



May- June 2016

- I. **Bilateral / Multilateral Cooperation**
- II. **Science, Technology & Innovation in Russia.**
- III. **Profile of R&D Institutes and Industry in Russia**
- IV. **Forthcoming Workshops and Conferences in Russia**
- V. **Academic Programme offers of Russian Universities**



Bimonthly Newsletter
of the
Embassy of India
Moscow

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by*

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Dear Readers,

Greetings from Science & Technology Wing, Embassy of India, Moscow!

Greetings from Science & Technology Wing, Embassy of India, Moscow!

The months of May and June has been very productive with various activities for fostering Bilateral and Multilateral ties between both the countries. This started with 2nd Indian-Russian Joint Conference in Statistics and Probability held in St Petersburg, 9 renowned experts from India and over 20 from Russia. One of the leading Russian University, Moscow Institute of Physics and Technology has signed MoU with Amity University to collaboration in priority area of research, education, student and faculty mobility. A highly competitive research grant constituted between the Department of Science and Technology, New-Delhi and Russian Science Foundation has awarded 17 projects to the research team and was the first call of its kind. In basic sciences 22 project were accepted by Department of Science and Technology and Russian Foundation of Basic Research jointly under 9th call. The Russian-Indian Network of Institution for Higher Education is now one year old and has made remarkable achievements in terms of new members joining the network and the partnering Universities are able to find right partners for joint scientific activities. Two of the RIN Partnering Universities have bagged prestigious DST-RSF award.

On 29 Jun, 2016 the Ambassador of India to the Russian Federation H. E. Pankaj Saran visited Research and Educational Centre «Primorsky Aquarium» of the Far Eastern Branch of the Russian Academy of Sciences and also visited Admiral Nevelskoy Maritime State University (MSU), where he received warm welcome by the Rector. During his meetings he had fruitful discussions for improving scientific ties between research and academics institute of India and the Far East region of Russia.

A large-scale industrial international forum Technoprom 16 Forum was held in Novosibirsk and highlighted Arctic Research activities in Russia. A method of essentially everlasting data storage on quartz discs instead of traditional CD has been developed that can enable users to save up to five bits of data per dot instead of just one as is with conventional storage solutions. A team of Siberian researchers has come up with a new monitoring system for neurosurgery, which is expected to help substantially reduce the number of postsurgical complications. MPhI scientists have created hybrid spectrometers, which allow quickly define contents of complex multicomponent samples, essential for pharmaceuticals, criminalistics, safety, medicine and monitoring of environmental objects. MPhI Institute have worked out a novel xenon gamma spectrometer on sorting and segregation of radioactive waste.

Looking forward to take Indian-Russian Relations in Science and Technology to new heights and this is possible by continued support from you and your valued team.

We hope our Newsletter facilitates identification of potential Russian partners by Indian organisations. Your queries on Russian S&T developments and suggestions for improving the impact of the Newsletter are welcome.

Dr. Abhishek Vaish

I. Bilateral / Multilateral Cooperation

1) 17 Indo-Russian Projects supported under DST-RSF call for Basic and Exploratory Research.



Department of Science and Technology of India (DST) and Russian Science Foundation (RSF) have approved the results of the assessment of applications for the first joint call. According to the results, 17 projects out of 150 applications will be funded. Grants will be allocated for carrying out basic and exploratory research in 8 fields of research: mathematics, computer science and systems; physics and space science; chemistry and materials science; biology and life sciences; fundamental research in medicine; agricultural sciences; Earth sciences; engineering sciences. The grant amount for the Russian part of the international research team will range from 4 to 6 million rubles per year, and the projects will be implemented in 2016-2018.

2) 22 Indo-Russian Projects supported under 9th DST-RFBR call for Basic Research.

Department of Science and Technology of India (DST) jointly with Russian Foundation for Basic research have successfully approved

22 joint projects in Basic Science for years 2016-2017. The research will be conducted in 7 fields of research such as: mathematics, mechanics and informatics; physics and astronomy; chemistry and materials science; biology and medical sciences; Earth sciences; Fundamental engineering; Telecommunications and Computer Sciences. Annual funding equivalent to US\$ 20,000 from each side will be allocated for research projects for a period of 2 years.

3) MIPT signed MoU with Amity University.

Promoting mutual cooperation in educational, cultural and scientific achievement exchanges, Amity Universities and Institutions of India and Moscow Institute of Physics and Technology (MIPT) signed a Memorandum of Understanding in June 2016. The MoU endorses the development of programs and activities that advance scholarship through cooperative relations and may include:

- 1) Joint educational, cultural and research activities
- 2) Development of new educational programs for undergraduate and postgraduate students
- 3) Development of joint research and engineering projects, joint participation in competitions for Russian and international grants, creation of joint research labs;
- 4) Exchange by faculty, graduate students and postdoctoral scholars;
- 5) Participation in seminars, workshops and academic meetings.
- 6) Exchange by academic materials, publications and other information;
- 7) Special short-term programs and visits.

The MoU will remain in effect for five years with the possibility of extending.



Representatives of MIPT and Amity University at MIPT Campus

The Indian Side was represented by Prof. W. Selvamurthy, Amity Science, Technology and Innovation Foundation, Amity University, Uttar Pradesh, Chancellor, Amity University. The Russian Side was represented by Prof. N. N. Kudryavtsev, Rector, Moscow Institute of Physics and Technology.

4) Admiral Nevelskoy Maritime State University (MSU)

On 29 Jun, 2016 the Ambassador of India to the Russian Federation H. E. Pankaj Saran visited Admiral Nevelskoy Maritime State University (MSU), where he received warm welcome. The university is the oldest establishment in maritime education in the Russian Far East and has deep scientific traditions and focuses on an innovative approach in its development.

To date, studies are pursued in 41 directions at the University. The Institute of postgraduate professional education provides continuity of scholarly traditions and training of highly qualified personnel at the University. Candidate and doctoral dissertations are defended in dissertation councils.

An important role in the commercialization of new developments is given to the Centre of Protection of Intellectual Property Rights whose staff provides legal protection and use of the University intellectual activity results, enforces the rights of authors of intellectual property, informs the University staff on research activities and presents the University developments at Russian and international exhibitions, shows and auctions.

The economy based on knowledge, involves the integration of education, research, production and investment. On behalf of the Maritime State University we invite scientists and research teams, inventors and innovators, managers of production enterprises and logistics centers, department heads of fleet operations and decision makers of shipping and fishing companies, future entrepreneurs, private and corporate investors.

The MSU Institutes comprise:

- Maritime Academy;
- Maritime IT Institute;
- Institute of Transport Economics and Management;
- Maritime Humanities Institute;
- Institute of Sea protection and Shelf Development;
- Open Maritime Institute;
- Institute of International Education;
- International Business School;
- Institute of Postgraduate Professional Training.

The University invites all who are interested in personal growth and academic career, in presenting results of their research, generating new knowledge, developing new technologies, making high technology products and profit from the results of reliable partnership:

- participate in the scientific activities of the University;
- organize a joint research project;

- develop high-tech products and technologies or implement their modernization on the basis of applied R & D;
- have scientific probation;
- publish research results in scientific publications of the Admiral Nevelskoy Maritime State University;
- continue post-graduate education and / or defend candidate and doctoral dissertations at our university;
- get marketing and information services, financial consulting on the implementation of research results;
- receive the right to use the results of the University intellectual activities in the form of license agreement, patent assignment, patent sharing, buying know-how, etc.;
- obtain consulting in the area of intellectual activities.

The University is actively and successfully engaged in joint activities with enterprises and organizations of the Far Eastern region, fruitfully cooperates with legislative and executive branches of the Primorsky Territory, research institutes of the Far Eastern and Siberian Branches of Russian Academy of Sciences: VE Zuyev Institute of Atmospheric Optics, Institute of Automation of Control Processes, VI Ilyichev Pacific Oceanological Institute, Far Eastern Federal University, Research and Design Institute of Merchant Marine, as well as with foreign organizations. MSU is actively involved in innovative conferences, competitions, sites, forums and fairs.

5) Research and Educational Centre «Primorsky Aquarium», Far Eastern Branch, Russian Academy of Sciences.



On 29 Jun, 2016 the Ambassador of India to the Russian Federation H. E. Pankaj Saran visited Research and Educational Centre «Primorsky Aquarium» of the Far Eastern Branch of the Russian Academy of Sciences, scheduled for opening in early autumn 2016. Primorsky Aquarium will create new opportunities for scientific and translational research. There will be the following tasks:

- 1) Developing modern technologies of aquaculture and conducting research in the area of hybridization of marine organisms;
- 2) Conducting comparative studies of genetic diversity of different fish taxons and invertebrates, creating data bases of rare and valuable in commerce species of fish and invertebrates, developing recommendations for their breeding;
- 3) Developing breeding techniques and re-introduction of rare and endangered species of fish and invertebrates to the wild;
- 4) Studying life cycle and reproductive biology of different marine species; cryopreservation of reproductive cells,

larvas and tissues of marine organisms with following restoring of their vitality; creating a cryobank of the marine organisms tissues, including ones of the rare and endangered species;

- 5) Conducting research in the area of the comparative cytology of marine animals;
- 6) Research in the areas of neurobiology, physiology, and veterinary science of marine mammals.
- 7) Research in the medical field will facilitate dolphinarium development. It is proved that dolphin therapy is effective in treatment of ICP children, children with special needs and with other diseases.

Main areas of the scientific research of the Primorsky Aquarium will be:

- creating a scientific base and techniques for developing up-to-date husbandry methods and breeding programs for the rare and endangered species of the marine biota;
- reproductive biology for the rare and endangered species;
- research in the physiology, ethology and veterinary science of the marine animal;
- observation and research of the higher nervous activity and behavior of the marine animals;
- Research in the areas of the molecular genetics, biological chemistry and biotechnologies for rare and endangered species of marine biota.

To develop the above mentioned research, six following laboratories with the up-to-date equipment will be opened with a focus on cellular biology; biological chemistry, molecular biology and genetics; biotechnologies; microbiology; marine ecology and hydrobiology; sea bioresources.

Research in the fields of pharmacology, biochemistry, microbiology and biotechnologies of marine organisms will allow develop new generation medicaments. Additionally, there will be a tour program, where all visitors interested in modern methods of scientific research of ocean studies will be able to learn about them. Also visitors can learn about unique science equipment, machines and achievements in marine biotechnologies and biological engineering.

6) 1st Anniversary of Network of Institutes of Higher Education of the Republic of India and the Russian Federation.

In today's knowledge-driven economy, sectors like education, research & development are playing very important role for shaping the future of the nation and therefore it is imperative to facilitate a clean ecosystem for universities and research institution to grow. India and Russia has a very old relation in the sphere of Science, Technology and Education. Both the countries are moving together to greater heights and achievements with new initiative year after years in the form of various bilateral scientific cooperation. One of the recent initiative is Indo –Russian Network of Higher Education (RIN). RIN was launched on 8th May 2015 during the visit of Hon'ble President of India, Shri Pranab Mukherjee to Lomonosov Moscow State University by concluding the Memorandum of Intent (MOI) which was signed by Prof Devang V. Khakhar, Director of the Indian Institute of Technology (IIT) Bombay on behalf of Indian institutions and by Prof V. A. Sadovnichiy, President of the Russian Rectors' Union on behalf of Russian institutions.



Indian and Russian RIN Participants gather in Mumbai for the first meeting in February 2016

RIN facilitates:

- Networking — through extended Russian-Indian net of universities, institutes, R&D labs, research units.
- Access — to the best scholars, scientific achievements, labs and R&D equipment.
- Collaboration and knowledge exchange — to develop joint educational program and enrich each other curricula, making it highly competitive on the global education market.
- Support — to get all-pervasive support from Ministry of Education and Science of Russia, Department of Science and Technology of India, Embassies of Russia and

Highlights of Major Achievements:

- 11-12 February 2016 the first meeting of the Russian-Indian Network of Institutions of Higher Education (RIN) was held in Mumbai. Nine Russian universities and eleven leading Indian institutes participated in this event.
- The number of participants joined RIN is 20 from Indian side and 24 from Russian side.
- Two RIN partnering Universities have been awarded with grants for bilateral projects under S&T Bilateral Cooperation

Programme in Basic and Exploratory Scientific Research, supported by DST and Russian Science Foundation (RSF);

- One RIN partnering university have been awarded under DST-RFBR Basic Science research.

7) BRICS STI Framework Program launched.

Pilot Coordinated Call for BRICS Multilateral Research and Development Projects has been launched under the BRICS STI Framework Programme. The programme aims to support excellent research on priority areas which can best be addressed by a multinational approach. The initiative should facilitate cooperation among the researchers and institutions in the consortia which consist of partners from at least three of the BRICS countries. Multilateral (participants minimum from 3 BRICS countries) research projects are invited to submit proposals in the following thematic areas:

1. Prevention and monitoring of natural disasters;
2. Water resources and pollution treatment;
3. Geospatial technology and its applications;
4. New and renewable energy, and energy efficiency;
5. Astronomy;
6. Biotechnology and biomedicine including human health and neuroscience;
7. Information technologies and high performance computing;
8. Ocean and polar science and technology;
9. Material science including nanotechnology;
10. Photonics.

Funding agencies from the Indian Side include the Department of Science and

Technology of India. Maximum Indian support for each Project: 50,000 US\$ equivalent to Indian rupees Rs. 40 lakh approx. for 3 years duration.

Funding agencies from the Russian Side are: Russian Ministry of Education and Sciences (RMES), Foundation for Assistance to Small Innovative Enterprises (FASIE) and Russian Foundation for Basic Research (RFBR).

The call is open until 25 August 2016. The detailed information for all interested participants is available at the link: <http://brics.rfbr.ru/rffi/eng/brics>

8) 2nd Indian-Russian Joint Conference in Statistics and Probability held in St Petersburg



Conference Participants at Euler International Mathematical Institute

The 2nd Indian-Russian Joint Conference in Statistics and Probability was held on May 30-03 Jun, 2016 with participation of 9 renowned experts from India and over 20 from Russia. The event was organized by St Petersburg Department of Steklov Mathematical Institute, Euler International Mathematical Institute, St. Petersburg State University and Chebyshev Laboratory, with support from Indian Statistical Institute and Chennai Mathematics Institute. Chair of the

organizing committee was DrBimal Roy from Indian Statistical Institute. As a result, further interaction is planned such as:

- A summer school for 2-3 weeks in 2017 in Russia on Probability where participants would be master's or Ph.D. students from India & Russia (about 30) and speakers also from both the countries;
- A winter school on Statistics, in India in 2018.

The conference is reciprocal with respect to the 1st Indo-Russian Joint Conference in Statistics and Probability which was successfully held in New-Delhi on 15-18 of January, 2015 with participation of 10 Russian participants and 25 Indian statisticians, mainly from Kolkata, Chennai, and Delhi and three sections of Indian Statistical Institute. 3rd Indian-Russian conference on Statistics & Probability is scheduled for 2018 in India.

II. Science, Technology & Innovation in Russia.

1) Essentially Everlasting Data Storage On Quartz Discs developed.

Moscow's Mendeleev Russian University of Chemistry and Technology have developed a method of essentially everlasting data storage on quartz discs instead of traditional CD ones. Unlike a CD disc where data is stored on its surface, with the new quartz disc data is stored inside it on a layer-by-layer basis, using what scientists call the nanolattices pattern. That can reportedly enable users to save up to five bits of data per dot instead of just one as is with conventional storage solutions.

The Moscow researchers say such discs can store as much as a terabyte (1,024 GByte) of information — for example, about 500 movies

or more than 200,000 archived documents. In addition to that, the new quartz discs are believed to be exceptionally stable when exposed to such external factors as high pressure and temperature, and electromagnetic fields. They can survive a heavy fire without losing any data.

The Mendeleev University team has been working on this project to order from Russia's Advanced Research Fund (ARF), the national analog of the US' DARPA.

Advantages that are believed to make the new gadget a cut above the existing competition reportedly include the accuracy of measuring which is not dependent on the properties of a specific patient's skin, such as perspiration, pigments, etc. ; no need for recalibration with invasive methods; relatively low cost; no side effects, such as skin irritation; and compactness.

2) **Siberians develop advanced neurosurgery monitoring system**

A collaborative team of scientists from several Siberian research institutes has come up with a new monitoring system for neurosurgery, reportedly unparalleled in the world. Using the system is expected to help substantially reduce the number of postsurgical complications, as the solution is said to enable ongoing monitoring of what physicians refer to as specific load on blood vessels — an important factor determining surgery's success or failure. The load changes as surgery goes on; if it exceeds permissible limits, the whole procedure puts the vessels at serious risk. By monitoring the load and taking proper action to reduce it on time surgeons can now prevent vessel damage and avert a lot of postsurgical complications.

Before the new solution was developed possible deteriorations in the blood vessels as a result of overload were basically

unpredictable, which led to similar operations having different outcomes.

The project has been funded from a grant by the Russian Scientific Fund, the new organization which also supports bilateral research projects between India and Russia.

3) **Hybrid spectrometers created in MPhI to define contents of complex multicomponent samples**

MPhI scientists have created **hybrid spectrometer** on the principles of drift ion mobility spectrometry and mass-spectrometry. The novel devices allow quickly, for some seconds, define contents of complex multicomponent samples, which is essential for a number of spheres, including pharmaceuticals, criminalistics, safety, medicine, monitoring of environmental objects.

Employees of the Department of molecular physics of MPhI have created devices having unique scientific-technical solutions, which allow reach high analytical characteristics, the key ones among which are quickness and reliability of information acquisition. In particular, one of the main advantages of a new hybrid device on the basis of time-of-flight spectrometry and ion mobility spectrometry are high selectivity and the speed of analysis (3-100 sec.) under a high number of traceable target components. The reached detection limit in the liquid is 1 molecule for 5 billion molecules of the basis. High selectivity is reached by a consecutive division of probe components by 2 characteristics: the size of ionized molecules in ion mobility spectrometers and then by mass ratio to charge. Such two-dimensional division allows analyze certain very complex multi-component samples.

MEPhI devices are based on the principles of drift ion mobility spectrometry and mass-spectrometry. According to Associate Professor at the Department of molecular physics Alexey Sysoev, traditional methods of detection of multi-component samples' contents combine liquid or gas chromatography and mass- spectrometry which provide for long duration of measuring lasting for dozens of minutes. In case of ion mobility spectrometry - time-of-flight mass-spectrometry – the time of measuring can be diminished 10-100 times. This is crucial for a number of applications. In particular, under the development of new medicines at the stage of synthesis the analysis of a vast number of samples is required, and in the field of safety the efficiency of the analysis allows increase the number of inspections with high level of selectivity.

One more important peculiarity of drift ion mobility spectrometers is a higher resolving power reaching 100. Apart from the possibility of separation on the mobility of a big number of probe components, it will allow raise the precision of defining the modified mobility of researched compounds, which has an important meaning for their further identification. This peculiarity provided for the possibility of successful application of devices in Russia and abroad.

Nowadays MEPhI scientists are working under a method of raising of selectivity and sensitivity of devices and methods, which will allow increase possible applications in the sphere of sciences about life and oil analysis. The raising of method dimensions is of great interest, which is possible due to the inclusion of ion mobility high-resolution spectrometer into the hybrid device, which our scientists hope to accomplish in cooperation with Wichita State University (the USA).

4) Technoprom-2016 Forum highlights Arctic Research

On 9-10 Jun, 2016, Technoprom-2016 forum took place in Novosibirsk. The program consists of more than 30 various events, including the 10th anniversary of the Siberian Venture Fair. Deputy Prime Minister Dmitry Rogozin acted Head of the organizational committee is.

At the Forum, Russian Vice-Premier Dmitry Rogozin stated that Russia should focus on its Arctic projects, which will be urgent and relevant in any market conditions if Russia wants to develop as an integral and sovereign state. Several strategic factors determine the importance of the Arctic region for Russia, and these factors can fairly be called the country's national priorities. As per Rogozin, it is necessary to clearly define long-term strategic goals and priorities, on the one hand, and take account of changing external circumstances and the uncertainties, which may arise.

As per Rogozin, Russia is planning to implement projects worth a total of 1.35 billion Rub as part of the 2015-2030 shipbuilding and shelf development state program. Beginning in 2016, the government will start implementing promising projects to the tune of 1.35 billion Rub as part of the 2015-2030 shipbuilding and shelf development state program. The program is expected to reduce Russia's dependence on foreign seismic measuring equipment and help to implement import substitution initiatives.

According to Mr. Rogozin, the Zvezda plant in the Russian Far East will start building ships in late 2016. By the year end, they will start cutting metal and building ships and other maritime equipment to develop the Arctic shelf. This will become the most modern and biggest plant.

In a near future, the technology can also be used for targeted delivery of a drug to tumors. Magnetite will reportedly be coated with a special “vector substance” which can “feel” receptors on the surface of cancerous cells. Then it is expected to get inside the cells and toxically impact these only, leaving the rest of the body intact. The team intends to launch its clinical trials in 2018. The initial testing stage envisages using the magnetite-based preparation for brain tumor MRIs. The researchers later plan to apply the method to other types of cancer.

5) **Russian President holds talks with leaders Russian Academy of Sciences**

On 14 Jun, 2016, Russian President Vladimir Putin held a meeting with Mikhail Kotyukov, Head of Russian Agency for Scientific Organizations (FASO), and Academician Vladimir Fortov, President of the Russian Academy of Sciences (RAS) to discuss present affairs related to management of work and interaction between FASO and RAS.

According to Kotyukov and Fortov, three years the launch of the sweeping reform of the Russian Academy of Sciences and creation of FASO the cooperation between the Academy and FASO is progressing steadily and smoothly. According to Kotyukov, in 160 organizations now belonging to FASO new directors were elected and now major research institutions are managed by directors under 50 years of age. He further mentioned another positive trend – increase of the number of young scientists among researchers. In such fields as chemistry, technology, metallurgy, materials science, aerodynamics the proportion of young scientists is reportedly close to 50%, which lays the foundation for future development of technologies in these key directions.



Left to right: FASO Head Mikhail Kotyukov, Russian President Vladimir Putin, RAS President Vladimir Fortov

6) **Presentation of 2015 Russian Federation National Awards**

On 12 Jun, 2016, Russian President Vladimir Putin presented the 2015 Russian Federation National Awards for outstanding achievements in science and technology, literature and the arts, and humanitarian work.

The Russian Federation National Award in science and technology was conferred to: Erik Galimov for the launch of carbon isotope research, the diamond formation theory, and research in petroleum geology and biogeochemical processes; Sergei Lukyanov and Yevgeny Sverdlov for the development and implementation of a technological complex for the analysis of compound genome structure and functions; Sergei Nedospasov for fundamental and applied works on molecular immunity mediators, including unprecedented biomedical models.

7) New Multiple Sclerosis Solution passes Clinical Trials

Institute of Bioorganic Chemistry, St Petersburg Municipal Multiple Sclerosis Center №31, and two private companies Pharmasintez and Xenetic have developed a new form of vaccine to treat multiple sclerosis, one of the deadliest neurodegenerative diseases of autoimmune nature. Results of the effort have been described in an article published in the prestigious «Neurotherapeutics». The key component of the new vaccine candidate is said to be liposomes that act like lipid bubble-like transporters containing fragments of myelin, a protein that structurally insulates nerve fibers.

In an experiment, three protein fragments were selected. One revealed a certain therapeutic effect at the initial stages of the disease, while the other two can keep pathology at bay in a remission period. Lab research enabled the scientists to conclude that combinatory introduction of all the three fragments inside liposomes produces the best possible effect. The vaccine candidates were tested in a series of clinical trials on healthy volunteers and multiple sclerosis patients in five sizable national centers in Russia. It is now known that the solution offers a good level of drug tolerance, and the likelihood of complications is fairly low.

With the project now past preclinical trials and two phases of clinical ones, the developers are hoping for success in phase 3, which would enable widespread use of the vaccine in multiple sclerosis therapy. There are more than 200,000 multiple sclerosis patients aged 15-25 in Russia.

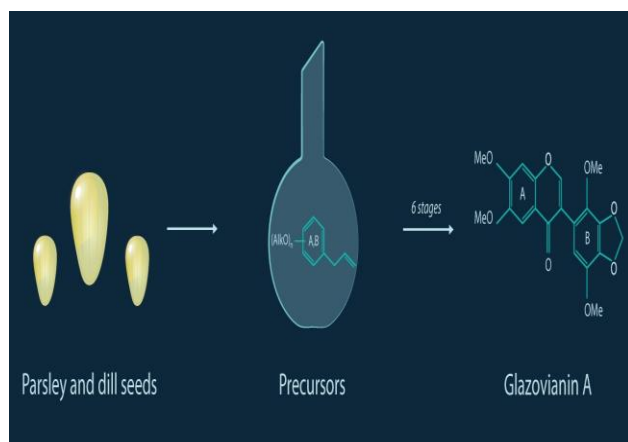
8) Novel Anti-Cancer Agents proved Effective

A team of Russian scientists from Moscow Institute of Physics and Technology (MIPT), the N. D. Zelinsky Institute of Organic Chemistry RAS, the Institute of Developmental Biology RAS, and the Institute of Cell Biophysics RAS proposed an efficient approach to the novel anticancer agents which synthesis is based on extracts from parsley and dill seeds.

The team of MIPT professor Alexander Kiselev developed a simple method of producing glaziovianin A and its structural analogs, which inhibit the growth of human tumor cells. Furthermore, their evaluation in vivo yielded several promising candidates selectively affecting tubulin dynamics.

Currently, the main anti-cancer medical treatment are antimetabolites: compounds disrupting the process of cell division (mitosis). Cancer cells divide much more frequently than normal cells and are more susceptible to the effects of antimetabolites (for instance, the number of melanoma cells doubles every 3 days compared to 15% increase of their healthy progenitors melanocytes). Microtubules, composed of a protein called tubulin, play an important role in mitosis. Antimetabolites bind tubulin and affect microtubule dynamics resulting in arrested cell division and subsequent selective death.

The study is focused on the potent antimetabolic glaziovianinA isolated from the leaves of the Brazilian tree *Ateleiaglaziioviana* Baill. The reported synthesis of this agent is rather laborious and requires expensive precursors and catalytic agents. The novel more efficient six-stage synthesis process (the normal process has 9 stages) for glaziovianin A was proposed with precursors derived from the seeds of common plants, namely parsley and dill (Fig. 1).



Synthesis of glazovianin A (Fig. 1)

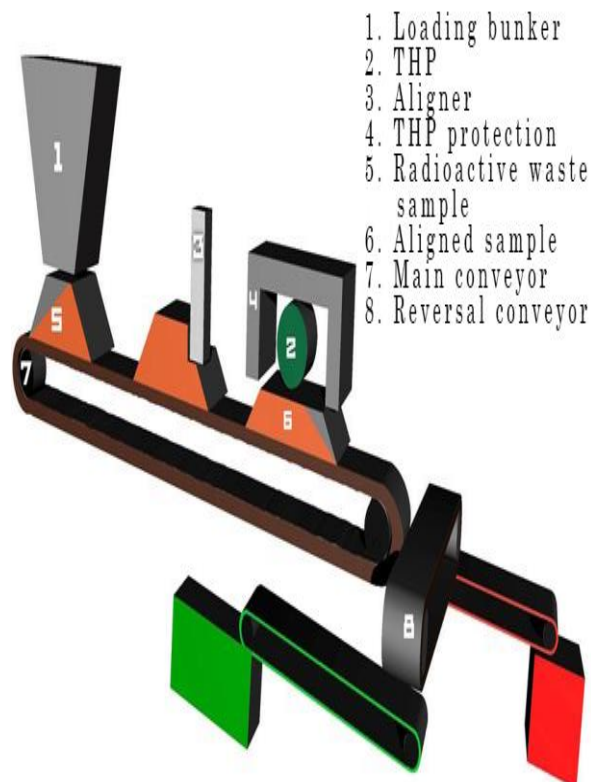
9) **Xenon Gamma Spectrometer for Sorting and Segregation of Radioactive Waste introduced**

MEPhI’s invention: xenon gamma spectrometer on the basis of thin walled 4-liter xenon gamma detector.

Due to growing number of NPP energy units and shutdown of the old ones, energy workers face the issue of burnup fuel utilization and, in particular, the optimization of choice of the type of radioactive waste disposal. For effective sorting out of radioactive waste the level of activity of radioactive waste should be determined the right way. For such purposes gamma spectrometers with good energy resolution, allowing determine components and concentration of separate radionuclides in each sample, are generally used. Detectors which register gamma radiation should be generally resistant to vibrations, acoustic noises, have appropriate size corresponding with the parameters of the construction.

MEPhI Radiation laboratory of experimental physics and cosmophysicshave worked out a xenon gamma spectrometer on the basis of thin walled 4-liter xenon gamma detector for a facility on sorting and segregation of radioactive waste. According to the specialists, with the help of xenon gamma

spectrometer it is possible to get energy resolution of about 2% for gamma quanta with energy of 1 MeV. Besides, such detector is less production-consuming, therefore it is possible to create it in different sizes. Such spectrometer can work even in field conditions.



During the creation of the spectrometer a system of transition of spectrometer information through RS-485 interface has been worked out, xenon gamma spectrometer has been tested in laboratory conditions, and the possibility of detection and identification of radionuclides has been tested. The research has shown that 137Cs source with the activity of ~9 kBq can be detected and identified by the xenon gamma spectrometer at 5 cm distance from detector for 5-10 sec. The xenon gamma spectrometer’s command performance («bad» or «good») has also been tested.

III. Profile of R&D Institutes and Industry in Russia

1. National Research University of IT, Mechanics and Optics (ITMO University)

General Director: Dr Vladimir Nikolaevich Vasiliev

Address: Russia, St Petersburg, Birzhevayaliniya, 14

Contacts: Tel:7(981)189-15-26; Email: niuitmo@gmail.com

Website: <http://en.ifmo.ru/en/>

ITMO University is an internationally renowned research centre and educational institution, participant of Russian-Indian Network of Institutes of Higher Education (RIN) and a participant of '5-100' project. ITMO University develops comprehensive cooperation with universities in BRICS countries in sphere of scientific research, education and personnel training. In cooperation with India ITMO University takes part in international scientific experiment related to understanding and management of massive human crowds during the largest religious festival KumbhMela. Earlier the university participated in two joint projects with Russia under STI Bilateral Cooperation programme and S&T Bilateral Cooperation in Basic Research. ITMO University is also the leading partner in the consortium - IIS, Bangalore and University of Amsterdam, Netherlands is a full party of the experiment responsible for data aggregation, modeling and visualization.

Research Directions:

Top research areas include:

- Photonics and Optics
- Intelligent Technology and Robotics
- Life Sciences and Health
- Natural Sciences

- "Smart" Materials, Nanomaterials and Nanotechnology
- IT in Economics, Social Sciences and Art

Collaboration with India:

The University expresses deep interest in establishing cooperation with Indian universities and educational organizations. Some of the direction of research ITMO is interested to collaborate on:

- Big data;
- Cyber security;
- Cognitive science;
- Big data analytics for medical applications;
- Smart cities.

ITMO University also invites Indian universities to participate in short-term programs and online trainings devoted to research, education and innovation. The University is also interested in enrolling students from India with the assistance of top recruiting agencies in India, as well as attracting talented young researchers through online programs for high-school graduates and undergraduate students.

2. Russian Scientific Center "Applied Chemistry"

General Director: Ms Elena Viktorovna Kozlova

Address: Russia, St Petersburg, Krylenkost 26A

Contacts: +7(812)647-92-77 ext. 1088; Email: giph@giph.su; sekretar@giph.su

Website: <http://www.giph.su/en/front>

Developments of Russian Scientific Center "Applied Chemistry" aim at support of key industries: chemical, defense, medical, radioelectronic, agricultural, refrigerating industry and others. The Center collaborates with leading chemical foreign firms and has long-term contracts on scientific research, design and construction of chemical plants.

The structure of the Centre allows solving any problems fully starting with calculations, experiments and pilot plants up to design and construction of large-scale works, including their chemical and environmental safety.

Research directions:

- Organic Synthesis;
- Chemistry and Technology of fluorine-containing Compounds and Monoproduct;
- The development of components and catalysts ZHRT their decomposition;
- Liquid monopropellant drop-in "green consumption", high-energy composition for burning denotational;
- Gasifiers for solid chemical sources;
- Conversion of hydrocarbon fuels and plasma-chemical processes;
- Near - and supercritical technology;
- Components, materials and monoproduct;
- Chemical safety, risk analysis, fire and explosion safety;
- Environmental and industrial safety;
- Technical safety of chemical processes;
- Rectification and distillation;
- Testing Laboratory "Small chemical products".

Collaboration with India:

Russian Scientific Center "Applied chemistry" has a 50-year experience in purification of waste waters released from industrial factories from various areas (chemical, petrochemical, chemical-pharmaceutical, electronic, tanning) that have a wide spectrum of organic, nonorganic impurities and pathogenic flora. The Centre has multiannual contacts with St Petersburg enterprises and organizations that develop and create facilities for purification of water from natural sources for drinking water supply. On the basis of the meeting the

Centre is ready to consider existing issues on water purification in India and offer scientific-technological and engineering decisions.

At present is performed jointly with with Russian Ministry of Education and Science, Ministry of Trade, Ministry of Defense and Russian Airspace Agency on the following basic directions: chemistry and technology of fluorine-containing compounds, basic and delicate organic synthesis, products of inorganic synthesis, membranes, sorbents and catalysts of technological and ecological destination, especially pure substances, chemistry of high temperatures and pressure, chemical gas dynamics, laser chemistry, photochemistry; composite and polymeric materials, isotope-containing dispersible products; chemistry of defensive and space-rocket complex, conversion of defensive science and production, utilization of products of military purpose; processes and instruments of chemical technology, creation scientific bases of flexible chemical productions on the basis of the block-module equipment, means of the control and automation; development of technologies, projection of chemical productions, manufacture of equipment and creation of pilot plants, engineering; information science in a chemical science and techniques', marketing, production of science intensive chemical products, training of the highly qualified scientific staff.

3. Ioffe Physical-Technical Institute RAS

General Director: Dr Andrey

GeorgievichZabrodskiy

Address: Russia, St Petersburg,

Politekhnikeskayast 26

Contacts: Fax: +7(812)297-10-17; Tel:

+7(812)297-79-28 ; Email:

andrei.zabrodskii@mail.ioffe.ru;

Lebedev.SV@administration.ioffe.ru

Website: http://www.ioffe.ru/index_en.html

The Ioffe Institute is one of Russia's largest institutions for research in physics and technology with a wide variety of operating projects. The institute had joint research projects with Indian Institute of Technology, Kharagpur in the area of Fundamental of Engineering Sciences and with Birla Institute of Technology in the area of Physics and Astronomy.

Research Directions:

- Nano heterostructure Physics
- Solid State Electronics
- Solid State Physics
- Plasma Physics, Atomic Physics and Astrophysics
- Physics of Dielectric and Semiconductors

Collaboration with India:

Ioffe Institute approaches Indian scientists working in the area of photovoltaic R&D, in particular on organization of the production in India of concentrator photovoltaic installations with capacity of 100 MW/year.

4. Saint Petersburg State Polytechnical University

President: Academician Yuriy Sergeevich Vasiliev

Address: 195251, Russia, St Petersburg, Polytechnicheskaya, 29

Contacts: Tel: +7(812)297-16-16; Fax: +7(812) 552-60-80;

E-mail: postbox@stu.neva.ru;

Homepage: <http://www.spbstu-eng.ru/>

St Petersburg State Polytechnical University was founded in 1899 and is known in Russia and abroad as Polytechnic Institute. A world-wide leader in the field of higher engineering and economic education, it remains at the leading positions in the rating of Russian engineering higher educational institutions. World famous scientists working within the

university have made an important contribution to fundamental and applied science. Among them are AF Ioffe, PL Kapiza, NN Semenov, Zh I Alferov and many others. In 2010 SPbSPU successfully obtained the status "National Research University". Nowadays SPbSPU (generally called "Polytech") develops as a new type research university, which integrates multidisciplinary R&D activities and advanced technologies for rising national economics competitiveness. Its structure consists of 12 Institutes, more than 105 departments and 120 R&E laboratories, Research centers, innovation laboratories and a science park.

The research effort is focused on: nuclear physics, condensed state physics, plasma physics and controlled nuclear fusion, high-temperature superconductivity, radio physics and electronics, physicochemical basics of life system organization, medical physics and engineering; power engineering, environment protection and support, balanced consuming of natural resources, municipal economy systems and life support; computing, control and cybernetics, robotics and flexible computer systems, telecommunication systems; mechanics, machine-building, design materials and new machinery and equipment materials, physicochemical basics of metallurgic processes.

The University has a supercomputing Center "Polytechnic". Its objective is to increase efficiency of fundamental and applied research with help of supercomputing; train engineers, graduated and postgraduate researchers with deep level of supercomputing knowledge and competences for industrial companies and research centers; create regional competency center devoted to practical supercomputing usage for industrial research centers (energy, bioinformatics, radio-electronics).

International research remains one of four main directions of scientific development at the university. The University is open to research collaboration with Indian Universities. It maintains longstanding traditions of international partnerships with a great number of foreign educational institutions, research organizations and industrial companies. It has more than 20 international research centers that conduct joint research along with prominent international companies. In total, among the University partners there are more than 327 universities, 131 scientific and research institutions and 172 companies from over 55 countries. The University takes part in NATO-Russia Science for Peace Project, EU Framework Programmes, ENPI CBC, International Science and Technology Center (ISTC), Civilian Research and Development Foundation (CRDF), National Science Foundation (NSF) and other.

5. Saint Petersburg State University (SPbU)

Rector: Dr Nikolay Mikhailovich Kropachev

Address: Russia, Saint Petersburg, Universitetskaya Emb 7/9, 199034

Contacts: Tel: 8(812)326-49-43; E-mail: rector@spbu.ru; a.durakova@spbu.ru;

Homepage:
<http://english.spbu.ru/>

Saint Petersburg State University is included in all ratings and lists of the best universities in the world and is one of the leaders in all indicators in Russia. The University is the second best multi-faculty university in Russia after Moscow State University and is ranked 4th in Russian University rankings for 2015. It is a participant of Russian-Indian Network of Institutes of Higher Education (RIN) and "5-100" Academic Excellence project. The university has a reputation for having educated the majority of Russia's political elite; these include presidents Vladimir Putin

and Dimitry Medvedev, both of whom studied Law at the university. The university was the first from Russian universities to join The Coimbra Group (CG), an association of long-established European multidisciplinary universities of high international standard, and now it represents Russia.

Today, St. Petersburg University is an internationally recognised center for education and research. SPbU constantly strives to provide state-of-the-art facilities that allow staff and students to excel in research and academic activity. The University has had nine joint projects with India in the field of chemistry, mathematics, physics, astronomy and biology, and welcomes new proposals for research and educational cooperation with Indian scientists and faculty.

Priority Areas of Research Include:

- Nanotechnology and materials science
- Biomedicine and human health
- Information systems and technology
- Ecology and sustainable use of natural resources
- Human resource management and technologies
- Social technologies

SPbU has a long-standing tradition of integrating research into teaching. SPbU staff has always included most renowned scientists, scholars and researchers. Evidently, for more than 200 years the University has possessed unique schools of thought.

6. Irkutsk State University

Rector: Dr Alexander V. Arguchintsev
Address: Russia, Irkutsk, Karl Marx st.1
Contacts: Tel: (3952) 24-34-53; Fax: (3952) 24-22-38; E-mail: rector@isu.ru; prorectornir@isu.ru

Homepage:
<http://isu.ru/en/index.html>



The Irkutsk State University, one of the oldest universities in Siberia, possesses considerable educational and scientific potential. The university has one separate branch, five educational institutes, ten faculties, 109 departments, a Center for Advanced Training and Retraining, three research institutes, a department for post-graduate and doctoral courses, a Center of New Informational Technologies, the Baikal Research and Education Center, a virtual university, the Confucius Institute, scientific and educational libraries, a UNESCO Chair for Water Resources, an astronomical observatory, a botanical garden and several educational practice centers.

Two hundred post-graduate and doctoral students currently study with us in 49 different fields. Scientific guidance is carried out by 150 scientists, among whom there are 90 Doctors of Science. These include six full members and two corresponding members of the Russian Academy of Science, as well as 30 members of the Branch and Social Academies of Science. Six Thesis Councils in 14 scientific specialties work at ISU.

The University's scientific schools are internationally known in the fields of fluorescence, ionosphere physics, high energy physics, physical chemistry and catalysis, inorganic chemistry and ore-dressing, macromolecular chemistry, differential and integral equations, optimal control theories, algebra and mathematical logic, the biology and ecology of Lake Baikal, microbiology, archeology, ethnography, and political science, as well as contemporary history, philology, geology and geography. The educational and scientific divisions of Irkutsk State University have considerable experience in different interdisciplinary fields and are ready to work with students. They offer educational programs, usage of pedagogical innovations, and information technologies, all of which are in tune with new and progressive

information from the international academic community, along with participation in international educational and scientific projects, and the wide academic mobility of students and teachers. Research Institutes include:

- Research Institute of Oil and Coal Chemical Synthesis
- Research Institute of Biology
- Research Institute of Applied Physics
- ISU Astronomic Observatory
- ISU Botanical Gardens

Irkutsk University welcome Indian scientific organisations for cooperation. The University offers many possibilities for the integration of scientific resources from foreign universities. They have 61 cooperative agreements with universities in Europe Asia, America, and Australia.

IV. Forthcoming Workshops and Conferences in Russia

1. International Conference on Robotics and Machine Vision (ICRMV 2016)

Dates : 14-16 Sep, 2016

Place : Moscow, Russian Federation

Coordinator: Ms Janet Hsiao, Conference Secretary

Contacts : Tel: +86-13298699999; Email: icrmv@academic.net ;

Website:

<http://www.icrmv.org/>

This meeting provides an interactive learning and relationship-building forum for all researchers in the Robotics and Machine Vision field. Colleagues from industry, academia, and government agencies will gather at the interface of research, partnerships, funding and commercialization to find ways to move forward. Above all, this event will provide networking opportunities in an intimate and accessible environment. The subjects will cover: Biomedical Image

analysis; Human-computer interaction; Tracking and surveillance; Biometrics; Robot control; Mobile robotics; Mobile sensor networks; Micro robots and micro-manipulation; Search, rescue and field robotics; Robot sensing and data fusion; Dexterous manipulation; Medical robots and bio-robotics; Human centered systems; Space and underwater robots; Tele-robotics; Robotic drives; Robotic Kinematics; Robotics and Artificial Intelligence; Image/video analysis; Feature extraction, grouping and segmentation; Scene analysis; Pattern recognition; Learning in vision; Activity/behaviour recognition; Localization, navigation and mapping; Applications.

2. International Conference on Mechatronics, Design and Automation Engineering (ICMDA 2016)

Dates : 14-16 Sep 2016

Place : Moscow, Russian Federation

Coordinator: Ms. Lakisha Dong, Conference Secretary

Contacts : Tel: +86-28-86528758; Email: icmda@iacsit.net;

Website: <http://www.icmda.org/contact.html>

Original papers are solicited in subjects including, but not limited to the following: Actuator design, robotic mechanisms and design, robot kinematics and dynamics; Agile Manufacturing; Agriculture, construction, industrial automation, manufacturing process; Automation and control systems, middleware; Biomedical and rehabilitation engineering, welfare robotics and mechatronics; Cellular Manufacturing; Concurrent Engineering; Design for Manufacture and Assembly; Distributed Control Systems; Flexible Manufacturing Systems; Humanoid robots, service robots; Human-robot interaction, semi-autonomous systems, telerobotics; Lean Manufacturing Logistics; Machine Vision; Management of Technology; Manufacturing;

Mining robotics; Mobile robotics; Modeling and Simulation Scheduling; Nano/micro systems and applications, biological and medical applications; Navigation, localization, manipulation; Operations Management; Rapid Prototype; Rescue, hazardous environments; Robot intelligence and learning; Robot vision and audition; Robots and Automation; Sensor design, sensor fusion, sensor networks; Sustainability, energy conservation, ecology.

3. 33rd IASP World Conference on Science Parks and Areas of Innovation

Dates : 19-22 Sep, 2016

Place : Moscow, Russian Federation

Coordinator: MrRenatBatyrov, Head of the Organizing Committee

Contacts : Tel: +7(495)956-00-33 ext.

2340 ; Email: RBatyrov@sk.ru;

iasp2016moscow@sk.ru; Website:

<https://www.iasp2016moscow.com/>

IASP is the worldwide network of science parks and areas of innovation. It connects the professionals managing science, technology and research parks (STPs) and other areas of innovation and provides services that drive growth and effectiveness for all members. Skolkovo Innovation Center in partnership with MSU Science Park and TechnoparkStrogino and with strong support of the Moscow City Government will host the 33rd IASP Annual World Conference on Science Parks and Areas of Innovation. The conference will bring together experts from science and technology parks (STPs) and other areas of innovation (AIs), technology-based incubators, academia, the public sector and business to discuss and debate in depth the trends in STPs and other areas of innovation as increasingly complex structures for professional innovation support.



4. The International Symposium on Nonequilibrium Processes, Plasma, Combustion and Atmospheric Phenomena

Dates : 02-07 Oct, 2016
Place : Sochi, Russian Federation
Coordinator: Mr. Alexander M. Starik, Organizer
Contacts : [Tel:\(+7495\)3616468](tel:+74953616468); Fax: (+7495)3620373; Email: star@ciam.ru;
 Website:
<http://www.nepcap2016.ciam.ru/>

Topics will cover: Kinetics of elementary processes in plasma, combustion and atmosphere; Fundamentals of ignition and combustion of organic, metalized and synthetic fuels; Physical and chemical processes in low temperature complex plasma, including burning plasma; Physics of shock and detonation waves; Ignition, combustion and detonation in application to jet and internal combustion engines and energetic machines; Novel combustion concepts including plasma-assisted and laser-induced combustion; Physics and chemistry of high speed gas flows; Ignition and combustion of gaseous, liquid and solid fuels in high speed flows; Novel physical and chemical propulsion concepts; Physics of clusters and nanostructures; Combustion, laser and plasma generated aerosols and nanoparticles; Plasma, laser and combustion assisted technologies, fuel reforming, nanomaterials and surface treatment; Gaseous and particulate pollutant formation and pollution control; Impact of pollutant emission on the atmospheric processes and climate.

5. 12th Central & Eastern European Software Engineering Conference in Russia

Dates : 28-30 Oct, 2016

Place : Moscow, Russian Federation
Coordinator: Mr Boris Kulakov, Member of the Organising Committee
Contacts : Tel: +7(499)703-16-55; Email: contact@cee-secr.org;

Website:
<http://2016.secr.ru/lang/en/program/program-overview>

The conference Program includes Invited talks, Regular and Blitz presentations, Panel discussions, Workshops and Open space talks. Trending topics will cover: IT in Healthcare and adjacent areas (biotechnologies, neurointerfaces); Mesh App and Service Architecture; Internet of Things Platforms. Programming for Robots. Embedded Systems; Data Science. Big Data. High-Loaded Systems; Cloud Computing; Advanced Machine Learning. Context-Rich Systems; Web-scaled IT for Enterprise; Knowledge intensive Startups; Mission-critical Software Traditional topics will consist of: Programming Technologies and Tools; System Analysis and Engineering of Requirements; Project and Product Management. Classic and Agile methodologies, Essence/SEMAT; Software Testing, Verification, and Analysis; Software Architecture; Software Security and Reliability; Mobile and Cross Platform Application Development; Open Source Technologies & Community; Continuous Professional Development: From Classical to Corporate University; Business and Entrepreneurship in the Software Industry.

Supercomputing Consortium of Russian Universities (link is external) and Federal Agency for Scientific Organizations (link is external)

September 26-27, 2016, Moscow

6. "Russian Supercomputing Days" Conferece

Dates : 26-27 Sep, 2016

Place : Moscow, Russian Federation
Contacts :
 Email: info@RussianSCDays.org ;
 Website: http://russianscdays.org/

The united conference will cater to the interests of a wide range of representatives from science, industry, business, education, government, and students – anyone connected to the development or the use of supercomputing technologies. The conference topics will cover all aspects of supercomputing technologies: software and hardware design, solving large tasks, application of supercomputing technologies in industry, exaflop computing issues, supercomputing education, and many others. Conference organization coordinator is MSU Research Computing Center.

The new, 25th edition of Top 50 list of the most powerful supercomputers in the CIS will be announced on the first day of the conference. The conference will be conducted in English and Russian, with simultaneous interpretation of the reports at the plenary section.

V. Academic Programme offers of Russian Universities.

Moscow Institute of Physics and Technology

Master's Degree Programme - Neural Networks & Neural Computers

Link: <https://mipt.ru/upload/medialibrary/62f/prgrm2-%206.pdf>

Duration: 2 years

For inquiries: Prof. Alexander Galushkin,
 Programme Coordinator

Tel: +74957370258; Email:
 neurocomputer@yandex.ru

The programme is designed to orient the students with the domain of computation science, neural network and their implementation in modern computer architectures with the application in the area of:

- Information Security;
- Image Processing (2D and 3D);
- Signal Processing (voice, radar, etc.);
- Data Processing (text and other);
- Modern computing hardware;
- Parallel, distributed and cloud computing.

Studied courses will include:

- Basics of theory of probability and statistics;
- Neural network theory basics;
- Basics of neuromathematics;
- Professional tasks solutions based on Matlab and CUDA toolboxes;
- Fundamentals of Intelligent Cyber Security Management
- Intelligent technology for information security;
- Intelligent Learning Systems;
- Neuromathematics
- Image processing & Text processing;
- Computational intelligence;
- Neural Network Technology;
- Fuzzy Logic Technology
- Intelligent technology for information security;
- Neurocontrol;
- Neural Network Technology;
- Neurocomputers;
- Neurochips;
- Memristor based neural networks;
- Neuro-fuzzy technology in Intrusion Detection Systems on information resources;
- 3D images processing;
- Neural network based Intrusion detection system.



Programme St. Xavier's College(India); Tsinghua University (China); the Centre of Information Technology and Systems (Russia);Czestochowa University of Technology (Poland); VNU University of Engineering and Technology (Vietnam); Le Quy Don University of Science and Technology (Vietnam).