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Dear Reader,

The months of March and April have witnessed several endeavors towards strengthening of bilateral education linkages between India and Russia. Many Russian universities including Tomsk State Polytechnic University and Skolkovo Institute of Science and Technology visited India to interact with some of the leading technical education institutions of India for developing and building mutually beneficial linkages in the area of education, research and innovation. As a result, some IITs and Russian universities considered establishing mutually beneficial linkages. In all, 5 visits from India to Russia and 10 visits from Russia to India took place for R&D projects, international conferences and exploring education cooperation opportunities.

Some important decisions related to S&T sector were taken in last two months by the Russian agencies. To boost further development of Russian Science Cities, Russian President Vladimir Putin made amendments in the federal laws pertaining to the status of the Science City as well as to the science and the state science and technology policy giving new mandate to these cities to make science as the basis of socio-economic development. With an aim to boost medical research Russian Government transferred management of four prominent scientific institutions from Federal Agency for Scientific Organisations (FASO) to the Russian Ministry of Health through a decree. Government has approved the plan of Innovation Development Strategy for 2015-2016. Subsequent to a recent new Russian law that gives priority status to three Far Eastern territories in Khabarovsk and Primorsky regions, Skolkovo Foundation signed an agreement with the administration of Khabarovsk Region for opening their branch in Vladivostok.

During the 2nd Meeting of the BRICS Science and Technology Ministers that was held at Brasilia, Brazil, Memorandum on Cooperation in Science, Technology and Innovation between the Governments of Brazil, Russia India, China and South Africa was signed. The Ministers are committed to bring the Memorandum to actual implementation.

The current issue of the Newsletter covers highlights of the S&T related policies, programmes and developments in Russia including announcement by the Russian Ministry of Education and Science (RMES) of general results of scientific activities in Russia in 2014; listing of two Russian universities, namely Lomonosov Moscow State University and Saint Petersburg State University in the 2015 World Reputation Rankings of the world's best universities; unearthing of a new dinosaur species; and development of a facility for effective simulation of space conditions.

This issue also gives glimpses of the latest R&D accomplishments including development of next-gen natural bio-cement to heal bone fracture, a novel energy efficient solution for microelectronics, superconductivity based electronic components for next-gen cellular communications, a new method for low-cost extraction of ultra-pure hydrogen, and of novel catalytic sorbents for water purification; proving of recombinant spidroin substrate as excellent for heart tissue engineering; revelation of secrets of DNA damage response; and prediction of new thermodynamically stable aluminum oxides. The Newsletter also introduces some research and industrial institutions of Russia and covers information on upcoming major events in Russia.

We hope that this Newsletter would facilitate greater information, cooperation and identification of potential Russian partners. We welcome your suggestions to improve the impact of the Newsletter for further strengthening the Indo-Russian S&T cooperation, and also your queries on Russian S&T developments.

Rama Swami Bansal

I. Bilateral / Multi-lateral Cooperation

a) Skoltech Explores Cooperation Opportunities with Higher Education Institutions of India

Prof Edward Crawley, President, Skolkovo Institute of Science and Technology (Skoltech), Moscow alongwith Prof Mikhail Myagkov, Vice-President of Skoltech visited India during Apr 27-30, 2015 to interact with some of the leading technical education institutions of India for developing and building mutually beneficial linkages in the area of education, research and innovation and meet decision making authorities in the government. Prof Crawley had meetings with senior officials in IIT Delhi, IIT Bombay and IISc Bangalore to explore cooperation opportunities. Also, he called on Secretary Department of Science and Technology, GOI.

Skoltech plans concluding collaboration memoranda with Indian institutions to promote student and faculty exchanges. As the first step Skoltech wishes to promote student exchange for developing linkages with Indian institutions. This would be followed by faculty exchanges for professors to get acquainted with each other and identify mutual interests in research topics for collaborations. Skoltech plans to sponsor a set of informal meetings in India and Russia to provide an interactive platform to the Indian and Russian faculty.

Skoltech, established in the end of 2011 in partnership with MIT, is a private graduate university that aims at advancing education, scholarship and economic development in Russia by educating leading graduate students and conducting research programmes to address key challenges in science, technology and innovation in the triple helix model. It is a part of the Skolkovo Innovation Centre that was set up in 2010 just outside Moscow under directives of the Russian government to promote innovation in Russia. The university conducts research and education activities in five priority sectors namely, Energy Efficiency; Computer Technologies and Software; Biomedical Technologies; Nuclear Technologies, Space Technologies and also technologies cutting across these areas. The key programmes of Skoltech focus on a) education at Master's, doctoral and post-doctoral level, b) research through setting up of Centers for Research Education and Innovation in collaboration with national and foreign partners to address critical problems being faced by industry and society and on c) entrepreneurship through their in-house Centre for Entrepreneurship and Innovation that provides education, research, and administrative services spanning across and coupled to the degree-granting Programmes. The medium of education is English. The university already has about 145 Masters Students, 60 PhD scholars and 57 post-doctoral scholars 20% of which are foreign nationals. Its faculty comprises about 54 professors 80% of which is hired from abroad. Nine CREIs have already been set up that carry out research activities. A short brief on the University is enclosed.

b) Memorandum on Cooperation in Science, Technology and Innovation between BRICS concluded

The 2nd Meeting of the Science and Technology Ministers of the BRICS member countries was held at Brasilia, Brazil during Mar 17-19, 2015. The Ministerial Meeting was attended by BRICS S&T Ministers from Brazil, India and South Africa and Vice Ministers from China and Russia. The Indian delegation was led by Hon'ble S&T Minister Dr Harsh Vardhan. The associated 4th BRICS S&T Senior Officials' Meeting (SOM) was also held on the sidelines of this meeting. The SOM was attended by Scientists and Officials from the BRICS S&T Ministries and the Foreign Affairs Ministries.

One of the major outcome of the Meeting was conclusion of the BRICS MoU on Science,

Technology & Innovation (STI) Cooperation that was signed on March 18, 2015. The Memorandum formerly establishes a strategic framework for cooperation among the BRICS member countries with overall objectives of addressing common Socio-economic challenges utilizing shared experience & complementarities in STI within the grouping. The BRICS S&T Ministers reaffirmed their commitment to support collaboration in the already identified 5 thematic areas (Natural disaster led by Brazil, New and Renewal Energy led by China, Geospatial Technology and its Application for Development led by India, Water Resources led by Russia, Astronomy led by South Africa) and new areas proposed by BRICS countries such as creation of a BRICS Young Scientist Forum and BRICS Technologies Foresight for Climate System by India; Joint proposal by Russia and Brazil in the area of Biotechnology and Human Health; creation of a platform for Research and Innovation by Russia; Joint research on strategies to promote BRICS science, technology and innovation cooperation by China. The BRICS S&T Ministers signed Brasilia Declaration to give overarching directives from BRICS collaboration in STI.

The member countries are currently finalizing the BRICS STI Work Plan for the period 2015-2018 which is expected to be approved in the next (5th) BRICS S&T SOM and signed in the 3rd BRICS STI Ministerial Meeting, both slated for October 2015 at Moscow. BRICS Thematic Working Group Meetings will be held by concerned coordinating countries to work out cooperation details. Additionally, meeting of funding agencies in the BRICS countries will be held discussing the modes and methodology for funding joint activities.

f) Exchange Visits

Indian Scientists to Russia

- Prof Indra Dasgupta, Department of Solid State Physics, Indian Association for the Cultivation of Science, Kolkata visited the Lebedev Institute of Physics, Moscow during Mar 16 – 23, 2015 under the DST-RMES Project.
- Prof Tanushree Saha Dasgpta, SN Bose National Centre for Basic Sciences, Kolkata visited Moscow State University during Mar 16 – 23, 2015 under DST-RFBR Project.
- Two scientists, namely Dr Sandeep Chaudhary and Dr Pradeep Jaiswal visited the Perm State University, Perm during Mar 18-31, 2015 under DST-RFBR Project P-169.
- Dr Tapas Baug, Postdoc Fellow, TIFR Mumbai visited RAS Institute of Applied Physics, Nizhni Novogorad, Russia during Mar 23-28, 2015 under DST-RFBR Project P-142.

Russian Scientists to India

- Two experts from RSC Group Russia visited India to attend the 2nd National Conference on Parallel Computing Technologies (PARCOMPTECH-2015) organized by C-DAC at Bangalore during Feb 19-20, 2015.
- Prof Alexander Polupanov, RAS Kotelnikov Institute of Radio-engineering and Electronics visited the IIIT-Allahabad for a month during March 2015 under DST-RFBR Project P-159.
- Three scientists namely Dr Kunsevich, Dr Yeraslav Geresimenko and Dr Stephan Vasilieyvich Sandulyanov from Lebedev Institute of Physics visited the TIFR Mumbai during March 2015 under DST-RMES Project.
- Two experts, namely Dr Lyudmila N Larina and Prof Evgeniya Frantsina from the Tomsk Polytechnic University visited India to explore possibilities for education cooperation and research linkages with premier higher education institutes of India in April 2015.

- Two experts, namely Prof Edward Crawley, President and Prof Mikhail Myagkov, Vice President of Skolkovo Institute of Science and Technology (Skoltech), Moscow visited some Premier Indian higher educational institutions at Delhi, Mumbai and Bangalore during Apr 27-30, 2015.

II. S&T News of Russia

1. Status of Russia's Science Cities Changed to Foster Development

Korolev Science city is well known as the cradle of Soviet and Russian space exploration

Science cities in Russia (formally called "Naukograd") are towns with high concentrations of R&D facilities, some specifically built by the Soviet Union for these purposes. Most notable Russian science cities include Dubna (an international nuclear research centre), Obninsk (a town with many nuclear and other special materials, meteorological and medical research facilities); Korolyov (the town hosts major space research facilities) and Skolkovo (under active construction).

In order to boost their further development Russian President Vladimir Putin has made amendments in the federal laws "About the status of the science city of the Russian Federation" and "On science and the state science and technology policy". According to the original law, "Naukograd" is mainly a territory with a large number of scientific and educational institutions. The amendments introduce a different approach: science in such cities should become the basis of socio-economic development, promote innovative business and attract additional investments for the development of high-tech industries. Such changes could reportedly help to overcome one-sided development of science cities similar to "single-industry cities" where the whole life is centered around one or several industrial enterprises.

The rights of local government on the use of means of federal support would be expanded. The creation of socio-economic development programme allows, on a competitive basis, receiving additional subsidies for almost any event aimed at developing scientific and industrial complex of the science city.

Also, the mechanism for receiving and conserving the status of Science City by municipalities has also been changed. The new "high" criteria are based on objective statistics; the new approach is expected to allow exhaustive monitoring of municipalities to choose the ones that in their development are approaching the status of science city. Also, the amendments allow to develop and coordinate new development strategies of science cities more easily by eliminating the planned transition to programmed principle of funding.

2. Medical Research boosted by Kremlin through New Applied Research Centres

NN Blokhin Cancer Research Centre

On 13 Mar 2015 the Government of the Russian Federation issued a decree, according to which the management of four prominent scientific institutions would be transferred from Federal Agency for Scientific

Organisations (FASO) to the Russian Ministry of Health. These institutions include NN Blokhin Cancer Research Centre, AN Bakoulev Scientific Centre for Cardiovascular Surgery, Academician Burdenko Scientific Research Institute of Neurosurgery and Scientific Centre of Children's Health. The decree comes into force on Jul 1, 2015.

According to the document, by Jan 1, 2016 new national applied research medical centres should be established on the basis of these institutes. In particular these centres would perform the following functions: organizational and methodical management of activities of the medical institutions of the corresponding profile; scientific research and R&D in the field of medicine and biology (including the creation of new drugs and medical products, development of new methods of medical care); provision of high-tech medical care to citizens; participation in the development of clinical guidelines on the provision of medical care. The decision aims at increasing the efficiency of fundamental and applied (including clinical) research and implementation of research results into healthcare practice in the field of oncology, cardiovascular surgery, neurosurgery and pediatrics.

3. Plan of Innovation Development Strategy for 2015-2016 approved

The Russian Government has approved implementation plan of the innovation development strategy for the period 2015-2016. The first stage of the strategy implementation includes restructuring of higher education sector in order to boost their development research activities and strengthen and promote cooperation between universities and real economy companies. In particular, development programmes for 15 leading Russian universities within the "5Top100" academic excellence project as well as innovative development programmes for 60 major state-owned companies, the state academies of sciences have been reorganised and the Russian Science Foundation, the Foundation for Advanced Research and the Zhukovsky Institute National Research Centre have been created. The Federal Fundamental Scientific Research Programme for 2013-2020 has been approved on 03 Dec 2012.

To respond to the challenges of the second stage in 2015-2016, the action plan sets out measures to promote research, technology and innovation activities, to create a system of state support for research and technical creativity of children and youth, to further improve the education system, to ensure a successful implementation of innovation development programmes in public / private companies, to create mechanisms for stimulating demand for innovation solutions, to modernise the R&D structure, to further develop financial framework of innovation activities, to create mechanisms for the legal protection of marketable research products created by Russian innovation companies, to enhance Russia's integration in global projects to create and implement innovations, and to implement development programmes in the territorial innovation clusters. Implementation of the approved action plan is expected to contribute to further development of basic support elements for innovation and boost the rise of a socially focused innovation economy.

4. Skolkovo Foundation opening its first Branch in Vladivostok

In February 2015 a new Russian law came into effect giving priority status to three Far Eastern territories in Khabarovsk and Primorsky regions where companies benefit from optimal investment and social-economic conditions with the help of federal, regional and private funding. These are Khabarovsk, Komsomolsk and Nadezhdinskaya territories. Soon after in April 2015 Skolkovo Foundation signed a cooperation agreement with the administration of the neighboring Khabarovsk region in Vladivostok. According to the First

Deputy Chairman of the Government of Khabarovsk Nikolai Brusnikin the agreement caps years of effort aimed at bringing Skolkovo and the Khabarovsk region together.

Skolkovo Foundation Chairman Dr Andrei Burenin greets Nikolai Brusnikin, First Deputy Chairman of the Government of Khabarovsk Krai on investment, territorial and industrial policy

Following the Agreement Dr Andrei Burenin, Chairman of Skolkovo Foundation announced opening of the Skolkovo Branch in Vladivostok to accelerate commercialization of new technologies developed in Russia's Far Eastern Region. Dr Andrei Burenin believes the Skolkovo Branch in the Far Eastern Region of Russia is necessary primarily to keep the top innovative companies in this region. The Branch currently would be established at the Far Eastern Federal

5. Results of Some Federal Scientific Programmes for 2014 announced

The report on the general results of activities for 2014 of the Russian Ministry of Education and Science has been announced on the website of the Russian Government. Some figures for the science sector are given below.

According to the Russian Ministry of Education and Science, the number of publications by Russian researchers in scientific journals indexed in the database of Web of Science estimated 2.15% (30900 research papers) in 2014 from the total number of publications. Also, i 2014 the number of registered results of intellectual activity intended for industrial application increased to 25,378 units (which is 1.5% higher than the expected number).

State support for young scientists was, as always, one of the national priorities. According to preliminary results in 2014 the number of researchers under the age of 39, involved in state activities and support programmes, estimated 41%. This indicates the achievement of the planned figure for 2014 (40%). According to the report, the gradual increase occurs thanks to growing attraction of scientific activities to young Russian researchers. 1000 grants of President of the Russian Federation, cumulatively amounting 240 bln Rubles, were awarded in 2014 to young researchers and PhDs conducting promising R&D activities on priority directions for modernization of Russian economy, with an objective to strengthen state support to them. Additionally, with an objective to increase state support for young scientists and identify talented young specialists, make science subjects more attractive and create grounds for professional growth and independent research, 800 grants were allocated to young PhDs, 120 grants to young doctors of science, and 400 grants were awarded to leading scientific schools in 10 areas of expertise; together amounting about 800 million Rubles.

6. Lomonosov MSU enters TOP 25 in 2015 World Reputation Rankings

Lomonosov Moscow State University

According to the 2015 World Reputation Rankings list of the world's best universities, the Lomonosov Moscow State University (MSU) occupies 25th place, sandwiched between a Singaporean university (24th place) and a Chinese university (26th place). This is the highest position Russia's most renowned

university has so far had in such ranking. The ranking also includes Saint Petersburg State University which ranks in the list's 71-80 group. In 2014 MSU was lower than the 50th position while St Petersburg State University was never listed in the World Reputation Rankings rating before.

This ranking list compiled by Times Higher Education in partnership with Thomson Reuters includes the world's top 100 universities of best reputation. To create the list, they had interviewed more than 10,000 scientists in 140 countries. University (FEFU) that had announced its eagerness to cooperate with Skolkovo to develop research and increase intellectual and economic potential of the region.

7. A New Dinosaur Species unearthed by a Group of Russian Scientists: a Milestone in the World of Science

An amazing scientific discovery by Russian scientists reveals that fossils of a new species of dinosaur which roamed the earth 100 million years ago, have been found. The finding was made in Russia when experts discovered fossils encased in rocks on the banks of the Kiya River in Western Siberia in 2008. Scientists from Tomsk State University found it hard to remove the rocks, and instead extracted fragments of the fossils from the sandstone for examination.

It was the first scientifically described dinosaur from this group in Russia. The researchers believe the remains belonged to a very large herbivorous dinosaur from the sauropods group. After competing (almost) the work on extraction of all remnants and restoration of the bones, the researchers claim to have found a new species. According to one of the researcher, namely Dr Stepan Ivantsov from the Laboratory of Mesozoic and Cenozoic Continental Ecosystems, they originally believed the remains were that of a very large herbivore. Many years of painstaking research were spent that paved the way for the discovery of a new dinosaur which has been nicknamed 'Sibirosaurs. The creature is thought to be related to the giant Titanosaurs, which could grow to a height of 40 metres and could weigh up to 90 tonnes. As per this study the dinosaur lived in the Late Cretaceous period, about a hundred million years ago. Experts also believe that a dinosaur's foot found at the same location in 1995 may also belong to the same species. According to Dr Ivantsov they constantly find remains of dinosaurs on a site near Shestakovo village which regularly fall down from the steep river bank.

Very soon the bones including part of a shoulder blade will be exhibited inside the Paleontological Museum at Tomsk State University.

8. Facility for Effective Simulation of Space Conditions developed

Scientists of the Tomsk Polytechnic University (TPU) have reportedly developed an automated vacuum facility capable of simulating the main harmful space factors. This allows checking the strength of satellite construction materials and other devices in one place and in a short time. Existing test systems in Russia, unlike the development of Tomsk polytechnicians, simulate only some of the conditions of space.

According to Dr Yuri Yuryev, Head of the laboratory of the Department of Hydrogen Energy and Plasma Engineering, their facility presents a unified complex of most sophisticated simulators of cosmic effects. It consists of three parts: the section for loading the samples, the sector of impact of space

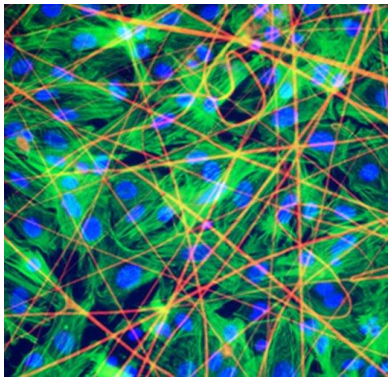
factors on test samples, and the sector of optical measurements. The main tests on samples are conducted in the sector of impact of space factors. The sector has a temperature control system (checking of the thermal effect) and systems of irradiation with solar radiation, protons and electrons. The optical measurement system, installed in the sector of optical measurements, allows to calculate the coefficient of absorption of solar radiation by the test material in vacuum. Thus the specialists can use it to test the impact of the whole spectrum of the main damaging factors of space: vacuum, temperature, electron and proton radiation and electromagnetic radiation from the sun. The whole range of tests can reportedly be performed in a single cycle. The facility allows investigating not only protective thin film coatings but also materials from which the spacecraft is made.

Presently TPU scientists are working on assembling the automated complex and are preparing to conduct the first tests on it. In spring 2015 this innovative facility won the prize at the international exhibition "VacuumTechExpo 2015" as the "best innovative product". It attracted great interest of potential customers and partners of the university, among them the Scientific and Production Association "Technopark Aviation Technology" as well as National Research Nuclear University "MEPhI "and NE Bauman Moscow State Technical University.

III. R&D Developments in Russia

1. Recombinant Spidroin Substrate proved Excellent for Heart Tissue Engineering

A group of scientists from Moscow Institute of Physics and Technology (MIPT) have addressed this issue by examining the ability of the recombinant spidroin to serve as a substrate for cardiac tissue engineering. Genetically engineered fibers of the protein spidroin, which is the construction material for spider webs, have proven to be a perfect substrate for this purpose. It may be noted that while cultivation of organs and tissues from a patient's cells is considered to be one of the most prospective areas of medicine, finding a suitable substrate to grow cells poses a challenge as the material should be non-toxic, elastic, biocompatible and not impede cell growth.



Heart tissue cells grown on a matrix, stained with fluorescent markers

The researchers from the Laboratory of the Biophysics of Excitable Systems of MIPT are involved in research on cardiac tissue engineering. They have been cultivating fully functional cardiac tissues capable of contracting and conducting excitation waves from cells called cardiomyocytes. Previously, the group used synthetic polymeric nanofibers for cell cultivation but recently decided to assay electrospunfibers of spidroin derived from genetically modified yeast. The structure of spidroin molecules that make up cobweb drag lines is similar to that of the silk protein called fibroin, but is much more durable, five times stronger than steel and twice more elastic than nylon. Cobweb strands are capable of stretching a third of their length. Furthermore, synthesized spidroin fiber matrices were earlier used as a substrate to grow implants like bone, tendons, cartilages and surgical dressings.

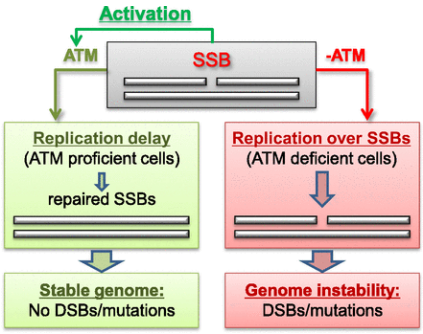
During the experiment, the scientists seeded on the electrospun fiber matrices cardio-myocytes isolated from the ventricles of 1–3 day old neonatal Wistar rats. The team then observed the growth of cells and evaluated their contractibility and the ability to conduct

electric impulses. The studies carried out using fluorescent markers demonstrated that within three to five days a confluent cardiac monolayer of cells formed on the substrate that were able to transmit organized electrical signals for the orchestrated contracting just like the heart tissue of a living heart would.

The ambitious Russian scientists are planning further study involving measurement of expression levels of gap-junction proteins and voltage-gated ion channels, as well as of their activity depending on the substrate material on which tissue is grown.

Alexander Teplenin et al., Functional Analysis of the Engineered Cardiac Tissue Grown on Recombinant Spidroin Fiber Meshes, PLOS ONE, March 23, 2015.

2. Secrets of DNA Damage Response revealed



Model for coordination of SSB repair and cell cycle progression by ATM. ATM-deficient cells are unable to detect unrepaired SSBs, and cell cycle progression leads to DSB formation and accumulation of mutations

Biochemists of the Lomonosov Moscow State University (MSU) have successfully discovered the functioning of the key mechanism in a cell which notifies internal defense mechanisms of DNA damage and the need for cell repair or self-destruction. According to researchers, Dr Khoronenkova and Dr Grigoriy Dyanov, 10000 to 20000 DNA endogenous breaks form every day in each human cell. These breaks are detected by a full system of proteins and signaling molecules that recognize them, evaluate the possibility of repair and then connect the damaged strands or give a signal for cell self-destruction. Though it is know that the ATM protein kinase is responsible for managing cell's response to multiple forms of stress including strand breaks in DNA. The switching mechanisms of ATM and its role remained unclear to the scientists. The MSU researchers therefore tried figuring out how ATM works and how violations in its functioning cause death of a cell.

For this, scientists have grown a skin cell culture and observed how these cells responded to DNA damage caused by molecules of an aggressive oxidizer. This allowed discovering how ATM responds to relatively harmless DNA single-strand breaks (SSBs) and not dangerous double-strand breaks (DSBs) in DNA, as previously thought. The reason for this "alarmism" is that the cell has no time to repair all the SSBs until the moment of cell division, since the repair process is slow from a chemical point of view.

When a cell starts to copy the DNA helix, SSBs often grow into DSBs, which causes cell death. The ATM protein prevents such an outcome and halts cell division until SSB repair is completed.

The gathered data would enable the scientists to shed light on causes of the Louis-Bar syndrome and other genetically determined disorders caused by mutations in the ATM protein kinase and other proteins involved in DNA repair. Their research aims at developing new therapies and ways to ease the fate of those people who suffer from the Louis-Bar syndrome and related diseases.

Their studies have been published in prestigious "Proceedings of the National Academy of Sciences".

3. Next Gen Natural Bio-Cement to Heal Bone Fractures developed

The scientists of the Seversky Technological Institute of the National Research Nuclear University MEPhI have developed a biological material known as "bone cement" derived

from animal bones that can be 3D-printed into bone fractures, aiding the body to heal faster and eventually dissolving into the patient's own tissue without leaving any traces.

Biocompatible 'bone cement' in powder form

According to Prof Vitaly Guzeev, Head of Functional Composite Materials Lab and Research Team Leader**,** the substance is based on biological hydroxyapatite, a white powder that transforms into a liquid when mixed with a biological polymer. The procedure relies on 3D printing to fill the damaged bone. An example of a patient with craniocerebral injury has been demonstrated: the injury could be 3D scanned and sent to a printer which re-creates the lost bone part. The "bone cement" is soft and flexible like plasticine when kneaded but hardens during the 3D-printing process.

A laboratory bone with bio-cement material implanted into the fracture

According to Vitaly Guzeev, all components of the material are of natural origin. Because the substance is derived from animal bones, it preserves biological activity which is an essential advantage and a significant ground for successful regeneration. The bone marrow contains mesenchymal cells that always migrate to the damaged tissue areas. They detect human matter as something that can take part in biochemical processes and start processing it to enable cell division. As a result, a new bone tissue is regenerated with its own blood vessels and nerve cells. Unlike in case of titanium which is often used in surgery to hold bones together, removing the material from the body is no longer necessary after completion of regeneration.

This new material is also claimed to be useful in healing painkiller injections for people with aching joints. After animal studies proved that the material could actually help heal fractures and cracks, scientists are preparing for the clinical trials. They subsequently plan to set up production facility in Moscow and in St. Petersburg; marketing authorization is currently underway.

4. A Novel Energy Efficient Solution for Microelectronics developed

Tomsk State University of Control Systems and Radio Electronics (TUSUR) jointly with its industrial partner, research and production company MICRAN have developed a technology to manufacture a power nitride-gallium transistor with copper metallization. The technology marks an important step towards developing a new family of energy-efficient conversion devices. According to developers this technology is completely new nationwide and abroad and has potential to help substitute precious metals (gold and aluminium) currently under use for manufacturing ICs and transistors, with much less expensive ones.

According to researchers, copper has many significant advantages in comparison to aluminum and gold. It is very low-cost and has higher thermal conductivity. The technology for production of nitride-gallium transistor with copper metallization is expected to improve the speed of transistor and increase its resistance to radiation and other extreme conditions. Moreover, this new technology would reportedly reduce the weight and dimensions of +transistor by 30-50% and reduce the cost of manufacture by

50%. Using this solution in a range of sectors of economy is expected to help boost the efficacy of electric energy's use by 20% and ensure substitution of silicon-based devices currently being imported. The prototypes and pilot units have already been created; developers are now planning to start commercialization process.

5. Superconductivity based Electronic Components for Next Gen Cellular Communications developed

Young scientists of Lomonosov Moscow State University (MSU) have developed superconductivity based electronic components. The researchers, namely Igor Solovyov, Nikolai Klyonov and Sergei Bakursky, believe that their new devices may lay the foundation for quantum computers and next gen cellular communications. The research is based on superconducting technology for data processing and for systems that receive and transmit a signal. The superconductivity effect enables the MSU team develop devices that are faster and less energy-consuming. With this new technology a mobile communications station could transmit much more content at a considerably higher speed. The reduction in energy consumption is believed to make data storage and processing more cost-effective given a daily increase in traffic.

The scientists have successfully solved the key problem of digital superconducting technology that has low memory capacity. Presently the memory is formed on magnetic elements but magnetism and superconductivity cannot co-exist: they mutually destroy each other. However, following a series of experiments the researchers have reportedly obtained a composite material which could help neutralize this effect.

The team has successfully created experimental prototypes and is filing patents. In the longer term young scientists plan to start R&D to come up with prototypes for superconductivity-based computers and cryptosystems.

6. New Method for Low-Cost Extraction of Ultra-Pure Hydrogen developed

Ultra-pure hydrogen has many application in various industries including micro- and nanoelectronics industry for manufacturing printed-circuit boards, chemistry and petrochemistry, metallurgy, food, glass, electronic and electrotechnical industry. For producing hydrogen synthetic gas mix derived from natural gas is banished under pressure through a palladium membrane. While hydrogen passes through the membrane the other gases do not, and as a result ultra-pure hydrogen is obtained. The world market of hydrogen production is estimated at $100 billion. Researchers around the globe are making effort to reduce the cost of hydrogen production.

Towards this effort, the researchers from "SIGMA.Novosibirsk" Nanocentre jointly with that of the Institute of Inorganic Chemistry of the Siberian Branch of the Russian Academy of Sciences (SB RAS) have developed and patented a method of applying an ultrathin palladium coating on hydrogen membranes: oxide of zirconium and palladium from a gas phase is consistently besieged with an ultra-thin (1-5 μm) layer on a substrate of any form. The basic substrate is stainless steel; if palladium is applied on it directly, the membrane would quickly be destroyed due to thermal influence and pressure. The intermediate layer of oxide of zirconium eases the difference in properties of steel and palladium. The ultra-pure hydrogen produced using this this method is expected be much cheaper and affordable at ~5000 USD per m^2. According to Head of the project office of Nanocentre "SIGMA.Novosibirsk" Yuri Loginov, the basic cost of one membrane is now about $10-12 thousand, which is mainly attributed to quite a thick layer of palladium, significant amount of waste and high-cost technological process.

Within next two years the company plans to upgrade this method into a full-fledged technology for obtaining hydrogen permeable palladium membranes for division and purification of hydrogen using the method of chemical vapor deposition from the gas phase PMOCVD. The Nanocentre and Institute of Inorganic Chemistry have plans to conduct pilot tests in partnership with their European partners. The developers plan to commercialize their invention through licensing of technology to producers of installations on synthesis and purification of hydrogen. Implementation of this technology into industry is expected to take about three years.

Nanotechnology Centre "SIGMA.Novosibirsk" was created in 2011 by the Fund for Infrastructure and Educational Programmes in partnership with RUSNANO, the Novosibirsk Region Administration and the Siberian Branch of the Russian Academy of Sciences. The Nanocentre is currently implementing 32 high-tech projects and another 20 projects are under development.

7. Novel Catalytic Sorbents for Water Purification developed

Scientists from the Institute of Natural Resources of Tomsk Polytechnic University (INR TPU) have developed catalytic sorbents that purify drinking water from iron and manganese and last longer due to the optimal combination of the medium, the catalytic agent and the primary modification method. The operation principle of the catalytic sorbent is as follows: water is passed through a granular loading, the catalyst accelerates oxidation that makes iron become insoluble; the insoluble iron gets deposited and is removed as a mechanical impurity, making the water potable. To create catalytic sorbent the scientists have used widespread in Siberia manganese-containing mineral with catalytic properties. When it is used in the catalytic sorbent in combination with a synthetic medium, water purification achieves a better effect than their foreign counterparts. Accordingly to Evgeniy Plotnikov, researcher at the Department of Physical and Analytical Chemistry INR TPU the use of the novel sorbent would facilitate import substitution with their low cost and long life catalytic sorbent. The capacity of the cartridge filled with this catalytic sorbent could count thousands of liters.

Water from artesian wells, which is used for water intake, reportedly contains high concentrations of manganese and iron. For instance in Tomsk these reportedly exceed the maximum permissible by three or four times. The accumulation of iron and manganese in the body leads to decreased immunity, dysfunction of enzymes and stimulates carcinogenesis. As per Evgeniy Plotnikov, researcher at the Department of Physical and Analytical Chemistry INR TPU, to remove these elements from the water together with aeration and ozonation both Russian and imported catalytic sorbents are currently in use. Nevertheless, catalytic sorbents available in the market have some significant drawbacks; these include low catalytic properties, high cost and active component flushing that requires regular material regeneration.

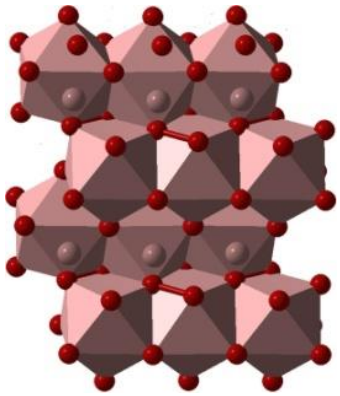
By the end of 2016 the researchers plan to patent the development and begin negotiations with industrial partners who are ready to fill cartridges with the new sorbent: small cartridges - for houses and cottages, big - for industrial enterprises. However, the team do not exclude the option of selling the technology itself. In the near future experts are going to create a portable unit to purify water in field conditions. In addition, the team continues to study possibility of using new types of sorbents for purification of industrial discharges and the arsenic removal from water as well as methods of microbiological water purification.

The Department of Physical and Analytical Chemistry, INR TPU, was opened in 1963. To

date, it includes scientific and educational centre "Biotechnology", laboratories for trace, analytical instrumentation, and quality control of dietary supplements. Evgeniy Plotnikov is known for winning the Medal of the Russian Academy of Sciences (RAS) in 2015 for a project to study the antioxidant activity, which would become a line of psychotropic drugs for the treatment and prevention of alcoholism and drug addiction.

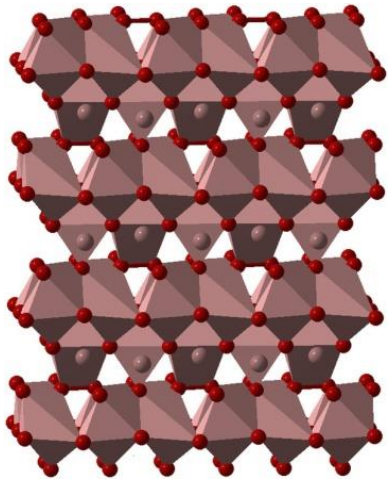
8. New Thermodynamically Stable Aluminum Oxides predicted

Aluminum and oxygen are two of the most common elements on Earth. Until now there was only one stable compound of aluminum and oxygen known to chemists, it is aluminum oxide Al_2O_3. This compound may take different forms for example crystalline forms: ruby, sapphire, corundum. Due to its durability and transparency corundum is widely used as an abrasive and as a material for optical windows in experiments studying the compression of matter in shock waves. Chemical characteristics of their atomic bonds indicate that Al_2O_3 should be the only stable combination of aluminum and oxygen.



Crystal lattice of AlO_2 at 500 GPa

A team of researchers from the Moscow Institute of Physics and Technology in cooperation with their partners from the USA, Austria and China decided to check whether counterintuitive compounds may be expected to form between aluminum and oxygen. Using the variable-composition structure prediction algorithm USPEX, the international team combed the pressure range between 0 and 520 GPa with a period of 10 GPa, searching for stable compounds of aluminum and oxygen. Besides the well-known Al_2O_3 they found two extraordinary oxides: AlO_2 and Al_4O_7. The former is stable under pressures above 332 GPa. Al_4O_7 is stable in the range of 330-443 GPa. Both of these compounds at the same time contain oxide $O^{2-}$and peroxide O_2^{2-}ions, and both are insulating. These oxides belong to the exotic class of "peroxide oxides". Electronic levels of the peroxo-groups form gap states ("low conduction band") that lead to a twofold lowering of the band gap relative to Al_2O_3.



Crystal lattice of Al_4O_7 at 400 GPa.

High pressures described above already exist in the Earth's core which mainly consists of iron and its alloys. For more massive, rocky planets (commonly known as "super-Earths") such pressures are common in the mantle, where there's a lot of aluminum and oxygen. Therefore it could be believed that such compounds may exist. The discovery marks an important step in studies of planetary interiors, with their high pressures and abundance of oxygen atoms. For details the article co-authored by Yue Liu, Artem R. Oganov, Shengnan Wang, Qiang Zhu, Xiao Dong, Georg Kresse, published in Scientific Reports (Nature Publishing Group) of Apr 1, 2015 entitled 'Prediction of new thermodynamically stable aluminum oxides' may be referred.

IV Profile of R&D Institutes and Industry in Russia

1. Prokhorov General Physics Institute of the Russian Academy of Sciences

Director : Academician Ivan Aleksandrovich Shcherbakov
Contacts: Tel: +7(499)135-23-66, Fax: +7(499)135-0270; E-mail: postmaster@gpi.ru ; website: http://www.gpi.ru/eng/history.php
Address : 119991, Moscow, Vavilova Str. 38.

General Physics Institute of the Russian Academy of Sciences (GPI RAS) was organized in 1982 by the Nobel Prize winner Academician AM Prokhorov, who headed it until 1998. GPI RAS was founded on the basis of the famous "A" Division (Oscillation and Plasma Physics Labs) of the PN Lebedev Physics Institute of the USSR Academy of Sciences, which was founded in 1934. Prominent scientists heading this division in different years developed its traditions and made outstanding scientific discoveries. Academician LA Mandelshtam also actively participated in the scientific guidance of the Laboratory of Oscillations. An excellent research achievement of this Division is the development of the first maser operating on a beam of ammonia molecules by AM Prokhorov and NG Basov (Nobel Prize together with C Townes in 1964). This discovery has marked the beginning of the global development of quantum electronics and laser physics throughout the world.

As of 2014 the Institute has 783 employees including 486 researchers, three Academicians and two Corresponding Members of the RAS and 367 doctors. It comprises 15 academic departments, two research centres (the Centre for Natural Sciences and the Centre for Laser Materials and Technology) and three branches: Wave Research Centre, Physics Instrumentation Centre (CFP) and a branch in the town of Tarusa. The Fiber Optics Research Centre, which is part of the Institute, is an independent organization established in 2007. The Institute has a scientific and experimental base, which makes it possible to carry out fundamental and applied research in various areas of physics. The results of these studies have led to development and introduction of a wide range of equipment and devices for industry, medicine and the environment, having no analogues in the domestic and foreign instrument engineering. The Key research areas of the Institute are

- Problems of condensed matter physics;
- Materials science, new materials and structures;
- Actual problems of optics and laser physics;
- The fundamentals of laser technology;
- Modern problems of radio physics and acoustics;
- Fundamental problems of physical electronics;
- Modern problems of plasma physics.

Scientific research in the Department is supported by the Russian Government and financed from the Federal Budget in different ways. The Ministry of Science and Technology of the Russian Federation supports basic and applied research through government scientific and technological programmes; the Russian Foundation for Basic Research supports basic research through awarding grants, and the Russian Academy of Sciences allots budgetary funds for carrying out the scientific researches in the Institute.

The Institute cooperates with research organizations from 15 countries in the framework of bilateral inter-academic agreements. Joint laboratories with scientific institutions in Canada, Italy and France have been set up. Each year up to 300 foreign scientists and experts visit the Institute.

2. Nikolaev Institute of Inorganic Chemistry Siberian Branch of Russian Academy of Sciences

Director : Acad Vladimir P Fedin

Address : 630090, Russia, Novosibirsk, prospekt Akademika Lavrentyeva 3
Contacts: Tel: +7(383) 330-94-90; Fax: +7(383) 330-94-89; Email: niic@niic.nsc.ru ; Website: http://www.niic.nsc.ru/en/

Nikolaev Institute of Inorganic Chemistry (NIIC) was founded in 1957 as one of the ten first institutes of new Siberian Branch of the Russian Academy of Sciences. Established specialists and still unknown at that time young scientists from a number of scientific institutions came to Siberia and formed a multifaceted team of this new Institute. Presently NIIC is one of the major multidisciplinary organisations of Russia in the area of modern inorganic chemistry. Institute employs close to 700 people, a little over 1/3 of which are scientists. Scientists of the Institute annually publish 200 to 250 articles and submit about 300 to 50 abstracts to national and international conferences. NIIC has close linkages with many universities including Novosibirsk State University. Scientific research activities of the institute are focused on

- Chemistry of inorganic compounds including coordination, cluster, and supramolecular compounds;
- Chemical thermodynamic of inorganic systems;
- Crystal chemistry and electronic structure of inorganic compounds;
- Chemical fundamentals for separation and purification;
- Chemistry and technology of functional materials.

Institute is proud of its long history of scientific collaboration with India as an active participant of Integrated Long Term Programme for S&T cooperation between India and Russia (ILTP). Former Director of the Institute Academician Fedor Andreevich Kuznestov was a dear friend of India was the ILTP Area Coordinator for Materials Science and Technology. Overall, the institute has collaborations with a large number of countries, including India, South Korea, Japan, China Germany and France. NIIC is involved in a number of international programmes in fields of materials, especially thermoelectrical materials, coordination chemistry, chemical analysis, ecology, crystal and electronic structure, informatics. As one of the founders and organisers of Asia-Pacific society of advanced materials (APSAM) it united foremost scientists of materials of Russia, Japan, India, China, Taiwan, South Korea, Australia and Uzbekistan.

3. Ukhta State Technical University

Rector : Dr Nikolay Denisovich Tskhadaya
Address : 169300, Russia, Ukhta, Pervomayskaya St 13
Contacts: +7(821)6774556 / 6738630; Fax: +7(821)676-03-33; Email: 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 staff, among them 53 are Professors and Doctors of Science and 213 Associate professors with Masters of Science. University has academicians and four corresponding members of the Russian Academy of Sciences as well as Honored Scientists of the Republic of Komi.

The USTU aims at fostering research at a high scientific level and continuing and strengthening proactive participation in national and international research networks and projects. Ukhta State Technical University aspires 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 & gas extraction in a climate of Far North;
- Emerging economy: economic, 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 recognized at regional, national as well as international 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. 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 and promotes exchange of research and academic staff with internationally recognized institutions and organizations. 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; Technical University of Ostrava in Czech Republic; the Duquesne University in Pittsburg, Princeton University, and the University of West Georgia in the US. The USTU also cooperates with commercial and research funds, such as Ramboll Storvik Company in Norway.

4. 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. Over this long period more than 200,000 of highly skilled specialists were educated in BMSTU, among them those who made groundbreaking scientific achievements are 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.

Scientific schools of the university have worldwide fame. The father of Russian aviation NE Zhukovsky, the founder of modern bio-physics PP Lazarev, the founder of Russian electronic computer engineering SA Lebedev worked here. Large engineering and scientific centres (MAI, MEI, MSUCE, CIAHD, VIAM, CIAM) were organized on the basis of some departments and laboratories of Bauman University. Being a huge centre of progressive areas development in science, engineering and technologies, BMSTU is regarded as National Research University.

Bauman University carries research in cutting-edge areas of science and technology and conducts 90 considerable scientific programmes in different fields. 32 companies included BMSTU in their innovational programmes. General research areas include:

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

BMSTU comprises nine research institutes with the following areas: structural materials and technological processes; special engineering; radiotronics and laser engineering; power-plant engineering; informatics and control systems; radio-electronic engineering; production process automation; biomedical engineering; organizational and economic problems. In addition, the university has 25 research centres and 36 labs.

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 education system - education through science – is well known in the world as "Russian engineering school method". It is based on the advanced study of fundamental sciences and vocational practical training. Therefore 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 International Association of Technical Universities (ATU) which consists of 147 universities and organizations in Russia and countries of the near abroad and Association of Technical Universities of Russia and China (ATURC).

V. Forthcoming Workshops and Conferences in Russia

1. Cellular and Molecular Mechanism of Tumour-Microenvironment Crosstalk Workshop

Dates : Jul 09-12, 2015
Place : Tomsk, Russia
Coordinator: Ms Olga Saveleva, Conference Secretary
Contacts : Tel: 7(905)089-2137; Email: olga_chechina@mail.ru; Website: http://events.embo.org/15-tumour-microenv/

The workshop focuses upon the following: immune system and inflammation; bacterial and viral pathogen contribution to tumor microenvironment; tumor invasion and metastasis, metastatic niches; molecular markers and targets for cancer therapy; microenvironment reprogramming as the innovative approach to cancer therapy.

2. XI International Scientific and Practical Conference Manned Space Flights

Dates : Nov 10-12, 2015
Place : Star City, Moscow Region
Coordinator: Mr Oleg S Gordienko, Deputy Head of Research Department, Conference Secretary
Contacts : Tel: +7(495)526-21-00 / 526-37-31 / 526-24-97; Email: a.kalmin@gctc.ru; a.penkin@gctc.ru; Website: http://msf2015starcity.com/en/

Organized by YuA Gagarin Research & Test Cosmonaut Training Center (GCTC), the conference is aimed to evaluate the existing research and practical results of the creation and operation of manned spacecraft, cosmonaut selection and training process, in-flight activity of cosmonauts and their post-flight rehabilitation. Russian and foreign cosmonauts, astronauts, scientists, engineers, designers and experts in space-related fields are invited to take part in the conference. The conference would cover: problems of manned space exploration and the candidate ways of problem-solving; development prospects of the world and domestic cosmonautics; tasks of popularization of the achievements of domestic manned cosmonautics among young people.

3. International Soil Science Congress on "Soil Science in International Year of Soils 2015"

Dates : Oct 19-23, 2015
Place : Sochi, Russia
Coordinator: Mr Evgeny Shein, President of Organizing Committee
Contacts : Tel: +7(495)939-29-47; Email: esss@soil2015.com ; Website: http://soil2015.com/

The congress would focus on multidisciplinary approach to soil science, with special interest on basic research, latest and technological developments for soil use and management. Papers would cover fundamental aspects, technical approaches and/or the related areas as follows: soil biology & biochemistry, soil health & quality; soil physics, erosion & conservation, soil management & reclamation; soil chemistry, soil pollution & remediation; soil fertility, plant nutrition & fertilization; soil genesis, classification & mapping, geostatistics, remote sensing & GIS.

4. 9th IEEE International Conference on Application of Information and Communication Technologies - AICT2015

Dates : Oct 14-16, 2015
Place : Rostov-on-Don, Russian Federation
Coordinator: Daria Zaruba, Vladimir Kureichik, Members of Organizing Committee
Contacts : Tel: +7(863)437-16-51, +7(950)857-64-22, Fax: +7(863)4371651; Email: aict@qu.edu.az ; Website: http://www.aict.info/2015

The Conference is a forum to bring together business people, researchers, scientists, software architects, and industry professionals to discuss innovative ideas and diverse topics on next generation of information technologies and services. AICT2015 topics include, but are not limited to, the following research and development areas: Big data management and application; Data mining and data engineering; Cyber security issues; Latest Trends in ICT Application; Communication, network and hardware; ICT in business administration, finance and economy; ICT in governance and government policy making; ICT in education, humanities, social sciences and research; ICT in medicine and health care.

5. 11th Central & Eastern European Software Engineering Conference in Russia (CEE-SECR 2015)

Dates : Oct 22-23, 2015
Place : Moscow, Russian Federation
Coordinator: Boris Kulakov, Conference Secretary
Contacts : Tel: +7(499)703-16-55, 7(812)336-93-44; Email:

contact@cee-secr.org ; Website: http://2015.secr.ru/

The conference programme targets both experienced specialists and those who seek to expand their knowledge to the new areas which might be adjacent to their core specialization. It covers: Software-Defined Architecture; Web-Scale IT; Big data & Smart data; Mobile and cross platform application development; Risk-Based Security and Self-Protection; Security of Mobile Application; Internet of Threats; Context-Rich Systems; Applications for banking and finance industry; Software architecture Software testing, verification, and analysis; Engineering of requirements and applied system analysis in IT projects; Project and product management; Domain-specific software engineering.

VI. Special Section on Academic Programme offers of Russian Universities

1. Russian Institute for Advanced Study in Humanities and Technology (RIAS) Sholokhov Moscow State University for the Humanities

RIAS Sholokhov Moscow State University for the Humanities has announced the CONTEST for scientific research funding (grants) in 2015-2016 in the following areas:

- Interdisciplinary research in the field of social and humanitarian sciences including institutional analysis, political and economic research, research of the processes of forming personal and group identity, social communications research, integrated political, legislative, social, economic and historical research;
- Social computing research and other fields of synthesis of socio-humanities and computing sciences (high-tech social network research, cyberpsycology, cyberpolicy, computing linguistics, pattern recognition, artificial intellect, IT in education, informative systems of management, new media environments);
- Cognitive and neurosciences, experimental psychology (basic and applied aspects);
- Research and development in various fields of social technologies (applications of socio-humanitarian and related knowledge), including political technologies, management technologies, marketing technologies, advertising and public relations, creative technologies, forecasting technologies, social, managerial and institutional design technologies, educational technologies, including educating and socialization of digital generation: pscyho-pedagogical features, etc .;
- Research in the field of the synthesis of social-humanities and life sciences including ethology research, biopsychology, genetic and other biological factors influence on individual features and social behavior of a person;
- Mathematical modeling of social, political, economic, neuropsycological, ecological and other complex systems and processes research;
- Research in the Environment (environmental monitoring, energy efficiency and conservation, human ecology, study of the influence of factors of high-tech and media on people in towns and cities etc.);
- Linguistic research (including social linguistics, computing linguistics, neurolinguistics, psychological linguistics, cognitive linguistics, etc.)
- Research in the field of synthesis of arts and sciences, including research in the field of creative industries, design and cultural studies.

Terms and Conditions:

a) Grant Duration:

10 months: Oct 1, 2015 - Jul 31, 2016 (5 grants)

6 months: Oct 1, 2015 - Mar 31, 2016 (2 grants) or Feb 1-Jul 31, 2016 (2 grants)

3+ months: Oct 1, 2015 - Dec 31, 2016 (5 grants, extension possible depending on result), or Feb 1-Apr 30, 2016 (3 grants), or May 1-Jul 31, 2016 (2 grants)

b) Sholokhov University Support for international program participants comprises

- An official invitation;
- Medical insurance (standard medical policy);
- Travel expenses cover (arrival at the beginning of the program and departure at the end of the program - by bus, rail or air flight (economy class);
- Accommodation in an individual comfortable room in a suburban complex RIAS Sholokhov University located in Moscow suburbs;
- 3 meals a day (breakfast, lunch and dinner) on RIAS venue;
- visa issuing support for foreign researchers have Sholokhov University;
- Scholarship for the period of stay in RIAS for Foreign participants - 70,000 (seventy thousand) Rub/month.

c) Program languages: Russian, English;

d) Applicants qualifying claims:

- Academic degree – Candidate of Sciences/Doctoral degree (for foreign participants - PhD);
- Publications in journals WEB of SCIENCE and / or SCOPUS

e) **Application Deadline**: until June 30, 2015, 12:00 Moscow time

The application is filed in electronic form on RIAS website (gray button to the right "Take part in the competition").

f) Expert assessment of applications

Expert evaluation is carried out by RIAS experts until end of July, 2015: eng.ipgit.mggu-sh.ru/people/expert-board/

g) Announcement of results will be published by August 15, 2015 on the RIAS website: www.eng.ipgit.mggu-sh.ru

Russian and foreign experts participating in the project will have a unique opportunity to carry out their research by a Sholokhov University grant, being a part of an international team working in a multidisciplinary scientific community. RIAS would provide all the necessary conditions for research, information and library support, opportunities for publications, as well as assistance in obtaining patents and inventions licenses. The supported participants of the international program are required to

- Publish in journals WEB of SCIENCE and / or SCOPUS (issuing 2 articles every 3 months of program);
- Teach an elective course for Sholokhov University students (for 6- and 10-month program grant holders the subject of their elective course is on request, the amount of the course - 36 and 72 academic hours, respectively);
- Deliver public lectures / workshops on the project theme (for 3-month program grant holders);
- Develop and hold at least one seminar in RIAS and participation in the program of interdisciplinary seminars held on RIAS venue;
- Participate in preparation of the contest applications for grants of Russian and foreign funds.

Information about Russian Institute for Advanced Study in Humanities and Technology (RIAS) Sholokhov University, the results of previous contest programs, RIAS events, as well as the electronic application form for participation in the competition is available on the website ipgit.mggu-sh.ru. For details RIAS Director Galina Kuznetsova may be contacted (Tel: +7(495)915-5533; Email: riasgrants@gmail.com; Webpage: www.eng.ipgit.mggu-sh.ru)

2. Moscow Institute of Physics and Technology State University

Moscow Institute of Physics and Technology State University has announced the CONTEST for scientific research grants for the Master of Science programme on "Advanced Cybernetics (Cybernetics 2.0)". The objective of the programme is to train professional engineers with extensive research and practical skills in designing modern and next-gen complex organizational and technical systems and to provide students with expertise in the following fields:

- Control theory for interdisciplinary systems;
- Systems engineering;
- Activity organization in active systems;
- Solutions for organizational and control problems in engineering and production;
- Information systems and ICT in complex systems control;
- Applications in organization and control systems for activity processes and product lifecycles.

Syllabus would include Advanced Cybernetics; Mathematical Control Theory; Operations Research; Intellectual Control Systems; Information Technologies in Control; Systems Engineering; Information Risks Control; Enterprise Architecture: Design and Management; Quality Management Systems; Operational and Investment Business Models; Industrial Control Systems; Product Lifecycle Management; Theory of Control in Organizations; Discrete Production Management; Technologies of Business Activity Transformation; Business Processes Reengineering; and Models of Information Control and Collective Behaviour.

The programme is based around lectures, tutorials, and hands-on practical work (mastering the basic methods of modelling and simulation). In preparation for their research projects, students will obtain in-depth knowledge and practical skills within the chosen research area. The programme complies with the Russian Educational Standards and the Educational Principles by Moscow Institute of Physics and Technology (MIPT); CDIO Engineering Education Model and Educational Principles by IEEE and the European Education System including the European Credit Transfer System (ECTS). The Key Advantages of the programme are

- A cross-functional composite programme of several MIPT departments under the overall coordination of the Control Problems Chair (the core chair at the Department of Radio Engineering and Cybernetics, located at the Trapeznikov Institute of Control Sciences, Russian Academy of Sciences);
- Aims to create and develop a unique centre of excellence in areas of international-level expertise for MIPT and its partners, with textbooks and monographs published in English by leading international houses;
- International partner universities; and
- Gradual extension of the flexible core part of the programme through distant learning courses in the course of teaching.

a) Application deadlines

- Early admissions deadline: May 15, 2015
- Regular admissions deadline: June 01, 2015
- Reply deadline for early admissions students: July 01, 2015
- Reply deadline for regular admissions students: July 15, 2015

b) Required documents

- Passport (scanned copy)
- Diploma(s) and official academic transcript of records (scanned copy) (*applicants who are yet to be awarded a Bachelor's degree at the time of application only need to submit an official transcript)
- Resume (include academic awards, results of academic competitions, scientific publications)
- Statement of Purpose
- 2 Letters of Recommendation
- Certificate of Language Proficiency (IELTS, TOEFL). Recommended level - B2

All documents should be submitted in English or Russian to the Department of International Affairs by email: programmes.eng@mail.ru

c) Fees and funding

- Full-tuition government scholarships available (early application recommended)
- Standard tuition fee: 190,000 RUR per annum

d) Accommodation costs: Between 600 and 1,300 RUR per month

e) Medical insurance

- Free for students receiving full-tuition scholarships
- 7,000 RUR per annum

f) How it works: You will receive a letter with further instructions within a week after your documents are accepted.

e) Grant duration: Sep 1, 2015 - late May 2016

For details Programme coordinator Mr Artem Oganov may be contacted (Tel: +7(909)9408021; Email: artem.oganov@sunysb.edu; Website: http://mipt.ru/en/education/edu/magistr/master-degree-programmes-in-english/prgrm-Cybernetics.pdf)