Georgian Technical University

Department of science

General Information

The Georgian Technical University (GTU), before 1992 known as Georgian Polytechnic Institute, has existed under different names since 1922. This is one of the largest educational and scientific engineering institutions in South Caucasian region. GTU consists of 10 faculties that are home to 59 departments, contains of 17 research institutes and 150 scientific-educational centers. Currently up to 22000 students served by 1750 professors are studying on different specialties.

General Information

GTU offers a challenging intellectual environment in differe fields of study that are distributed among eight faculties. These faculties are:

- **Faculty of Civil Engineering;**
- **Faculty of Power Engineering and Telecommunication;**
- **Faculty of Mining and Geology;**
- **Faculty of Chemical Technology and Metallurgy;**
- **Faculty of Architecture, Urbanistics and Design;**
- **Faculty of Informatics and Control Systems;**
- **Faculty of Transportation and Mechanical Engineering;**
- **Business Engineering Faculty;**
- **Faculty of Agrarian sciences and Bio Systems Engineering;**
- **International School of Design.**

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Educational Activity

From 1995 GTU gradually began installation of new training standards, which officially has accepted, when the country at 2005 joined the well known Bologna process. The learning outcomes of an designed educational programs, syllabi and modules are described through field-specific and general competences.

Currently the following 211 educational curriculums have been developed and accredited:

- 58 vocational programs;
- 69 bachelor's degree programs;
- 46 master’s degree programs;
- 38 PhD programs.

Programs delivered in English

- BCs in mechanical Engineering and Technology;
- BCs in Informatics;
- BCs in Engineering Physics;
- MCs in Business administration;
- MCs in Biomedical Engineering;
- MCs in Technology management and politics.

General Educational Facilities

- To GTU belongs 10 educational premises.
- *Central Library* possesses: 2,7 million books, periodic and other printing materials; 12500 electronic versions of books;
- *Computer centers* – GTU is possessed of several computer centers with 720 computers totally;
- *Educational labs* – at each faculty functioning as educational as well scientific labs. Among these labs it is necessary to mark out labs at Power Engineering and Telecommunication, Civil Engineering, Faculty of Informatics and Control and Mining and Geology faculties.

Scientific activities at Georgian Technical University

17 scientific institutes and 126 scientific-educational centers provide scientific-research works in such important fields as: information technologies, cybernetics and automatic systems, metallurgy and chemical technologies, nano-technologies, biotechnology, machine building, aeronautics and astronautics, civil engineering and architect, communications, power engineering, transport, mining and geology, etc.

Affliated Scientific-Research Institutes of Georgian Technical University

- V.Chavchanidze Institute of Cybernetics;
- N.Muskhelishvili Institute of computational mathematics;
- A.Eliashvili Institute of control systems;
- Institute of food industry;
- Engineering institute of membrane technologies;
- Georgian Water Management Institute;
- Institute of hydrogeology and engineering geology;
- Institute of hydrometeorology;
- Institute “Talgha”;

Affiliated Scientific-Research Institutes of Georgian Technical University

- Centre of industrial facilities and natural resources;
- Institute “Techinformi”;
- Institute of biotechnologies;
- Scientific production association – “Analytical Instruments”;
- Institute of constructions, special systems and engineering provision.
- Department of ecological monitoring
- Centre of quantum physics and engineering technologies
- Scientific-technological center of sensor electronics and material engineering

MUSKHELISHVILI INSTITUTE OF COMPUTATIONAL MATHEMATICS

RESEARCH DEPARTMENTS

- Department of Probabilistic and Statistical Methods;
- Department of Computational Methods;
- Department of Informatics;
- Department of Mathematical Modeling.

MUSKHELISHVILI INSTITUTE OF COMPUTATIONAL MATHEMATICS

BASIC FIELDS OF RESEARCHES

- Programming and Information Technology
- Computational Methods
- Fundamental and Applied Problems of Probability Theory and Mathematical statistics
- Functional Analysis
- Cryptography
- Game Theory
- Operation Research
- Numerical Methods of Optimization Theory
- Approximation Theory

MUSKHELISHVILI INSTITUTE OF COMPUTATIONAL MATHEMATICS

ELABORATED PRODUCTS WITH PROGRAMMING PACKAGES

- "NOFIMA" – the package of approximate solution of problems of elasticity theory and of certain boundary problems;
- Automatic control system of special appointment for marine forces;
- Optimal development and control problems of energy system and agriculture complexes of the country;
- Software for Building Mechanics.

V.Chavchanidze Institute of Cybernetics

• ***Department of Mathematical Cybernetics :***
-Analytical and complexity theory of quantum computing;
-Research of algebraic methods of fuzzy logic;
- Preliminary processing of the information for PRL (pattern recognition with learning) systems;
• ***Department of Stochastic Analysis and Mathematical Modeling :***
-Methods of numerical modeling, prediction and control of stochastic processes and systems;
- The Mathematical finance theory;
• ***Department of the Applied Pattern Recognition Systems :***
- The robotic system for selective gathering of a tea sheet;
- Processing of bases of semantic information theory;

The robotic system for selective gathering of tea leaves

Several patterns of colored reflective displays

V.Chavchanidze Institute of Cybernetics

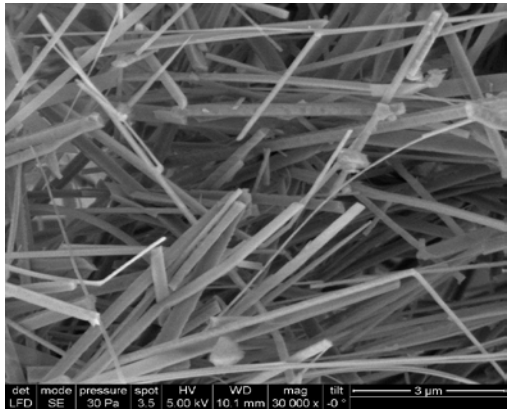
- ***Department of Biocybernetic Systems:***

  - Using of infrared irradiation for optical information processing for the diagnoses of prostate cancer at early stage of its development;
  - creating of the active sonar analyzer's computer model based on the dolphin's echolocation system;

Liquid cristal display needing no internal illumination

- ***Department of the Computer Engineering Elements and Nanomaterials :***

  - Development of new technologies for the synthesis of innovative one dimensional materials;
  - Determine the effectiveness of electro-hydraulic arrangement for nano-fluids containing magnetite used in medicine



Structure of new type of nano wires used in compounds for semiconductors

V.Chavchanidze Institute of Cybernetics

•***Department of Coherent Optics and Electronics***

-The creation and application of modern spectroscopic techniques for the purpose of fundamental research of the photo-processes in ex vivo biological tissue samples;

- Collaborative research with the Andronikashvili Institute of Physics) in basic research of photo-processes involving nano particles, metal ions, organic dyes and DNA;

- Laser and optical spectroscopy of a turbid medium;

- The light-controlled aggregations of molecules in organic compounds;

- Investigations of Bismuth-containing superconducting materials and improving their properties via doping by nano aditives;

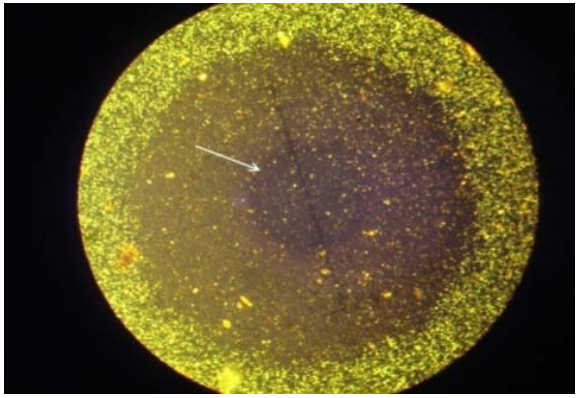
•***Department of the Optically controlled Anisotropic Systems:***

- Investigation of the Photosensitive Cholesterol Polymer Structures doped With Nano particles;

- Optical, Relaxive and Transport Processes in the Semiconductor Nanostructures;

- Optical and Spin Properties of the Semiconductor and Magnetic Structures with Reduced Dimension;

Lazer canceroscop for cencer diagnoses



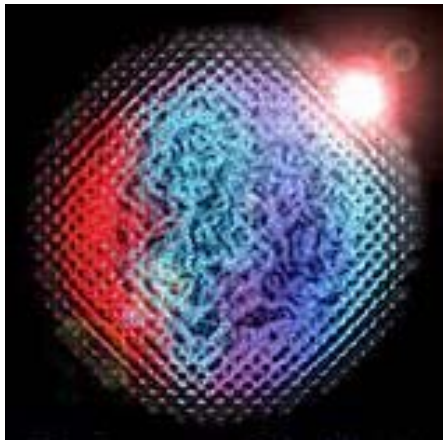
.Electronic image obtained by canceroscop.

V.Chavchanidze Institute of Cybernetics

•***Laboratory of Holographic Recording and Processing of Information***

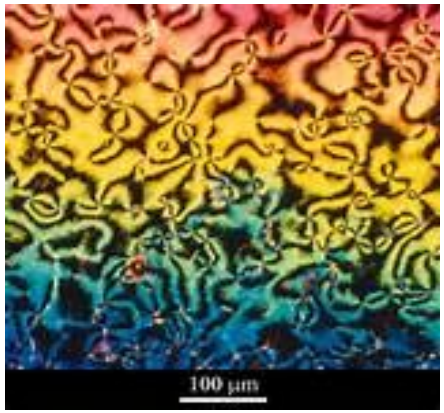
The obtaining of high-efficiency polarization-sensitive materials and the development of the methods of polarization holography;

Development of the technology of the obtaining of polarization-sensitive materials with high value of photoanisotropy and photogyrotropy



•***Optical-Chemical Research Laboratory***

Development of light-driven and thermally controlled liquid crystal polymer plates, synthesis and study of photo-sensitive material (spiropyran), the fabrication of functionally gradient materials.



A.Eliashvili Institute of Control Systems

RESEARCH DEPARTMENTS

- Department of Optimal Control Problems;
- Department of Information Transformation Problems;
- Department of Modelling and Control Systems;
- Department of Language Modelling;
- V. Chavchanidze Department of Machine Intelligence Problems;
- V. Gomelauri Department of Power engineering Problems;

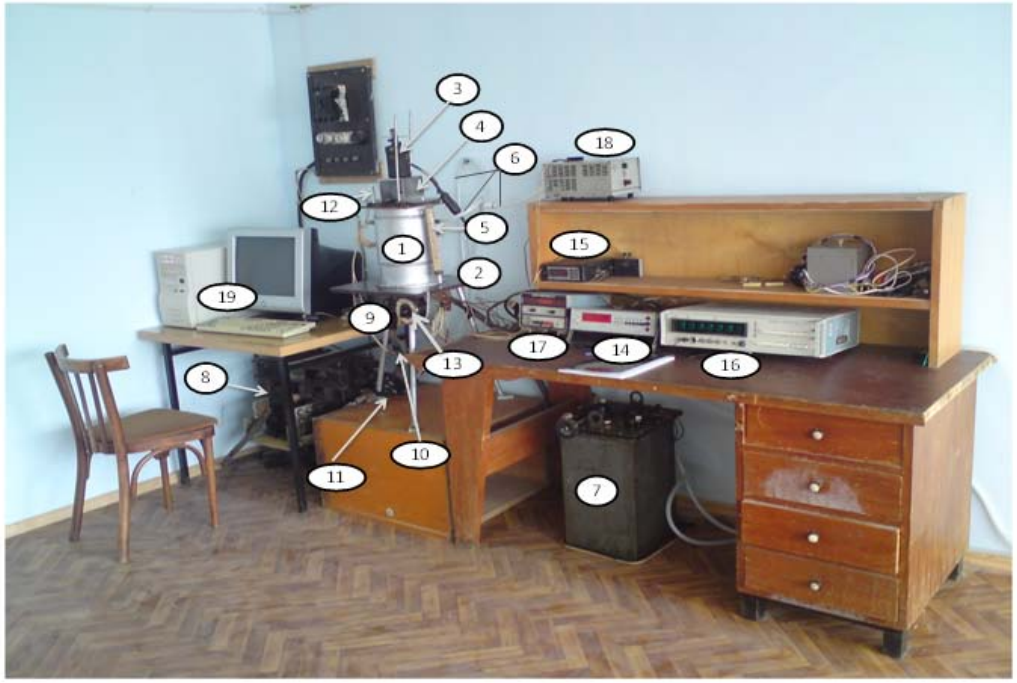
Device for measuring of compound vibration parameters. It's used for tuning various musical instruments.

Regulator of hydroelectric aggregate frequency

A. Eliashvili Institute of Control Systems

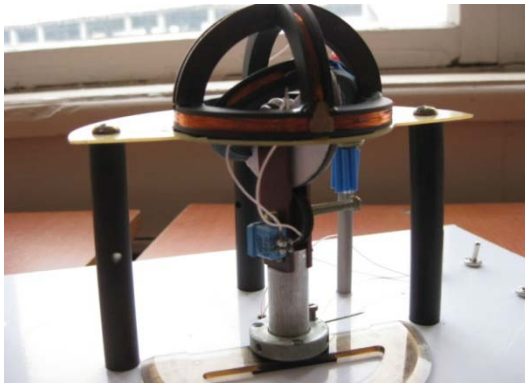
BASIC FIELDS OF RESEARCHES

- **Control Systems**
  - **Identification, Optimization and Building of Technical Systems and Devices;**
  - **Control Processes in Energy Systems.**

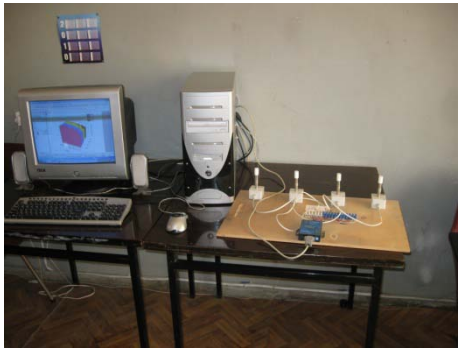


Experimental equipment for study of heat transfer intensification

1 -vessel; 2 -stand; 3 -the engine; 4 -Engine stand; 5 -level indicator; 6 -cooling system; 7, 8, 9, 11 – transformers; 10 -Cable; 12 -reels; 13 -switch;14, 15, 16, 17 -digital devices; 18 –zeroevice; 19 -the computer.



Hollow Hemispheric threecoordinate mutual induction Primary transformer



Microprocessor-based control System of microclimate parameters.

A.Eliashvili Institute of Control Systems

BASIC FIELDS OF RESEARCHES

- **Control Theory**
  - **Problems of Vector optimization, Mathematical programs, nonlinear identification.**
- **Informatics**
  - **Creation of Intellectual Information Systems in Medical Field;**
  - **The Tasks of Computer Presentation of Linguistic Knowledge;**
  - **Issues of Text corpora annotation,**
  - **Research of Biometric Markers of Speech and Hearing Mutual Connection .**

A. Eliashvili Institute of Control Systems

Works done last years

- Research of Identification of Control Systems and Problem Tasks of Linear Optimization on the Basis of the Modern Informational Technologies;
- Constructing and Testing of Experimental Sample of Devices for Regulation of Hydropower Station Frequency; Research of Problems of Using of Noise Vibration of Moving Mechanisms In Control and Diagnostic.
- Intellectual System Creation for Diagnosing, Prognosing and Treatment Selection of Various Diseases;
- Georgian Sentence Computer Analysis in the Interactive Regime;
- Research of Problems of Energy Device Efficiency Raising and Structure Optimisation of Georgian Hydro Power Stations.
- Problems of optimization of Georgian power stations structure
- Problems of augmentation of efficiency of energetic equipment

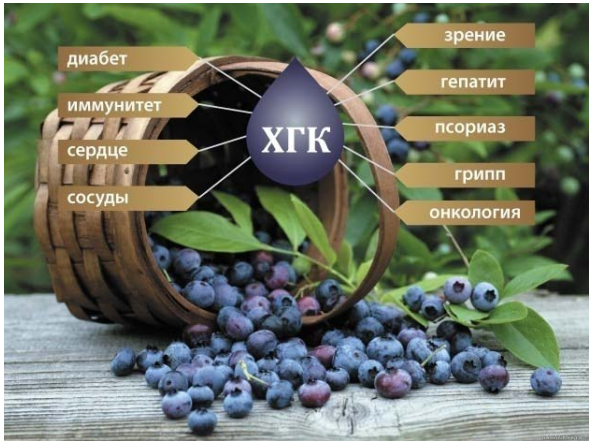
Institute of Food Industry

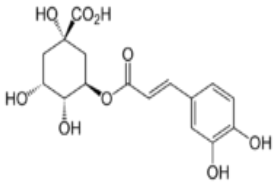
The major fields of activity

- development of innovative technologies for processing of food from local raw materials;
- creation of functional foodstuffs.
- production of natural bioactive supplements from citruses;
- elaboration of scientific bases of production of Georgian type of wine;
- Technology of recycling of plant materials;

At the same time, the Institute is authorized as the state certification and food quality control organization.

Environmentally friendly canned local raw materials and lliquide fruite



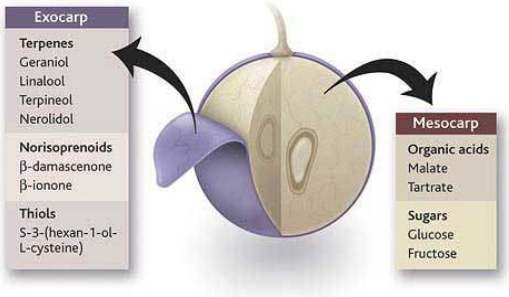


Antioxidant juice

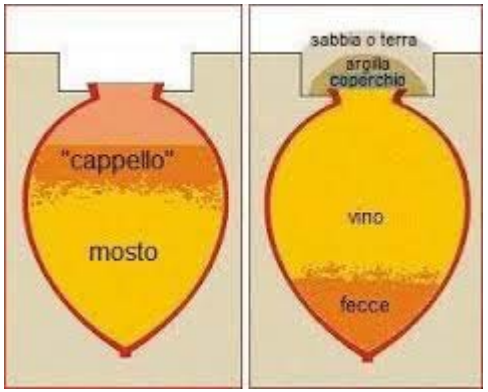
Institute of Food Industry

Essential (volatile) oils production. **A new technology of attar of roses has been elaborated. The technology 2-3 times increases reception of essential oil from picked roses.**
Principally the new technology of grass ethereal oil processing is developed. Technology provides 50-60% reduction of power consumption.

Vine industry. **New technology of grapes processing is developed which provides significant improvement of wine quality received from local grapes sorts and at the same time production of natural food dyes as a concomitant product;**



Development of natural essential oils production



Development of wine production

Institute of biotechnologies

Major directions of activity

- Selection of adapted highly productive clones for virus less potatoes seeds;
- Improvement and conservation of medical, aromatic, dressing and poisonous plants' genetic resources;
- Production of full-value formula-feed of farm animals and fowl on expense of local resources;
- Study of the effect of low concentrated chemicals on phytopathogenous microorganisms
at vegetable cultures preservation for a long period.

Incubator for receiving virus-less potato test-tube plants

Plantation of virus less potato at green house

Georgian Water Management Institute (GWMI)

Main fields of activity of the Institute

- Development of methods ensuring safety of water management of hydro melioration units and environment;
- Study of natural disasters and elaborations of recommendations to prevent them;
- Assessment of water resources and exploitation of hydro technical constructions;
- Investigation of irrigation and drainage systems in agricultural lands.

For modeling of floods, sea-storms, mudflow and erosion processes and soil mechanics the Institute possesses with different laboratories.

To the Institute belongs six technological and testing stations located in different regions of the country.

www. gwmi.ge

Institute of hydrogeology and engineering geology

- Investigations of underground waters as resources of drinking water supply and distribution;
- Hydrogeology and hydro geochemistry of mineral waters deposits;
- Estimation and prediction of risk-factors of geodynamic processes;
- Elaboration of new technologies for extraction of precious and rare metals from mining industry wastes;

Laboratory of soil mechanics

Utsera mineral water source

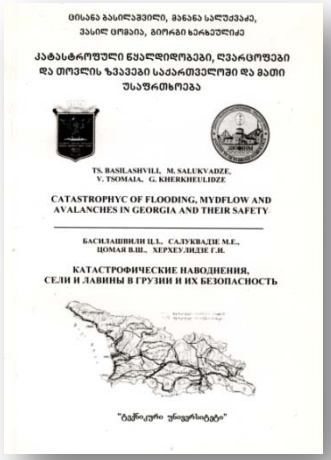
Institute of Hydrometeorology of Georgia

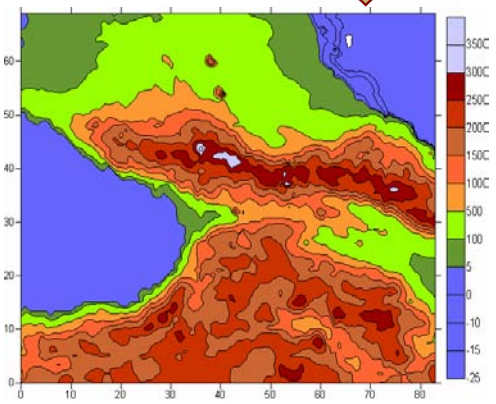
DEPARTMENT OF WATER RESOURCES AND HYDROLOGICAL FORECASTING

DEPARTMENT OF CLIMATOLOGY AND AGROMETEOROLOGY

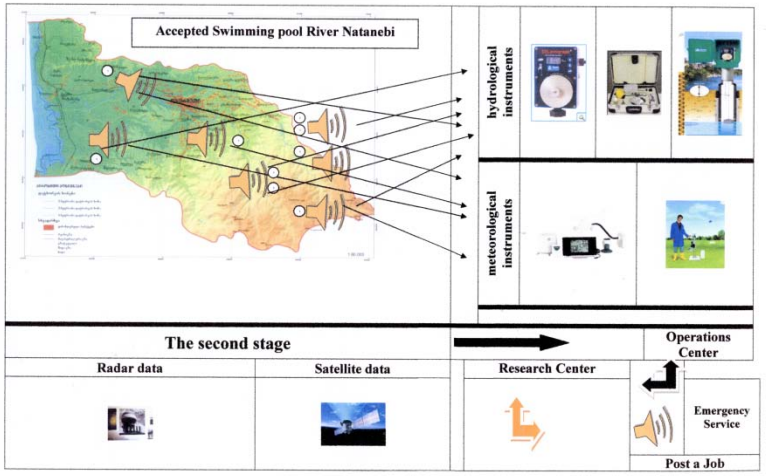
DEPARTMENT OF FORECASTING AND MONITORING ENVIRONMENTAL POLLUTION

DEPARTMENT OF MODELLING OF WEATHER FORECASTING AND NATURAL AND ACTIVATE DISASTERS

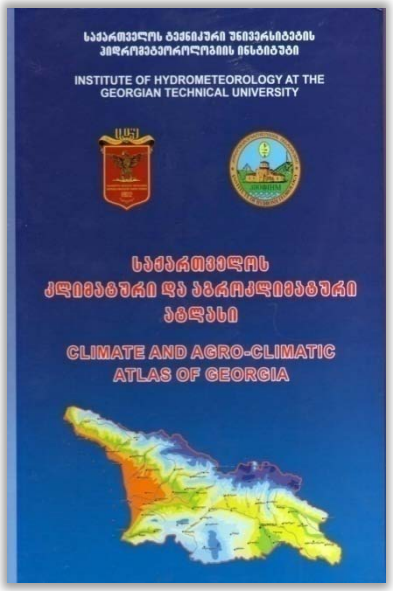


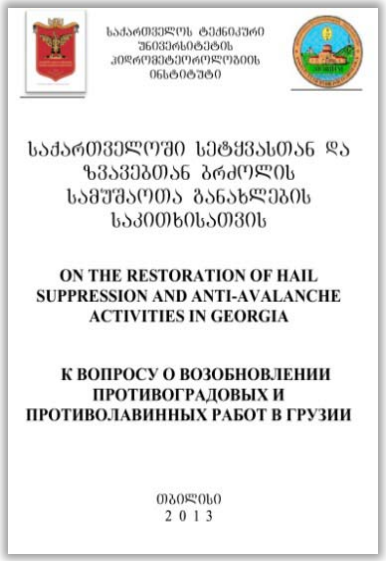


Solving area of Nonstationary mezoscale model of atmospheric processes considering Georgian relief



Arrangement of rivers' hydrometeorological automated observance network in mountain basins and processing of forecasting models of freshets and inundations based on those data for the purpose of creation of Early Warning System (on the example of riv. Natanebi basin).

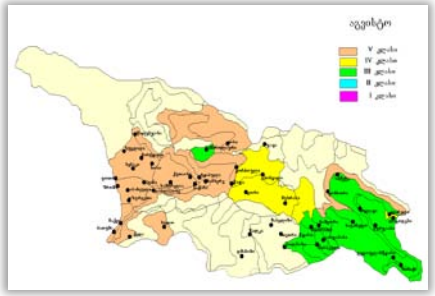




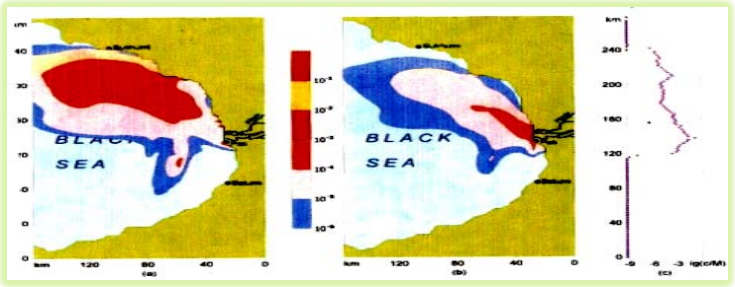
Institute of Hydrometeorology of Georgia

Basic fields of research activities

- **Development of forecasting methods of meteorological, hydrological and agricultural meteorological phenomena;**
- **Development of methods of forecasting dangerous natural phenomena (mud-streams, snow avalanches, floods, squalls, hail, heavy rainfall, drought, etc.);**
- **Estimation of climatic, agricultural climatic and renewable energy resources (water, wind, solar radiation);**
- **Development of methods for estimation of possible climate changes and their effect on social economy;**
- **Investigation, estimation and forecasting of pollution level and ecological state of the environment (atmosphere, soil, water) with the aim of protection and rational use of natural resources;**
- **Development of scientific and methodological basis for the creation of cloud and precipitation monitoring system.**



Zoning of the territory of Georgia According to intensity of droughts



Dynamic model of spreading of accidental oil spill brought out by R.Rioni to the sea surface

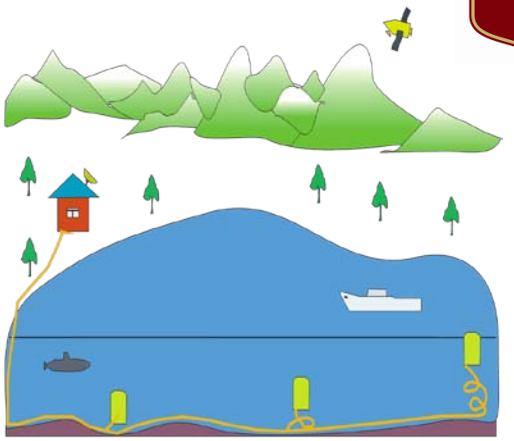
Department of Geo-ecological Monitoring

The main objective of the Department is investigation and monitoring of ecological situation in Georgia and consequently giving the recommendations in order to improve them. Currently, the Department works at the river Mtkvari and its basin (the section from Zemo Avchala to Tsiteli Khidi) that is characterized by high pollution and consequently by unstable ecological system.

Application of appropriate mathematical models and geo-information systems enable to solve numerous practical tasks in geo-ecological monitoring.

Institute “Talgha”

- Elaboration of energo effective, low temperature diffusion processes for wide area semi-conductors.
- Monitoring and protection system of sea area.
- Development of new generation of dosimeters for continuous monitoring of environment ecology.
- Development of nondestructuve methods of mechanical strain determination in micro and nano films.
- Development of medical photons source and creation of devices (“Phaser”).



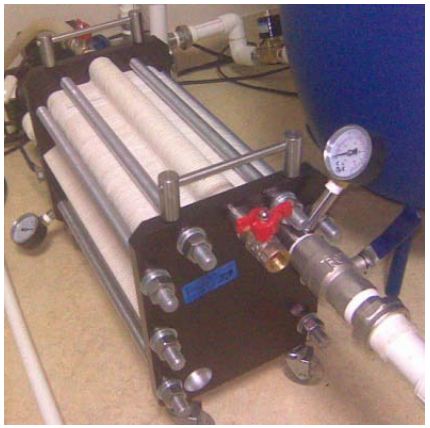
System of sea area monitoring and protection

New Model Wave Energy Transformer
Patent: **(10) AU 2009 11199 U**
(51) Int. Cl. (2006) F 03 B 13/00

Engineering Institute of Membrane Technologies

Major directions of scientific-research and test-and-design works:

- Food production - purification-clearification, concentration, cold sterilization and stabilization of wine, beer, juices and other liquids;
- Municipal engineering - runnig water purification and water supply;
- Pharmaceutical industry - purification, concentration and sterilization of biologically active water solutions for preparation of different medicines;
- Chemical industry - creation of high molecular compounds and colloidal systems;
- Medicine - filtration and sterilization of water and dialysis solution for artificial kidney unit.



Scientific production association – “Analytical Instruments”

The SPA “Analytical Instruments” is engaged with project development, design and manufacturing of different analytical instrumentations and automated information-measurement systems.

- Conductivity meter CEL-1M2 for measuring the specific electrical conductivity of any solutions;
- Apparatus for local renal hypothermia. Would be used in surgical urology;
- Ion meter for measuring of different ions of oxidation-reduction potentials in various solutions;
- PH –meter for measurements of hydrogen ions and oxidation-reduction potentials in water solutions Would be used in field conditions.

Techinformi

Inter sectoral Scientific Center for Scientific and Technical Information

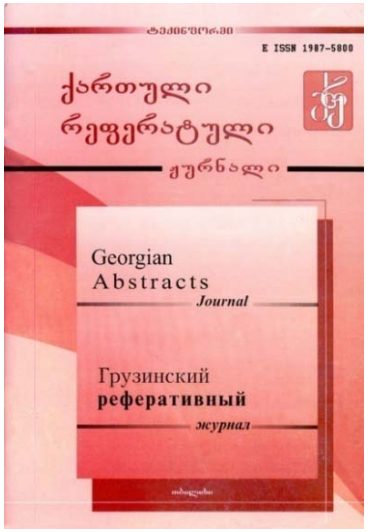
Major fields of activity:

- Scientific-research and analytical works in scientometrics, bibliometrics etc.
- Information flows forming and distribution;
- Statistical and mathematical modeling of scientific and innovative processes ongoing in the country;
- Analysis of the state of affairs of the national R&D system through scientometric, including bibliometric methods;
- Elaboration of concepts and recommendations of scientific-technical development;
- Creation and implementation of new information technologies;
- Creation of information resources;
- Information service;
- International cooperation;
- Publishing and printing services.

Techinformi

Databases of Scientific Information Resources:

- Scientific researches done in Georgia;
- Theses defended in Georgia;
- Scientific publications issued in Georgia;
- Projects financed by Georgian National Scientific Foundation by years;
- Publications of Georgian scientists in high rating journals;
- Innovation proposals;
- Georgian experts in different fields of sciences;
- Georgian companies.

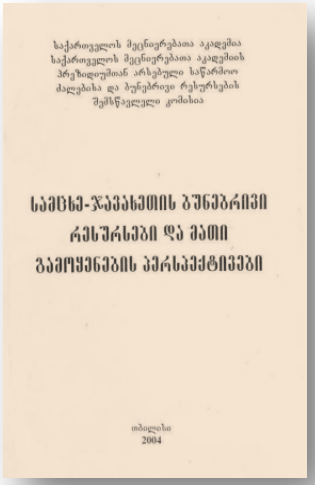


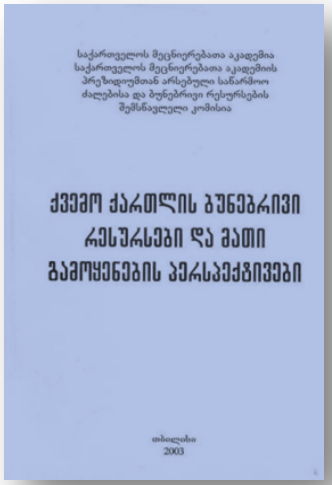
Publications of Techinformi

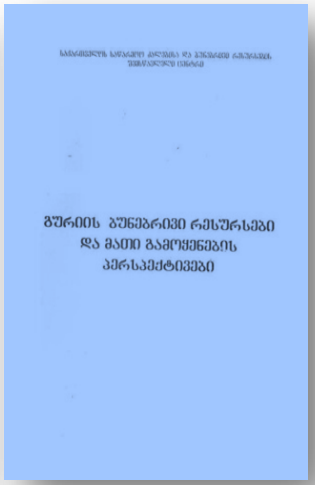
Center for studying of production forces and natural resources

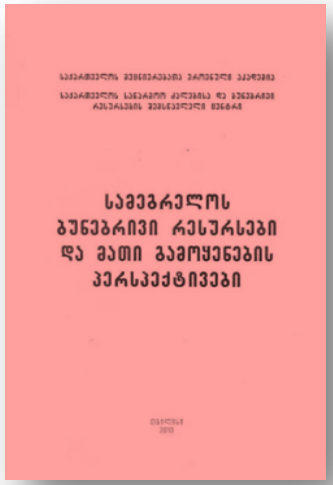
The Center carries out integrated study of the problems of natural resources and their conservation in the whole country, as well as. in its separate regions.

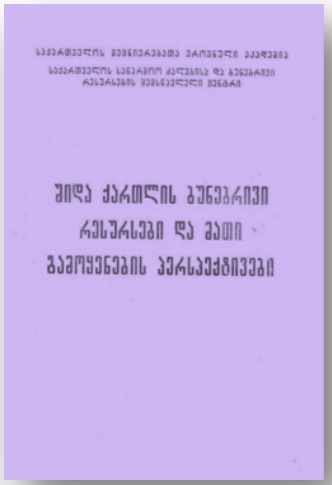
The Center has prepared and published monographs on the problems of natural resources of different regions of Georgia as: Kvemo Kartli, Shida Kartli, Samtskhe-Javakheti, Guria, Imereti, Kakheti, Samegrelo, Achara and Abkhazeti and on the problems of the use of these resources.











Institute of constructions, special systems and engineering provision

Research area of the institute concerns to design and realization of orbital and earth engineering complexes and means of cosmic systems.

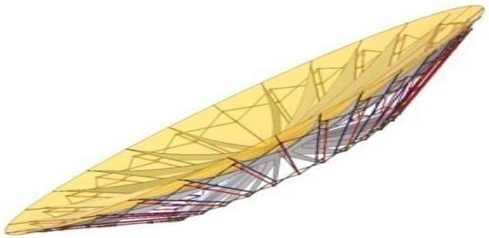
One of the remarkable work done by the institute is creation of original scheme of unfolding space reflector with new type of actuators.

Besides, design and build up of pilot samples of reusable rapidly assembled steel bridges in extreme situations are successfully performed.

The first Georgian space reflector launched on orbital station Mir. 28.07.1999

The constructions developed at the institute are based on using the theory of transformable engineering systems.

Institute of constructions, special systems and engineering provision



New scheme of Unfolding s pace reflector

The transformable construstions

International contacts

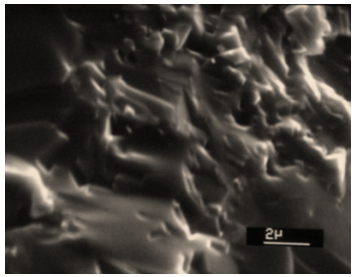
- European Space Agency (Nederland)
- Daimler Benz Aerospace (Germany)
- Alenia spatio (Italy)
- Munich Technical University (Germany)
- Large Space Constructions (Germany)
- Energya (Russia)
- Frustar (Austria)

6 meter cylindrical space reflector

Unfolding single-span reusable bridge (L = 48 m)

Transportation of the bridge

Republican center of structural researches



Structure of composite material for bullet-proof vests.

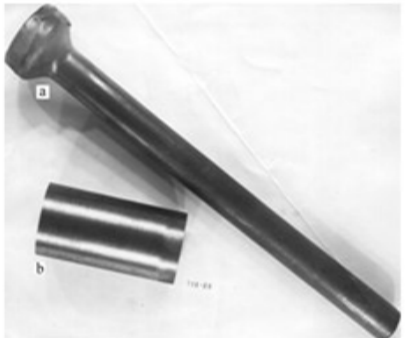
On contemporary stage the center performs the following scientific and applied works:

1. Creation of nano-crystalline scintillation materials, powders and solid samples;
2. Nano-crystalline hard alloys and billets: water current cutting nozzle, high pressure water intake facility shaft, cutting tools, wear-resistant members of machines and devices, plates of bullet-proof vests.
3. Technology development of nano-crystalline composite materials production.

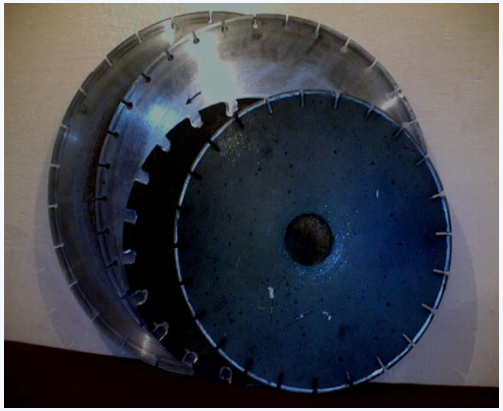
Republican center of structural researches

The Republican Center works in taight connection with following well known foreign companies and organizations:

- Siemens Medical Solutions Molecular Imaging, Knoxville, TN, USA;
- ALEM ASSOCIATES, Boston ,MA, USA;
- Crystal Photonics Inc, Sanford, Florida, USA;
- Saint-Gobain Crystals, Newbury, OH, USA;
- Federal Institute for Materials Research and Testing (BAM), Berlin, Germany;
- Scintillation Materials Research Centre, Knoxville, TN, USA;
- Komatsu Ltd, Kanagawa, Japan;
- Nisan Motor Co. Ltd, Kanagawa, Japan.



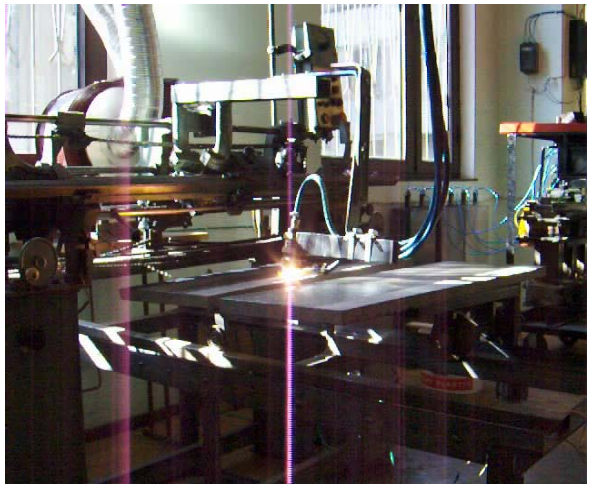
Scientific center of diamonds and composi materials



The major scientific activity of the Scientific Center of Diamonds and Composite Materials of Georgian Technical University is the development of new innovation technologies for diamond synthesis using spontaneous crystallization method, based on high pressure and high temperature conditions.

Development of efficient technologies for production of diamond composite materials and other super-hard materials that are utilized for drilling, grinding and polishing as metal as well non-metal materials are widely used in civil engineering, mechanical engineering and other fields of industry.

Direction of electro mechanics of the department of mining technologies



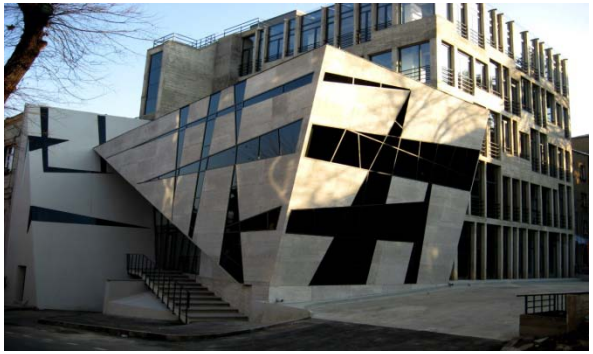
Development of high efficiency plasmatron

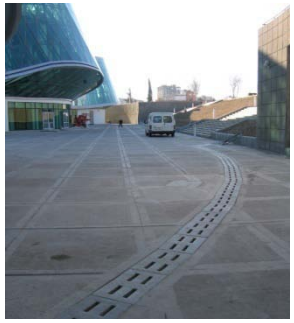
Water vapor plasmatron for treatment of high resource and technical economic efficiency materials is created used for machine repair and building materials cutting and coating.

Problem of durability and efficiency is solved by creation of long-cathode plasmatron.

Service life of such plasmatron exceeds 10 times the service life of plasmatrons produced by foreign companies.

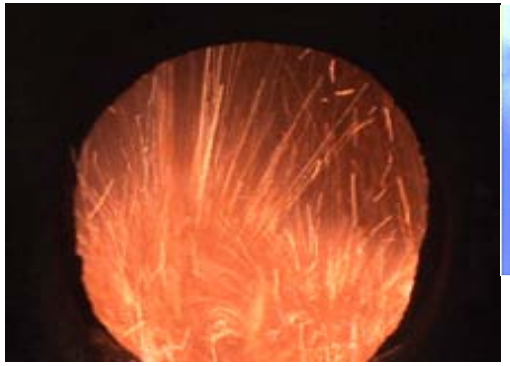
The composite materials with fiber reinforcement





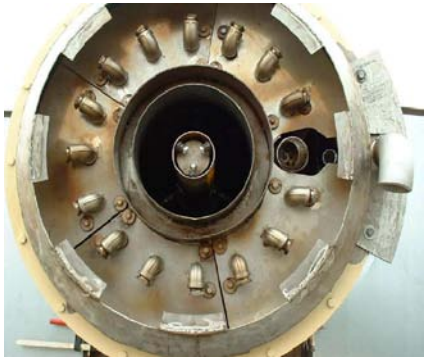
Concerning the usage of corrosion-resistant fiber-glass and locally manufactured basalt fiber as concrete reinforcement element at the *Center of Fiber Reinforced Composite materials of the Georgian Technical University* has elaborated the original technology, used for production of elements of building constructions, ornamental elements of exterior facade and interior of buildings, parts of drainage and sewage system.

Scientific-educational laboratory of high temperature thermo-energy plants









The Lab has developed a new technology of burning low quality coal in boiled layers based on The technology allows to use all kinds of low quality solid fuel taking in to account ecological requirements.

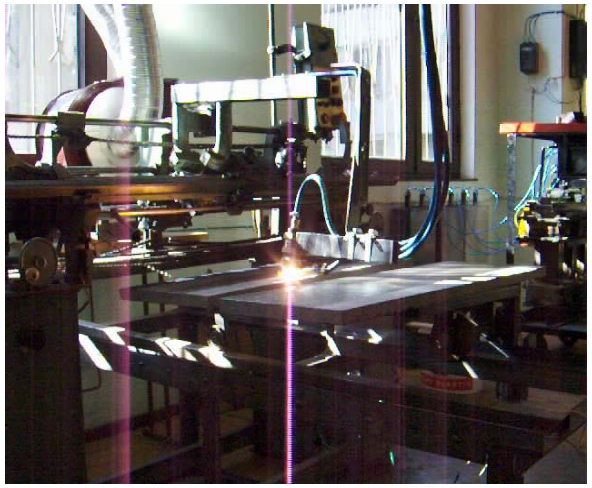
The laboratory has developed a new construction dust-catching filter for asphalt-concrete plants for filtering inert materials of heating furnace exhaust with filtration coefficient of 0.995. at the same time, by the researchers of the lab the building materials with 3-4 times less thermal conductivity and 2-2.5 times lighter compared to the materials used at present have been created.

Scientific-educational laboratory of high temperature thermo-energy plants

Pyrolysis boiler

- Power - 150 kwt;
- efficiency 87-90%;
- Fuel – pellets, bio remnants, timber, coal and natural gas (after modernization);
- Consumption 30 kg/h;

Scientific centre of mining electro mechanics



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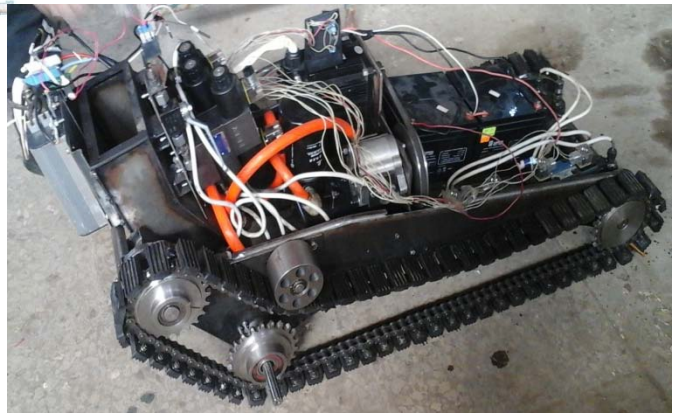
At the center have been developed a laboratory model of plasma furnace feed from fixed current source with the rectangular volt-ampere characteristics. It is simpler and cheaper than the electric-arc furnace, and a more effective than other plasma outfits.

The device for displacement of disable persons on steps of stairs.

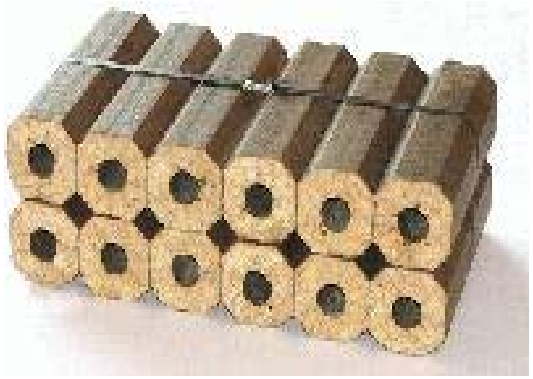


A special device for handicap persons for moving on stairs has been designed at the Engineering Service Center of Georgian Technical University. The device differs from well-known systems with original design of rail runners which have flexible structure. This allows to enlarge areas of contact of the machine tracks in order to enhance stability of such equipments.

The device is equipped with sensors of direction that makes its operation much easier. It can be also used as a service platform for displacement for load up to 350 kg.

Engineering service center of transport and machine building faculty

Production of ecologically clean bio fuel



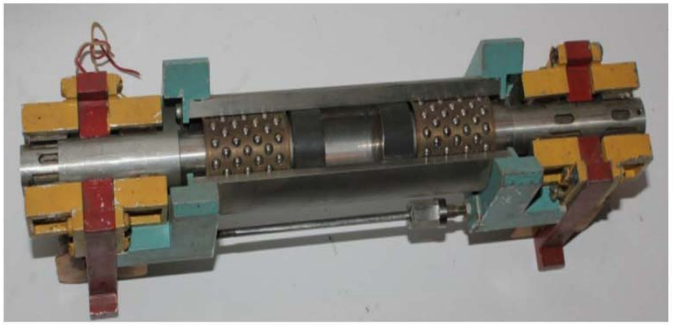
The palletised briquettes of bio-fuel

The drayer and high pressure device for production of bio-fuel briquettes.

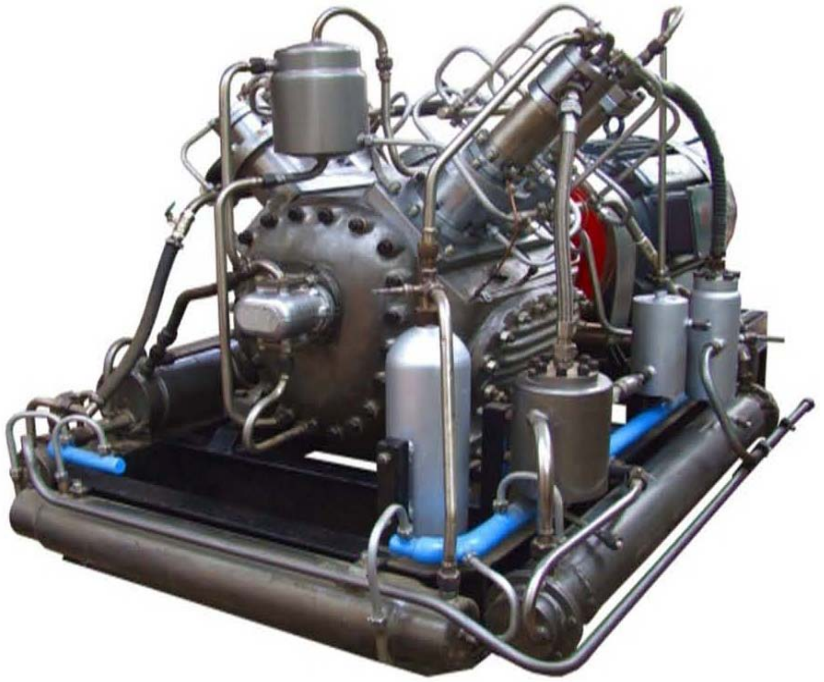
The technological line for production of bio-fuel as briquettes from different reminders of timber and agro-food industries has been created at the centre

Scientific-engineering-education center of heat engineering

A new scheme of piston-cylinder group with minimum friction losses is developed. A number of high factor thermal machines are created on the basis of this scheme.



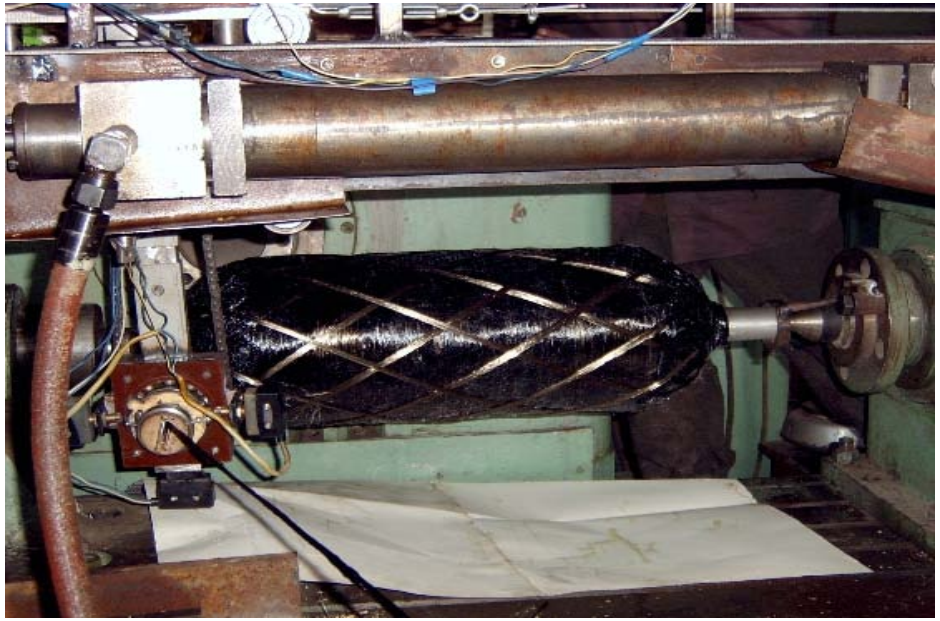
Liquid oxygen compact pump



High pressure natural gas pump

Transport and machine building faculty

At department of the faculty the technology of high pressure natural gas cylinders production using fiber polymer composites is developed.

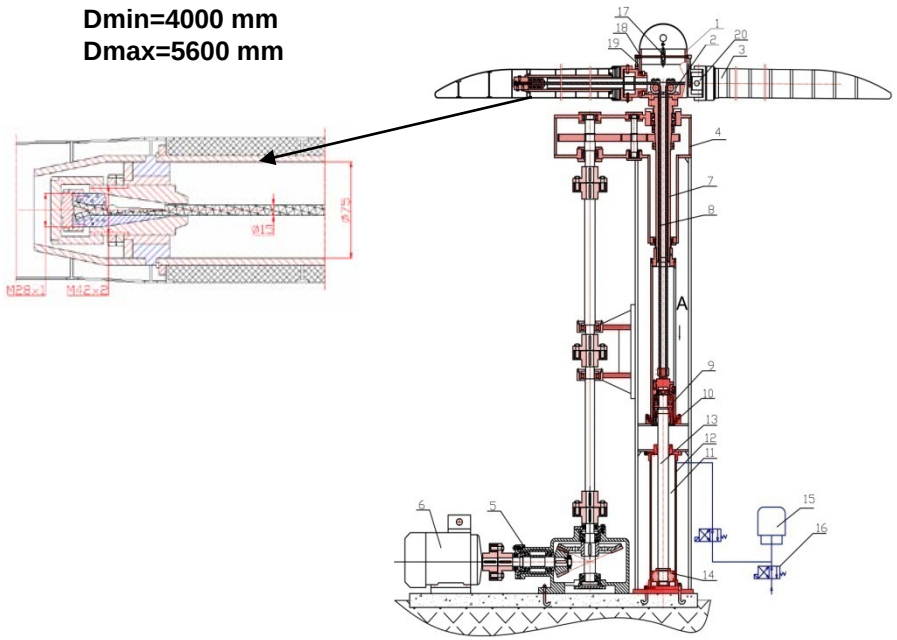


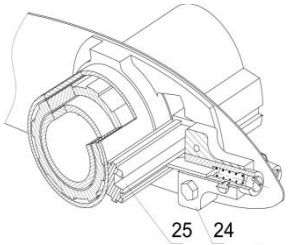
High pressure natural gas containers produced on the basis of fiber polymer composites

Transport and machine building faculty

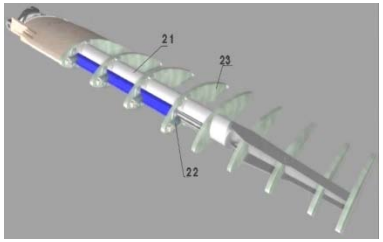
Variable-Diameter rotor with centrifugal forces compensation mechanism

Dmin=4000 mm
Dmax=5600 mm



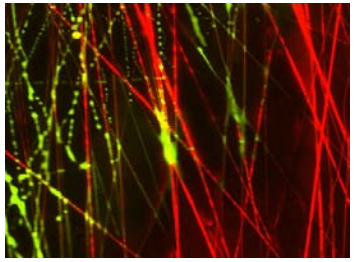


Blade movable part with the blade twist change mechanism



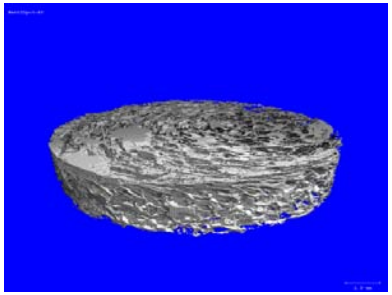
The researches have are mainly devoted to the creation of prop-rotor with variable geometry, which is intended to be mounted on aircrafts with vertical take-off. The design is made in cooperation with BOEING company, supported by ISTC grant.
The scheme has been approved and registered by the European Patent Office

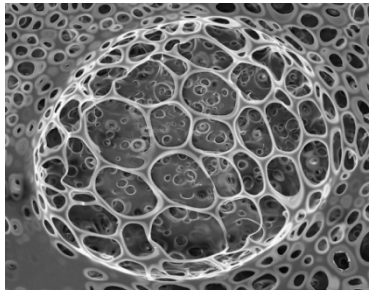
Research Center for medical polymers and biomaterials



Biodegradable nano fibres for wound healing. Medicated wound dressing - artificial skin "Phagobioderm".

Medical bactericidal glue **Coladerm®** (spray) and its platform solution





Biodegradable artificial bone and structure

At the Research Center the wound dressing (artificial skin) "Phago Bio-Derm" has been elaborated. It is composed on the basis of original biodegradable polymer and contains a complex of bacterium phages and other bactericides and different enzymoids. "PhagoBioDerm" shows a high bactericidal and anti-inflammatory activity.

Another achievement of the center is production of medical bactericidal glue Coladerm® (spray). It represents a solution of original biodegradable polymer in ethanol, contains silver sulfadiazine and other powerful bactericides, very effective for both in-patient and out-patient treatments of burns, infected wounds, etc.

Science Center of Bionanoceramic and Nanocomposite Materials

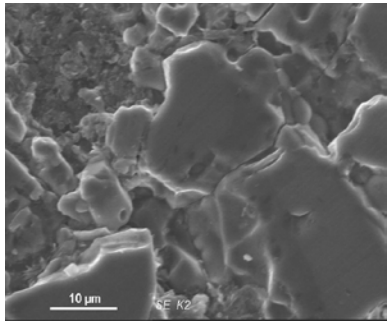
The main investigations carrying out at the center

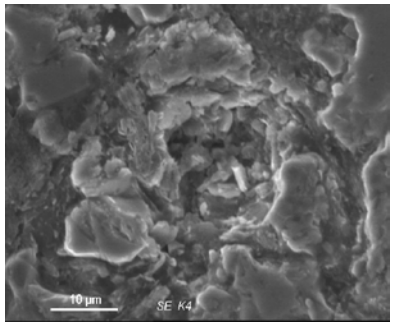
1. Production of bionanocaramic super paramagnetics for creation of controlled local hyperthermia and their use, as therapeutic agents, for purposeful transportation in living organisms for surface (skin) cancer treatment.

2. Production and research of multifunctional heteromodular composites in B_4C-BN-TiC-SiC-Al_2O_3-Si_2ON_2-C system.

3. Development of corrosion-proof antifriction polymer composite materials on tetrafluorethylene basis using mineral raw material of Georgia and ceramic nano powders

4. Production of engine parts on silicon nitride basis. Production of dielectric materials in BaO-Al_2O_3-SiO_2 system for electronics and electrical engineering.





Raster electron-microscopy representation of composite materials K1-K4, x2000

Bioengineering center

The researches at the center are dedicated to creation and implementation of energoactivators, which enables – 2,5 -3 times increase ecologically pure plant productivity. The elaborated bioenergoactivators enables to :

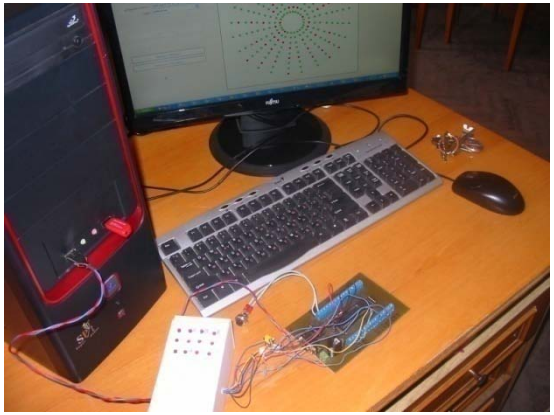
- **remarkably increase crop capacity**
- **speed up for several years fruit bearing**
- **reduce nitrates, heavy metals and radionuclide in agry-food products**
- **increase immunity and productivity of fowl and animals**

DEPARTMENT OF BIOMEDICAL ENGINEERING

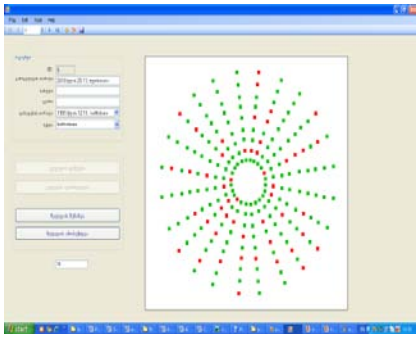
Computer-Controlled System For Diagnosis of Vision Field

1.The system is elaborated for automatic control of the parameters of the field of eye vision.

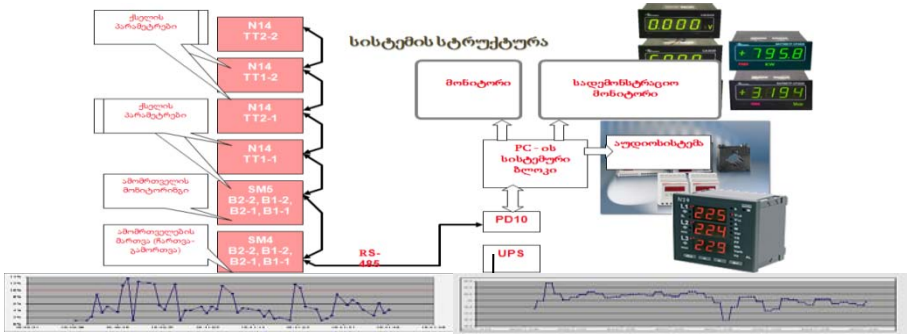
The System allows to transfer the data of measurements to the patients centralized database.



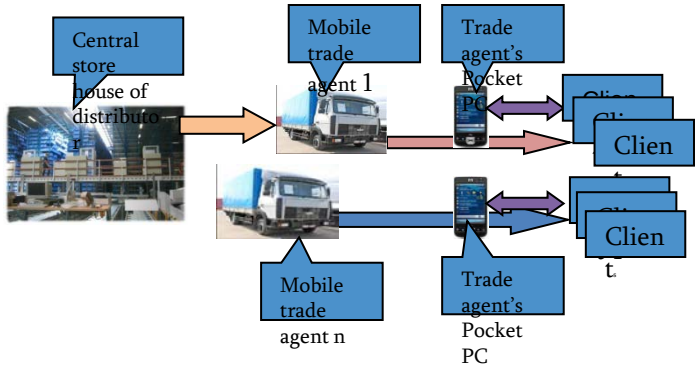
2. Control unit of magnetic storms compensation systems based on determination of constant component of geomagnetic field (GMF) is created.



Faculty of informatics and control systems



Monitoring of power supply system for enterprises.



Computer-aided system for distribution.

Training process control system at higher educational institutions with teachers biometrical registration system.

. By the researchers of Faculty the following automated systems had been elaborated:

- Monitoring of power supply system for enterprises.
- Computer-aided system for distribution service, where PC interface is in Georgian language.
- Training process control systems at higher educational institutions, using weekly evaluation of students; monitoring and management of educational process

Faculty of informatics and control systems

System of control of electric parameters of high voltage substations.

The ventilation control system of Chakvi-Makhinjauri tunnel.

;
Water level monitoring computer system for HPPs

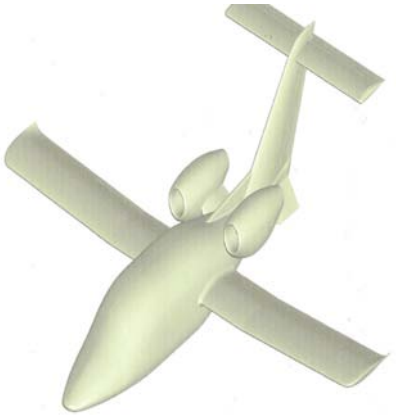
By the researchers of the Faculty of informatics and control systems of the Georgian Technical University the following systems had been elaborated :

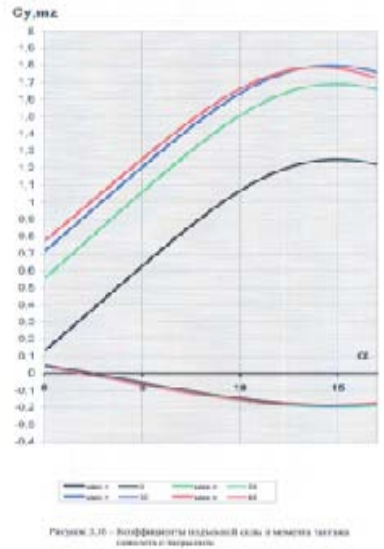
- Control System of electric parameters of high voltage substations;
- Water level monitoring computer system;
- Ventilation control system of Chakvi-Makhinjauri tunnel.

Scientific Engineering Center of Simulation and Controlling

The Research Works Done at the Center

- Mathematical model and corresponding algorithm for calculations have been elaborated. which allowed to determine the wings profile of aircraft with maximum bearing strength and minimum resistance force coefficients.





- The problem of soft landing of aircraft had been solved. As the result had been find the moment of engine cut off, when aircraft will make smooth landing at the given place. Mathematical model has been created and the problem has been solved for pilotless aircraft.

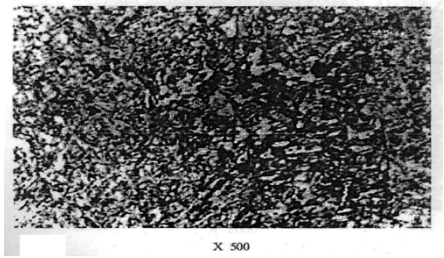
- Constriction of adaptive wing with the variable camber tail part.

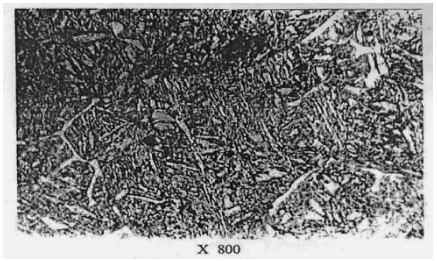
G.Gugunishvili international research center of expertise of welding materials

On the basis of local materials have been elaborated new type of welding compound, which would be used during welding of low carbon and low-alloyed steel.

Usage of this welding compound would allow to enhance stability of welding process, durability of welded edges, characterized with universality, high quality and efficiency.

Place of ore	Chemical ingredients %							
	SiO_2	Al_2O_3	MgO	CaO	TiO_2	K_2O	Na_2O	Other
Tbilisi suburb	41,1	18,7	3.7	25,2	5,1	-	4,3	1,9





Micro structure of welded steel

Welded sample

Research center of 3D stereoscopic technologies

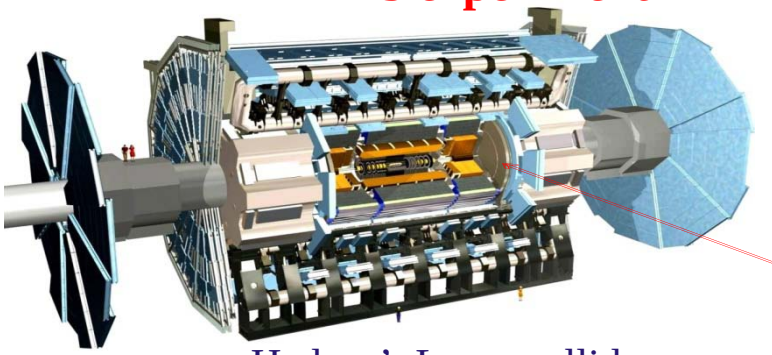
New 3D stereoscopic technology has been elaborated in the center .

The created device has the following parameters :

- Stereo base - minimal distance between optical axes of objective lenses is 70mm; maximum distance is 1000mm. These parameters are allow to take movie on the distance of 1,5-2,2 km;
- Convergence – the angle between optical exes of two objective lenses would be altered from 0^0 up to 20^0
- The working voltage is 13V and current strength is 0,85A.

Participation of Georgian Technical University in international projects

European organization of Nuclear Research
ATLAS experiment

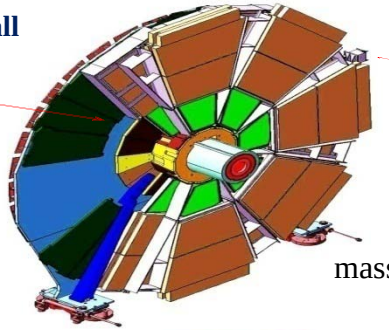


Small disc of protecting chamber

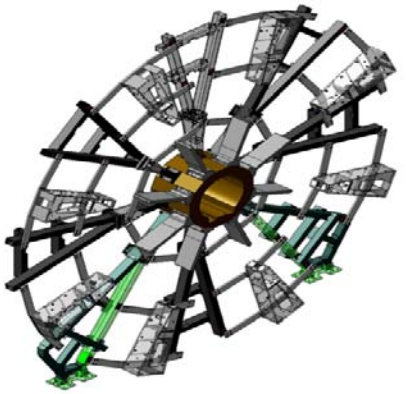
Hadron's Large collider

By the leadership of Georgian Technical University is conducted the works of designing and manufacturing of protecting chamber's small disc

General part of the small disc

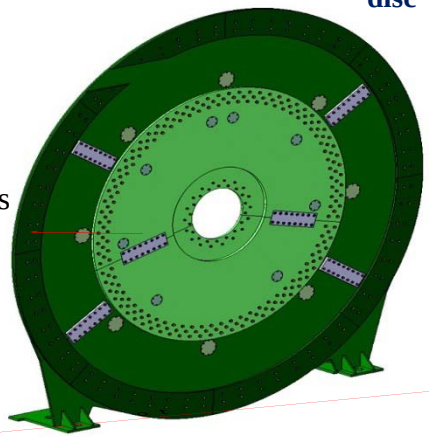


Aluminum structure of the small disc



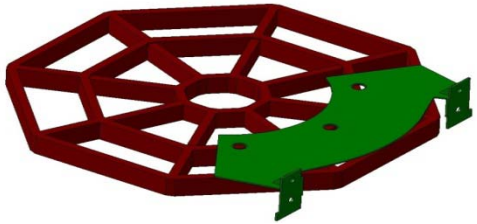
thickness

10 cm



D=8720 mm

mass 33 tones

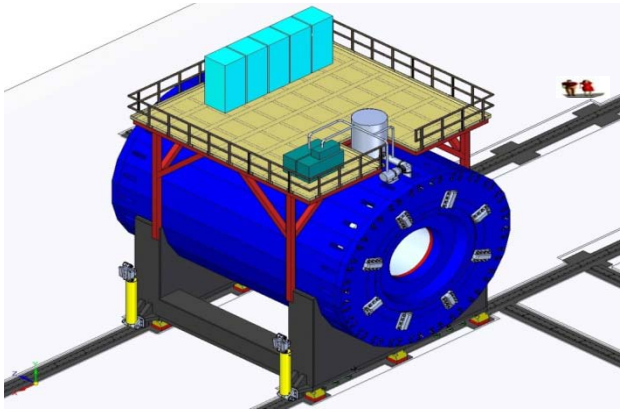


In Georgian Technical University's Nuclear Engineering Science Center based on CATIA V5 software had been created geometric-visual model of the collider that used for its optimization designing and assembling processes.

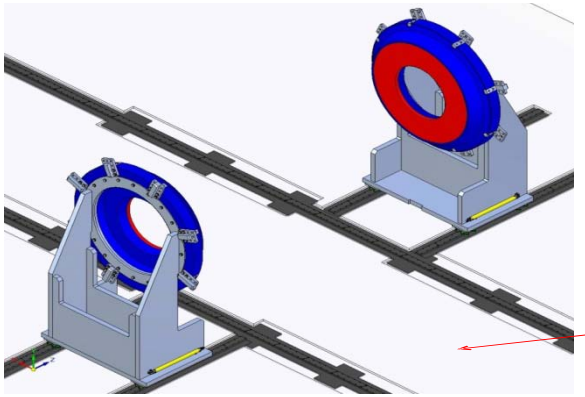
Participation of Georgian Technical University in international projects

Joint Institute of Nuclear Researches - DUBNA

By the scientist of Georgian Technical University are conducted works devoted to designing and realization of precision motion of multipurpose 1.000 tone detector and its poles



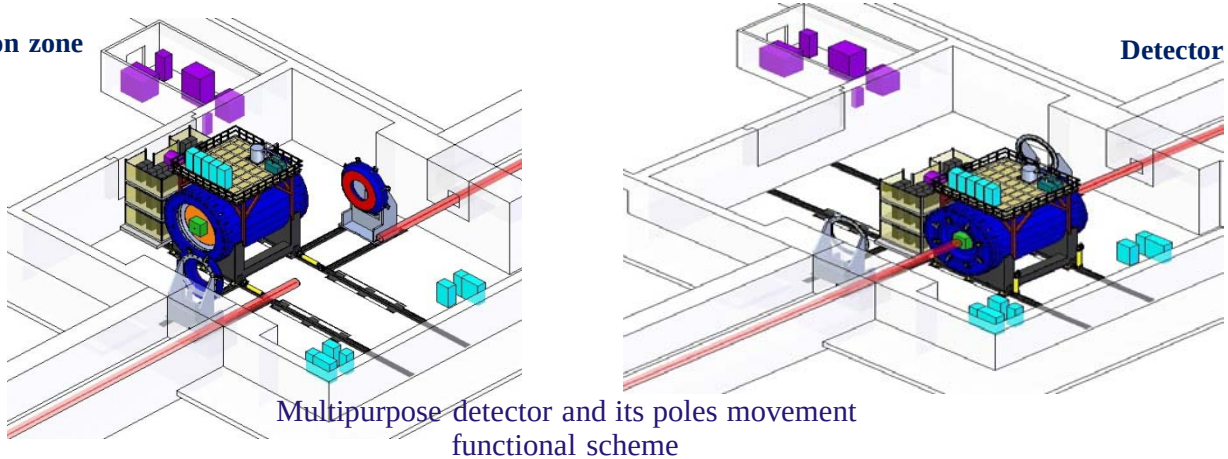
Multipurpose 1.000 tone detector and railway track for its motion



Poles of detector and directions of their movement

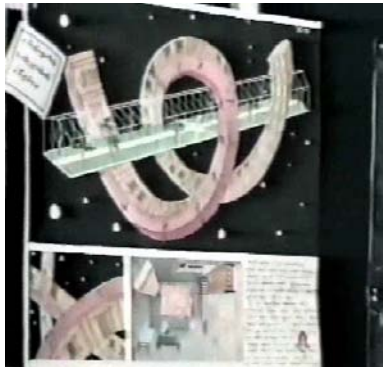
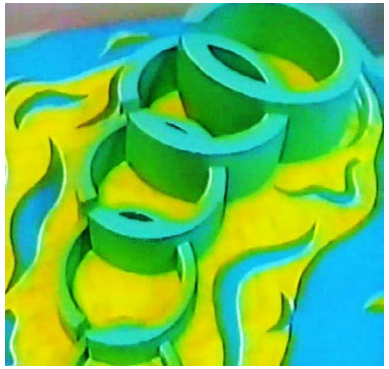
Detector in preparation zone

Detector in operation zone



Multipurpose detector and its poles movement functional scheme

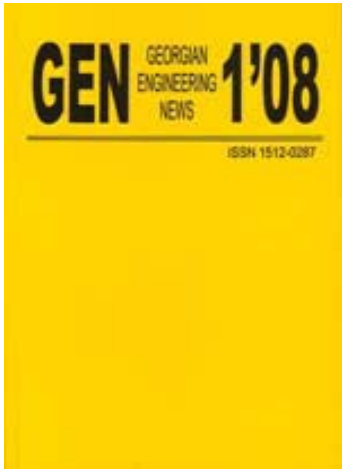
Faculty of Architecture, Urban Planning and Design

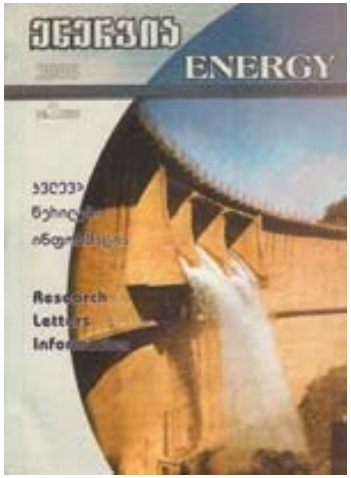




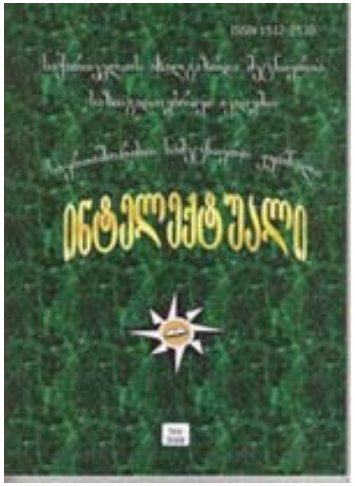


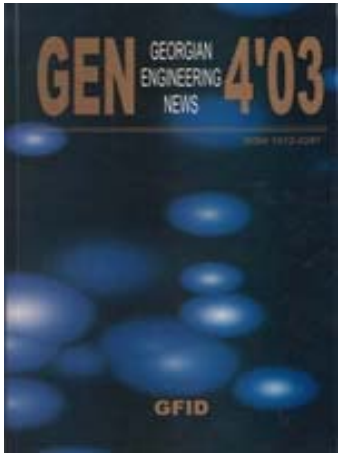

Works done at the faculty of architecture

The scientific magazines issued at GTU









The electronic scientific magazine of the GTU

(Established in 2001)

The editorial board - Germany, France, Spain, Hungary, Latvia, Armenia and Georgia.

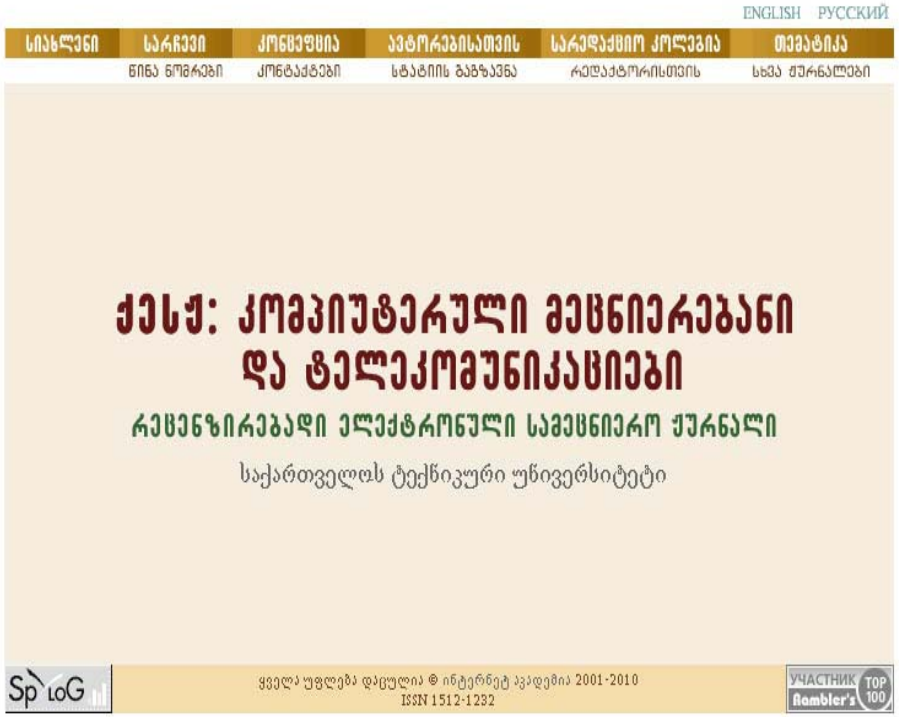
The investigators from more then 20 countries are used magazine for publishing of scientific papers. Participation of foreign authors can estimated as 73%.

On the basis of information from GOOGLE and SPYLOG in March of 2010 had been made the following inquiries:

Initial inquiries –1522 - 64.22%

Repeat inquiries – 848 - 35.78%

http://gesj.internet-academy.org.ge



The Banner page of the magazine

Connections with foreign scientific and scientific-educational centers

- European Organization for Nuclear Research (Genève, Switzerland) ;
- Friedrich Schiller University of Jena (Jena, Germany);
- Graz University of Technology (Austria);
- Karadeniz Technical University (Trabzon, Turkey);
- Yalova Technical University (Turkey);
- The University of Nottingham, (Nottingham, United Kingdom);
- The University of Heilbronn (HSHN) (Germany);
- Karlsruhe University of Applied Sciences (Karlsruhe, Germany);
- Vilnius Gediminas Technical University (Lithuania);
- Tallin University of Technology (Estonia);

- AFEKGEO MEDICAL LTD. (Israel)
- Black Sea Universities Network (Romania, Constanta)

Connections with foreign scientific and scientific-educational centers

- Association “ Rondine Cittadella della Pace” (Arezzo, Italy);
- EUA – European University Association (Brussels, Belgium);
- European University Information Systems (EUNIS) (Paris, France);
- “British Petroleum”;
- “Durapact” GMBH;
- “Boeing-Rotorcraft”;
- “INVENSYS”;
- “Schneider Electric” and “SIEMENS”;
- “Julich – Forschungszentrum”;
- “GRENA”;
- CERN;
- European Academy of Sciences and Arts – Salzburg, Austria.

Thank you