



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 robotechnics;
- 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.