ANNEX III

UNESCO/POLAND CO-SPONSORED FELLOWSHIPS PROGRAMME IN ENGINEERING 2024
List of fields of research/Projects as determined by the Polish authorities.

Project No.	**FIELD OF RESEARCH/PROJECT TITLE** (Number of Fellowships)	**LIMIT OF AGE**	**ACADEMIC REQUIREMENT** minimum Be proficient in reading and writing in English.
	Biomedical Engineering (2 projects)		
01	Innovative methods for distant measurement of vital signs. (1)	not more than 32 years of age	B.Sc. degree in biomedical engineering, electrical engineering, or computer science (1) Candidates should have a general knowledge in computer usage and programming (C++, Java, Python etc.), electronic equipment, sensors (video camera, thermal imaging, radar), signal and image processing, human physiology, and physiological measurements. Scientific and technical reading and writing in English and experience with Matlab will also be welcome.
02	Video-based recognition of human emotional response to a visual stimulus. (1)	not more than 32 years of age	M.Sc. degree in biomedical engineering, electrical engineering, or computer science (2) General knowledge in computer usage and programming (C++, Java etc.), electronic equipment, signal and image processing, human physiology, and measurements. Scientific and technical reading and writing in English and experience with Matlab will also be welcome.
	Computer and Information Sciences (1 project)		
03	Intelligent artificial autonomous decision systems (AADS). (3)	not more than 32 years of age	B.Sc. or M.Sc. degree in computer science, mathematics, automatic control, robotics or computational physics/ astrophysics/ neurobiology (3) Excellent programming skills and experience in Matlab - a good working knowledge and Python/ Additional knowledge of PHP/MySQL; Java/C++/C#, no-SQL database programming are welcome. Analytic thinking ability is a necessary prerequisite to be fulfilled by the candidates. Interests and preliminary knowledge in one or more of the following fields: multicriteria optimization, forecasting, statistics, autonomous systems, including autonomous mobile robots and multi-robot teams, vision systems (such as moving objects tracking) autonomous webcrawlers. Pre-existing knowledge in neurosciences will be required from candidates wishing to undertake research theme 4 in Project description. Social communication skills and good teamwork record will be important assets.
	Earth and Related Environmental Sciences (12 projects)		
04	Recovery of phosphorus from wastewater using raw materials. (2)	not more than 32 years of age	B.Sc. degree in chemistry, materials science, environmental engineering, environmental sciences, or related scientific disciplines (4) Candidates should have a general knowledge of chemistry, analytical chemistry, and laboratory work. Additional biochemistry, biology, geochemistry, and material science knowledge will be a great asset. Scientific and technical reading and writing in English and experience with basic laboratory equipment will be required.

05	Synthesis of the adsorptive nanocomposite materials. (1)	not more than 32 years of age	B.Sc. degree in chemistry, materials science, environmental engineering, environmental sciences, or related scientific disciplines (5) Candidates should have a general knowledge of chemistry, material science and laboratory work. Additional materials engineering, geochemistry, and mineralogy knowledge will be a great asset. Scientific and technical reading and writing in English and experience with basic laboratory equipment will be required.
06	Genetic types of serpentinites; characterization and economic perspectives. (1)	not more than 32 years of age	B.Sc. degree in Geology Candidates should have a general knowledge in Mineralogy, Petrology and Geochemistry. Scientific and technical reading and writing in English and experience with literature studies, knowledge of methods of investigations of rocks and minerals (microscopic, spectroscopic, geochemical, and isotopic) and also interpretation of the results.
07	Geology and economic evaluation of Au-Cu selected deposit from one of SE Asia countries as key for country development. (1)	not more than 30 years of age	B.Sc. degree (6) Candidates should have a general knowledge in sample collection and preparation. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy, geochemistry, mineral deposit, and computer sciences. Samples from selected deposit or from mineral showing are required.
08	Geology and mineralization of the Pb-Zn-Ag deposit in the SE of Asia. An economic evaluation of the local raw materials. (2)	not more than 30 years of age	B.Sc. degree in geology (8) Candidates should have a general knowledge in the list of the samples should be including to the application form. Candidate without selected samples will be not accepted. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy, geochemistry, mineral deposit, and introduction to computer sciences.
09	Geology and mineralogy of the Cu-Ag indices as a potential for the red bed type deposit in S-America. (2)	not more than 32 years of age	B.Sc. degree in geology (9) Candidates should have a general knowledge in sample collection and preparation. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy, geochemistry, mineral deposit, and computer sciences. The list of the samples should be including to the application form. Candidate without selected samples will be not accepted.
10	Geology of the stratabound Cu-Ag deposits in S-America. (1)	not more than 32 years of age	B.Sc. degree in geology (10) Candidates should have a general knowledge in sample collection and preparation. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy, geochemistry, mineral deposit, and computer sciences. The list of the samples should be including to the application form. Candidate without selected samples will be not accepted.
11	Mineral characterization and evaluation of selected Sn-W (-Mo) deposit in SE Asia. (1)	not more than 30 years of age	B.Sc. degree in geology (11) Candidates should have a general knowledge in sample collection and preparation. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy, geochemistry, mineral deposit, and computer sciences. The list of the samples should be including to the application form. Candidate without selected samples will be not accepted.
12	Potential areas/deposits of one of SE Asia countries in some Cu-Au deposit as key for country development. (1)	not more than 30 years of age	B.Sc. degree in geology (12) Candidates should have a general knowledge in sample collection and preparation. Scientific and technical reading and writing in English and experience with general knowledge in geology, mineralogy,

			geochemistry, mineral deposit, and computer sciences. The list of the samples should be including to the application form. Candidate without selected samples will be not accepted.
13	Mineralogical characteristics of the epithermal systems in South America (2)	not more than 32 years of age	B.Sc. degree in geology (14) Candidates should have a general knowledge in ore deposits – especially porphyry and epithermal systems, microscopy in reflected light, mineralogy of ore minerals, general knowledge on South America geology and metallogeny, be familiar with EMPA and EDX analyses, own samples for study are REQUIRED. Scientific and technical reading and writing in English and experience with report and scientific article writing as well as preparation of presentations for public.
14	Nb-Ta-Sn-W mineralization in pegmatites, quartz veins and greisens from the Central Africa: Mineralogical and geochemical study. (2)	not more than 32 years of age	B.Sc. degree in geology (14) Candidates should have a general knowledge in ore deposits – especially pegmatites, microscopy in reflected light, mineralogy of ore minerals, granite geochemistry, general knowledge on Africa geology and metallogeny, be familiar with EMPA and EDX analyses, own samples for study are required. Scientific and technical reading and writing in English and experience with report and scientific article writing as well as preparation of presentations for public.
15	Assessment of geotourism potential of geological resources of selected regions in the developing countries. (3)	not more than 32 years of age	B.Sc. degree in geology (15) Candidates should have a general knowledge in geology¸ geography, tourism, geotourism, environment protection. Scientific and technical reading and writing in English and experience with geology, geography, tourism, geotourism, environment protection.
	Environmental Engineering, Mining and Energy (7 projects)		
16	A comprehensive study on tunnel ventilation, fire protection, and evacuation strategies. (1)	not more than 32 years of age	B.Sc. degree in civil, environmental engineering (16) Candidates should have a general knowledge in must possess a foundational understanding of key concepts, including tunnel ventilation systems, fire dynamics, subway stations, evacuation strategies, temperature distribution, fire extinguisher systems, transportation infrastructure impact, and the significance of experimental studies in addressing the intricate challenges of underground transportation systems. Scientific and technical reading and writing in English.
17	Optimizing thermal comfort through advanced ventilation and air management systems. (2)	not more than 32 years of age	B.Sc. degree in civil, environmental engineering (17) Candidates should have a general knowledge in optimizing thermal comfort through advanced ventilation and air management systems. scientific and technical reading and writing in English and experience with ventilation, thermal comfort, air conditioning, air distribution, indoor air pollution, diffuser, computational fluid dynamics.
18	The development of predictive models for energy and ecological efficiency assessment of integrated energy technologies. (2)	not more than 32 years of age	B.Sc. degree in chemical or environmental engineering (18) Candidates should have a general knowledge in renewable energy production, conventional energy production systems, integration of different energy sources, simulations, computations of energy efficiency, IT-oriented. Scientific and technical reading and writing in English and experience with scientific reports preparation, preparation of technical documentation of conducted research.

19	Research and application of selected sorption materials used in harmful gas absorbers. (1)	not more than 32 years of age	B.Sc. degree in chemistry sciences or material sciences (close to sorbents) or environmental sciences with good chemical background, possibly physics with specialization related to the previously mentioned sciences. (19) Candidates should have a general knowledge in chemical laboratory works + operation of measuring devices + instrumental analysis. Scientific and technical reading and writing in English and basic experience with carrying out experiments, collecting and summarizing collected data.
20	Transfer and adsorption of micropollutants on the surface of microplastics. (1)	not more than 32 years of age	B.Sc. degree in environmental and/or chemical engineering and/or chemistry, and/or environmental chemistry (20) Candidates should have a general knowledge in environmental and/or chemical engineering and/or chemistry, and/or environmental chemistry. Scientific and technical reading and writing in English and experience with environmental and/or chemical engineering and/or chemistry, and/or environmental chemistry.
21	Multi-objective optimization of energy system with share of VRES. (3)	not more than 32 years of age	B.SC. degree in mechanical engineering, environmental engineering but also other energy-related (21) Candidates should have a general knowledge in energy systems, power plants, renewables, programming, interest in mathematics welcomed. Scientific and technical reading and writing in English and experience with Energy systems, power generation, energy balances, energy end-use, decision making, energy policy, optimization, general algebraic modelling system (GAMS).
22	The renewable hybrid electric system with battery and green hydrogen (RHES-B GH2). (2)	not more than 32 years of age	B.Sc. degree in technical science (22) Candidates should have a general knowledge in energy, power system, hydrogen technologies, basic informatic/programming skills. Scientific and technical reading and writing in English and experience with experimental work in laboratory or experience in numerical simulation (Matlab Simulink, etc).
	Materials Engineering (3 projects)		
23	Additive manufacturing of complex shape ceramic parts. (2)	not more than 32 years of age	B.Sc. degree in chemical engineering or materials science or mechanical engineering (23) Candidates should have a general knowledge in in materials science or ceramic technology. Scientific and technical reading and writing in English.
24	Ceramic matrix composite for high-temperature applications. (1)	not more than 32 years of age	B.Sc. degree in chemical engineering or materials science or mechanical engineering (24) Candidates should have a general knowledge in materials science or ceramic technology. Scientific and technical reading and writing in English.
25	Advanced materials for solid oxide fuel cells. (2)	not more than 32 years of age	B.Sc. degree in materials science or chemical engineering or chemistry (25) Candidates should have a general knowledge in materials science and chemistry. Scientific and technical reading and writing in English and experience with laboratory work on materials synthesizing/testing will be required.
	Mechanical Engineering (4 projects)		

26	Automated transportation technology systems and devices (2)	not more than 32 years of age	B.Sc. degree (26) Candidates should have a general knowledge in computer programs, have a general knowledge related to transportation problems, including automation, availability, safety, and reliability problems. Scientific and technical reading and writing in English and experience with transportation technology systems and devices, automation, availability, safety, and reliability.
27	Cyber-physical systems (2)	not more than 32 years of age	B.Sc. degree (27) Candidates should have a general knowledge in computer programs, have a general knowledge related to cyber-physical systems, twin systems, transportation problems, including safety and reliability problems. Scientific and technical reading and writing in English and experience with cyber-physical systems, twin systems, safety, and reliability.
28	Decision-making processes in engineering (2)	not more than 32 years of age	B.Sc. degree (28) Candidates should have a general knowledge in computer programs, have a general knowledge in decision problem in engineering, including safety and reliability problems. Scientific and technical reading and writing in English and experience with problem base engineering systems and devices, decision problem in engineering, safety, and reliability.
29	Maintenance technology (2)	not more than 32 years of age	B.Sc. degree (29) Candidates should have a general knowledge in computer programs, have a general knowledge maintenance technology, including safety and reliability problems. Scientific and technical reading and writing in English and experience with maintenance technology systems and devices, safety, and reliability.
	Physical Sciences (1 project)		
30	Optimalization of the vertex reconstruction in heavy-ion collisions. (1)	not more than 32 years of age	B.Sc. degree in physics or computer science (degrees in similar subjects are also acceptable) (30) Scientific and technical reading and writing in English and experience with physics and programming i C++. Experience with python, git, and/or Linux would be advantageous.
	Sociology (1 project)		
31	Interrelations between new technologies and social and economic life in globalizing world. (1)	not more than 32 years of age	B.Sc. or M.Sc. degree, MA degree in humanities or social sciences or economics (31) General knowledge in world economics.
50 positions into 31 proposed projects			