among the Polish institutions – 2020.
- IFJ PAN was awarded the title of “Horizon Star 2020” in the competition for “The Most Active Participant in the Framework Program Horizon 2020” from the Małopolskie and Podkarpackie Voivodeships in the category of research institute – 2020.
- The Institute is the winner of the "Institute a Thousand Times the Best" competition which aimed to select a research unit with superior scientific accomplishments creating the best conditions for carrying out research and training of PhD students. The last three years of the scientific activity of the Institute were assessed.
- The Institute took honorable places in the competition for "The most pro-doctoral institute of the Polish Academy of Sciences - PROPAN": in 2018 it took 3rd place, in 2019 - 1st place, and in 2021 - 2nd place. The aim of the competition is to select an institute of the Polish Academy of Sciences that creates the best conditions for educating doctoral students and to promote good practices in supporting the scientific activity of young scientists.

## The main research equipment

### a) Proteus C-235 cyclotron:

The Proteus C-235 cyclotron was designed and produced by IBA (Ion Beam Applications S.A., Belgium) specifically for medical applications. It is an isochronous cyclotron with a compact conventional magnet, able to accelerate protons from 70 MeV to 230 MeV, while the beam intensity is from 0.5 nA to 500 nA. Protons of this energy have a range of some 30 cm in water and are thus able to reach all tumor locations in a radiotherapy patient.



The proton beam, produced by the C-235 cyclotron, is also used in fundamental research in the field of nuclear physics as well as in life science and applied nuclear physics such as: irradiation of physical and biological material, tests of detectors and dosimeters in the proton field, irradiation of electronic components using fast proton beams to simulate cosmic radiation.

The facility is equipped with:

- two gantries which enable irradiation from 0 MeV to 230 MeV using a scanning beam (with  $\sigma=2.7$  mm or  $\sigma=4$  mm spot size) at a selected angle within the range of 0 to 360,
- facility for irradiation with the use of a horizontal beam with an energy ranging from 0 MeV to 70 MeV; this facility gives a possibility of irradiation using Spread Out Bragg Peak, SOBP. Dose rate: from 0.01 to 1Gy/s. In addition, the experimental room with a horizontal beam and a magnetic optical system enabling beam size adjustment and two separate rooms for biological samples preparation (material of animal and human origin) are available.
- Experimental hall for experiments in the field of nuclear physics with a large scattering chamber.

b) Cyclotron AIC-144:

The isochronal cyclotron AIC-144 is used to accelerate light ions (protons, deuterons, alpha particles). The accelerated protons in the form of a focused beam have optimum parameters for this type of cyclotron: energy 60 MeV, beam current 80 nA, stability of the beam current 5%. The beam, produced by the AIC-144 cyclotron is applied to irradiation of physical and biological material, tests of detectors and dosimeters, irradiation of electronic components, to simulate cosmic radiation.

c) The Laboratory for Spectroscopic Imaging, which is equipped with:

- The integrated Raman-AFM system capable of performing Raman microspectroscopy, atomic force microscopy (AFM) and Raman nanospectroscopy enhanced on the AFM tip (TERS).
- The NanoIR system - Integrated IR-AFM layout - infrared microscope with nanometer resolution achieved by enhancing a signal on the AFM tip.
- Vacuum FTIR spectrometer (VERTEX 70 FT-IR spectrometer with the HYPERION 3000 microscope), bolometer and FPA detector. Operation range: from near to far infrared.
- UV-VIS Spectrometer - plate reader - for the laboratory accreditation requirements, allowing the use of multiple absorption, fluorescence and luminescence markers.
- System for automatic analysis of chromosome aberrations. The existing system (Zeiss microscope Axiolmager Z2) was upgraded for karyotype determination. The extension includes the capability of automatic metaphase searching and building up a test stand of GTG and FISH analysis for accreditation requirements.
- Independent fast imaging IR microscope (Nicolet IN10 MX) – for spectral imaging and spot measurements, equipped with three detectors and a motorized microscope table, capable of recording the spectrum in both transmission and reflection modes, as well as of taking classical microscope images of a sample.
- The RT-PCR system for real-time testing of DNA sequence, fulfilling accreditation

requirements. Used in the research involving: gene expression, single nucleotide polymorphism (SNP), dysfunctional copy number of the gene (CNVs),  $\mu$ RNA profiles, detection of pathogens.

- Atomic force microscope integrated with a fluorescent microscope.
- d) The X-ray Laboratory, which is equipped with:
- X-ray imaging setup based on Hamamatsu L9191 X-ray tube which is designed for  $\mu$ CT and  $\mu$ XRF. The accelerating voltage can be adjusted in the range of 30 to 160 kV and anode current from 1  $\mu$ A to 30  $\mu$ A. The size of the electron beam on the anode is 3 microns.
  - Laboratory high energy resolution X-ray spectrometer in von Hamos geometry – the setup enables us to perform simultaneously X-ray absorption and X-ray emission measurements in hard X-ray regime. The spectrometer is based on X-ray tube, two cylindrical diffraction crystals and two CCD detectors. Moreover, a second X-ray source is available and offers the possibility to perform time-dependent studies. The setup is equipped with a sample holder for solid state samples and liquid flow cell and is adapted for biological material.
- e) The Bruker Biospec 94/20 magnetic resonance experimental tomograph with a 9.4 T horizontal superconducting magnet of a 210 mm opening, with a set of actively shielded gradient coils of internal diameters of 120 mm and 60 mm. It was installed in May 2011 as the first fully complete system for imaging in Poland. It allows interdisciplinary biomedical research in vivo, using non-invasive imaging methods and MR spectroscopy using animals (mice, opossums, rats). The system is equipped with a cryo-coil (Bruker CryoProbe™) which allows us to obtain high-quality images of the mouse brain in a short time.

## Technology transfer

### **Improving patient treatment safety through development of proton radiotherapy methods and access to proton therapy at Cyclotron Centre Bronowice**

The Cyclotron Center Bronowice IFJ PAN is a spectacular example of a strong link between basic research and applications. It is a modern center, unique on a European scale, where proton therapy for cancer is carried out, as well as basic research both in the field of nuclear physics and in the field of medical physics, dosimetry, radiobiology, and materials engineering is pursued.

Innovative methods of proton therapy (PT), clinical dosimetry and scattered radiation dosimetry developed at IFJ PAN allowed us to use the new technology of proton scanning beams in a more precise manner. Research results, published in renowned medical physics and oncologic radiotherapy journals, have been introduced into clinical practice and resulted in innovative patient irradiation with the use of pencil-beam scanning at Cyclotron Centre Bronowice (CCB) in cooperation with other medical partners. The implementation of these results has given Polish and foreign patients access to the most modern radiotherapy method within the range of indications funded by the Polish Health Fund (NFZ). The development of the treatment procedures done at IFJ PAN has allowed radiotherapists and medical physicists to improve PT effectiveness and, consequently, the quality of cancer care in Poland and other European countries. Over 2017-2021 almost 200 eye cancer patients underwent effective treatment.





The two gantry facilities serve to irradiate mainly neck and head cancers. The therapy is conducted in collaboration with a team from the National Research Institute of Oncology in Krakow. The medical team underwent training as part of the implementation of this technology. The procedures developed by the CCB team now constitute a part of the medical protocol at the gantry facilities.

Over the years 2017- 2021, 576 patients were irradiated at CCB, including 13 children. Most patients were Poles, but a few came from Ukraine and Russia. Most of the treatments were funded by the National Health Fund.

The results of studies carried out at IFJ PAN have served as the basis for developing guidelines for PBS treatment planning for head and neck tumors. They have also been implemented in foreign PT centers. The result is the standardization of treatment, increased safety of therapy, improvement of its effectiveness, and greater public confidence. Consequently, the guidelines have contributed to the improvement of the quality of treatment offered to cancer patients also in other countries.

The availability of the treatment protocols developed at CCB for cancers difficult to treat with the use of other forms of therapy, along with the minimization of side effects, contributed to the improvement of healthcare in the group of patients with unfavorable prognosis. CCB may admit ca. 400 patients annually and is open to Polish and foreign patients.

### **Design and application of high-sensitivity LiF:Mg,Cu,P thermoluminescent detectors for dosimetry development in medicine, environment and astronautics**

A high-sensitivity LiF:Mg, Cu, P (MCP-N) thermoluminescent detector for measuring ionizing radiation was developed and introduced at the Laboratory of Individual and Environmental Dosimetry IFJ PAN. The detector has excellent dosimetry properties: low background, flat energetic characteristics, and the ability to read doses in range of 1  $\mu$ Gy to MGy. Owing to interdisciplinary studies, conducted in cooperation with radiologists and radiation protection officers (IOR), the MCP-N detectors were used on an international scale to measure doses to eye lenses by interventional radiologists and nuclear medicine workers. The detectors were also used to study organ dose distribution for astronauts on the International Space Station, also with respect to future missions to the Moon and Mars. The wide implementation of MCP-N detectors into the practice of environmental dosimetry made it possible to conduct short-term dose measurements at the level of natural background.

### **Development of new detector, accelerator and information technologies and increased interest in science – IFJ PAN's involvement in CERN research**

CERN is the largest high energy physics center in the world. The Institute of Nuclear Physics PAN has been for many years involved in R&D works conducted at CERN, and the consequence of this involvement is IFJ PAN's contribution to breakthrough discoveries about the structure of the Universe, innovations in particle detection and acceleration techniques, and development of calculation methods. These achievements translated into an increased interest of global research community in the understanding of the structure of the Universe, adaptation of educational programs to progress in science, and growing interest of pupils and students in natural sciences. Expertise in new accelerator techniques acquired at CERN by IFJ PAN scientific and engineering teams led to the construction of accelerator research infrastructures (XFEL, ESS), which are crucial for human progress, while the development of IT technologies resulted in establishing computing centers based on Grid and Cloud systems.



## **Environmental protection and human safety improvement as a result of studies on radioactive substances in the environment and residential buildings**

Since the Chernobyl disaster, IFJ PAN has undertaken efforts to conduct continuous measurements of radioactivity in the surroundings which have resulted in systematic monitoring of the environment and atmosphere using measurement methods developed, among others, at IFJ PAN. Research results of the Laboratory of Radiometric Expertise and Laboratory of Radioactivity Analyses have an impact on the improvement of human safety and quality of life and on raising public awareness and knowledge of occupational groups directly exposed to ionizing radiation. This is done through the assessment of medical staff health risk, identification of radiation sources in so far unexplored areas, designing of a new version of a radon/thoron concentration meter used around the world to check radiation exposure, preparation of state services for radiation events, cooperation with a team appointed by the Minister of Environment for the implementation of Directive 2013/59/EURATOM, and studies on isolation materials to protect buildings against radon penetration.

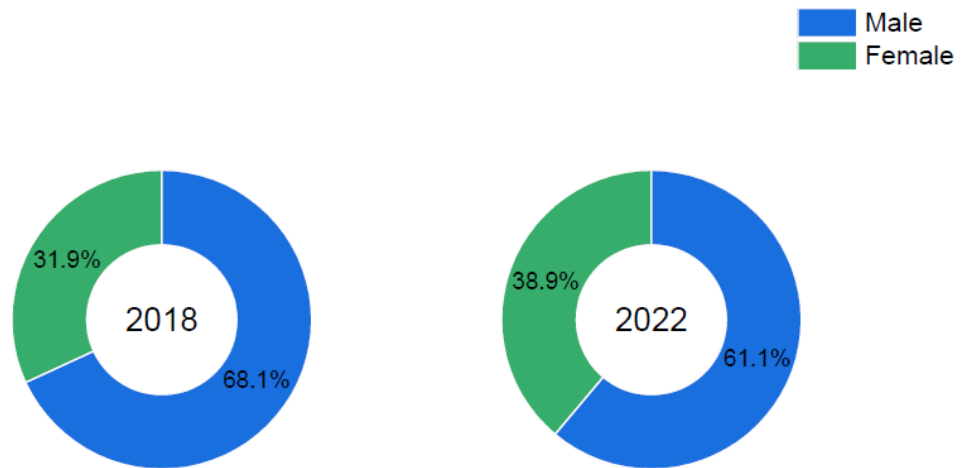
### **HRS4R Survey (2018/2022) Analysis**

#### **General considerations and statistics of the participants.**

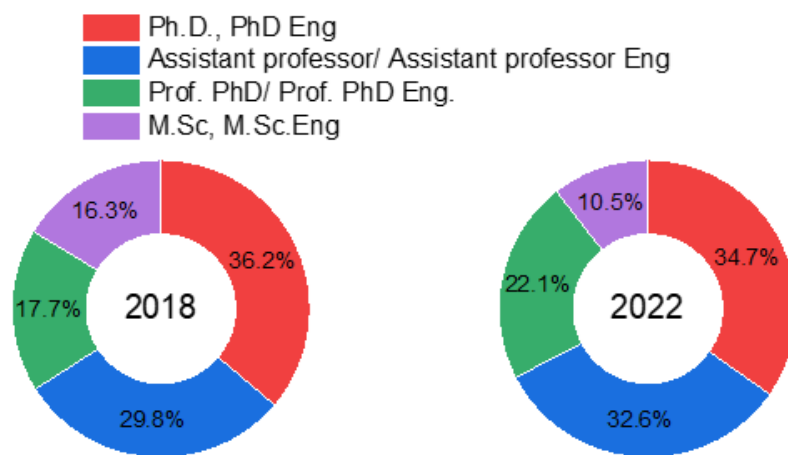
The purpose of this chapter is to compare the results of the 2018 and 2022 HRS4R surveys. These surveys were addressed to the Institute's researchers in order to gather their opinions on the status of implementation of a given HRS4R action at IFJ PAN, and, if so, to what extent. 95 and 141 respondents took part in the 2022 and 2018 HRS4R survey, respectively.

The charts below illustrate the characteristics of the participants in both surveys.

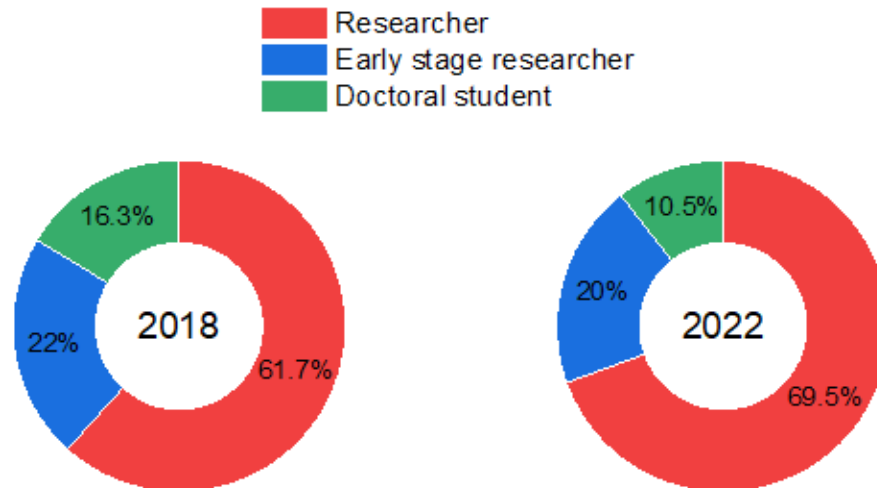
Graph 1. Sex



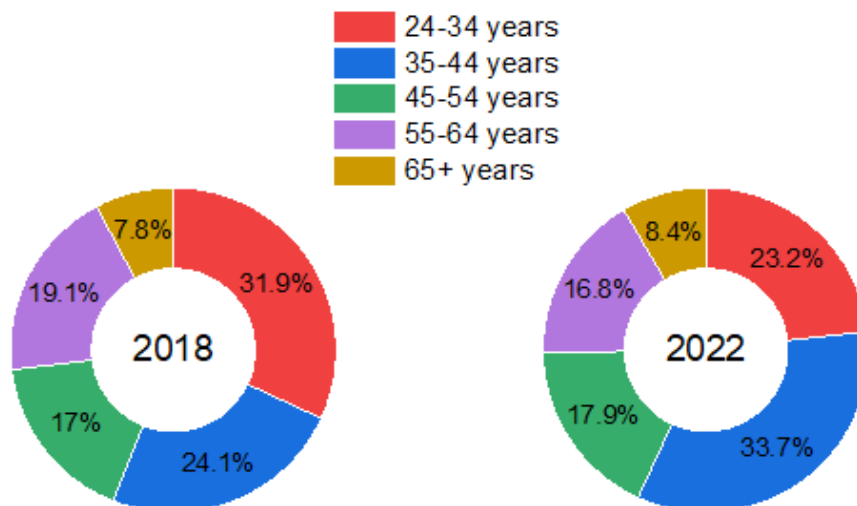
Graph 2. Degree / academic title



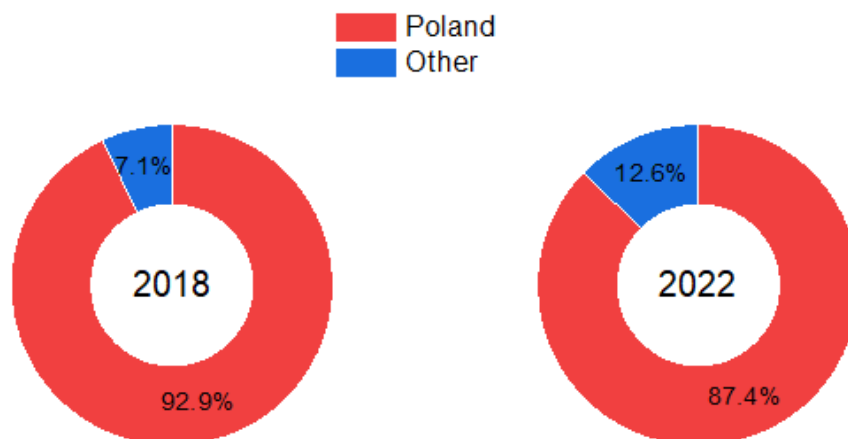
Graph 3. Researchers' group



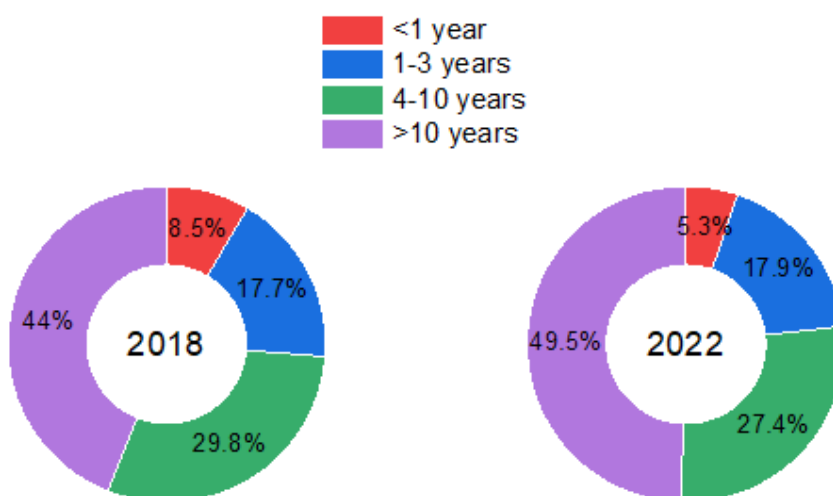
Graph 4. Age



Graph 5. Origin



Graph 6. Time of employment at IFJ PAN



Observations:

- i) Graph 1: the majority of researchers that participated in the survey are men, however, the number of women increased from **31.9 % in 2018 up to 38.9 in 2022**.
- ii) Graphs 2 and 3: proportions between groups of researchers R1, R2, R3, and R4 are similar in both years, although a small shift towards a relatively larger number of R3 and R4 occurred. This shift is a result of a decrease in the number of PhD students – the newly created KISD PhD School offers fewer positions compared to the number of PhD students at MSD PhD School, which is being replaced by the KISD.



- iii) Graph 4: the age structure of scientific employees is very much the same in both years, with ca. 56% of researchers in the 24-44 age slot.
- iv) Graph 5: number of foreign employees in scientific positions has increased from 7.1% in 2018 to 12.3% in 2022.
- v) Graph 6: the distribution of employment time at IFJ PAN practically did not change between 2018 and 2022.

## Survey methodology and content

The first six questions of the surveys were devoted to the characteristics of the respondents (e.g., Sex, Degree, Academic title, Age, Origin, Time at IFJ PAN). In 2018, the survey consisted of 50 questions, while in 2022 - of 54 questions.

For each question, the 2018 survey proposed five possible answers: 'Strongly agree', 'Agree', 'Neutral', 'Disagree', 'Strongly disagree'. Each answer was associated with a specific number of points as follows:

- Strongly agree      5 points;
- Agree                4 points;
- Neutral              3 points;
- Disagree            2 points;
- Strongly disagree   1 point.

For each question of the 2022 survey, six possible answers were proposed: 'Strongly agree', 'Agree', 'Neutral', 'Disagree', 'Strongly disagree', 'Don't know'. Responses related to points as follows:

- Strongly agree      5 points;
- Agree                4 points;
- Neutral              3 points;
- Disagree            2 points;
- Strongly disagree   1 point;
- Don't know         0 points.

In the analysis, the average number of points given to each question was calculated separately for both surveys. Answers 'Don't know' in the 2022 survey were not taken into account. Table 1 lists pairs of questions that covered the same or a very similar topic in each survey.

Table 1. Pairs of questions related to the same or similar issue in the HRS4S surveys performed in 2022 and in 2018.

HRS4S survey in 2022	HRS4S survey in 2018
7.1 While conducting research at IFJ PAN, it is possible to enjoy the freedom of thought and expression.	7 While conducting research at IFJ PAN, it is possible to enjoy freedom of thought and expression, and to determine methods of solving problems (according to recognized ethical principles and practices).
8.1 IFJ PAN has mechanisms to ensure the ethical principles of the research carried out by its Staff.	8. IFJ PAN has mechanisms to ensure the ethical principles of research carried out by its Staff.
9.1 In the case of research carried out at IFJ PAN in collaboration with a supervisor/tutor and/or other researchers, there are principles of respect for intellectual property and joint data ownership.	9. In the case of research carried out in collaboration with a supervisor/guardians and/or other researchers, there are principles of respect for intellectual property and joint data ownership.
10.1 I am familiar with the institutional strategic goals and existing governing bodies.	10. I am familiar with the institutional strategic goals and existing governing bodies
11.1 IFJ PAN provides adequate means for researchers to familiarize themselves with and conform to the national, sectorial or institutional regulations governing training and/ or working conditions.	11. IFJ PAN provides adequate means for researchers to familiarize themselves with and conform to the national, sectorial or institutional regulations governing training and/ or working conditions. This includes Intellectual Property Rights
11.2 IFJ PAN keeps me informed about the funding mechanisms available to me as a researcher and their requirements and conditions.	12 IFJ PAN keeps me informed about the funding mechanisms available to me as a researcher and their requirements and conditions
12.1 IFJ PAN keeps me informed about the funding mechanisms available to me as a researcher and their requirements and conditions.	13 IFJ PAN provides assistance to and supervises researchers in their accountability towards the employer, funders or other related bodies, especially their accountability in financial management.
12.2 I understand what is expected of me and how my research serves the scientific goals.	14 I understand what is expected of me and how my research serves the project's goals.
13.1 IFJ PAN enables researchers to adopt safe working practices and takes the necessary precautions for health and safety	15 There exist safe working practices, among others necessary health and safety precautions, data protection and confidentiality and recovery of lost information due to IT technology breakdowns.
13.2 I am familiar with the current national legal requirements regarding data protection and confidentiality protection requirements.	15 There exist safe working practices among others necessary health and safety precautions, data protection and confidentiality and recovery of lost information due to IT technology breakdowns.
13.3 IFJ PAN facilitates the dissemination and exploitation of the results of my research	17 IFJ PAN facilitates the dissemination and exploitation of the results of my research



13.4 I am familiar with practices for data recovery in case of lost information due to IT technology breakdowns	18 Research data is well protected and necessary precautions for data recovery in case of information technology disasters are taken.
14.1 IFJ PAN ensures researchers are made aware of their responsibilities regarding the dissemination of data and research results.	19 IFJ PAN ensures that researchers are aware of their responsibilities regarding dissemination of data and research results.
15 IFJ PAN ensures that the research activities are made known to the public in such a way that they can be understood by non-specialists, thereby improving the public's understanding of science.	20 IFJ PAN ensures that the research activities are made known to the public in such a way that they can be understood by non-specialists, thereby improving the public's understanding of science
16.1 IFJ PAN does not discriminate against researchers in any way on the basis of gender, age, ethnic, national or social origin, religion or belief, sexual orientation, language, disability, political opinion, social or economic conditions.	21 IFJ PAN does not discriminate against researchers in any way on the basis of gender, age, ethnic, national or social origin, religion or belief, sexual orientation, language, disability, political opinion, social or economic conditions
17 IFJ PAN introduces evaluation systems for assessing researcher's professional performance on a regular basis, in a transparent manner.	23 IFJ PAN introduces evaluation/ appraisal systems for assessing researcher's professional performance (including senior researchers) on a regular basis, in a transparent manner by an independent committee
19.1 There is a clear and transparent progression structure for researchers in IFJ PAN.	25 There is a clear and transparent progression structure for researchers at IFJ PAN
19.2 Individual research roles and responsibilities at IFJ PAN are clearly defined.	26 Individual research roles and responsibilities at IFJ PAN are clearly defined
20.1 The selection committees bring together diverse expertise and competences and have an adequate gender balance, where appropriate and feasible.	27 The selection committees bring together diverse expertise and competences and have an adequate gender balance, where appropriate and feasible
21.1 Prior to the selection of the candidate, IFJ PAN informs about the recruitment process and the selection criteria, the number of available positions and the career development prospects.	28 Prior to the selection of the candidate, IFJ PAN informs about the recruitment process and selection criteria, the number of available positions and career development prospects.
22.1 IFJ PAN judges merits qualitatively and quantitatively, focusing on outstanding results within diversified career path and not solely on the number of publications.	29 IFJ PAN judges merits qualitatively and quantitatively, focusing on outstanding results within a diversified career path and not solely on the number of publications (the bibliometric indices are properly balanced within a range of evaluation criteria such as level of independence, creativity, mobility experience acquired through stays in other countries/ regions, teaching, supervising, teamwork, management, etc.)
23.1 In the recruitment process IFJ PAN allows applicants to present a multidimensional career path to submit additional evidence which reflects achievements and qualifications relevant to the offered position.	30 In the recruitment process IFJ PAN allows applicants to follow and present a multidimensional career path to submit additional evidence which reflects achievements and qualifications relevant to the offered position.
24.1 The experience of mobility is considered in the selection process.	32 IFJ PAN ensures proper assessment of academic and professional qualifications, including non-formal qualifications with particular emphasis on international and professional mobility
25.1 IFJ PAN ensures proper assessment of academic and professional qualifications, including non-formal qualifications.	32 IFJ PAN ensures proper assessment of academic and professional qualifications, including non-formal qualifications with particular emphasis on international and professional mobility





26.1 IFJ PAN ensures proper assessment of academic and professional qualifications, including non-formal qualifications.	33 IFJ PAN has established the required level of basic skills to meet the needs of the particular position
27.1 IFJ PAN establishes clear rules and explicit guidelines for the recruitment and appointment of postdoctoral researchers considering that the postdoctoral status should be transitional, with the primary purpose of providing additional professional development opportunities for a research career in the context of long-term career prospects	34 IFJ PAN establishes clear rules and explicit guidelines for the recruitment and appointment of postdoctoral researchers considering that the postdoctoral status should be transitional, with the primary purpose of providing additional professional development opportunities for a research career in the context of long-term career prospects
28.1 All researchers, at any career level, are recognized as professionals and are treated in accordance with this fact.	35 All researchers, at any career level, are recognized as professionals and are treated in accordance with this fact
29.1 IFJ PAN offers appropriate equipment, facilities and opportunities to create a stimulating research environment.	36 IFJ PAN offers appropriate equipment, facilities and opportunities to create a stimulating research environment.
30.1 IFJ PAN enables flexibility in research performance and allows researchers to combine family and work, children and career.	37 IFJ PAN ensures, when appropriate, the flexibility deemed essential for successful research performance in accordance with existing national legislation and allows researchers to combine family and work, children and career.
31.1 The employees at IFJ PAN on temporary or permanent positions are treated equally.	38 The stability of employment is ensured
32.1 IFJ PAN provides appropriate and attractive conditions to research staff including salary in accordance with IFJ policy and legislative requirements.	39 IFJ PAN provides appropriate and attractive conditions to research staff including salary in accordance with IFJ policy and legislative requirements
32.2 IFJ PAN provides appropriate and attractive conditions to research staff including salary in accordance with IFJ policy and legislative requirements.	40 IFJ PAN provides appropriate and attractive conditions to research staff including maternity leave, paternity leave, sick leave, parental leave in accordance with IFJ policy and legislative requirements
33.1 IFJ PAN aims for a representative gender balance at all levels of staff, including the supervisory and managerial levels.	41 IFJ PAN aims for a representative gender balance at all levels of staff, including at supervisory and managerial level
34.1 IFJ PAN has defined career development guidelines for researchers at all stages of their career.	42 IFJ PAN has defined a specific career development strategy for researchers at all stages of their career and provides guidance over and/or mentoring in personal and professional development of researchers.
35.1 IFJ PAN recognizes the value of any form of mobility as an important factor of broadening scientific knowledge and enhancing professional development of researchers at any stage of their careers.	44 IFJ PAN recognizes the value of geographical, intersectoral, inter- and trans- disciplinary and virtual mobility, as well as the mobility between the public and private sector as an important factor of broadening scientific knowledge and enhancing professional development of researchers at any stage of their careers.
36.1 IFJ PAN provides support for improving my skills and competences.	45 IFJ PAN provides support and guidance specialized in the scientific/research career for my professional development and for improving my skills and competencies



37.1 IFJ PAN ensures appropriate intellectual property rights protection, including copyrights and allows researchers, at all career stages, to take profits from the results of their research.	46 IFJ PAN ensures appropriate intellectual property rights protection, including copyrights and allows researchers, at all career stages, to take profits from the results of their research
38.1 IFJ PAN adopts policies and procedures for researchers to be recognized and the right to publish their own research results independently from their supervisor and the right to be listed and/or quoted (co-authors of papers, patents, etc.)	47 IFJ PAN adopts policies, practices and procedures providing the researchers, including scientists at the beginning of their careers, with necessary conditions so that they can enjoy the right to be recognized and the right to be listed and/or quoted as co-authors of papers, patents, etc. or the right to publish their own research results independently from their supervisor.
39.1 Teaching opportunities are available for me to support research career development.	48 Teaching opportunities are available for me to support research career development
40.1 IFJ PAN has established appropriate procedures to deal with complaints/appeals of researchers, including those concerning conflicts between supervisor/s and researchers.	49 IFJ PAN has established appropriate procedures to deal with complaints/appeals of researchers, including those concerning conflicts between supervisor/s and early –stage researchers, providing all research staff with confidential and informal assistance in resolving work-related conflicts, disputes and grievances, with the aim of promoting fair and equitable treatment
41.1 IFJ PAN allows researchers to be legitimately represented in the relevant information, consultation and decision-making bodies of the institution to protect and promote their individual and collective interest as professionals and to actively contribute to the workings of the institution.	50 IFJ PAN allows researchers to be legitimately represented in relevant information, consultation and decision-making bodies of the institution to protect and promote their individual and collective interest as professionals and to actively contribute to the workings of the institution.
42.1 I receive constructive feedback regarding my professional growth and development.	51 I receive constructive feedback regarding my professional growth and development
42.2 I receive constructive feedback regarding my professional growth and development.	52 IFJ PAN promotes and evaluates good practices between the supervisors and the researchers in their training phase so as to take advantage of their relationship (ensuring structured/ regular follow-up, keeping record of the work progress and research findings, feedback by means of reports or seminars, work in accordance with agreed schedules, milestones, deliverables and/ or research outputs).
43.1 IFJ PAN ensures good quality supervision of postdoctoral researchers or junior researchers that facilitates the development of an independent scientific career.	53 IFJ PAN ensures that the supervision of postdoctoral researchers R2 or junior researchers R2 is made in such a way that it facilitates the development of an independent scientific career.
44.1 IFJ PAN supports scientists at all stages of their careers, helping them to develop and also to improve their skills and qualifications, enabling participation in conferences, training and other forms of education	54 IFJ PAN supports scientists at all stages of their careers, helping them to develop and also to improve their skills and qualifications, enabling participation in conferences, trainings and other forms of education.
45.1 IFJ PAN provides researchers, regardless of the stage of their professional career and regardless of the type of contract, with career counseling.	55 IFJ PAN ensures that all researchers at any stage of their career, regardless of their contractual situation, are given the opportunity for professional development and for improving their employability

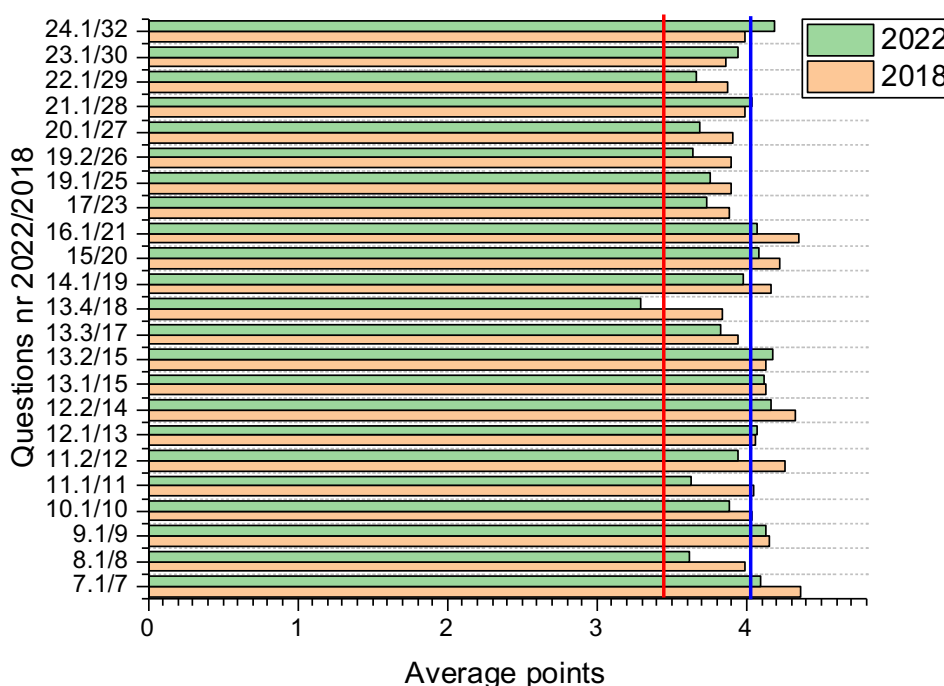
	through formal training, workshops, mobility, conferences, e-learning and others
46.1 IFJ PAN ensures supervisors for postdoctoral researchers or junior researchers in a way that it facilitates the development of an independent scientific career.	56 IFJ PAN ensures that supervising postdoctoral researchers or junior researchers is made in such a way that it facilitates the development of an independent scientific career.

## Results of the survey

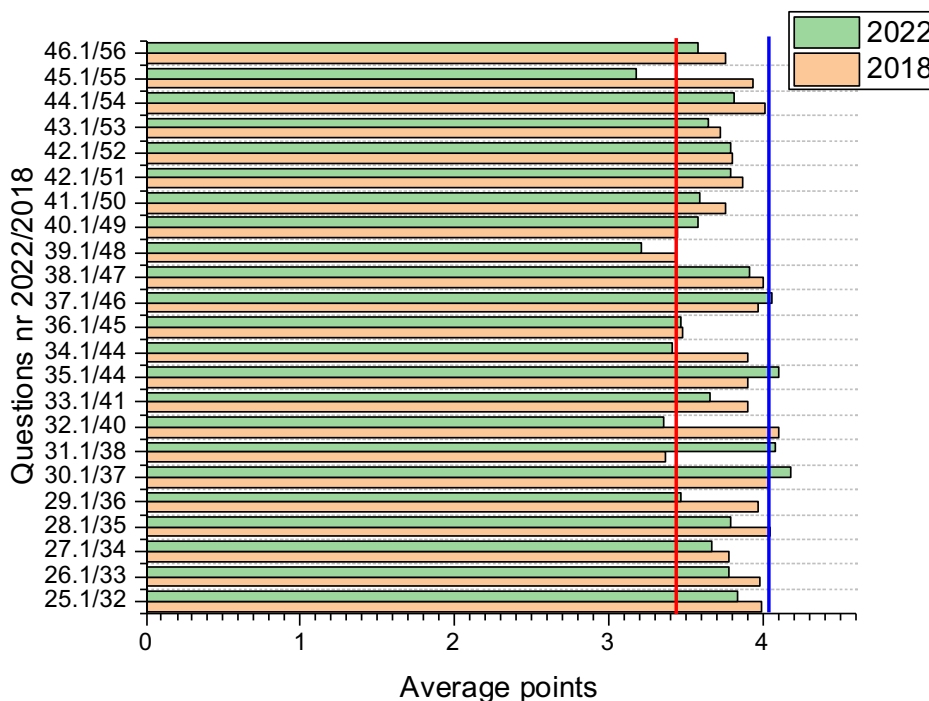
The results of the HRS4S surveys are presented in Graph 7 and Graph 8. The graphs show the average number of points scored by each question in the form of horizontal bars. To make a direct comparison between 2018 and 2022, the bars of the corresponding questions for 2018 and 2022 are close to each other.

Two thresholds were adopted at the level of 3.45 and 4.05 points (marked respectively by vertical red and blue lines). These correspond to cuts in the 2022 score distribution at 15% (upper threshold) and 85% (lower threshold). The thresholds define three main regions of interest. The first of them, i.e., a group of questions with a score above 4.05 points, marks the non-problematic area. The second one contains questions with a score in the range of 3.45-4.05 - the issues raised in these questions are at a fairly satisfactory stage, although they should be monitored. The last region (scores below 3.45 points) signals the existence of certain problems which should be of particular concern during the implementation of the Action Plan.

Graph 7. Results of the HRS4S surveys performed in 2018 and 2022. Horizontal bars show points scored by each question. The bars corresponding to the same questions in the 2018 and 2022 surveys are located close to each other (first group of questions - part A).



Graph 8. The same as Graph 7 for the second group of questions (part B).



The questions listed below scored above 4.05 points in the 2022 survey. In addition, the questions that have higher score in 2022 than in 2018 are underlined.

- 7.1 While conducting research at IFJ PAN it is possible to enjoy the freedom of thought and expression.
- 9.1 In the case of research carried out at IFJ PAN in collaboration with a supervisor/tutor and/or other researchers there are principles of respect for intellectual property and joint data ownership.
- 12.1 IFJ PAN keeps me informed about the funding mechanisms available to me as a researcher and their requirements and conditions.
- 12.2 I understand what is expected of me and how my research serves the scientific goals.
- 13.1 IFJ PAN enables researchers to adopt safe working practices and taking the necessary precautions for health and safety
- 13.2 I am familiar with the current national legal requirements regarding data protection and confidentiality protection requirements.
- 15 IFJ PAN ensures that the research activities are made known to the public in such a way that they can be understood by non-specialists, thereby improving the public's understanding of science.
- 16.1 IFJ PAN does not discriminate against researchers in any way on the basis of gender, age, ethnic, national or social origin, religion or belief, sexual orientation, language, disability, political opinion, social or economic conditions.
- 21.1 Prior to the selection of the candidate, IFJ PAN informs about the recruitment process and the selection criteria, the number of available positions and the career development prospects.
- 24.1 The experience of mobility is considered in the selection process.



- 30.1 IFJ PAN enables flexibility in research performance and allows researchers to combine family and work, children and career.
- 31.1 The employees at IFJ PAN on temporary or permanent positions are treated equally.
- 35.1 IFJ PAN recognizes the value of any form of mobility as an important factor of broadening scientific knowledge and enhancing professional development of researchers at any stage of their careers.
- 37.1 IFJ PAN ensures appropriate intellectual property rights protection, including copyrights and allows researchers, at all career stages, to take profits from the results of their research.

The above-mentioned questions belong to the categories: *Research freedom, Professional responsibility, Accountability, Good practice in research, Public engagement, Non-discrimination, Transparency (Code), Recognition of mobility experience (Code), Working conditions, Stability and performance of employment, Intellectual Property Rights.*

#### Conclusions:

Significant progress has been made in: i) informing staff about the available research funding mechanisms, ii) knowledge of current national data protection legal requirements, iii) recruiting researchers, iv) recognizing researchers mobility in the selection process, v) in the issue of equal treatment of researchers in temporary or permanent positions, vi) in the area of intellectual property rights protection.

The questions listed below scored less than 3.45 points in the 2022 survey – at the same time they have a lower score than in 2018. They belong to the category of *Good practice in research, Research environment, Funding and salaries, Career development, Teaching, Access to research training and continuous development.*

- 13.4 I am familiar with practices for data recovery in case of lost information due to IT technology breakdowns
- 32.1 IFJ PAN provides appropriate and attractive conditions to research staff including salary in accordance with IFJ policy and legislative requirements.
- 34.1 IFJ PAN has defined career development guidelines for researchers at all stages of their career.
- 39.1 Teaching opportunities are available for me to support research career development.
- 45.1 IFJ PAN provides researchers, regardless of the stage of their professional career and regardless of the type of contract, with career counseling.

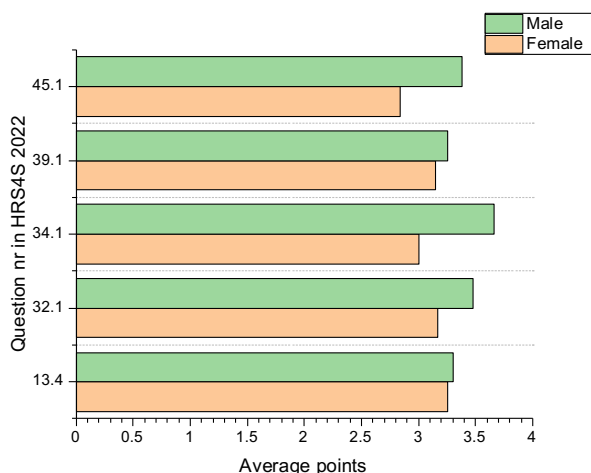
The above questions were subject to a detailed analysis. In Graph 9, their scores are broken down by gender, and in Graph 10, by respondent category. It demonstrates that women assessed these questions worse than men. In turn, in the scientist category, according to Graph 10, the lowest score was given by PhD students (in one case by early-stage researchers).

Conclusions:

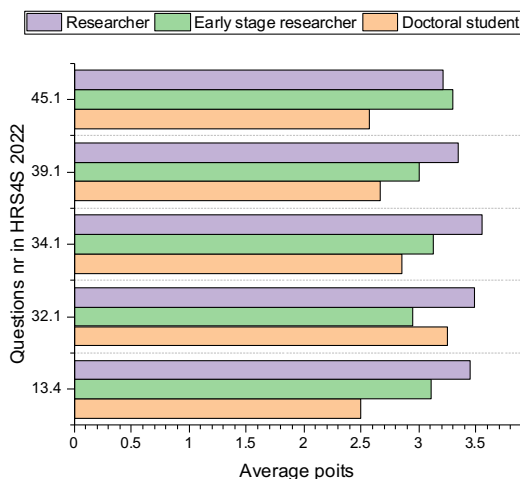
All these results indicate that at IFJ PAN particular care should be devoted to activities that relate to the following issues: i) remuneration offered to researchers, ii) lack of official career development guidelines for researchers at all stages of their career, iii) insufficient career counseling, regardless of the type of contract, iv) too fragmented knowledge of data recovery practices in the event of information loss.

Relevant actions should focus primarily on women, PhD students and early-stage researchers.

Graph 9. Scores broken down by men and women for the 2022 survey questions with the lowest total score.



Graph 10. Scores broken down by PhD students, Early researchers, and Researchers for the 2022 survey questions with the lowest total score.



The answer ‘strongly disagree’ has occurred neither in the 2022 survey nor in 2018 for the following questions:

- 12.2 I understand what is expected of me and how my research serves the scientific goals./14 I understand what is expected of me and how my research serves the project’s goals.



- 13.1 IFJ PAN enables researchers to adopt safe working practices and taking the necessary precautions for health and safety /15 There exist safe working practices among others necessary health and safety precautions, data protection and confidentiality and recovery of lost information due to IT technology breakdowns.
- 13.2 I am familiar with the current national legal requirements regarding data protection and confidentiality protection requirements./15 There exist safe working practices among others necessary health and safety precautions, data protection and confidentiality and recovery of lost information due to IT technology breakdowns.
- 32.2 IFJ PAN provides appropriate and attractive conditions to research staff including salary in accordance with IFJ policy and legislative requirements./40 IFJ PAN provides appropriate and attractive conditions to research staff including maternity leave, paternity leave, sick leave, parental leave in accordance with IFJ policy and legislative requirements

#### Conclusions:

Application of the principles of safe work have been recognized. No lack of knowledge of data protection requirements has been identified. Despite the fact that the question about wages received a fairly low mark, there were no strong objections to this aspect of the working conditions offered to researchers.

The answer 'strongly disagree' has occurred in 2022 survey, but not in 2018 survey, for the following questions:

- 11.2 IFJ PAN keeps me informed about the funding mechanisms available to me as a researcher and their requirements and conditions./12 IFJ PAN keeps me informed about the funding mechanisms available to me as researcher and their requirements and conditions
- 11.1 IFJ PAN provides adequate means for researchers to familiarize themselves with and conform to the national, sectorial or institutional regulations governing training and/ or working conditions. /11 IFJ PAN provides adequate means for researchers to familiarize themselves with and conform to the national, sectorial or institutional regulations governing training and/ or working conditions. This includes Intellectual Property Rights
- 8.1 IFJ PAN has mechanisms to ensure the ethical principles of the research carried out by its Staff. /8 IFJ PAN has mechanisms to ensure the ethical principles of research carried out by its Staff.

#### Conclusions:

In question 11.2 of the 2022 survey, one respondent (?) indicated that information on funding mechanisms available to researchers was insufficient. This is somewhat inconsistent with the total score for this question which is well above the average.

On the other hand, to the respondents' complaints about the lack of initiatives to provide researchers with the appropriate means to familiarize themselves with national, sectorial or institutional regulations governing education and / or working conditions calls for an immediate action to remedy this situation. Likewise, the existing mechanisms for ensuring the ethical principles of research conducted by scientific staff should be reviewed and, where necessary, intensified.

The answer 'strongly disagree' has occurred in 2018 survey, but not in 2022 survey, for the following questions:

- 9.1 In the case of research carried out at IFJ PAN in collaboration with a supervisor/tutor and/or other researchers there are principles of respect for intellectual property and joint data ownership./9 In the case of research carried

out in collaboration with a supervisor/guardians and/or other researchers there are principles of respect for intellectual property and joint data ownership

- 19.2 Individual research roles and responsibilities at IFJ PAN are clearly defined. /26 Individual research roles and responsibilities at IFJ PAN are clearly defined 24.1 The experience of mobility is considered in the selection process./32 IFJ PAN ensures proper assessment of academic and professional qualifications, including non-formal qualifications with particular emphasis on international and professional mobility
- 35.1 IFJ PAN recognizes the value of any form of mobility as an important factor of broadening scientific knowledge and enhancing professional development of researchers at any stage of their careers./44 IFJ PAN recognizes the value of geographical, intersectoral, inter- and trans- disciplinary and virtual mobility, as well as the mobility between the public and private sector as an important factor of broadening scientific knowledge and enhancing professional development of researchers at any stage of their careers.

### Conclusions:

The situation has improved in the area of respect for intellectual property and joint ownership of data; roles and responsibilities among researchers are also better defined. Intersectoral as well as inter- and trans-disciplinary mobility has gained recognition.

Table 2. Detailed results of the 2022 and 2018 surveys. Questions are grouped in pairs according to their similarity in both surveys.

Question	Year	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
7.1	2022	40	38	4	8	5	0
7	2018	74	51	10	5	1	-
8.1	2022	16	41	10	18	4	6
8	2018	40	65	31	5	0	-
9.1	2022	30	49	5	8	0	3
9	2018	55	62	15	8	1	-
10.1	2022	27	39	6	17	3	3
10	2018	45	63	27	5	1	-
11.1	2022	12	49	14	14	1	5
11	2018	39	75	22	5	0	-
11.2	2022	36	30	9	18	2	0
12	2018	57	66	15	3	0	-
12.1	2022	35	41	6	10	2	1
13	2018	45	64	28	3	1	-
12.2	2022	39	38	6	12	0	0
14	2018	68	55	14	4	0	-
13.1	2022	33	46	7	8	0	1
15	2018	46	71	20	4	0	-
13.2	2022	26	60	0	9	0	0
15	2018	46	71	20	4	0	-
13.3	2022	26	40	6	18	4	1
17	2018	35	68	34	3	1	-
13.4	2022	12	31	17	24	6	5
18	2018	26	75	32	7	1	-
14.1	2022	26	45	3	16	2	3

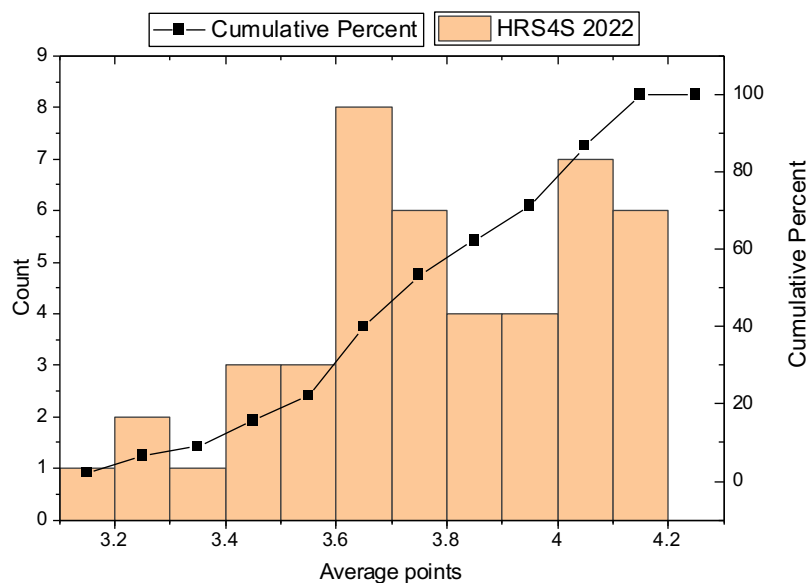




19	2018	50	66	24	0	1	-
15.1	2022	34	44	2	10	4	1
20	2018	55	65	19	1	1	-
16.1	2022	34	41	5	9	3	3
21	2018	72	51	14	3	1	-
17.1	2022	16	44	9	19	1	6
23	2018	38	57	38	7	1	-
19.1	2022	21	30	9	24	6	5
25	2018	36	66	30	6	3	-
19.2	2022	15	42	12	24	0	2
26	2018	37	62	34	6	5	-
20.1	2022	17	31	6	16	4	21
27	2018	38	56	44	2	1	-
21.1	2022	28	42	6	10	1	8
28	2018	41	63	32	4	1	-
22.1	2022	19	34	5	19	6	12
29	2018	33	67	33	6	2	-
23.1	2022	21	36	5	12	1	20
30	2018	30	66	42	2	1	-
24.1	2022	30	36	2	11	0	16
32	2018	36	72	29	3	1	-
25.1	2022	24	28	5	18	3	17
32	2018	36	72	29	3	1	-
26.1	2022	17	42	3	17	4	12
33	2018	34	74	30	2	1	-
27.1	2022	21	34	8	15	6	11
34	2018	31	58	44	6	2	-
28.1	2022	23	45	8	12	5	2
35	2018	43	69	23	5	1	-
29.1	2022	17	39	11	19	9	0
36	2018	41	64	29	5	2	-
30.1	2022	33	44	3	5	2	8
37	2018	49	55	31	4	2	-
31.1	2022	33	37	6	8	2	9
38	2018	21	46	46	19	9	-
32.1	2022	10	35	12	31	5	2
39	2018	34	61	32	10	4	-
32.2	2022	30	37	2	12	0	14
40	2018	50	56	34	1	0	-
33.1	2022	17	34	6	17	5	16
41	2018	39	53	46	2	1	-
34.1	2022	15	27	15	22	4	12
42	2018	23	57	49	9	3	-
35.1	2022	33	44	0	12	0	6
44	2018	30	75	30	4	2	-
36.1	2022	18	36	15	17	7	2
45	2018	15	57	51	17	1	-

37.1	2022	27	40	2	15	1	10
46	2018	36	73	26	4	2	-
38.1	2022	27	41	5	10	5	7
47	2018	44	66	20	9	2	-
39.1	2022	11	30	19	21	7	7
48	2018	14	58	49	15	5	-
40.1	2022	14	35	8	16	5	17
49	2018	15	51	60	11	4	-
41.1	2022	12	47	3	19	8	6
50	2018	27	66	38	7	3	-
42.1	2022	27	38	8	16	5	1
51	2018	40	58	30	10	3	-
42.2	2022	16	35	10	22	3	9
52	2018	35	57	37	10	2	-
43.1	2022	18	38	11	19	3	6
53	2018	26	58	51	4	2	-
44.1	2022	24	43	8	14	4	2
54	2018	41	69	25	4	2	-
45.1	2022	7	28	17	27	5	11
55	2018	36	66	33	5	1	-
46.1	2022	18	40	13	11	6	7
56	2018	25	67	41	6	2	-

Graph 11. Distribution of scores in the 2022 survey – channel width is 0.1 point. Cumulative percent of this distribution is shown with black squares.





## Identification of Strengths, Weaknesses, Opportunities and Threads of the current practice

### Ethical and professional aspects

A series of initiatives aimed at improving the conditions of scientific activity at IFJ PAN have been undertaken with the goal to promote ethical standards. The Committees already in force at IFJ PAN - the Anti-Mobbing Committee, the Disciplinary Committee, and the Work Council - have reviewed their webpages and updated them with more transparent information. The internal Anti-mobbing and Anti-discrimination Policy (2020) was introduced and websites containing information about the scope of activities and composition of the committees appointed at IFJ PAN (Ombudsman, Anti-mobbing Committee) were launched. The most up-to-date Code of Ethics for Researchers (3rd edition, 2020) has been published on the Ombudsman's website. One of the expert teams, composed of research scientists (R1-R4), has undertaken to develop a Supervisor's Guidebook which will be available to all employees.

In order to disseminate and provide access to scientific papers produced at IFJ PAN, the IFJ PAN Repository has been granted the possibility to issue unique DOI identifiers. This has become possible thanks to an individual IFJ PAN account set up in DOI DataCite service. Following the introduction of the Policy of Open Access to publications and research results at IFJ PAN, we have concentrated on the problem of research data management. For this purpose, we have appointed a group of coordinators from research divisions and organized a training to analyze the problem of research data management and creation of Research Data Management Plan required by national and European research funding agencies. We have also appointed a new Open Access Coordinator, whose task is to promote the principles of open research data.

As a publisher and in order to counteract unfair publishing practices, the Institute has adopted and put into practice ethical principles in accordance with the guidelines of the Committee on Publication Ethics and the Code of Ethics for Research Workers of the Polish Academy of Sciences, which sets out the responsibilities and rules for publishers, authors and reviewers.

In accordance with national legislation, we have introduced the requirement for conducting anti-plagiarism control of doctoral dissertations (within the Uniform Anti-Plagiarism System) at IFJ PAN (a report from this control constitutes one of the documents required for the procedure for the conferment of a doctoral degree). All doctoral dissertations are now publicly available following the implementation of principles of doctoral dissertation archiving in 2017.

In connection with interdisciplinary research conducted in the field of medical physics within the activities of Cyclotron Centre Bronowice, we have appointed the Medical Council (2020). We have also formed the Advisory Panel for Animal Welfare and launched a program for appointing a new laboratory



animal keeper (2022).

The Institute has implemented the Policy of Personal Data Protection and organized trainings for employees on the personal data protection and processing. The situation is monitored by way of periodical audits (conducted also by external auditors) of selected organizational units of the Institute. We also keep the register of processing operations and carry out risk analyses.

Pursuant to the Act on the Polish Academy of Sciences, all research workers of the Institute undergo periodic assessment. The criteria and procedure of conducting the assessment are laid down in the Rules for periodic assessment of researchers in 2020. Moreover, we have introduced the Detailed procedure and criteria for conducting the mid-term evaluation at the Krakow School of Interdisciplinary PhD Studies (2021).

Periodically, i.e., every 3 years, we conduct Reviews of scientific activity at IFJ PAN, at which accomplishments of research teams and scientific plans for the next years are presented. The employees of the Institute are kept updated on most important organizational and scientific issues by means of programs and minutes from the Scientific Council sessions made available in the Library and IFJ PAN Newsletter issued periodically (in PL and ENG version).

Things to improve:

The Institutes prides itself on a high level of internationalization of the PhD Studies. Our staff also includes foreign researchers. Because of recent inconveniences with regard to the availability of bi-lingual forms and the fact that the full English version of the institutional webpage is not yet ready etc., the division secretaries and direct supervisors join their efforts to help non-Polish workers to overcome language barriers. In the succeeding years we plan to make working conditions more comfortable for foreigners, although it must be noted that already in 2018 an assistant to foreign employees was appointed at IFJ PAN.

Guidelines on good practices concerning co-authorship are under preparation. They will be one of the priorities in the process of HRS4R implementation in the near future.

In connection with the development of the open access program in science, it has become necessary to analyze the problems of open research data with respect to legal and organizational matters.

IFJ PAN employees should receive more support for commercialization of research results. The Team for Commercialization should develop a guide for scientists presenting a pattern “from idea to implementation”.

The students of the PhD School should familiarize themselves with the PhD Student Code of Ethics while taking the vow. A new version of this Code should be placed on the PhD School website.



## Recruitment and selection

Over the last years, IFJ PAN filled many gaps by implementing a number of improvements in the recruitment and selection procedures for scientific, technical and administrative positions, in order to make them fully coherent with the OTM-R principles and policy. In particular, we have modified the Recruitment policy for scientific positions at the Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences and improved the following Regulations:

- a. Terms and conditions of recruitment for the positions of research assistants and adjuncts at the Henryk Niewodniczański Institute of Nuclear Physics PAN financed from statutory funds
- b. Terms and conditions of recruitment for the positions of professors and institute's professors at the Henryk Niewodniczański Institute of Nuclear Physics PAN financed from subsidies for primary statutory activity
- c. Terms and conditions for conducting competitions and recruitment for scientific positions financed from funds other than subsidies for primary statutory activity.

The OTM-R group has prepared candidate evaluation forms and recommendation cards, which are sent to candidates once the recruitment process is over. In order to improve the work of people responsible for opening recruitment procedures for scientific positions, we have developed a guide on how to publish job announcements. For this purpose, we have prepared applications for opening competitions and templates of recruitment reports. We have also implemented rules of communication with candidates at every stage of the recruitment. All the documents mentioned above have been published on a separate subpage of IFJ PAN created for this purpose. The OTM-R policy and the Recruitment Regulations have been translated into English and placed on the IFJ PAN website.

Most of recruitment procedures at IFJ PAN are conducted with the use of the above mentioned documents created by the OTM-R group. The group also collects feedback from selection committees, which serves to further improve the recruitment documentation.

All job announcements are published on the IFJ PAN website, in the nationwide database of the Ministry of Education and Science, and in EURAXESS. We have updated the Institute tab "Career" (in Polish and English). In justified cases job announcements are published on the websites of the National Science Centre and in industry databases. All vacancy announcements are published in Polish and English. As far as it is possible, we offer flexibility in the date of signing a job agreement.

We have also set up a single e-mail address for letters of applications. We require only documents necessary for the candidate's evaluation (letter of application, CV, reference letters, candidate's card). All the documents may be delivered in electronic form in Polish or English. To facilitate the process of applying for the positions of adjuncts, the OTM-R group has created a candidate's card that includes all essential information about a candidate necessary to assess his/her scientific accomplishments.

In accordance with the OTM-R policy, the applications are examined by, as possibly, a gender-balanced selection committee composed of at least 3 members. For the applicant's convenience, qualification interviews may be conducted via Zoom platform.



Each candidate receives feedback about the strong and weak sides of his/her application. To facilitate communication with candidates, we have created communication templates at subsequent stages of the recruitment procedure (in Polish and English).

Candidates may appeal against the decision of the selection committee by filing complaints with the Board of Appeal. To enable this, the IFJ PAN Scientific Council has established the Board of Appeal composed of 5 members /two women and three men/. The Board has prepared Work regulations for the Board of Appeal by the Scientific Council of the Institute of Nuclear Physics PAN, examining appeals against decisions of the Selection Committees in recruitment for scientific positions.

We have also launched an IFJ PAN welcome webpage in English dedicated to newly employed non-nationals to help them settle down in the new country and to provide information in matters of interest, such as organization of stay, completion of formalities in Polish offices, and essential information about the Institute. The webpage is divided into four sections with information about: what formalities to complete before arrival and after arrival, useful information regarding living in Poland, and legal information.

To assist foreigners in finding their way in the tangled undergrowth of Polish legislation, we have appointed an assistant to foreigners at the Institute. The assistant helps newcomers to apply for a visa and work permit, open a bank account, find accommodation, and in many other problematic situations. The assistant also serves as an interpreter.

The OTM-R group has organized trainings for heads of divisions and departments, heads of projects and division secretaries to improve the process of opening, conducting and finalizing recruitment. The trainees could familiarize themselves with the Policy of recruitment for scientific positions at IFJ PAN and with Recruitment regulations and discuss in detail documents developed by the OTM-R group /application for opening a competition, recruitment report, recommendation card, candidate evaluation form/. An essential aspect of the training was to sensitize the trainees to the problem of discrimination of candidates based on sex, age, ethical, national or social origin, sexual orientation, language, disability, political beliefs, and social or material status. To illustrate this problem, a video material was presented to instruct the participants how to get rid of any misleading preconceptions. The trainings were held in May/June 2022.

In order to further improve the transparency of the recruitment process, we have launched a job announcement archive on the IFJ PAN website.

#### Things to improve:

The requirements for describing the details of job advertisements are not well-defined. Until now, an electronic application system has not been introduced and no unified career development document is available. Also, post-competition protocol templates have not been updated. Some recruitment documents do not have their English counterparts, this including: i) English version of the Work Regulations of the Board of Appeal, ii) candidate evaluation form in recruitment of professors. Job announcement templates need improvements in the aspect of gender equality and masculine and feminine gender forms.



## Working conditions

The Institute provides satisfying working conditions to all employees. In comparison to other PAN institutes, IFJ PAN guarantees competitive salaries for its employees. Salary ranges according to career stage. All R1-R4 scientists have free access to professional research equipment. To facilitate this access, a research equipment database at IFJ PAN was developed.

The Division of Scientific Equipment and Infrastructure Construction (DAI) supports the development and modification of existing equipment available at IFJ PAN.

Researchers enjoy a high degree of freedom - senior research staff members and group leaders can freely choose the topics of their research and modify them by an annual update of the Task Plan. Access to a wide range of scientific journals is provided to all researchers and doctoral students.

IFJ PAN offers task-based working time to all scientific staff, which translates into flexible working hours and the possibility to reconcile private and professional life, keeping it balanced. Another option is part-time teleworking. In addition, the Institute provides women with necessary support for reconciling family and working life (adapting a room for parents, home office, flexible working hours). There are also two units that distribute financial support to the employees in need of assistance: the Social Benefits and Loans Fund and the Employee Benefit Fund.

The Ombudsman and the Board of Appeal (dealing with appeals in recruitment procedures) were appointed at IFJ PAN. A suggestion mailbox to submit suggestions and/or appeals is available to staff. The activities towards the recognition of mobbing, harassment, and discrimination and their possible prevention were initiated.

The members of decision-making bodies (Scientific Council, Work Council) are elected by means of open election based on a transparent procedure. Representatives of all age groups and scientific categories of employees (PhD students, young researchers, seniors) can be appointed to become members of the Councils.

Research staff can exert a critical influence on decision-making bodies. There are two independent trade unions at IFJ PAN. The members of the Scientific Council, a statutory body of the Institute that exercises supervision over its scientific activities, are selected through general elections. Another body operating at IFJ PAN is the Work Council. Furthermore, all researchers have continuous access to the Institute's authorities – both formal (weekly meetings gathering heads of scientific divisions and IFJ PAN directors) and informal (possibility to talk directly with directors practically on a daily basis). Internal meetings are also held within individual organizational units (divisions, departments).

At IFJ PAN the Equality Team was established and a document entitled: "Gender Equality Plan for the Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences for the years 2022-2025" was prepared.

Participation in national and international research networks and collaborative structures is favored. Every scientist can partake in national and international conferences, do internships, or carry out scientific consultations within funds allocated to each IFJ PAN division.

IFJ PAN supports foreign researchers: all announcements and notices sent to IFJ PAN employees and PhD students are bilingual (in Polish and English) and relevant documentation was translated into English. Moreover, an assistant to foreign employees was appointed – a person that readily answers all questions about formalities and procedures.

Over the years 2019-2021 three investment projects were completed: 2 equipment investments and 1 informative investment financed from the Ministry subsidies. Intensive inventory and renovation works of offices and rooms were carried out to improve working conditions of employees. Wheelchair-



friendly paths were set out for people with limited mobility and parking spots and toilets for disabled people were built.

The content of the IFJ PAN website and forms in electronic version are compliant with the Web Content Accessibility Guidelines; WCAG 2.1. Rules for uploading content to the IFJ PAN website have been introduced (Decree 45/2020).

The pandemic showed us how essential electronic document management is and that the possibility to settle matters via mass media is of crucial importance. For this reason, we purchased an HR cloud platform that enabled employees to electronically submit requests for holiday, childcare or special leave. The system also allowed workers to submit a request for harmful working conditions allowance or an application for opening recruitment for a job vacancy. The applications were automatically directed to decision-making persons, who with a single click could either accept or decline a given request.

Things to improve:

There is no procedure for use of indirect costs of projects realized at IFJ. According to the NCN procedure, the Institute is obliged to agree with the principal investigator to use at least 25% of the value of indirect costs. There exists no clear and motivating career code.

There is no standard procedure that defines the figure of mentors with a senior profile to provide support to researchers. Also, opportunities to purchase large research equipment (with a cost of over 500 000 PLN) are very limited. Salary increase for researchers is not systematic - it depends on the availability of funds and subvention. Uncertainty in earning funds for doctoral students may be detrimental to the recruitment of new people and development of research groups.

There is no sufficient encouragement and support for the process of commercialization of research results.

Despite efforts to eliminate architectural barriers for disabled people, many buildings in the IFJ PAN complex still need to be adapted to the needs of the handicapped.

## **Training and development**

Over the last years our staff could take part in or have undergone trainings in the area of: personal data protection, open access, intellectual property rights, aspects connected with formalities pertaining to grants, and commercialization of research results. Furthermore, every IFJ PAN employee undergoes occupational health and safety training and on-the-job training.

The Institute supports the research staff in their efforts to apply for a grant or project funding. Employees have access to national/international conferences and can participate in research internship programs, being supported by research grants or by the Institute's funds. The following departments offer their help in that matter: European Cooperation Unit and Economic Planning Unit (administrative units supporting scientists in grants/projects management). In recent months, in order to facilitate the supervision of funding obtained from external projects, IFJ PAN decided to merge both departments into one Research Project Service Department (DPN). This should result in shortening and facilitating administrative procedures and increasing the competences of employees of both departments.





IFJ PAN hosts several seminars where employees at every stage of their scientific career have the opportunity to present their research results and listen to a lecture given by external guests. In particular, a new series of seminars dedicated to IFJ PAN PhD students and Institute's scientists who have not yet earned the habilitation qualification was initiated. The seminars provide an opportunity to improve presentation skills and constitute a platform for discussions and conversations among young scientists that may be helpful in the course of preparation of doctoral theses or conference contributions. Participation in the seminars gives a chance to share research experience with colleagues or receive help and support in solving problems often encountered by young scientists at the threshold of their careers.

IFJ PAN supports the development of R1-R2 researchers: recently we introduced the IFJ PAN Director's Award to distinguish young researchers standing out in terms of research or organizational capabilities. A pilot mentorship program in two departments of Division 3 was initiated. The main objective of this program is to support and offer career counselling for staff holding supervisory positions.

A new PhD school, named Krakow School of Interdisciplinary PhD Studies (KISD), was founded by IFJ PAN as the result of the reorganization introduced by the Constitution for Science in Poland. The School comprises other six PAN Institutes and two faculties of the AGH University, while IFJ PAN is the coordinating institution. KISD trains PhD students in the domain of five basic science disciplines. The priority within the human resources area is to make the school a place that guarantees doctoral students a friendly environment from both scientific and social points of view.

#### Things to improve:

Trainings on soft skills for all employees, especially managers (Communication, Creativity, Conflict Resolution, Flexibility, Teamwork skills, Time Management, Interpersonal Communication Training, etc.) have to be organized and continued on the regular basis. Also, a training program for persons holding particular positions or performing particular functions, such as supervisory duties, or a mandatory training package for junior scientists and PhD students has to be established. It is imperative to develop a career development system.

Support for a commercialization and patenting process is inadequate: i) lack of description of an internal procedure for commercialization of research results, ii) lack of training on knowledge transfer, commercialization, and spin-off.

Promotion of employee self-development, i.e., acquiring new competencies, is not sufficient. Also, managerial skills of some supervisors have to be improved.

The Institute does not offer any career counselling, so the main responsibility for guidance in that matter falls on the staff holding supervisory positions. As a result, there is a large disproportion between the cooperation of supervisor-PhD student pairs. For this reason, it is of great importance to launch mentoring and coaching trainings at IFJ PAN.



## Implementation process

In 2016, the European Commission awarded “HR Excellence in Research” status to IFJ PAN. The basis for the award was an application in which the Institute assessed its own practices in accordance with the principles of the European Charter & Code for Research and implemented actions to offer an HR friendly environment. The actions have been collated in an action plan containing 46 items and covering the following areas: ethics and scientific integrity, recruitment, working conditions, and career development.

To oversee the realization of the HRS4R actions, a Steering Committee made of the representatives of the Directorate and scientific and administrative workers was appointed. Its composition takes into account gender balance, position categories and divisions of the Institute.

In the first phase of the implementation of the HRS4R strategy at IFJ PAN, priority was given to the problems of ethics and professional aspects. (This choice was dictated by the fact that the possibility of making improvements in other areas was suspended because of important legislation changes that were in progress and that were expected to result in a new act on science and higher education in Poland). A number of initiatives have been undertaken. A chain of advisory bodies/boards to which researchers may refer in cases of both vertical and horizontal conflicts was considerably expanded. In addition, apart from a Disciplinary Spokesman, who had already been operating at the Institute, we appointed an Ombudsman and a Board of Appeal. The Committees already in force at IFJ PAN (the Anti-Mobbing Committee, the Disciplinary Committee, and the Work Council) have reviewed their webpages and updated them with more transparent information. The Code of Ethics for Researchers has been published on the institutional webpage, and the PhD Student Self-Government has adopted the PhD Student Code of Ethics by way of resolution.

As more and more researchers (R1-R4) got involved in the HRS4R actions and engaged in numerous discussions and analyses, and because the legal background also began to crystallize, we started to focus also on other areas of HRS4R. Our organizational approach to the HRS4R implementation underwent a change too – it became more formalized.

In 2018, we expanded the original composition of the Steering Committee and appointed additional bodies: a large Working Group (more than 30 members), an OTM-R Team, and a Monitoring Team. Additionally, we formed ad hoc expert teams to identify problems on a current basis.

The introduction of the so-called Constitution for Science in 2018 entailed such changes as: modifications in the career path of researchers, changes in funding scientific units and in funding science (grants, scholarships, awards), new recruitment conditions, and changes in positions held by researchers.

Considering these new regulations, IFJ PAN implemented a number of activities in the field of streamlining and improving the conditions of recruitment by modifying the employment policy and introducing further employment regulations in order to make them fully coherent with the OTM-R principles and policy.



As the result of the reorganization introduced by the Constitution for Science in Poland, the doctoral (PhD) studies were replaced by doctoral schools that are obliged to provide interdisciplinary education. IFJ PAN succeeded, together with other six PAN Institutes and two faculties of the AGH University, in founding a new PhD school, named Krakow School of Interdisciplinary PhD Studies (KISD), to train PhD students in the domain of five basic science disciplines. Here, for IFJ PAN as the coordinating institution, the priority within the human resources area is: i) to make the school a place that guarantees doctoral students a friendly environment from both scientific and social points of view, ii) to build up a support system for international students, iii) to make the recruitment processes easily accessible and transparent, with special attention paid to the communication between the candidates and the selection committee.

The survey conducted in July 2018 clearly confirmed the success of our action plan in the priority areas – ethical and professional aspects. Simultaneously, we decided to continue our efforts to make our recruitment procedures more open and transparent, and we concentrated on improving working conditions, social security, and training system.

New circumstances led us once more to the reorganization of the HRS4R bodies. In 2020, the large Working Group was substituted by five Working Groups (WG), appointed according to the following subjects: WG1 “Development of young scientists and PhD students, PhD school, starter kit, career paths”, WG2 “Development of experienced research staff, academic supervision, mentoring, starter kit, career paths, supervision and responsibilities related to management”, WG3 “Dissemination and utilization of research outcomes, social involvement, intellectual property”, WG4 “Equality and diversity”, WG5 “Strategy, ethical principles, freedom of scientific research, professional responsibility, good practices in scientific research”.

Although the actions undertaken within HRS4R were mainly designed for researchers, the correct process of the strategy implementation also required the cooperation of administrative employees to make them aware about their role in creating an optimal environment for research and development. We have to emphasize the extraordinary involvement of our administrative workers in the implementation of the HRS4R policy. The administrative departments of the Institute have conducted internal reviews of their activities to adjust them to the principles of the Code and Charter. The administrative workers have also participated in discussions with the scientific staff to listen to their needs and suggestions. In the initial phase of the HRS4R implementation it was the responsibility of administrative workers to propagate the idea of HRS4R and the principles of the Code and Charter among the scientific staff. The involvement of our administrative workers in the process have not diminished with the increasing interest of the scientific employees. It is also worth stressing that the researchers (R1-R4) very positively assess the work and efforts of the IFJ PAN administrative departments.

In April 2022, another survey on the implementation of the principles of the Charter and Code was conducted among IFJ PAN researchers and PhD students. The analysis of the results identified the HR areas in which a significant progress was achieved. Also, weak points were identified and are the basis for an update of the Action Plan for next years. All these, together with the reports from the continuous monitoring of the HRS4R implementation by the Working Groups and individual interactions of the



Groups' members with other employees and PhD students, provided a basis for the Internal Review which was approved by the Board of Directors.

The basis for the successful implementation of the updated Action Plan is the cooperation of the Steering Committee with the Working Groups. Indeed, pursuant to the Decree of the IFJ PAN Director no. 13/2022 of March 13, 2022, the Steering Committee is obliged to continuously cooperate with the Working Groups via meetings held at least 3 times a year. This ensures a good flow of information between the Steering Committee and Working Groups. In order to use the full potential of people most interested in the implementation of HRS4R, a periodical update of the composition of both the Steering Committee and Working Groups is planned.

The Steering Committee will set directions and prioritize activities for the implementation of HRS4R and OTM-R policy. Also, the Committee will provide supervision, substantive support and consulting to the Working Groups and will coordinate their work. An important task of the Committee will be to develop a work schedule for the Working Groups, designate persons responsible for individual tasks and ensure that the implementation of HRS4R and OTM-R policy is compliant with the objectives of the general Strategy. Apart from that, the Committee will also be responsible for upgrading the Strategy for the implementation of HRS4R in IFJ PAN as well as the Action Plan and Gap Analysis, taking into account the needs of all categories of IFJ PAN employees and PhD students (gender, career stage, descent, organizational units). Promotion and communication of practices and documents developed as part of the implementation of HRS4R in IFJ PAN are also essential tasks of the Steering Committee.

Effective cooperation with Working Groups may require that in many cases the meetings should be organized more than 3 times a year. For this reason, we also plan to hold informal ad hoc meetings of small groups consisting of only a few members of the Steering Committee and Working Groups, whose goal will be to develop solutions to specific problems and present them for approval at general meetings of the Steering Committee and Working Groups.

The broadly composed Steering Committee for the HRS4R at IFJ PAN will continue to ensure that the actions are implemented and that the premises for the work on the revised action plan are set out. The Steering Committee will convene three meetings each year.

- At each meeting, the Steering Committee will consider updated reports for all actions.
  - Actions for which there is a need for clarification of the process and content must be considered specifically by the Steering Committee.
  - Actions for which the implementation deadline falls within the current semester must be summarised so that the Steering Committee has the basis for approving the completion of the actions.
  - The Steering Committee will conduct an annual status review of the implementation, which will be included in the IFJ PAN's annual report.
- The HRS4R efforts must be visible and flexible and must include a broad involvement of the target groups.
  - Broad involvement of employees is crucial for ensuring that the work is undertaken with the right perspective. This applies to both efforts related to individual actions and a general follow-up, and will be emphasised in connection with the work to revise the action plan.
  - Input related to new instruments, received centrally, must be continuously forwarded to those responsible for adjacent actions and, if necessary, be escalated to the Steering Committee in the event of any major changes.
- The Steering Committee's efforts should focus on the preparation of the revised action plan.



- Reporting and final assessments of actions must be supplemented with an outlook on further development of the priority areas.

We plan to conduct further surveys to monitor the working and development conditions, level of satisfaction and visibility of individual actions undertaken as part of HRS4R. In particular, we plan to introduce short anonymous questionnaires related to current activities performed by the Working Groups and dedicated to employees and PhD students. The possibility of submitting suggestions, problems and recommendations by the research community may be further enhanced by setting up an easily accessible box or an editable website (e.g., a Google document). Such suggestions, either personal or anonymous, should largely contribute to the increase of interest and involvement of the research community in HRS4R activities at IFJ PAN.

Systematic trainings dedicated to employees and pertaining to problems of HRS4R will also be continued. In particular, we plan to disseminate information on progress in the implementation of HRS4R at periodically and regularly organized seminars (2/year).

#### Short- and medium-term priorities

As mentioned in the Strategy 2019 document, in view of the uncertainties associated with the adoption of the Constitution for Science, our priorities for the years 2019-2021 were focused on professional and ethical aspects, which are universal independently of the existing legislation. Our priority is to continue this policy, with the main goal of making the Institute a place that guarantees the optimal development of scientific and professional careers and that is free from any forms of discrimination. In this respect, the implementation of the Gender Equality Plan at IFJ PAN is one of the urgent actions to undertake. Indeed, recently the Plan entered into force in accordance with IFJ PAN Director's Decree and its realization receives the highest support from the directors and other institutional bodies of the Institute.

Similarly, further development of mechanisms to ensure our compliance with the highest ethical standards in research activities should be one of topmost initiatives in the coming years. In this area of activity, priority will be given to trainings which address the issue of principles to be obeyed in order to ensure conformity with ethical guidelines. Also, the institutional bodies such as Ombudsman for Ethical Rights and Values in Scientific Work will be encouraged to create a forum at which various issues related to the researchers' ethical conduct can be discussed and the examples presented.

Another important priority of IFJ PAN is the constant effort to attract young scientists with the highest qualifications from Poland and abroad. To this end, the recruitment process for post-doc and permanent positions should be intensified. In particular, job advertisements should be posted on various international portals to ensure that the information reaches a very wide international research community. Also, an interactive platform or system for electronic submission of applications for recruitment purposes will have to be implemented to facilitate the collection of applications, receipt of letters of recommendation, as well as communication between candidates and the selection committee.

A broad spectrum of national and international collaborations, in which the Institute's employees participate, forms a firm footing to support and facilitate the international mobility of researchers. Based on this advantage, the Institute will promote and facilitate actions to allow young researchers to visit foreign scientifically renowned institutions within short-term or long-term research internships or contracts.



At the Institute a rather large number of national research grant/projects (around 160) are realized. However, although IFJ PAN is highly visible worldwide from the research quality point of view, the number of international projects granted to IFJ PAN is not very high. To encourage and support the research staff in their efforts to apply for international grants or projects funding is yet another Institute's high priority. The high level of internationalization of IFJ PAN in the area of scientific research should be a very helpful factor, but it should be complemented with providing information to potential grant applicants about various possibilities of research funding offered internationally. Further improvements within this issue can be done by strengthening the administrative units supporting scientists in grants/projects preparations.

From a broader perspective, in the coming years we plan to focus even more on introducing the internal acts to ensure a full compliance of the existing regulations with the HRS4R strategy.

#### Recent external and internal changes and their impact on HR strategy.

Changes in the job market connected with a dynamical increase in salaries in the private sector (driven by inflation and other factors) that followed the pandemic make it difficult to recruit administrative workers. If this trend continues, and if new external factors related to a decrease in the number of administrative workers available (quitting a job, retirement) add up to this situation, the Institute may face serious problems with recruiting suitably qualified staff.

Moreover, the runaway inflation that has found its origins mainly in the war in Ukraine contributes to the decrease in purchasing power of funds available to the Institute – the amount of subvention received from the Ministry of Education and Science has not changed this year. This situation has a negative impact on some of initiatives undertaken within HRS4R. As an example, the adaptation of traffic routes at the Institute to the needs of people with disabilities (e.g., installation of elevators) may go slower than anticipated because of a high increase in prices of supplies and services.

Another external factor that can affect the implementation of our initiatives is a growing competition in applications for scientific projects, especially the European ones, that can influence the evaluation of the Institute. A decreasing "success rate" translates into applying for better projects, which in turn entails more intensified scientific support for applicants.

Changes in project administration regulations force institutions to introduce uniform procedures related to salaries and book-keeping. The introduction of a uniform salary system for workers involved in scientific projects (June 2022) that promotes transparent salary increases of employees participating in projects should result in increased motivation for applying for grants, especially the European ones. On the other hand, a lack of clear rules for allocating direct costs to projects, divisions and the Institute may be detrimental to that motivation.

By a decree of IFJ PAN Director, we have developed and introduced the Gender Equality Plan (GEP) for IFJ PAN. Presently, fulfilling this condition is necessary for applying for European projects. The implementation of GEP over the next few years will strongly support the activities within HRS4R, especially those related to ethics and work conditions. The main goal of GEP is to guarantee: i) work-life



balance, ii) gender equality in management and decision-making bodies, iii) gender equality in recruitment procedures and career progress, iv) combating gender-based violence and harassment.

An influx of foreign scientists to the Institute (mainly Marie Curie and Cyclotron Centre Bronowice as part of the so-called international access to research infrastructure) is a phenomenon having a positive impact on the internationalization of the Institute, but we suffer from deficiencies in mentoring and administrative support for this group of employees. We need to intensify our activities to appoint a mentor for non-nationals, whose task would be to act as a guide for foreign scientists and to provide them with support and essential information.

### Potential strategic decisions which might impact the Action Plan

Although no significant changes to the IFJ PAN development strategy by the Institute's governing bodies are expected, there are plans by the Polish Academy of Sciences and the Ministry of Science and Higher Education to amend the Act on the Polish Academy of Sciences. Such an act, if introduced, will affect the principles of operation of all PAN institutes, the consequences of which are difficult to predict. The new regulations will have to be taken into account and their implications will have to be incorporated into the Action Plan. It will have to be ensured that the internal strategic documents are checked in order to comply with the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

Another external factor that may have an impact on the strategy is the national evaluation of higher education and research institutions in Poland which is being finalized. In the two recent evaluations, with the results issued in 2013 and 2017, IFJ PAN was awarded the highest category, A+, in science and engineering in Poland. At present, we are expecting the announcement of the results of the last evaluation, which encompasses the years 2017-2021. This last evaluation is being performed using criteria that are quite different from those employed in the former categorizations. The results of this process will have a direct impact on the funding of the Institute, and, in consequence, we might face the need for adjusting the activities proposed within HRS4R which require investments of funds.

### Implementation of OTM-R principles

In the period of 2019-2021 a series of improvements in the recruitment and selection procedures for scientific, technical, and administrative positions at IFJ PAN was introduced. The OTM-R group continued to prepare recruitment documents (in Polish and English) such as terms and conditions, job offer templates, candidate evaluation forms, recommendation forms, job opening requests, recruitment protocol templates. In addition, the OTM-R policy was published (in Polish and English) on the Institute's website. It gathers all information concerning the advertising, evaluation, and appointment phase, as well as complaint procedure.

Most of the recruitment processes at IFJ PAN are now carried out using the aforementioned documents created by the OTM-R group. The group is also gathering feedback from selection committees, which helps to refine the documents used.

All job advertisements are published on the IFJ PAN web page, in the national database of the Ministry of Education and Science as well as at EURAXESS. The "Career" website of the Institute has been



upgraded (in Polish and English). Whenever applicable, job offers are advertised on the National Science Centre web pages, as well as in discipline-specific databases. All scientific vacancies are announced in both Polish and English. Where possible, flexibility is offered as to the starting date of the contract.

A unified e-mail address for job applications has been created (@jobs). Only documents strictly necessary to assess the candidates (Application Form, CV, Recommendation Letters, Certificates) are requested. All documents can be provided in electronic format.

Following the OTM-R policy, applications are reviewed by at least a three-person and, whenever possible, gender-balanced recruitment committee. For applicant's convenience the interviews can be carried out via Zoom.

Each candidate receives feedback on strong and weak points of his/her application. For that purpose, templates for communication with candidates at different stages of the recruitment procedure have been created (in Polish and English). Candidates can appeal against a decision of the selection committee by lodging complaints with the Appeal Board.

A series of actions aimed at helping newly hired employees were undertaken: i) a welcome page for newcomers has been launched on the IFJ PAN website, ii) a dedicated position of an assistant for newcomers has been established, iii) support in the applications for visa and work permit is offered.

A dedicated website for recruitment committees with all necessary documents and guidelines has been created. Trainings for department and division heads, as well as principal investigators, to guide them through the recruitment documents, were prepared by the OTM-R group. The first training sessions were performed in May 2022.

An archive of scientific job offers was launched on the IFJ PAN website in order to enhance the transparency of the recruitment process.

#### Alignment of organizational policies with the HRS4R

The provisions of strategic documents at IFJ PAN mostly reflect general regulations of the Code and Charter, although not all IFJ PAN documents refer directly to the latter. Having this in mind, an important step in the work on the HRS4R implementation was to harmonize it with ongoing processes within the organisation and establish an action plan that would ensure our compliance with HRS4R requirements. The actions have been closely integrated with IFJ PAN's day-to-day operations and this approach has also formed the basis for the revision of the action plan. Emphasis has been placed on ensuring the follow-up and further development of actions so that the work is continued in the right direction and at a steady pace.

An exemplary action in this context is the preparation of a detailed task plan for a given year in which the researchers actively participate. Devising the plan, where research tasks are allocated to respective organizational units of the Institute, results in an environment favorable to the freedom of research, including the freedom of conscience, expression, and problem-solving approach.

Another example which demonstrates the alignment of organisational policies with the HRS4R is the recruitment policy. In 2018, after the Constitution for Science and amendments to the Labour Code entered into force, the Recruitment Policy for scientific positions at IFJ PAN was introduced by Decree 38/2018 of IFJ PAN Director. After being approved by the Scientific Council, it was supplemented with





regulations on competitions and recruitment procedures for given positions. The new Policy directly refers to the principles of the European Charter for Researchers, Code of Conduct for the Recruitment of Researchers, and OTM-R package. This Policy was updated by Decree 17/2021 of IFJ PAN Director of April 13, 2021.

Starting from 2017, our Institute has undertaken efforts to fully implement the Open Access policy. An institutional digital repository has been created to collect, archive and disseminate online scientific and popular science papers, in which authors use IFJ PAN as their affiliation. In 2018, by Decree 5/2018 of IFJ PAN Director of March 13, 2018, we introduced the Policy on Open Access to publications and research results at IFJ PAN and appointed the Open Access Coordinator.

The Institute provides strong support to its employees, especially those at the threshold of their scientific careers, in earning grants and funds to carry out scientific projects. Many of those grants help to establish close international collaborations and facilitate the mobility of researchers. In the last years, 13 our researchers became the laureates of the Bekker Programme (financed from the Polish National Agency of Academic Exchange (NAWA)), which aims at increasing the international mobility of Polish scientists. The winners received scholarships to cover travelling and accommodation expenses at renowned foreign research centers. The Institute has been also granted a sizeable amount of funds of approx. 3 mln PLN within the PROM and STER programs, whose goal is to enhance the scholarship exchange of PhD students and academic staff.

In the coming years we plan to focus even more on the practice of referring directly to the principles of the Code and Charter through internal acts of the Institute to further enhance the sense of close connections between the existing regulations and the HRS4R strategy.

#### Monitoring progress in HRS4R implementation

Monitoring the implementation of the principles of the Charter and Code is a day-to-day process and is mainly the responsibility of the Monitoring Team. The members of the Team check whether the respective Working Groups carry out their tasks in a timely manner and inform the Steering Committee about the status and progress of the implementation process. They also pass to the Steering Committee's suggestions for further works which the Working Groups should undertake. The Monitoring Team keeps internal institutional documentation, which helps to monitor the current progress and assess the level of achievement of the desired effects.

Owing to the composition of the Steering Committee and the double role of one of the project coordinators – the IFJ PAN Scientific Director, who not only participates in the work of the Committee but is also a member of the Monitoring Team – a smooth flow of information between the bodies responsible for the implementation process and the IFJ PAN authorities has been ensured.

In the last two years the system which allows assessment of the progress in HRS4R implementation has been improved. As stated earlier, we appointed six working groups, each responsible for the specific part of the Action Plan. The status of the realization of each action can be assessed by analyzing its indicator, which provides an objective measure. The degree of task completion is assessed using the corresponding indicators and reported by the Group Coordinator to the Monitoring Team. In the coming



years, we plan to broaden these interactions and organize regular meetings of the Monitoring Team with the Working Groups, held every 3-4 months, at which the degree of task completion will be discussed. Short reports from such meetings will be prepared by the Monitoring Team and presented to the Steering Committee. Based on these reports, every 6 months the Steering Committee will formulate opinions and provide recommendations regarding the action progress and assess the efficiency of the implemented actions.

After 1,5 years, a survey will be launched to collect additional feedback from employees and PhD students. Also, a series of meetings gathering separately various groups, e.g., young researchers, women, foreigners, will be organized on a regular basis and will constitute a source of suggestions and comments regarding the progress of HRS4R implementation. These inputs will be analyzed and used to modify the course of actions.

The Monitoring Team will strive to attain even greater transparency and accessibility of information on the progress of the implementation process in the succeeding years. This will be accomplished by publishing relevant reports or guides in the tab on the IFJ PAN webpage dedicated to HRS4R. Thanks to this solution the Monitoring Team will count on direct feedback from the scientists.

#### Making the HRS4R distinction more recognizable

We plan to undertake a series of steps to enhance the recognizability of the HRS4R distinction. So far, the HRS4R logo has already been placed on IFJ PAN websites, but its visibility may be additionally strengthened by putting it on top of the subpages with information what it represents and denotes. Similarly, the logo may be placed in the background of the Institute's profiles in social media (Facebook, YouTube), where we also plan to publish posts related to HRS4R and discussing important activities of the Working Groups.

The recognizability of the logo may be also increased by placing it in documents used in correspondence with persons or institutions. To achieve this, we plan to insert the logo and/or appropriate information in our company letterhead and in the brand book templates. Currently the information about the logo appears in job advertisements. The logo will appear e.g., in calls for application to the PhD School, letters of intent, correspondence with public and commercial entities, in model contracts for scientific cooperation, outreach event announcements, correspondence related to conferences and symposiums organized by IFJ PAN and conference and symposium proceedings. The logo or information about the distinction may also accompany grant applications.

We plan to modify templates of slides used by IFJ PAN employees to prepare conference and seminar presentations (PowerPoint/Latex) so that they will include the logo. Additionally, the logo may also be put on business cards or inserted in e-mail footers of scientific and administrative workers.

In general, the logo/appropriate information should appear wherever the Institute is affiliated or promoted, e.g., at fairs, Career Days, conferences. In addition, it may be displayed in popular science projects, e.g., in popular science movies produced at IFJ PAN and shared on social media.



Finally, the logo can be displayed in Institute's rooms where we receive guests (lecture hall, seminar rooms etc.). The logo can also be promoted outside of the Institute by supporting scientific mobility programs.

The HRS4R logo may also be used in e-mail messages addressed to students of the Krakow School of Interdisciplinary PhD Studies. The main objectives of the proposed and undertaken actions will be discussed at the first informative meeting organized at the inauguration of the academic year.

#### Ensuring implementation of the proposed actions

To ensure the implementation of the proposed actions, we have prepared favorable background at the Institute. First of all, we made sure that the Action Plan, considering the involvement of people and resources, is approved by the Board of Directors. Secondly, we expanded the original composition of the Steering Committee and appointed five working groups and an OTM-R working group, each responsible for the specific area of HRS4R, led by persons who showed their interest and became experienced during the HRS4R implementation phase. To make the compositions of the groups as representative as possible, group members were carefully selected by diversifying them based on: sex, job seniority, position held, career development progress, and allocation within IFJ PAN organizational units (Scientific Divisions and Departments).

Further, the Gender Equality Plan, which was introduced at IFJ PAN in February 2022, foresees a number of actions which are fully coherent with actions planned within the HRS4R activities and will also be fully supported by the management. We have also made efforts to establish formalized groups having as an objective research outreach: The Team for Popularization of Scientific Research IFJ PAN and The Team for Dissemination of Physics. These groups will provide continuous and professional support for several activities listed in the Action Plan.

#### Measuring progress by using indicators

In our Action Plan each activity is supplemented by a description of a goal that we hope to achieve and/or an indicator of the realization of this goal is proposed. Most indicators denote the number of people covered by a given activity, e.g., employees participating in a training course, or the number of specific events, e.g., the number of seminars organized.

Many actions come down to ensuring our scientists access to relevant information or drawing up specific documents. The IFJ PAN website plays a key role in the cases mentioned above – the webpage is a tool offering our employees access to relevant information. It is also the place where internal legal acts of the Institute are published.

It is a task of the Monitoring Team to maintain constant contact with persons responsible for executing specific actions, and then to compare the current indicators with the intended ones. The Steering Committee is to be informed about the progress of the work on a current basis.

Besides measuring the achievement of the intended indicators, we also plan to conduct another survey among R1-R4 scientists, the results of which will serve as the source of information about the



progress of the implementation of the Code and Charter principles, as viewed by the scientific staff. In case of objections expressed by the scientists, even if the action plan is fully executed, it will be necessary to undertake corrective measures (possibly after consultations with the respondents). All IFJ PAN employees may provide their feedback on the implementation process and the compatibility of the Institute's activities with the principles of the Code and Charter on-line (dedicated e-mail: hrs4r@ifj.edu.pl to contact the Coordinators and the Monitoring Team).

#### Preparing for the external review

In order to prepare for the external review, the Steering Committee, in cooperation with the Monitoring Team, has revised the execution of the Action Plan on a current basis. The Committee has checked whether all the activities are thoroughly documented (drawing up status reports, publishing information on webpages). During this time, the Monitoring Team has remained in close contact with the members of the Working Group, serving simultaneously as a communication link between the Working Groups and Steering Committee.

In April 2022, another survey among R1-R4 scientists was carried out, the results of which served as the source of information about the progress of the implementation of the Code and Charter principles, as viewed by the scientific staff (results of this survey are reported in one of the chapters of this document). On the basis of the results of this survey, new actions in the Action Plan have been proposed for the consecutive years.

To be ready for the European Commission's visit in 2022, which will entail reassessment/renewal of the HRS4R status, required documents have been prepared and uploaded to E-Tool for assessment. It has also been verified whether all the supporting documents are available on the IFJ PAN website dedicated to HRS4R. Where necessary, an update was done.

Once the Assessors to evaluate the implementation of HRS4R by our Institute are appointed, a detailed agenda of the site visit will be consulted with the Assessors. The meetings with the Board of Directors, Chairs of the Scientific Council, representatives of all groups of researchers (R1-R4), engineers, technicians, and administration staff will be scheduled. Relevant presentations will be prepared to provide a broad overview of the IFJ PAN's activities and environment.

#### Additional comments

The Monitoring Group played an important role in preparing the implementation of HRS4R. In fact, the central administrative responsibility for the implementation process, including establishment and follow-up of control and support systems, has been assigned to the Monitoring Group. This arrangement ensures smooth processes and facilitates a positive dialogue between the Steering Committee and those responsible for the implementation of the actions within the organisation - the Monitoring Group is a point of contact for any questions related to the follow-up of actions during this phase.

Of significant importance is also exchanging experience with other Polish institutions holding the HR Excellence in Research distinction, among others through the participation of the IFJ PAN project



coordinators in national conferences. These conferences, in part, focus on our local Polish needs, which may differ from those discussed at the international meetings.

Finally, one has to note that because of the COVID-19 pandemic, the last two years have unexpectedly been a very difficult period in the history of contemporary civilization. This unusual situation had a negative impact on many actions planned at the Institute, as they had to be suspended, unrealized or postponed to another period. This is clearly reflected in the status of quite a few items in the Action Plan. Despite the unfavorable external conditions, the Institute took many steps to ensure the continuity of the implementation of the HRS4R policy and is doing its best to catch up on the backlog of planned projects.