



## **BREAKOUT SESSIONS OF THE XVI INTERNATIONAL FORUM-CONTEST OF STUDENTS AND YOUNG RESEARCHERS “TOPICAL ISSUES OF RATIONAL USE OF NATURAL RESOURCES”**

### ***1. New approaches to resolving oil & gas sector-specific issues***

- efficient raw hydrocarbon production engineering, including enhancement of oil and gas recovery methods;
- advanced technologies of opening and development of hydrocarbon reservoirs;
- efficient technologies of oil and natural gas transportation;
- technologies of reducing losses during hydrocarbons;
- prospects for natural gas, gaseous motor fuel and liquefied natural gas;
- gas as a bridge fuel;
- intelligent oil & gas enterprise;
- gas hydrates: recovery processes and prospects for the development.

### ***2. Technologies of integrated processing of mineral raw materials with further production of new generation materials***

- chemical technologies of non-organic matters of hydrocarbons;
- synthesis and refining of hydrocarbons;
- pyro- and hydrometallurgical processes;
- extraction of materials with unique properties;
- deep processing of mineral resources with the production of high-grade concentrates;
- loop technologies and recycling of technogenic and household wastes,
- deep processing of coals and carbon materials.

### ***3. Geotechnologies of resource extraction: current challenges and prospects***

#### ***3.1. Solid minerals mining technologies. Industrial and labor safety***

- technologies of open-cast, underground and combined mining of solid minerals;
- advanced blasting technologies;
- systems of industrial and labor safety management at the enterprises of the mineral resources sector;

- gas control in the process of mining solid minerals;
- thermal, dust and gas conditions of mines;
- mining engineering 4.0 (intelligent mine).

### *3.2. Underground and ground space development technologies. Rock mechanics and control of rock conditions*

- technologies of underground space development;
- management of rock conditions in the process of mining solid minerals;
- geodesy, geodynamics and land modeling;
- topical issues of land management and cadastre.

## ***4. Geological mapping, exploration, and prospecting of mineral resources***

- geology, exploration, and prospecting of solid minerals;
- geology, exploration, and prospecting of oil & gas deposits;
- geotectonics, geodynamics, regional geology, and stratigraphy;
- mineralogy, petrology, and geochemistry;
- digital technologies of the survey, prospecting and modeling of hydrocarbon fields;
- hydrogeology and geological engineering;
- geophysics and geophysical techniques for mineral exploration and prospecting.

## ***5. Economics of sustainability and global investment trends***

- principles of circular economy and cost-effective use of resources;
- economics of critical materials;
- the role of stock exchanges and investment companies in industrial economics;
- current requirements to the quality of human resources in the mineral resources sector;
- economic and legal issues of energy industry development;
- innovative entrepreneurship and venture capital funding in the mineral resources sector;
- development of strategizing and business modeling in the companies of the mineral resources sector.

## ***6. Information telecommunication technologies and digital transformation***

- digitalization and automation of technological processes in metallurgy and mining, oil refining and mechanical engineering;

- digital logistics centers and computer simulators;
- industrial mechatronics systems and robottechnics;
- intelligent energy-saving technologies;
- information technologies and cybersecurity in the mineral resources sector.

## ***7. Equipment, vehicle maintenance and energy efficiency at the enterprises of the mineral resources sector***

### *7.1. Innovations and prospects for the developments of mining mechanical engineering*

- technologies, equipment, and automation of mechanical production operations;
- mining machines and equipment;
- material engineering and materials-processing technologies;
- tool engineering, metrology, and metrological supervision;
- transportation systems and logistics in the mineral resources sector;
- automotive vehicles, implementation of transportation and management for automobile transport.

### *7.2. Energy efficiency at the enterprise of the mineral resources sector.*

- electrification and automation of mining;
- renewable and alternative energy resources;
- intelligent technologies and digital transformation in power engineering;
- energy saving and energy efficiency technologies.

## ***8. Climatic changes, environmental activity, and principles of sustainable development in the mining facility***

### *8.1. Sustainable development of regions and environmental safety*

- monitoring and assessment of the technogenic impact of industrial facilities of the mineral resources sector on components of the environment;
- issues of sustainable development of regions and industrial agglomerations;
- rational use and conservation of natural resources;
- assessment and control of ecological safety in the process of the mineral resources sector industrial facilities' operations.

### *8.2. Waste management utilization, water treatment, off-gas treatment and land reclamation*

- innovation methods of gas treatment;
- innovation methods of water treatment;

- advanced techniques of reclamation and revegetation of derelict and contaminated areas;
- innovation methods of production and consumption waste disposal.

### ***9. Topical issues and contradictions of modern society development***

- world fuel and energy complex as an area of interest, conflicts and contradictions between the actors of political relationship;
- social and political conflicts in modern society among young people;
- policy of international cooperation in management and resolution of social and political conflicts: theory and practice;
- role of mediation in the system of alternative dispute and conflict resolution;
- engineering education: social, cultural and psychological aspects of research and development trends.

### ***10. Current aspects of architectural and urban activities***

- strategy of spatial evolution and urban comfort zone;
- state-of-art approaches to the revitalization of the areas, urban spaces and historic development;
- current trends in the development of underground urbanistics;
- advanced trends in the development of architectural and urban theoretical research;
- innovations in architectural design.

### ***Creativity competition for students and graduate students in architecture and civil engineering in the following nominated categories:***

- design of a public building;
- design of a multi-family house;
- design of a single-family house.