

Oslo, Norway  
February 27, 2013



# Cooperation with Universities and Centers of Norway

**Gennadiy PIVNYAK,**  
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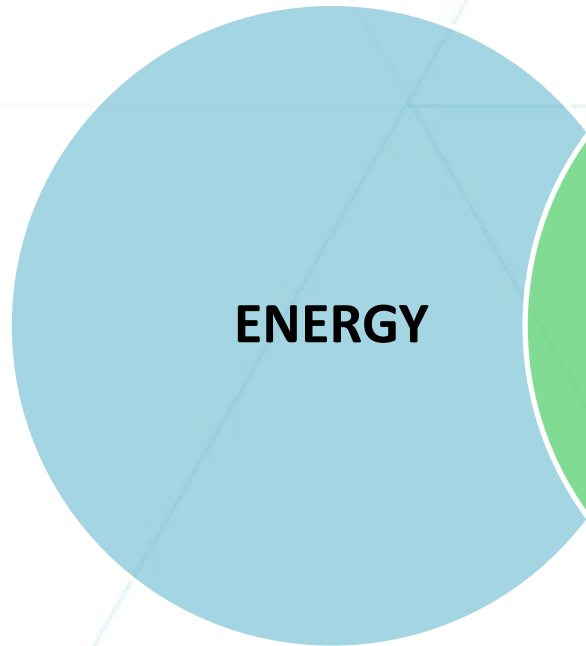
# IN ACCORDANCE WITH TIME – main priority in University activity



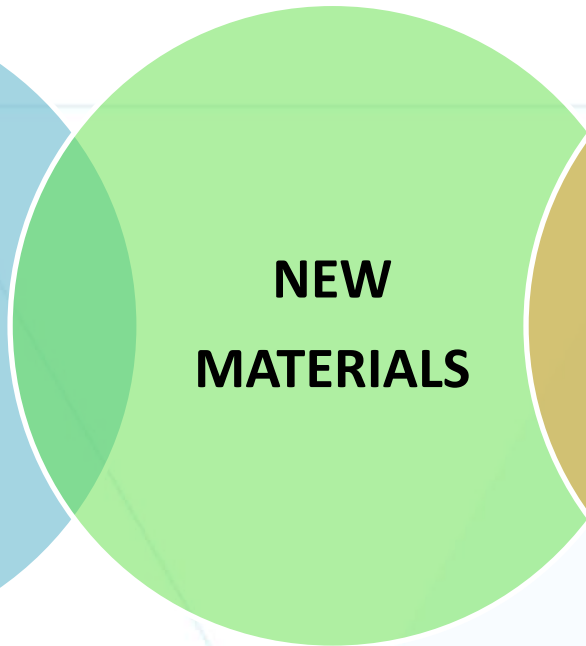
**National Mining University** (founded in 1899) is a research national higher education establishment that characterized by fundamentality and system academic approach, complex integration of education, research and innovations, diversification of international activity.

**At present University is oriented on innovative growth of national economics via development of mineral recourse base of Ukraine, implementation and effective use of high technologies and programs for sustainable development.**

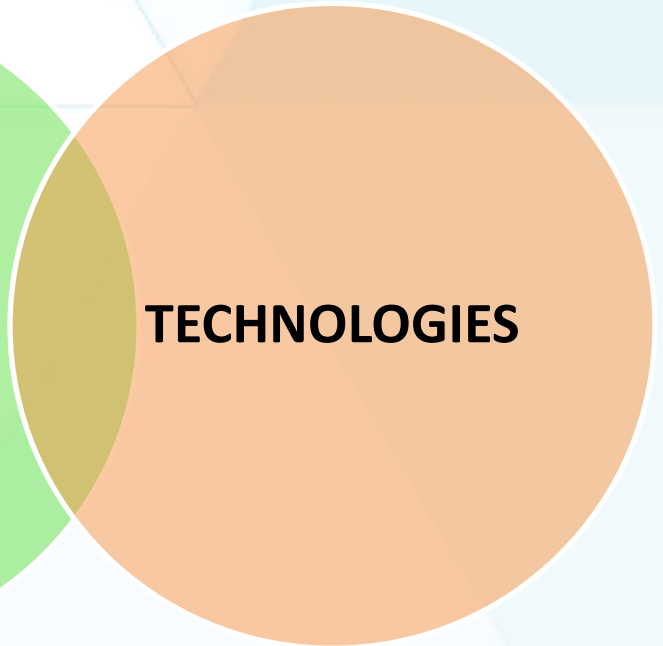
# Main areas of training specialists and research



**ENERGY**



**NEW  
MATERIALS**



**TECHNOLOGIES**



## Priority areas:

Development of fuel and power engineering complex, raw materials processing;

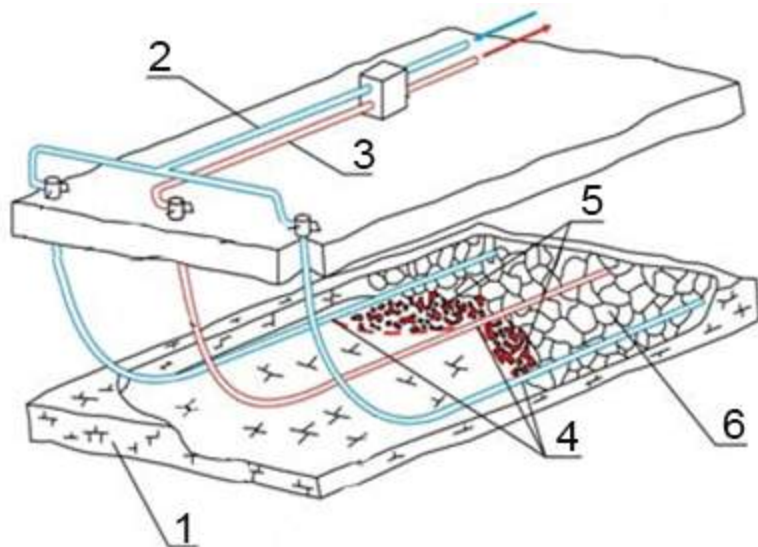
Mechanical engineering;

Technologies of mining and efficient use of coal, ores of ferrous and non-ferrous metals;

Development and implementation of resource and power saving Geoinformation technologies;

Up-to-date systems of industrial management;

Ecology and environmental engineering.

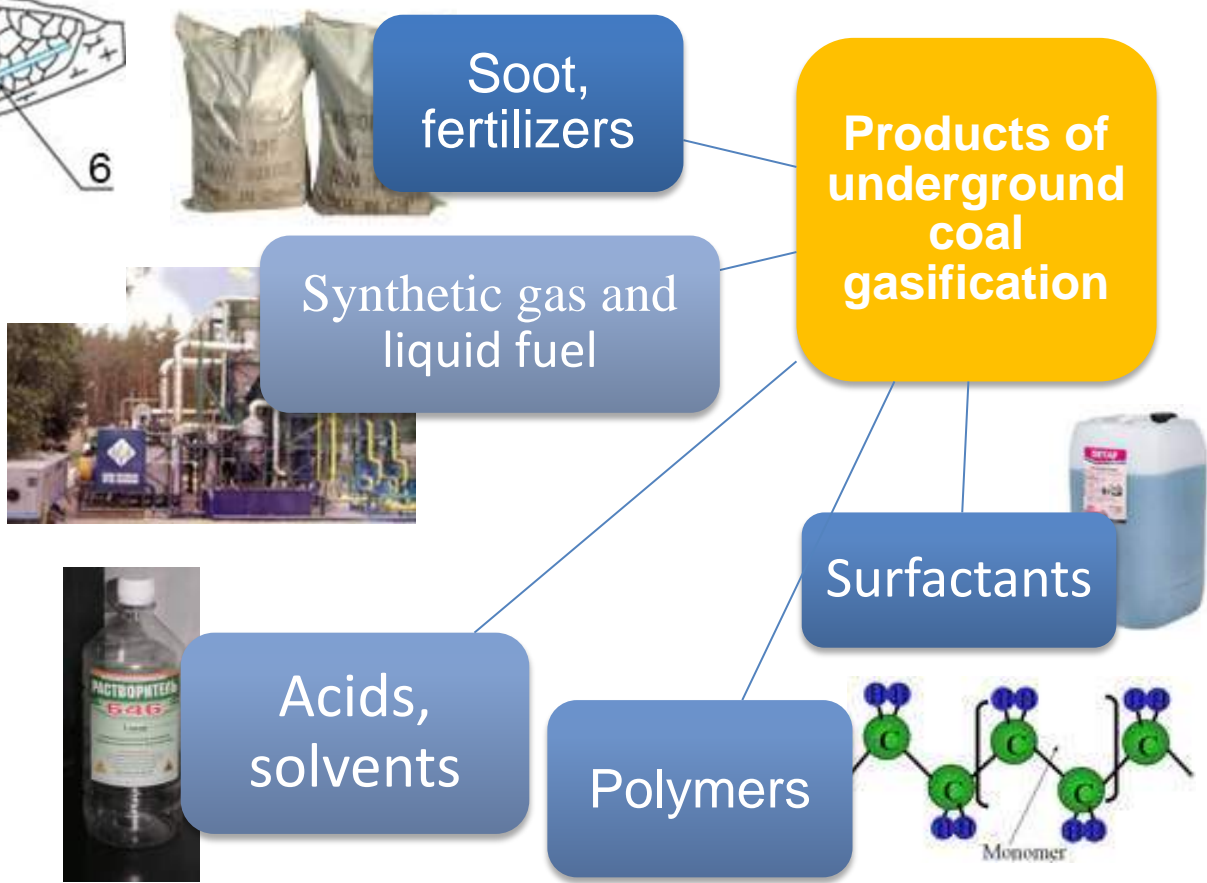


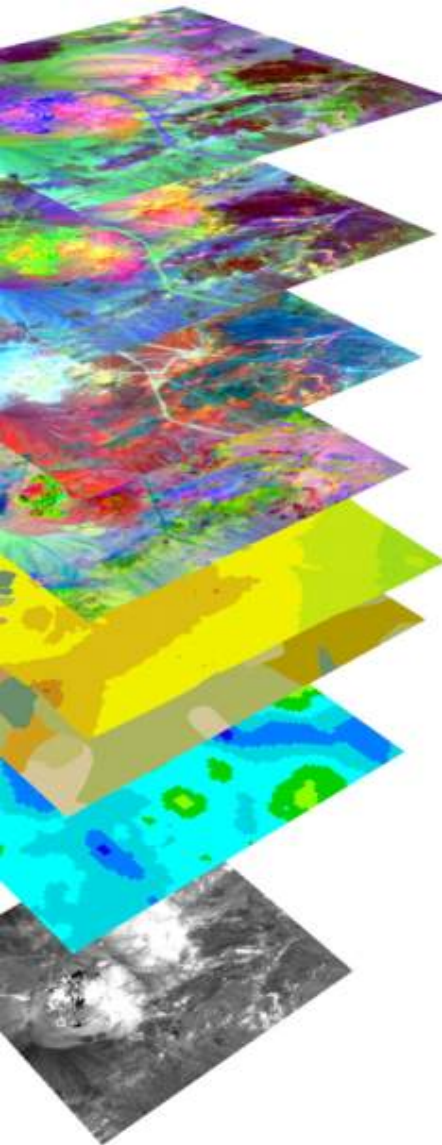
**Principal scheme of borehole of coal seams underground gasification:**

- 1 – coal seam;
- 2 – injection well;
- 3 – gas relief well;
- 4 – mobile sparking pipeline;
- 5 – combustion face (gasification channel);
- 6 – worked-out area.

## EXPECTED RESULTS:

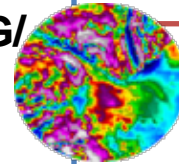
Thermal and electric power, chemical products, gas, liquefied (gaseous) motor fuel, hydrogen etc.





**GIS “RAPID”** is specialized software for decision-makers in the sphere of using natural resources, environmental safety and forecasting emergency situations .

**GEOECOLOGICAL ZONING/  
MAN-CAUSED SITUATION  
FORECAST**



subsystem GIS RAPID

Cartographical, geoecological and satellite data processing

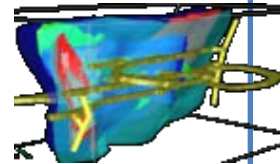
Territory zoning and classification

Man-caused danger estimation

Geoecological situation forecast and disaster forecast

Natural resources search

**GEOLOGICAL ENVIRONMENT  
3D MODELING**



subsystem GIS CONTOUR

Natural and man-caused objects and events 3D modeling

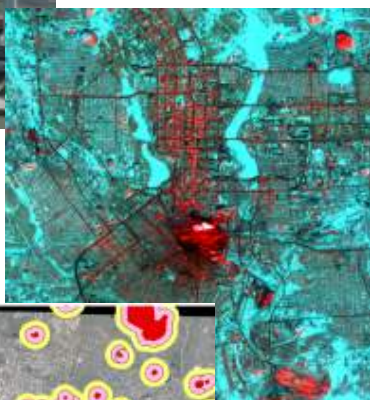
Horizon-oriented plans and profiles construction

Geological environment objects 2D and 3D visualization

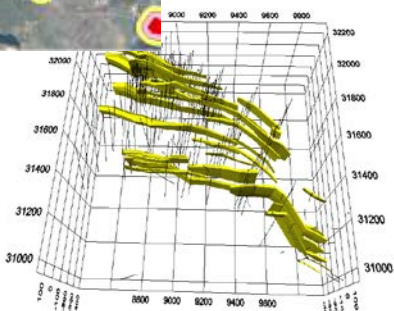
# SPACE MONITORING AND GEOINFORMATION TECHNOLOGIES APPLICATION



Thermal abnormalities in Donetsk area

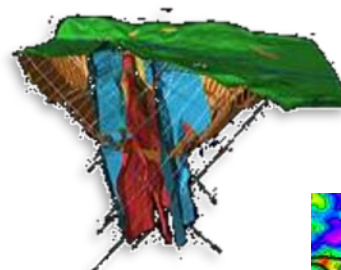


Industrial waste dumps of Donetsk and buffer sanitary zones

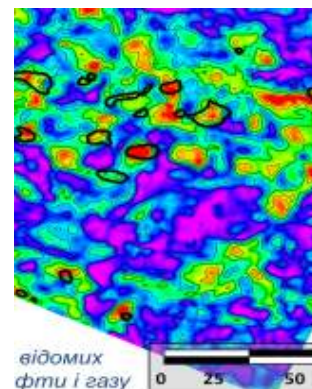


3D-model of ore bodies for mineral deposits

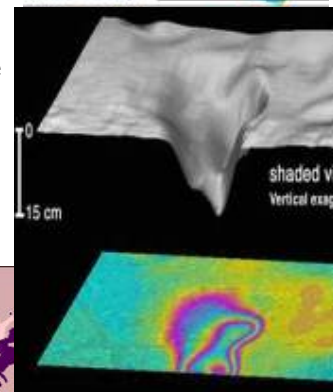
- raster and vector data input, storage, transformation and filtration;
- making geological databases;
- objects and events mapping;
- ecological zoning;
- forecast and detection of man-caused disaster;
- man-caused disasters estimation;
- forecast, search and economic evaluation of natural and man-caused deposits;
- environmental object and event 3D modeling.



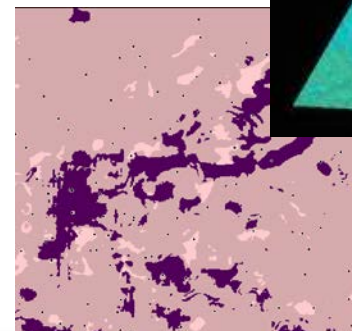
Prognostic map of oil-gas deposits



Numerical model for soil subsidence in the city



Expected zones of abnormal methane concentration at the coal mine "Zasyad'ko"



# Energy-saving technologies with using heat pumps



## **HEAT PUMP PLANT HPP-800**

**( Coal-mine “Blagodatnaya” of joint-stock company “DTEC Pavlogradugol” )**

The technology is based on additional source of low-capacity heat of mine waters and other sewages that allows obtain hot water for heating and hot water supply.

### **General technical characteristics:**

Heat capacity per unit	800 kWt
Number of heat pumping units	3
Volume of hot water	120 m <sup>3</sup>
Time for water pre-treatment	7 hours
Temperature of mine waters	16-17°C
Temperature of cold water	8-15°C
Temperature of hot water	42-45°C
Water discharge	200 m <sup>3</sup> /s

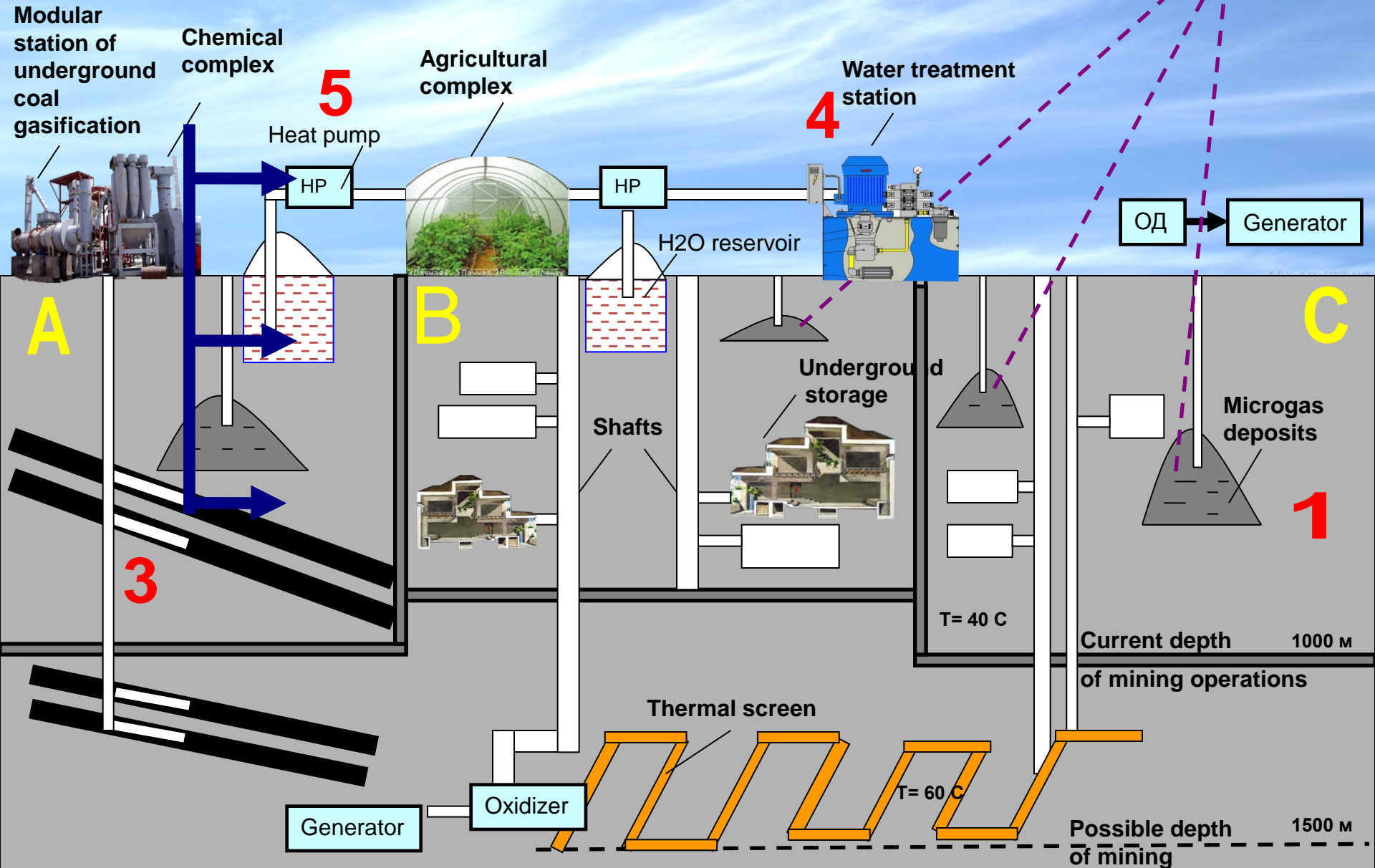




# POST-MINING technologies

**A** – closed mine, **B** – mine-hydroregulator, **C** – mine in operation

Relevant technologies are marked with certain numbers



# Consortium for implementing programs on sustainable development



## International University of Resources



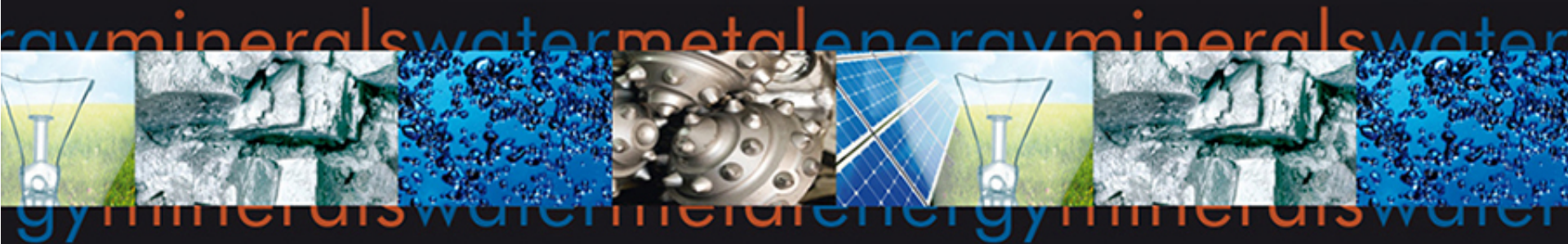
Within the framework of the International University of Resources, partner Universities have established a joint degree program "**International Master of Science in Advanced Mineral Resources Development**".

The **program purposes** are: development of collaboration in academic and research sphere, enhancement of student mobility, obtaining diplomas from 3 Universities, resolving problems related to rational use of world mineral resources.



### ***IUR Partner Universities:***

TU Bergakademie Freiberg  
National Mining University Dnipropetrovsk  
AGH University of Science and Technology Krakow  
Saint Petersburg Mining Institute  
Montanuniversität Leoben



**58** international resource universities from **39** countries of Central and Western Europe, Asia, Africa, America have founded World Forum of Resource Universities on Sustainability.

**Objective** – strategy of sustainable development of society and implementation of modern technologies for rational using resources and their balanced consumption, saving and renewal potential of natural ecosystems.





**Partners:**

Universities from EU,  
Armenia, Russia, Ukraine,  
Germany, Lithuania, Israel

**“Two-level educational programs in E-commerce for development information society in Russia, Ukraine, Israel”**

*Coordinator: Vilnius technical University named after Gedeminas (Lithuania)*



**Partners:**

Universities from EU,  
Armenia, Russia, Ukraine

**«Informatics and Management»:  
qualification frames in standards of Bologna  
process**

*Coordinator: University Coblenz-Landau (Germany)*



**Partners:**

Universities from EU,  
Moldova, Georgia,  
Bielorus, Ukraine

**Integrated system of University management :  
EU experience adapted in NIS states**

*Coordinator: University of Mary Curie Skłodowskie (Poland)*

## ***Educational area***

**Academic exchange both of students and academics (teachers and researchers):**

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- terminal programs and Master's degree programs within the framework of the Bologna Declaration;

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- industrial trainings and excursions for Ukrainian and Norwegian students at the leading enterprises of Ukraine and Norway;

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- participation in the International Schools (for example, Leadership School of the National Mining University, School of Strategic Ecological Evaluation of Brandenburg Technical University (Cottbus) at the National Mining University, business-weeks etc.);

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- short-term cycles of lectures, seminars both for undergraduate and postgraduate students within the programs of Visiting Professors.

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## ***Research area***

- rock mechanics modeling of the projects on the underground construction of the objects both for industrial and civil purposes;
- geological information technology of the integrated analysis of geological and geophysical and remote sensing data for solving the tasks on forecast and prospecting mineral resources of different types of minerals: ores, non-metallic, hydrocarbons;
- forecast and modeling of the phenomena, which take place in sedimentation mass of rocks during its deformation in the process of tectonic evolution, aimed at discovery and identification of zones of oil and gas concentration and their migration pathways;
- modeling of migration currents in a man-made environment, and determination of protective properties of geological sediments, environmental risks and methods of their neutralization;
- methods of prospecting and exploitation of oil, gas and gas hydrate deposits on the sea bottom and sea shelf ;
- automatization of the industrial processes;

## ***Research area***

- realization of the ecological projects within the concept  
**«Post-Mining»** and **«Synchro-Mining»**;

- energy saving technologies with the use of thermal pumps and  
abandoned field energy resource;

- Controlling blast hole drill wear and stress distribution in constructive  
elements of drilling platform while operation on the basis of acoustic  
emission effect.

- estimation of ground slopes sustainability under the terms of man-  
made hydrodynamics, taking into account indefiniteness of the  
parameters of the natural factors;

- Establishment of high efficient technologies and implementation of  
projects for effective using natural resources in the context of  
International program for sustainability.

## ***Socio-cultural area***

- organization and running joint cultural events and sports competitions which will contribute to the development of mutual respect between the nations;
- organization and running cultural awareness local excursions

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- information exchange on students self-governing in Ukraine and Norway, including the use of the Internet-resource.

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***Thank you for attention!***

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