सत्यमेव जयते

Bimonthly Newsletter
of the
Embassy of India
Moscow

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Dear Readers,

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

The months of March and April have witnessed several endeavors towards strengthening Bilateral and Multilateral cooperation. This has started with a high level delegation from Sverdlovsk Region led by the Governor Kuyvashev and delegation members from Ural Federal University and Ural State Agricultural University, the delegation members met with officials in Department of Science and Technology and Department of Biotechnology, GoI.

The 1st BRICS Working Group on Geospatial Technology (WG-GS) Meeting was held in Greater Noida, India, at GeoSmart India 2016. "Geospatial Technologies for Good Governance and Decision-making" has been the theme of the deliberations, held under the aegis of the BRICS Moscow Declaration 2015. The first Forum of the BRICS Network University was held at Ural Federal University (UrFU) in Yekaterinburg, Russia. The Forum was the first official event held in the frames of the project. The event pursued three main goals – meeting of Rectors And Vice-Rectors of participating universities, working out action plans for the development of joint study programs in the priority thematic areas within the frames of international thematic groups and meeting of the International Governing Council, which is coordinating this project. Representatives of the universities signed a protocol of accession to the BRICS Network University at the end of the forum.

The present issue of the Newsletter gives glimpses of the latest S&T developments in Russia. Russian Prime Minister D. Medvedev announced the progress of Russian universities and their improved results in global academic rankings under the Project "5-100". A Russian company "Brain Bit" is developing a new type of lightweight blood glucose meter based on its proprietary patented technology of noninvasive spectroscopic blood glucose measuring. ITEB RAS jointly with MIPT have synthesized the next gen material perfect for water and air purification, protection of respiratory organs and biological research. MISiS university scientists have successfully developed Russia's first magnetite-based nanotech solution for early MRI-aided cancer diagnostics. Novosibirsk State University experts created the first detailed 3D model of Zika virus for early disgnostics and creation of a vaccine. MISiS researchers have come up with a low-cost thin-filmed photoelectric cell batteries based on hybrid metal-organic compounds called perovskites. ITMO University has introduced a breakthrough approach to the construction of quantum communication systems for secure data exchange. Scientific satellites served as the first launch from the new Russian Cosmodrome "Vostochnyi".

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.

Abhishek Vaish

I. Bilateral / Multilateral Cooperation

1) 1st BRICS Working Group on Geospatial Technology (WG-GS) Meeting

On 02 Mar, 2016 1st BRICS Working Group on Geospatial Technology (WG-GS) Meeting was held in Greater Noida, India, at GeoSmart India 2016. 'Geospatial Technologies for Good Governance and Decision-making' has been the theme of the deliberations. Held under the aegis of the BRICS Moscow Declaration 2015, the BRICS Working Group has been formed to promote collaborative Geospatial Information Science & Technology Research, Technology Development and their Applications in good governance and decision-making amongst the BRICS countries. The deliberations culminated in an agreement towards partnerships in Science, Technology and Innovation in Geospatial Technologies through an eligible work programme. Areas of cooperation discussed at the event included 'Geospatial Information Policies', 'Geoscience', 'Earth Observation and its Applications', 'Land Information System', 'Human Resources and Capacity Building' and 'Industry Engagements'

Meeting of BRICS Working Group on Geospatial Technologies

The BRICS Geospatial Technology Working Group Meeting had representatives of the related domains from the respective countries (except South Africa) discussing on evolving strategies for cooperation in Geo-Information Science & Engineering like identifying common areas of interest, evolving mechanisms for common Call for Proposals (CFPs), disseminating identified areas of interest among Scientific and Technical communities in the respective countries, using Public Private Partnership (PPP) mechanisms for catalyzing B2B relationships and providing inputs to the BRICS Science & Technology and Innovation Ministerial Group.

Russian participants included:

- Eugeny Tsadikovskiy, Head of Division, Russian Space Systems;
- Sergey Pulinets, Chief Researcher, Russian Space Systems;
- Sergey Nehin, Head of Department, Centre of Geodesy, cartography, and Spatial data infrastructure;
- Andrey Mukhin, Adviser for cooperation with non-governmental and international organizations, Roseestr;
- Viktor Nepoklonov, Vice-Rector for Science, Moscow State University of Geodesy and cartography;
- Dmitry Ershov, Deputy Director for science, Centre for Forest Ecology and Productivity, Russian Academy of Sciences.

2) Sverdlovsk Region enhances Cooperation with Indian Partners

A senior delegation of the Sverdlovsk region visited India on 09-14 Mar, 2016, to hold meetings with official authorities of the Republic of India business and academia. As a result, new Indian-Russian linkages have been successfully established in the field of

science and education. During the visit, there was also a meeting held between the Indian Prime Minister Narendra Modi with Governor Kuyvashev.

Sverdlovsk Delegation led by Governor EV Kuyvashev in India.

On 10 Mar, 2016, VA Koksharov, Rector of Ural Federal University and Chairman of the Council of Rectors of higher educational institutions of the Sverdlovsk Region along with AA Petrov, Chairman of the Board of "Medsintez" Pharmaseutical Plant, met Dr Krishnaswamy Vijay Raghavan, Secretary, Department of Biotechnology of India (DBT). The negotiations resulted in the agreement to begin joint exchange of experience and promote Indian and Russian technologies in the way similar to how DBT interacts with other foreign countries. During the meeting, Dr Viktor Anatolievich Koksharov invited the Indian delegation to participate in the forthcoming conference titled "Mendeleev Congress for Applied Chemistry" to be held at Yekaterinburg during 26th-30th September, 2016, and the Indian colleagues accepted the proposal.

On March 11, 2016, VA Koksharov together with Academician IM Donnik, Rector of the Ural State Agricultural University met Dr Arabinda Mitra, Head, International Cooperation (Bilateral) Department, Department of Science and Technology, GoI. The Indian Side expressed their readiness to assist in facilitation of contacts in agricultural research from molecular biology to selective breeding and bioengineering. Possible ways of cooperation for joint scientific projects have been identified (including through grants by the Russian Science Foundation (RScF)) on environmental issues, biotechnology and engineering sciences. Both Sides have agreed on the development of scientific research in the field of biotechnology, processing of agricultural raw materials, development of software products for agriculture, exchange of students and professors, cooperation on programs of extended education, postgraduate studies. Dr Viktor Anatolievich Koksharov expressed his appreciation for a fruitful visit.

3) First Forum of the BRICS Network University held in Russia

On 6-9 Apr, 2016, the first Forum of the BRICS Network University was held at Ural Federal University (UrFU) in Yekaterinburg, Russia. The Forum was the first official event held in the frames of the project. The event pursued three main goals – meeting of rectors and vice-rectors of participating universities, working out action plans for the development of joint study programs in the priority thematic areas within the frames of international thematic groups and meeting of the International Governing Council, which is coordinating this project. Representatives of the universities signed a protocol of accession to the BRICS Network University at the end of the forum.

First Forum of the BRICS Network University.

The thematic priorities of the BRICS Network University are energy, computer science and information security, BRICS studies, ecology and climate change, water resources and pollution treatment, economics.

The delegates discussed the key aspects of the project's development. Members of the international governing board discussed the organizational and regulatory issues whilst the members of six thematic groups were working on action plans for the development of joint programs. They discussed the fields for developing network Master and PhD programs taught in English that will be open for students from all 5 countries, expanding academic exchange within BRICS countries and organization of short-term programs: summer schools, internships etc.

As a result each international thematic group prepared a working plan for the establishment of joint programs. In accordance with the actions plans during the following academic year the first joint summer and winter schools will be later created, exchange programmes between participating universities will be initiated, and then the universities plan to launch joint graduate and post-graduate programmes. Members of the international thematic groups plan to hold regular webinars and conferences to exchange ideas, materials and determine their next steps to move the project forward.

More than 150 representatives of universities and Ministries of Education of India, Russia, China, Brazil and South Africa took part in the event. Key participants included Minister of Education and Science of the RF Alexander Klimov; Secretary, Department of Higher Education, MHRD of India Mr. Vinay Sheel Oberoi; VP of Beijing Normal University Chen Li; Head of International Affairs Office of Brazil Ministry of Education Aline Schleicher; Deputy Director-General: University Branch, Department of Higher Education and Training of South Africa Diane Parker.

4) Indo-Russian Joint Research Call for Proposals 2016 launched

On Mar 01, 2016, the Indian Council for Medical Research (ICMR) and Russian Foundation for Basic Research (RFBR) launched the first joint call for proposals in order to support research projects in the field of common interest of health research. The first joint call of 2016 is focused on "Bio-Imaging and Bio-Informatics" in the following priority areas:

- Data mining, pattern recognition, computer aided drug discovery;
- Analysis of drug reactions and toxicity;
- Computer design of the medicine compounds;
- Biosensor development analysis;
- Mechanism of secondary impact caused by medical preparations;
- Photodynamic therapy.

The duration of the projects under this call is a maximum of 3 years. The results and awardees of the competition will be announced in November, 2016. Projects are to be carried out by individual scientists or groups of Russian and Indian scientists, which

may include graduate and undergraduate students, but headed by respective Russian and Indian principle investigators (PIs). The PI should be a regular employee of the organization obliged to secure implementation of the project. The PI can be associated with only one project participating in the call.

Funding for the awarded projects will be provided as per the required and approved budget for each project and as per the terms and conditions followed by ICMR and RFBR in their respective countries. Each side covers expenses of its national participants. The decision to continue funding of the project after its first year will be based on the results of reviewing intermediate reports. One of the key conditions for continuing of a project's funding is timely presenting progress report along with joint publication(s) in a peer-reviewed journal(s).

5) Exchange Visits

Indian Scientists to Russia:

- Dr Anil Kumar and PhD Yogesh Chandra Joshi, Aryabhatta Research Institute of Observational Sciences (ARIES) visited Special Astrophysical Observatory during Mar 29 - Apr 10, 2016 under DST-RFBR project P-219.

Russian Scientists going to India:

- Prof Oleg Teryaev, Laboratory of Theoretical Physics, Joint Institute of Nuclear Research, visited IIT Bombay for one month starting from Mar 14, 2016.
- Dr Shukrinov Yury, Bogoliubov Laboratory of Theoretical Physics, Joint Institute of Nuclear Research, visited Indian Association for the Cultivation of Science during Apr 23-30, 2016.
- Sverdlovsk Region Delegation, led by Governor EV Kuyvashev and including VA Koksharov, Rector of Ural Federal University, visited DST and other representatives of Indian business and academic institutions on 09-14 Mar, 2016.

II. Science, Technology & Innovation in Russia.

1. Russian Investors boost Noninvasive Glucose Metering Technology

A Russian **company "Brain Bit"** is developing a new type of blood glucose (BG) meter based on its proprietary patented technology of noninvasive spectroscopic blood glucose measuring. The novel technology can reportedly provide an optical sensor that weighs not more than 180 grams.

The invention uses optical radiation for scanning tissues in human fingers to obtain the reflected light diagnostic information about the biochemical composition of the blood. The magnitude of the registered signal depends on the absorption coefficient as well as the coefficient of light scattering of blood perfused tissue. The main contribution to absorption is determined by water (H2O), protein, lipids, glucose, various forms of hemoglobin (in particular, oxy, deoxy-hemoglobin) and skin melanin. The device calculates the level of blood glucose on the basis of the measurement of radiation in the optical spectral region in several glucose absorption peaks, while simultaneously minimizing the impact of water and melanin.

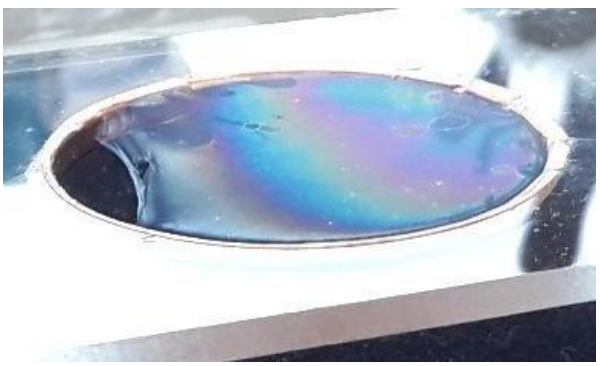
The gadget can be either self-contained or interacting via a USB or Bluetooth interface with PCs and mobile devices, including smartphones and tablets. It can also be used in a telemedicine system for remote blood glucose concentration screening and interaction between patients and physicians. The device works by detecting optical radiation from a patient's finger tissue.

Reflected scattered light emitting from the tissue is expected to give a doctor enough information to diagnose the patient's biochemical blood composition.

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. Next Gen Nanofiber Material for Water and Air Purification created

The Institute of Theoretical and Experimental Biophysics (ITEB RAS) jointly with **Moscow Institute of Physics and Technology (MIPT)** have synthesized the material that is perfect for water and air purification, protection of respiratory organs, biological research and other practical purposes. An almost weightless fabric made of nylon nanofibers with a diameter less than 15 nm beats any other similar materials in terms of filtering and optical properties. The scientists characterize their material as lightweight (10–20 mg/m2), almost invisible (95% light transmission: more than that of a window glass), showing low resistance to airflow and efficient interception of <1 micrometer fine particulate matter.



A sample of the new fabric in reflected light. A photo by MIPT researchers.

Previously, the same team demonstrated that reducing fiber diameter from 200 nm down to 20 decreased filter resistance to airflow by two thirds, and this effect could no longer be explained by classical aerodynamics. When an obstacle size is smaller than the free path of gas molecules, the standard methods estimating aerodynamic resistance based on the continuum theory no longer work. In normal conditions, the mean free path of air molecules makes 65 nanometers. The mean free path is the average distance one molecule manages to cover before colliding with another. Only if all obstacles are much bigger than this value, the free stream coming at them can be rightfully considered a continuous medium.

The scientists used the technique called electrospinning: a jet of a dissolved polymer is ejected through a special nozzle aiming at a target under action of an electric field. From the other side, ethanol is electrosprayed. The polymer jet and the alcohol ions take the opposite electric charges. Colliding in the air, they form ultra-thin fibrous films. Electrospinning technology for nonwoven fibrous filters has been developed back in the 1950s to purify air in atomic industry. However, the researchers introduced an important improvement: instead of obtaining nanomats on a solid conducting substrate like before, now with the new technology, a free filter is formed covering a 55-mm hole in a non-conductive polycarbonate screen.

It was established that the unique optical and filtering properties originate from a special mechanism of "healing" holes and defects in free standing filters. Such holes literally attract fibers landing onto the filter surface. As a result, a good filter without big holes can be obtained from a minimum amount of nanofibers and, accordingly, with a minimum resistance to airflow. Moreover, active healing

of big holes between threads provides the filters with the properties inherent in filters with calibrated pores, so called track-etched membranes (Nuclepores). The scientists have also demonstrated that the "healing" mechanism does not work in the conventional electrospinning technique where nanofibers are deposited onto a conducting substrate completely at random.

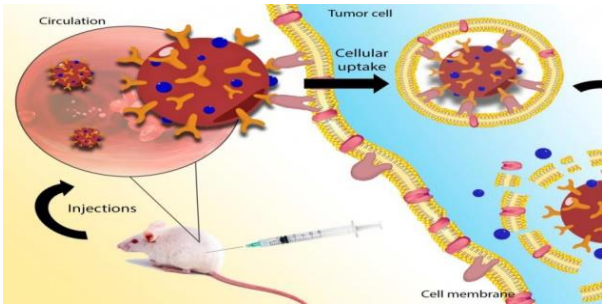
The testing of nylon-4,6 electrospun films showed that the almost weightless and invisible fabrics trap no less than 98% of airborne dust particles. For testing, the scientists used particles from 0.2 to 0.3 micron in diameter. This roughly corresponds to the dust that is not caught by the nasal pharynx, and penetrates the lungs causing a number of dangerous medical conditions. Submicron particles (< 1 micrometer in diameter) are the ones also used to test industrial and medical filters. To assess performance, resistance to airflow is tested as well.

Experiments to measure resistance have been made on singular samples so far. In real filters a multi-layer surface with a complex configuration is normally used. The experiments showed that the nylon-4,6 filtering material had the best properties out of all types of fabric previously described. In terms of interception extent to filter weight ratio and interception-resistance to airflow ratio, the new filtering material beats any existing equivalents by several times.

Apart from air and water purification from particulate matter, the material can be used in biological research as it surpasses glass in transparency. For example, after pumping air or water through the new filter intercepted microorganisms may be directly observed right on the transparent filter under a microscope thanks to ultra-fine threads. Their thickness is significantly less than even visible light wavelength.

3. New solution for MRI-aided Cancer Diagnostics developed

MISiS university have successfully developed Russia's first magnetite-based nanotech solution for early MRI-aided cancer diagnostics. The breakthrough solution is 40 nm in size on average and contains biopolymer-coated magnetite. Magnetite nanoparticles are clearly visible in magnetic resonance imaging, which is expected to enable physicians to pinpoint a tumor at an early stage. Unlike most other agents available today, magnetite is not toxic and also considerably less expensive than the agents currently used. The technique will be used to carry the drug to tumor cells as the coating is sensitive to their surface receptors.



First magnetite-based nanotech solution for early MRI-aided cancer diagnostics

Apart from NUST MISiS, the team unites experts from **Lomonosov Moscow State University** and **Pirogov Russian National Research Medical University**. According to Alexander Mazhuga, Project Developer, at the moment, the team is studying magnetite nanoparticles based agents coated with a biopolymer and having a cancer drug "built in." They have come up with a brand new technology that makes it possible to intentionally release the drug in very specific cancerous cells. Magnetite penetrates only these cells and does not poison the entire body.

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.

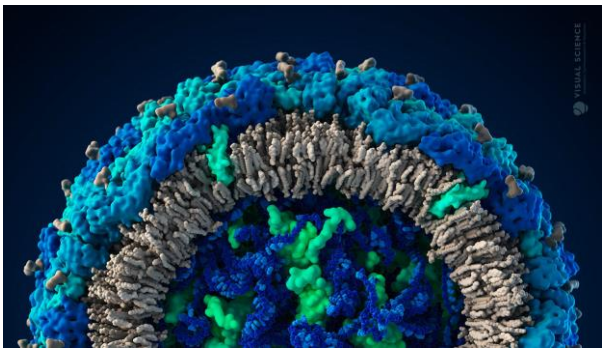
4. Power Installation for Processing of Technological Waste In Development

Chemical engineers of Ural Federal University will create versatile autonomous current sources on the basis of domestic high-performance solid oxide fuel cells. The production will be carried out in collaboration with partner industrial enterprises. The work is conducted by **the Institute of Chemical Technology UrFU** and led by Professor Yuri Zaykov together with colleagues from the **Institute of High-Temperature Electrochemistry**, Ural Branch of the Russian Academy of Sciences on the order of the Electrochemical Converters Plant.

This and one more project related to the processing of technological waste, won the competition of the Russian Ministry of Education and Science. According to scientists, an experimental model of the power installation is ready and has been successfully tested on natural gas as an autonomous current sources of cathodic protection of the pipeline of gas distribution station №4 of the linear production department of main gas pipelines LLC "Gazprom Transgaz Yekaterinburg". The tests were conducted with a rated power of 1.5 kW and a maximum output of 2.5 kW. According to the project, power installation will be more energy efficient with a maximum capacity equal up to 5kW.

5. First Detailed Zika Virus 3D Model to Develop Vaccine created

Researchers from **Novosibirsk State University (NSU)** contributed to the creation of the first detailed 3D model of Zika virus worked out by a Russian company "Visual Science". A detailed prototype made in atomic resolution was created based on the scientific information published using the methods of structural bioinformatics. The model will help researchers diagnose the fever and develop a vaccine for this dangerous disease caused by a tropical virus. Zika virus belongs to the same systematic group, Flaviviridae, as the hepatitis C, Dengue, yellow fever, West Nile and Chikungunya viruses.



A scientifically accurate model of the Zika virus.

The Laboratory of Structural Bioinformatics and Molecular Modelling at NSU was engaged in modelling the virus. The experts created models for some proteins and analyzed scientific data about related viruses in order to identify the positions of various Zika components, such as proteins, RNA, or the lipid membrane, in the structure of the virion.

According to Ms Anastasia Bakulina, Head of the Laboratory and Head molecular modeler, the most reliable method of diagnosing virus infections is to identify the genetic material of the virus in the patient's blood. However, it can only be done with the help of sophisticated equipment and experienced doctors. More common diagnostic methods,

such as enzyme immunoassay EIA, are based on finding antibodies against the virus. It is particularly useful for epidemiological studies as it testifies to the fact of the person's meeting the virus in the past. The major surface protein E (in the model — different shadows of blue on the surface of the virion) has a strong resemblance to the corresponding protein of yellow fever, West Nile and Dengue. The difference is in fewer than half amino-acid residues in the proteins with many of them either hidden in the membrane or glycosylated (in the model — dark grey spots on the surface of the virion). Experiments show that the antibodies against Zika bind to Dengue and vice versa, which makes it difficult to diagnose the fever.

As per Ms Bakulina, it is still not quite clear how Zika may cause microcephaly, which is a challenge for the research team. However, it could be reportedly connected with some special properties of protein E. If scientists try to "spoil" it with some mutations while leaving the virus viable, they may work out a good vaccine.

The 3D model of Zika virus is a part of the non-commercial educational project Viral Park, which includes models of HIV, influenza A/H1N1, adenovirus, Ebola and papilloma viruses. Such models sum up all the available information about the structure of the most widespread and dangerous human viruses and may act as kind of visual scientific reviews. Novosibirsk State University is participant of the Russian-Indian Network of Institutes of Higher Education (RIN).

5. The Most Solid Isolation Valves in The World developed

Experts from **Tomsk State University (TSU)** together with colleagues from **Institute of Strength Physics and Materials Science** (ISPMS SB RAS) have created a break-through technology to produce nanoceramics with a coefficient of thermal expansion close to zero. This ceramic composite material has a high resistance to wear and is expected to be used for the manufacture of a brand new class of locking elements for oil and gas pipelines. It includes tungstate of zirconium. Specifically, it provides nanoceramics the invar effect - constant size in the heating and cooling in a sufficiently wide temperature range from -100 to +200 °C, and also provides such features as effective operability in extreme conditions, high structural strength, and light weight. As the invar effect reduces the friction of isolation valves to almost zero, its service life increases significantly. That in turn reduces the volume and frequency of costly repairs to gas and oil pipelines.

According to Prof Sergey Kulkov, Head of the research group, the main problem is that zirconium tungstate is very difficult to enter into the ceramic. Previously, no one in the world had ever done it, but in the course of the research, the inventors found a technical solution to the problem and determined the optimal content of zirconium tungstate in the composition of the ceramic and an effective method of sintering. The development received two patents of the Russian Federation.

Engineering solutions developed by scientists of TSU can be unified in the various areas of technology and focused on the use of a domestic resources base, which will be a significant alternative to imported high-tech ceramic products from foreign companies – exporters.

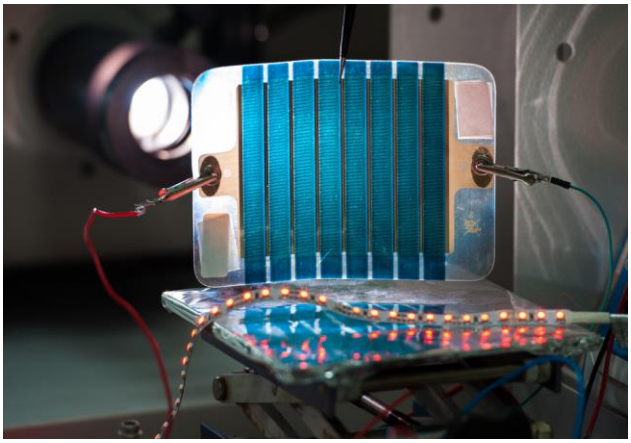
Tomsk State University is participant of the Russian-Indian Network of Institutes of Higher Education (RIN) and participant of Russian academic excellence project "5-100" aimed at maximizing the competitive position of leading Russian universities in the global research and education market.

6. First Flexible Thin-Filmed Solar Cell Technology cuts Cost 5 Times

MISiS University researchers jointly with colleagues from the University of Texas have come up with a thin-filmed photoelectric cell based on hybrid metal-organic compounds called perovskites. These perovskites can convert solar energy radiation into electric energy with a performance coefficient of more than 15%, and with a planned rate of 20%. Before long, this advanced technology will give way to light, flexible, and cheap solar panels based on perovskites to be used for charging and powering a bevy of electronic devices, from tablets to buildings' electrical grids.

The metal-organic perovskites are a revolution in materials for optoelectronics and solar energy, increasing the field's capabilities immeasurably. The uniqueness is in the conversion mechanism's efficiency of turning solar energy into electric energy. The team has created a prototype device with the application of photovoltaic cells in monolithic compounds with the use of carbon nanotubes. The multilayer prototype can combine subcells from perovskite (from the basis of lead iodide and methylammonium halide) with traditional silicon solar cells to convert the entire spectrum of visible radiation from sunlight into usable electricity.

Today, the estimated cost of perovskite solar panels is less than $100 per m^2, while the best silicon panels cost about $300 per m^2. In mass production that price difference is expected to be amplified by 6 times. The cheap production of the new class of devices would significantly reduce the use of traditional energy, turning people instead to environmentally friendly and affordable photovoltaics.



Prototype of a low-cost thin-filmed photoelectric cell based on perovskites.

According to Alevtina Chernikova, Rector of NUST MISIS, this project has no analogues in Russia and it promises to become a breakthrough in the field of autonomous energy. Now, scientists are testing the obtained prototype of the device and are planning to implement it in commercial trials in 2017. The main competitive advantage of perovskite, which brings photovoltaics to a new level, is the active layers of the solar cells that can be applied from liquid solutions on thin and flexible substrates. The commonly named "roll-to-roll" technology allows the placement of solar batteries on any surface with curvatures. This technology's application range, enhanced by its "charging from the Sun", is significantly extended in comparison with traditional silicon solar batteries. This new technology will influence portable electronics, the automotive industry, household appliances, "smart house" technologies, and in general transform the power supply of buildings.

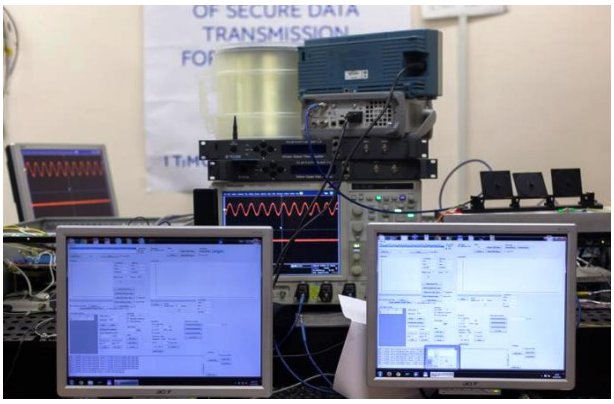
According to Anvar Zakhidov, Head of the project, the main advantage of the hybrid pervoskites is the ease of obtaining them from the metal salts and industrial organic chemical compounds instead of the rare and expensive elements used in high-performance semiconductor parallels like solar batteries based on silicon and gallium arsenide.

Additionally, perovskite-based materials can be used for printing photo electronics not only on glass, but also on a wide variety of materials and surfaces. This makes the batteries much cheaper than the more sophisticated methods of obtaining thin-filmed solar cells.

7. Long-range Secure Quantum Communication System developed.

Information security is becoming more and more of a critical issue not only for large companies, banks and defense enterprises, but even for small businesses and individual users. A team of scientists from **ITMO University** has developed a novel approach to the construction of quantum communication systems for secure data exchange. The experimental device based on the results of the research is capable of transmitting single-photon quantum signals across distances of 250 km or more, which is on par with other cutting edge analogues. The research paper was published in the prestigious Optics Express journal.

According to Artur Gleim, Head of the Quantum Information Centre, to transmit quantum signals, they use the so-called side frequencies. This unique approach gives them a number of advantages, such as considerable simplification of the device architecture and large pass-through capacity of the quantum channel. In terms of bit rate and operating distance they system is comparable to absolute champions in the field of quantum communications. Stable transmission of quantum signals through fiber optical channels is instrumental to subsequent integration of quantum key distribution systems that will be used to secure the useful data. Down the track, this new approach can enable smooth coexistence of numerous data streams with different wavelengths in one single optical cable. Moreover, these quantum streams can be fed into the already existing fiber optic lines along with conventional communications.



Experimental device of quantum cryptography system.

In order to encode quantum bits in the system, laser radiation is directed into a special device called the electro-optical phase modulator. Inside the modulator the central carrier wave emitted by the laser is split into several independent waves. After the signal is transmitted through the cable, the same splitting occurs on the receiver end. Depending on the relative phase shift of the waves generated by the sender and the receiver, the waves will either enhance or cancel each other. This pattern generated by overlapping wave phases is then converted into the combination of binary digits, 1 and 0, which serves to compile a quantum key. Importantly, the scientists have achieved high stability of the relative phase shifts of the signal in the system. All waves undergo random changes while passing through the fiber. But these changes are always identical and get smoothed over during the additional run through the receiver's modulator. In the end, the receiver observes the same combination as the sender.

Now the researchers plan to create a full-fledged quantum cryptographic system, which will generate and distribute quantum keys and transmit useful data simultaneously.

8. Russian PM evaluates Project "5-100" Positively

At present 21 leading Russian universities participate in the Russian academic excellence project "5-100". Out of them 14 universities are members of the Russian-Indian Network of Institutes of Higher Education (RIN).

Russian PM Dmitry Medvedev noted the progress of Russian universities in the State Duma.

On 19 Apr, 2016, Prime Minister of Russia Dmitry Medvedev noted the progress of Russian universities and their improved results in global academic rankings while delivering a report on the current status of the Government in 2015 in the State Duma. According to Medvedev, positive results are being observed in the promotion of Russian universities among the world's elite which is called the "top 100". Most importantly, many universities have improved their positions. The government has are also witnessed an increase in the number of schools which have entered global rankings for the first time. As per Medvedev, this is highly important, since it means that the quality of education is improving among the most advanced and innovative universities in the Russian Federation. As per Medvedev, the Russian Government would continue with "5-100" project. The Minister also pointed out that the universities' promotion in world rankings is directly related to research activities.

9. Scientific Satellites serve as First Launch from Vostochnyi Cosmodrome

Vostochny Space Launch Centre is Russia's first civilian spaceport for preparation and launch of scientific, socioeconomic and commercial satellites. The main construction works were completed in mid-January of 2016. When completed in 2018, it is intended to reduce Russia's dependency on the Baikonur Cosmodrome in Kazakhstan.

Launch of the Soyuz-2.1a from Vostochny Cosmodrome.

On 28 Apr, 2016, Russian President Vladimir Putin observed the launch of the Soyuz-2.1a carrier rocket from the Vostochny Centre. The booster was the first to set off from Vostochnyi and delivered deliver into orbit three scientific spacecraft – Mikhail Lomonosov, Aist-2D and SamSat-218. The Mikhail Lomonosov satellite is designed to help study transient phenomena in the Earth's upper atmosphere and magnetosphere and near-Earth radiation environment along with fundamental cosmological studies. The Aist-2D small satellite is designed to position and control spacecraft and study how external factors in outer space impact spacecraft equipment and satellite body materials. Nanosatellite Samsat-218 was created by students at **Samara State Aerospace**

University to test orientation control algorithms for this class of spacecraft.

The President congratulated Russian Space Agency Roscosmos, cosmodrome workers and builders on the successful launch of the carrier rocket. He described the event as highly important and significant step forward in the development of the Russian cosmonautics. The historical event is also a symbolic contribution to the 55th anniversary of the launch of the first human into orbit. On April 12, 1961, Russian cosmonaut Yuri Gagarin became the first human to journey into outer space.

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

1. Ural State Agrarian University

Rector: Academician Irina Donnik
Address: Karla Libknehta st 42, Yekaterinburg, Russia
Contacts: Tel: +7(343) 371-33-63, (343) 371-03-61; Email: rector@urgau.ru;
Website: http://www.urgau.ru/

Ural State Agrarian University has 7 faculties and institutes. The university works in the field of engineering, biotechnology, information technologies for agriculture: on the genetic-molecular technologies, on sequestering animal tissue for oncological diagnostics (fundamental research), on increasing soil fertility, development of high-molecular compounds on an environmentally friendly basis.

The University is looking forward to participate in grant programs and programes with scientists from Indian universities and research centers. Their objective is to establish partnerships for potential participation in scientific research projects. In addition, the Ural State Agrarian University invites Indian students and professors from Indian universities to participate in the academic exchange. Rector Donnik Irina stated her willingness to invite a delegation of Indian colleagues to the University.

Directions of research activities of potential interest for joint research between scientists of the Ural State Agricultural University and Indian scientists and agricultural experts are as follows:

- Development of research and practical measures for prevention and treatment of porcine circovirus infection;
- The morphology of permeability of histo-hematic barriers in the system "Mother-placenta-fetus-newborn" under different impacts on the organism of a mother (objects of research: cows, breeding sows, birds). The research has been conducted on circovirus infection, Reproductive and Respiratory Syndrome, pasteurellosis, Chlamydiosis of swine, brucellosis, respiratory syncytial virus, leukemia of bovine, Gumboro disease in birds, as well as effect of salts of heavy metals on large animals in a various industrial areas and on pregnant mice and rats in the laboratory experiment. The university conducts complex morphological examinations, histologic examinations, electron-microscopic research on the effect of probiotic agents on the body of broiler chickens, egg-laying hens as well as bullocks for feeding and laboratory animals;
- Developing medications to fight Bovine leukemia virus (BLV);
- Obtaining biogas as an alternative source of fuel;
- Development of resource-saving, high-performance agrotechnologies in crop farming, potato farming and vegetable growing.

2. Bauman Moscow State Technical University

Rector: Dr Anatoliy Aleksandrovich Aleksandrov
Address: 105005, Moscow, Baumanskaya st 2-ya, 5/1
Contacts: Tel: +7(499)263-63-91; Fax: +7(499)267-48-44; Email: bauman@bmstu.ru ; unid@bmstu.ru ; Website: http://www.bmstu.ru/en

Bauman Moscow State Technical University (BMSTU) is one of the oldest Russian engineering schools, established in 1830. Since then more than 200 000 of highly skilled specialists were educated in BMSTU, among them those who made groundbreaking scientific achievements: the founder of applied cosmonautics SP Korolev, the first nuclear reactor designer NA Dollezhal, a unique missile complex creator SP Nepobedimy, aircraft designers PO Sukhoi and AN Tupolev and many other great engineers – the glory of Russia. The first Russian helicopter, the first aerodynamic tunnel, the first diesel locomotive, the first automated machine-tool line and a lot of other things forming modern life of the human were created by Bauman engineers.

BMSTU comprises nine research institutes, 25 research centres and 36 labs. It carries research in cutting-edge areas of science and technology and conducts 90 considerable scientific programmes in different fields. General research areas include:

- Cybernetics;
- Experimental and Exact Sciences;
- Power Engineering;
- Electrotechnics, Radiotechnics, Telecommunications;
- Automatics, Computer Science;
- Mechanical Engineering;
- Instrument Engineering;
- Medicine and Public Health;
- General and Systemic Problems of Engineering and Applied Sciences.
- Economics.

BMSTU has wide international cooperation: common research, education methodology development, conferences, seminars, and congresses, student exchanges, postgraduates, doctorates, teachers and scientists, teaching international students. BMSTU actively collaborates with more than 70 universities in Europe, America and Asia, including leading universities of Germany, Italy, China, the USA and France. The university is active member of ATU (international Association of Technical Universities, which consists of 147 universities and organizations in Russia and countries of the near abroad) and ATURC (Association of Technical Universities of Russia and China). BMSTU is a participant of the Russian-Indian Network of Higher Education Institutions.

3. Ukhta State Technical University

Rector: Dr Nikolay Denisovich Tskhadaya
Address: 169300, Russia, Ukhta, Pervomayskaya St 13
Contacts: +7(821)677-45-56, +7 (821) 673-86-30; Fax: +7(821)676-03-33; E-mail: ugtuinternational@gmail.com; agrigoriev@ugtu.net; Website: http://en.ugtu.net/

Ukhta State Technical University (USTU) is a representative of oil and gas Universities in Russia, founded in 1967. The University has close ties with all gas and oil producing enterprises of the Republic of Komi and also with mining, timber, and building industries of Russia. The University employs 423 instructors and scientific members of staff, among them are 53 Professors and Doctors of Science and 213 Associate professors with Masters of Science. There are academicians and four corresponding members of the Russian Academy of Sciences, and Honored Scientists of the Republic of Komi.

The aim of research and development at USTU is to continue and strengthen proactive participation in national and international research networks and projects and to foster research at a high scientific level. Ukhta State Technical University aims to be a leading centre of research expertise and dissemination of research findings in the following strategic areas:

- Development and perfecting techniques and technologies of rational forest resources in a climate of the Far North;
- Theory and methodology of further education in technical university;
- Physical-mathematical modeling in the Earth Sciences;
- Automation, control and identification in complex process systems ;
- Well drilling in European North of Russia;
- Topical issues of formation, prediction, exploration and development of hydrocarbon reservoir in Timano-Pechorskaya province;
- Machines, equipment and processes in oil and gas extraction in a climate of the Far North;
- Emerging economy: economical, social and institutional changes;
- Better life safety in a climate of European North;
- Experiments and computer modeling of physical-mechanical systems within continuum mechanics;
- Regional minerageny and geochemistry;
- Exploration and exploitation of oil and gas fields;
- Radiometric and electromagnetic methods of inspection oil and gas extraction and transportation facilities;
- Development of high-viscosity oil and bitumen fields.

Research activities at USTU are recognised at international level, while also continuing to satisfy the demand for research relevant at regional and national levels. Scientific potential of the staff is used in many scientific industrial innovation centers. The university's researchers publish their works in relevant research journals and the university promotes the exchange of research and academic staff members with internationally recognized institutions and organizations. In cooperation with private and public institutions, the university's research and academic environments contribute to developing the region's societal, working and business life and living conditions. USTU strives to enhance the quality of research by stimulating innovation in existing activities, as well as by establishing new, relevant projects.

The University cooperates with a wide number of institutions abroad. Its partners in post-soviet region include Azarbaidjan (Azarbaidjan State Oil Academy), Belarus (Belarus State Technological University) and Kazakhstan (Auezov South-Kazakhstani State University). Other partners of USTU include the University of applied science in Regensburg and Technische Universitaet Bergacademie Freiberg, Germany; University CEU Cardenal Herrera, Spain; Technical University of Lisbon, Portugal; Bodo University College, University of Nordland and Arctic University of Norway; Oulu University and Savonia University of Applied Science, Finland. The USTU also cooperates with commercial and research funds, such as Ramboll Storvik Company in Norway.

4. Pacific National University

President: Dr Sergei N. Ivanchenko
Address: 680035, Russia, Khabarovsk, Tihookeanskaya st 136
Contacts: Tel: (4212)72-07-12; (4212)73-40-03; Fax: (4212) 72-07-12; Email: azubarev@pnu.edu.ru
Website: http://pnu.edu.ru/en/

Pacific National University (PNU) is one of the largest universities in the Russian Far East. Established in 1958, the university today trains over 21000 students in 54 majors and employs more than 900 people of the teaching staff, including about 540 doctors. The University pursues all-round development of fundamental and applied R&D in priority areas of science and technology. The main areas of research include:

- Research in mathematical analysis, differential equations and the theory of functions;
- numeric modeling of problems in the field of continuum mechanics and geophysics;
- study of the interaction of electromagnetic radiation and matter;
- standardization and quality control of products;
- measuring and computing and management tools and systems for information processing, information systems and technology, design of automated information systems for various applications;
- research in the field of nuclear physics;
- technology innovation and entrepreneurship;
- research and development of computer-aided design facilities of new technology and process engineering, construction, chemical and forestry sector;
- new materials and technologies for their production and use;
- improving the design and manufacturing processes to improve quality, reliability and durability of machines and mechanisms;
- more efficient use of vehicles and improvement of their performance;
- design of industrial and civil buildings and structures;
- problems of management and organization of production;
- research and development of technologies for harvesting, deep processing of wood and biomass and restoration of forest reserves;
- research, design and development of technologies for the construction and operation of transportation facilities;
- Environmental problems of nature and the environment.

More than 20 internationally recognized scientific schools were established at PNU. The University has made and continues to make a significant contribution to the development of science in the Far East. In recent years scientists of PNU have produced world-class results in the fields of theoretical physics, magneto-optics, laser technologies, microprocessor technologies, non-destructive testing of new materials, law and many others.

Annually more than 600 scientific papers which cover the results of PNU scientific research are published in leading Russian and foreign journals and paper collections of international conferences. Continuous development of material and technical basis of the university and use of modern scientific equipment contributes to the increase of research effectiveness. There are more than 20 laboratories, more than 20 Scientific-Educational and Engineering Centres and two students' Design Engineering Bureau at PNU. The University teams of researchers actively participate in various competitions for conducting researches within the framework of the Federal Target Programs, Scientific and Technical Programs, Grants in different scientific fields (grants and programmes of Federal Agency for Education and Federal Agency for Science and Innovation, RFBR).

PNU maintains fruitful relations with more than 120 foreign partners from 21 countries. The most contracts were signed with countries of the Asia-Pacific region and especially the bordering countries: China, Japan, Republic of Korea, Korean Democratic People's Republic. Other countries include Germany, Italy, France and USA. PNU cooperates with universities, research centres, production companies and administrative bodies. The University is engaged in active international cooperation in scientific and educational programmes, exchanging of faculty members and students, joint research projects. In May 2015 PNU became a participant of the Network of Higher Education Institutions of the Republic of India and the Russian Federation.

5. Bach Institute of Biochemistry of the Russian Academy of Sciences

Director: Dr Popov Vladimir Olegovich
Address: 119071, Moscow, Leninsky prospekt 33/2
Contacts: Tel: +7(495)952-34-41; +7(495)954-52-83, Fax: +7(495)954-27-32;
E-mail: vpopov@inbi.ras.ru ; dzantiev@inbi.ras.ru ; inbi@inbi.ras.ru;
Website: http://www.inbi.ras.ru/index-e.html

The Bach Institute of Biochemistry, the first biochemical institution affiliated with the Academy of Sciences, was organized in 1934. The main objectives of the Institute are related to research into the biochemical foundations of vital processes and application of the basic results obtained to production. AN Bach Institute of Biochemistry has become well-known for the theory of life origin, the discovery of ATP activity of myosin, decoding of molecular mechanisms of solar energy transformation under photosynthesis, the development of the theory foundations of globular protein structure, the development of biochemical genetics foundation, the prediction of information RNA existence and the discovery of informosomes, the creation of sub-cell structure biochemistry, the studies in the field of plant biochemistry and nitrogen fixation, the discovery of actin and myosin in all eukaryotic cells that resulted in the discovery of cytoskeletal structures, the creation and implementation of new biotechnology.

Biotechnological developments of the Institute have found wide application in the national economy, yielding considerable benefits. These works brought highest governmental and scientific awards to their authors - the Lenin Prize, State Prizes of the USSR and the Russian Federation, the Prize of the Government of the Russian Federation, the Lomonosov Golden Medal, and other prizes, decorations, and medals of the Russian Academy of Sciences, named after prominent scientists, as well as scientific prizes of foreign countries.

The Institute plays a vital part in organizing and developing of Russian biochemistry. The institute regularly holds home and international conferences and symposiums. It has taken part in organizing the All-Union Biochemistry Society and the International Scientific Society researching the life origin. At present, the Institute is actively involved in training scientific personnel, including students, postgraduates, and researchers working for the doctorate degree. The Institute specialists were given the honorary titles of foreign universities and rewarded with the governmental and academic premiums. Together with Moscow State University, institutions such as the People's Friendship University of Russia, Moscow State University of the Food Industry, and other institutions of higher education and scientific educational centres have been organized; over 100 students and postgraduates are involved in their work.

The Institute pays much attention to innovative activities. Among the latest developments of the Institute, a highly efficient microbiological technology for purification of ventilation discharges from toxic volatile compounds is worth noting. The gas-cleaning systems designed using this technology are successfully exploited in Russia, the UK, and South Korea.

Immunosensor systems for ecological monitoring and medical diagnostics have been developed. Diagnostic kits for the detection of drugs and early diagnostics of phenylketonuria have been designed and introduced into practice.

The Institute comprises 22 research laboratories with the expertise in the fields of

- Enzymology;
- Structural biology;
- Biochemistry of phytoimmunity;
- Immunobiochemistry;
- Photosynthesis;
- Molecular mechanisms of motility;
- Environmental biochemistry and biotechnology;
- Analytical biochemistry, biosensors/diagnostic kits;
- Biotransformations;
- Proteomics of human muscles tissues.

Major industry oriented projects include:

• Bioreactor - a novel type of biotrickbing filters, a specially designed hardware containing a consortium of immobilised natural micro-organisms that removes from air emissions an impressive number of VOCs;
• A novel jne-step synthetic route of photochemical synthesis of Ca-folinate used for cancer and anemia treatment;
• Development of synthetic vaccine against latent tuberculosis caused by Mycobacterium tuberculosis;
• Development of DNA diagnostic kits for inherited myopathias;
• Development of immunosensors and immunodiagnostic kits for ecological monitoring and healthcare;
• The technology to substitute synthetic formaldehyde containing toxic resins in the process of manufacturing of wood chipboard by natural binders produced by partial destruction of wood polymers by strains of basidiomycetes;
• The microbial technology for obtaining of biodegradable polymer beta-oxybutyrate with production over 90 % of the polymer.

The research performed at the Institute is supported by domestic and international grants and foundations, namely, programmes of the Presidium of the Russian Academy of Sciences and grants of the Russian Foundation for Basic Research, Russian Ministry of Education and Science, Government of Moscow, INTAS, INCO-Copernicus, CRDF, NATO, Welcome Trust, ISTC, and others.

A lot of attention is paid to the usage of the obtained fundamental results in applied work: for example, in agriculture, medicine, food industry and various biotechnology and ecology directions.

The Institute collaborates with many foreign institutions through implementation of joint projects. Nowadays the Institute represents a blend of expertise and youth, a unanimous team of like-minded people, and a tremendous intellectual potential.

Combining the research into most topical problems in biochemistry with innovative activities, the Bach Institute creates a new impetus for further development. As to the future, the Institute is optimistic and ready to respond to all challenges of science of this century.

IV. Forthcoming Workshops and Conferences in Russia

1. XX Mendeleev Congress on General and Applied Chemistry

Dates:26-30 Sep, 2016
Place : Yekaterinburg, Russian Federation.
Coordinator: Ms Yulia Gorbunova,
Scientific Secretary
Tel: +7(495)955-48-74; +7(343)374-34-77;
Email:mendeleev2016@gmail.com;
mendeleev@prm.uran.ru ;
Website: https://mendeleev2016.uran.ru/

Mendeleev Congress is recognized as the largest Russian scientific event focusing on fundamental and applied chemical research. In addition to scientific discussions, Mendeleev Congress specifically features the networking among business, industry and academy. 2,200-2,500 participants are expected to attend the Congress, including 300 scientists from abroad. Keynote lectures will include Ganesh Krishna N from Indian Institute of Science Education and Research, India. The objective of the Congress is to

- highlights groundbreaking scientific and industrial achievements in chemistry;
- Provide the networking among business, industry and academy.

The program of the XX Mendeleev Congress would include plenary and section lectures, poster presentations, business exhibition, symposia and round-table discussions on main directions of chemical science, technology, and chemical education. The following sections will be included:

- Fundamental problems of chemical science;
- Chemistry and technology of materials and nanomaterials;
- Physical chemistry of metallurgical processes;
- Topical problems of chemical industry, evaluation of technical risks;
- Chemical aspects of alternative energetics;
- Chemistry of fossils and renewable hydrocarbon raw materials;
- Analytical chemistry: novel methods and devices for chemical research and analysis;
- Medicinal Chemistry: fundamental aspects and application;
- Chemical education.

Satellite symposia would include International Symposium "From empirical to predictive chemistry" and International Symposium "Self-assembly and supramolecular organization".

Conferences in the framework of the Mendeleev Congress would include IX All-Russian Conference on electrochemical methods of analysis with the Youth Scientific School and international participation «EMA-2016» and International conference «Ab-initio based modeling of advanced materials.

2. 22nd International Symposium "Modern Problems of Laser Physics" (MPLP 2016)

Dates : 22-28 Aug, 2016
Place : Novosibirsk, Russian Federation
Coordinator: Dr Denis Brazhnikov,
Scientific Secretary
Tel: +7-9628427007;
Email: mplp2016@gmail.com
Website: http://mplp2016.laser.nsc.ru

MPLP-2016 aims at presenting talks on modern laser physics, optics, and spectroscopy, and to bring together scientists from all over the world to establish fruitful scientific cooperation at the regional and global levels. A special event (School for Young Scientists) will be organized for young participants during the symposium. Discussions will be devoted to the latest

achievements and results for the purpose of development and refinement of theoretical and experimental methods of laser physics, optics, high-resolution spectroscopy, laser cooling, nano- and femto-photonics. Various applications of laser radiation in biophysics, medicine, and other fields will be considered.

3. 2nd workshop "Modern Nanotechnologies 2016" (IWMN-2016)

Dates :27-29 Aug, 2016
Place :Yekaterinburg, Russian Federation
Coordinator: Mr Vladimir Shur, Director of UCSU MN UrFU
Tel: +7(343)261 74 36; +7(912)613-48-34; Email: vladimir.shur@urfu.ru;
Website: http://nanocenter.urfu.ru/en/iwmn2016

Topics of the conference would cover: functional imaging of materials: scanning probe microscopy, Raman confocal microscopy, electron microscopy; domain engineered ferroelectric crystals; Relaxor and multiferroic materials; Ferroelectric ceramics and thin films; Biocompatible materials and life science. The round table "Collaboration of UCSU "Modern Nanotechnologies" UrFU with Russian and foreign scientists. Achievements and future development" will be held. Proceedings of the Workshop will be published in the special issue of Ferroelectrics journal.

4. V International Conference "Technical Chemistry: from Theory to Praxis"

Dates : 20-22 Sep, 2016
Place : Perm, Russian Federation (Institute of Technical Chemistry of Ural Branch of the RAS)
Coordinator : Mr Yevgueni Naimushin, Scientific Secretary
Tel: +7(342) 237-82-72 +7; Fax: +7(342) 237-82-62; Email: cheminst@mpm.ru;
Website:http://www.itch.perm.ru/en/conference/list/v_international_conference_technical_chemistry_from_theory_to_praxis/information_5/

The Conference Scientific program will include plenary (30 min), oral (15 min), and poster session highlighting the latest basic and applied research work in organic chemistry, in material sciences, and sharing best practices. Section "Organic chemistry and heterogeneous processes" would cover: investigation in reactivity and in reaction mechanisms of organic synthesis; structure and reactivity of heterocyclic compounds; targeted functionalization of natural compounds; theory and praxis of heterogenic processes, incl. extraction and ion flotation, absorption and catalysis. Section "polymers and composites" would include: synthesis of and investigation in structure and properties of polymers and biopolymers; nanosystems and composites.

5. Joint meeting: 3rd Congress on Controversies in Thrombosis and Hemostasis (CiTH) and 8th Russian Conference on Clinical Hemostasis and Hemorheology

Dates : 20-22 Oct, 2016
Place : Moscow, Russian Federation
Coordinator: Ms Ilana Rabinoff-Sofer, Scientific Secretary
Tel: +41(22)33-99-576; Email: cith.reghot@mci-group.com (registration), cith.abs@mci-group.com (abstract); Website: http://atnd.it/46523-0

Topics would include: Thrombosis in oncology and oncohematology; Thrombosis and hemorrhage in obstetrics; Thrombosis and hemorrhage in surgery and traumatology-orthopedics; Coagulation disorders in ICU; Pathology of platelet-mediated hemostasis and vascular wall. Antiplatelet and angioprotective agents; Venous thromboembolism; Hemocoagulation problems in pediatrics and neonatology; Arterial and venous thrombosis in cardiology and neurology; Organ blood flow disorders, microcirculation and blood rheology; Pharmacogenomics; Warfarin and new oral anticoagulant. New indications for NOAK; Heparins: past, present and future; Clinical

transfusiology and hemostasis disorders; Acute bleeding, care and preventions. Patient's blood management; Hemophilia. Thrombocytopathias. Von Willebrand Disease; An Update on Laboratory Diagnostics in hemostasis and hemorheology; Autoimmune diseases and pathology of hemostasis; New tools for diagnosis, therapy and prevention of hemostasis disorders and blood rheology disturbances; Thrombolytic therapy: Basic research for clinical practice.

V. Academic Programme offers of Russian Universities.

1) Ural Federal University - PostDoc positions

1. **Postdoctoral Researcher – Neurocognitive Development**

Deadline for applications: June 01, 2016.
Link: http://urfu.ru/en/research/postdoctoral-positions/
For inquiries: Kiselev Sergey Yuryevich, Head of CC,
Email: eskisa@rambler.ru
Union representatives: Mobile +7 (922) 216-78-23

Project description
Project «Longitudinal study of risk factors in children behavior development» is implemented within priority innovation "Alife systems and health"

The aim of studying the brain activity and cognitive functions in infants and toddlers project is to reveal the forming mechanisms of atypical development and risk factors of behavioral impairments in children development. Implementation of ADHD and ASD risk factors study in cooperation with Center for Brain and Cognitive Development, University of London allows to light the consistent patterns of brain and neurocognitive functions development in children of 5 months to 7 years as well as cross-cultural differences in impairments of behavior in development of this children.

The aim of postdoc research is to define the correlates of impairment sources and impairments of cognitive functions in children with hypoxic ischemic brain injury. High density EEG (128 channels) and Bayley Scales assessment would be done at the Laboratory for Brain and Neurocognitive development, for MRI recording would be set collaboration with the Regional Clinical Children's hospital. All the data (EEG, MRI and behavioral development) would to be collected and analyzed at every time point of longitudinal study: at the age of 5, 10, 14, 24 and 36 months.

Terms of employment
The position involves a full-time employment for 12 months, with the possibility of further extension up to 24 months. The position is full-time (nominally 40 hours a week). Remuneration for this position will be about 1 million Russian rubles in year.

Qualification requirements
The Competition may involve the academic staff (scientists) under the age of 35 who have received the degree of Candidate of Sciences or PhD not more than seven years before the announcement of the Competition and involved in research activities, English-speaking, with publications in internationally reviewed journals included in the 'Web of Science' and 'Scopus' databases.

Special requirements to the participant of postdoc tender:
- The experience of registering and analyzing of EEG and MRI data;
- The experience of statistical analysis of data;
- The experience of work in MatLab (optional requirement).

2) **Postdoctoral Researcher – Neurocognitive Development**

Deadline for applications: June 01, 2016.
Link: http://urfu.ru/en/research/postdoctoral-positions/
For inquiries: Kiselev Sergey Yuryevich, Head of CC, Email: eskisa@rambler.ru
Union representatives: Mobile +7 (922) 216-78-23

Project description

Project «Longitudinal study of risk factors in children behavior development» is implemented within priority innovation "Alife systems and health"
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The aim of longitudinal research is to define the EEG marks of disorders in children at high risk of ADHD and ASD. For this purpose EEG (128 channels) and ERP methods would be used. The EEG responses for the social and nonsocial stimuli, as well as the ERP in visual and audial stimulation are expected to be registered and analyzed in group at high risk of ADHD and ASD and control group (healthy infants not at familial risk of ADHD and ASD). The result of the research would be the number of EEG patterns which allow us to assume diagnose of ADHD and ASD in early stages of children development.

Terms of employment

The position involves a full-time employment for 12 months, with the possibility of further extension up to 24 months. The position is full-time (nominally 40 hours a week). Remuneration for this position will be about 1 million Russian rubles in year.
The place of employment for this position is the Department of psychophysiology and clinical psychology, Department of Psychology, ISPS of Ural Federal University.

Qualification requirements

The Competition may involve the academic staff (scientists) under the age of 35 who have received the degree of Candidate of Sciences or PhD not more than seven years before the announcement of the Competition and involved in research activities, English-speaking, with publications in internationally reviewed journals included in the 'Web of Science' and 'Scopus' databases.
Special requirements to the participant of postdoc tender:
- the experience of registering and analyzing of EEG and MRI data;
- the experience of work in MatLab (optional requirement).

3) **Postdoctoral Researcher – Transmission electron microscopy**

Deadline for applications: June 01, 2016.
Link: http://urfu.ru/en/research/postdoctoral-positions/
For inquiries: Kolosov Vladimir Yu., Head of Electron Microscopy Laboratory, Email: Kolosov@urfu.ru
Union representatives: Phone: +7 (343) 261-74-38, mobile +7 (912) 653-27-73

Project description

Studies of structure-functional and smart low-dimensional materials: gradient and nanoscale structures, microcrystals and structures (synthesis, transfrtomations and specific features).
1) Transrotational. Gradient and aperiodic nano-, microcrystals and structures.
2) Functional structure dependent and protective films, layers, particles; nanostructure engineering and diagnostics of thin-films objects.

3) Amorphous and nanocrystalline structures primarily with specific features (i.e. phase change materials – PCMs for memory devices), Low-dimensional crystalline structures 1D-2+D, self-organisation based micro/nanostructures.

4) Development of new methods and procedures for nanostructure studies primarily based on modern microscopy methods and diffraction with transmission electron microscopy in the first hand.

The research project is in the frame of 3d Priority research area of the Ural Federal University - Flexible Technologies and New Materials.
We are seeking a postdoctoral appointee to perform advanced synthesis and transmission electron microscopy of thin films with involvement in team efforts on the subject. Synthesis and transmission electron microscopy of thin (0-100nm) films, crystals and microstructures primarily on the base of 15/16 groups elements (Sb/Bi/O/S/Se/Te and phase-change materials): vacuum evaporation, local crystallization/recrystallization.
Characterization by diffraction electron microscopy (JEM-2100, Titan 60-300, LVEM-5) and correlation microscopy.

Terms of employment
The position involves a full-time employment for 12 months, with the possibility of further extension up to 24 months. The position is full-time (nominally 40 hours a week). Remuneration for this position will be about 1 million Russian rubles in year.
The place of employment for this position is the Electron Microscopy Laboratory of Institute of Natural Sciences.

Qualification requirements
The Competition may involve the academic staff (scientists) under the age of 35 who have received the degree of Candidate of Sciences or PhD not more than seven years before the announcement of the Competition and involved in research activities, English-speaking, with publications in internationally reviewed journals included in the 'Web of Science' and 'Scopus' databases.

Ph.D. in materials science, physics, chemistry, materials engineering, nanostructures and nanotechnology or closely related field within the past 7 years. A record of publication in peer-reviewed scientific journals (Web of Science, Scopus) where the applicant contributed to the writing and revision process. A record of presentation of applicant's research at well-known regular scientific conferences (oral and/or poster). Experience performing material characterization experiments including electron microscopy.
Special requirements to the participant of postdoc tender:

- Strong understanding of electron microscopy, diffraction and optics.
- Strong understanding of the structure of condensed matter and crystal defects, low-dimensional structures, crystal and thin film growth.
- Some experience with a transmission electron microscope (TEM) and vacuum evaporation.
- Good understanding of vacuum safety and instrumentation.
- A recommendation letter describing an above-average depth of thought regarding lab safety, skills and careful manipulation with complicated instruments like TEM and scientific ethics.

4) **Postdoctoral Researcher – Quantum Magnetometry**

Deadline for applications: June 01, 2016.
Link: http://urfu.ru/en/research/postdoctoral-positions/
For inquiries: Vladimir Alexandrovich Sapunov, Head of Quantum Magnetometry Laboratory, Email: vasapunov@urfu.ru
Union representatives: Mobile +7 (922) 204-27-44

Project description
Overhauser dynamic nuclear polarization and EPR spectroscopy of stable organic radicals for MRI and quantum magnetometry.

Overhauser method of dynamic nuclear polarization are receiving prevalence as an analytical method. It is primarily used to amplify the NMR signals, but also has independent significance, having a specific sensitivity to different types of spin-spin interactions [1], in particular for MRI hyperpolarization in the presence of spin exchange between spin labels [2]. Synthesis was mastered and made use of in the field of quantum methods for measuring the magnetic fields of the original stable radicals, which have the effect of light saturation, providing marginal gains even in the presence of the super-structure of the EPR spectrum, which allows to determine, for example, the spin exchange constant.

Work is proceeding on program in "Biotechnology, bioengineering and sensorika (Magnetic Sensology, magnetic sensors)" and "Cognitive electronic systems".
New equipment is supposed to be transformed and introduced based on the well-known FC NMR relaxometer of the Italian company Stelar or analogous, namely, sensor development DNP for NMR relaxometer. Development and modernization of the software. Conducting research in development and application of methods for the DNP, EPR and NMR relaxometry aimed at creating new relaxation and hyperpolarizing agents for MRI and quantum magnetometry.

Terms of employment
The position involves a full-time employment for 12 months, with the possibility of further extension up to 24 months. The position is full-time (nominally 40 hours a week). Remuneration for this position will be about 1 million Russian rubles in year.

The place of employment for this position is the Electron Microscopy Laboratory of Institute of Natural Sciences.

Qualification requirements
The Competition may involve the academic staff (scientists) under the age of 35 who have received the degree of Candidate of Sciences or PhD not more than seven years before the announcement of the Competition and involved in research activities, English-speaking, with publications in internationally reviewed journals included in the 'Web of Science' and 'Scopus' databases.
Special requirements to the participant of postdoc tender:
· Combining competencies in the field of theoretical and experimental methods of NMR spectroscopy with the ability to design radio-electronic systems high and ultrahigh frequencies.

2) Higher School of Economics

Master's Programme: Governance of Science, Technology and Innovation:

Link: https://www.hse.ru/en/ma/sti/programme
Contacts persons:
1) Dirk Meissner, Academic Director: Email: dmeissner@hse.ru, Tel: +7 (495) 772-95-90 * 11701
2) Anna Rodionova, Programme Coordinator: arodionova@hse.ru ; Tel: +7 (495) 772-95-90 * 12494

The Programme is organised by the HSE Institute for Statistical Studies and Economics of Knowledge (HSE ISSEK), the leading Russian research and analytical centre. HSE ISSEK has an outstanding reputation and experience for research in the STI field, analytical support, expertise and consulting for federal and regional government agencies, large corporations and other organisations. The Faculty unites recognised Russian and foreign professors who are leading experts in

industry, advisory, academy or super-national organisations. International lecturers come from University of Manchester (Great Britain), University of Ottawa (Canada), Joanneum Research and Centre for Social Innovation (Austria), Seoul National University (Republic of Korea), Middle East Technical University (Turkey), George Washington University (USA), as well as from the Organisation for Economic Cooperation and Development (OECD).

The programme brings together the views and knowledge of science, technology and innovation management and policy perspectives on science, technology and innovation. It has several highly ambitious goals:

- To enrich students' professional skills:
- By delivering state of the art theoretical knowledge
- By training students' practical skills through the analysis of real cases
- By broadening students' horizons beyond science, technology or innovation
- towards an integrated understanding
- By training students' problem solving skills and project management abilities
- To create a proper educational infrastructure:
- By working with up-to-date international approaches and experiences
- By combining theoretical education and practical experience
- By enriching students' personal characteristics
- By increasing students' intellectual potential for the innovative development of organisations and policy

International Opportunities

- Opportunity for HSE students to study 1–2 modules at partner universities — credits obtained are recognised for the HSE degree: Seoul National University (Republic of Korea), Middle East Technical University (Turkey), University of Bremen (Germany);
- Double degree with Maastricht University (The Netherlands) and Technische Universität Berlin (Germany).

Format of the Study

· 2 specialisation streams: STI management and STI policy
· Teaching language — English
· Evening classroom hours

Core courses:

Core courses are preparatory in nature and help to set the ground for further specialisation. Core courses include lectures, seminars and self study. During lectures, assignments are given to students. Seminars are topic specific; each student writes essays on a chosen topic and gives a presentation or engages in targeted project work.

- Scientific Research Methods for STI
- Economics of Innovation
- Strategies in STI Management
- STI Policy
- Measurement of STI
- Foresight and Strategic Planning

Elective Courses:

- Finance of Innovation
- Intellectual Property Management
- Corporate Foresight
- Managing Creativity and Innovation
- Public-Private Partnerships for STI
- Regional STI Policy
- Social Studies of STI
- Risk Assessment for Science, Technology and Innovation
- Business Model Innovation
- Marketing Innovation
- University Pool Discipline
- Massive Open Online Courses (MOOCs) Adaptive course

Adaptive Course

- English Language

Potential employers:

a) Public sector
- Federal and regional government ministries and agencies
- Development institutions and science foundations
- Regional innovation clusters and science cities

b) Private Sector
- Industrial enterprises
- International and domestic consulting companies
- Multinational companies with R&D and innovation centres

c) Academia
- National research centres
- Federal universities
- Public research centres and institutes
- National research universities

d) International organisations
- Multinational organisations (OECD, IEA, UN)
- Development institutions

Application Process:

Obligatory documents include a letter of motivation, a diploma with attachments and curriculum Vitae. Advantageous documents include: letters of recommendation; scientific published and reviewed works, articles, contributions; participation in foreign language conferences/ seminars;
receipt of scholarships/ grants, valid English language certificates.