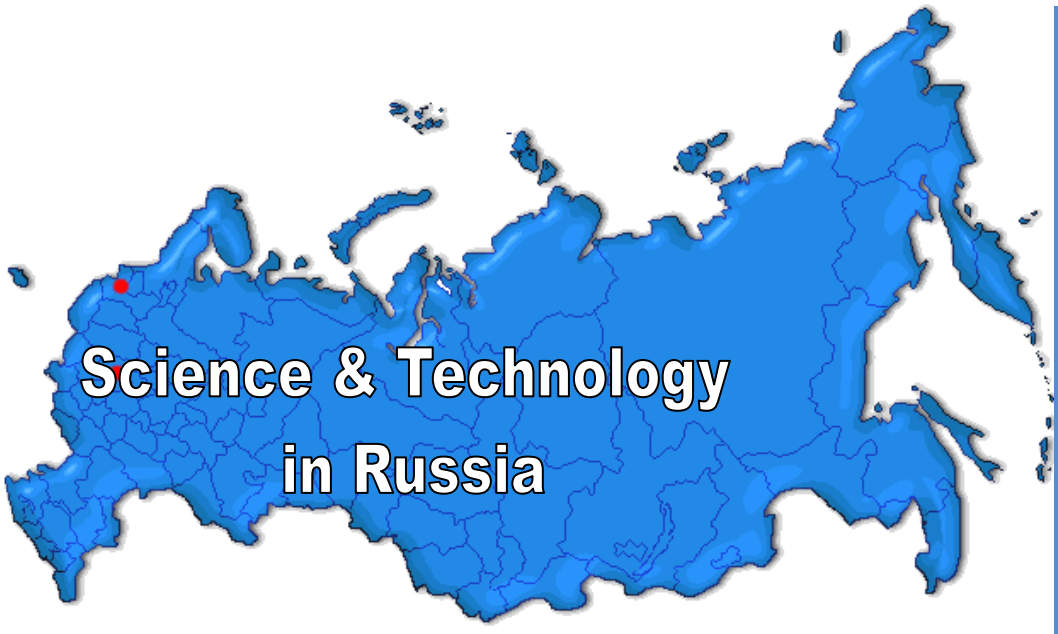


सत्यमेव जयते

Bimonthly Newsletter
of the
Embassy of India
Moscow

September – October 2016

Compiled and Edited by

Dr Abhishek Vaish
Counsellor (S&T)

With support from

Galina N Khokhlova
Interpreter

Science & Technology Wing
Embassy of India
9, Ulitsa Vorontsovo Polye
Moscow - 103064
Russia

Telefax
007-495-9160297
E-mail:
snt.moscow@mea.gov.in
Homepage
www.indianembassy.ru

Dear Readers,

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

The months of September and October has been very productive with various activities for fostering Bilateral and Multilateral ties between both the countries. This started with the "BRICS Young Scientist Conclave on 26-30 Sep, 2016 " (as an integral part of the "BRICS Young Scientist Forum" initiative) by the Department of Science & Technology, GoI (DST). The event was organised and coordinated by the National Institute of Advanced Studies (NIAS) in Bengaluru. Eight Young Scientists from Russia had participated in this event.

The meeting of 9th working group at New Delhi headed by Dr. Arabinda Mitra from Department of Science and Technology and Dr. Nikoloi Toivonen, Co-Chair of the Working Group, Russian Ministry of Education and Science, Russian Federation. 19 Member delegation from Russian Federation was part of this meeting. The member of delegation were represented by different sectors responsible for science and technology. Both sides noted the satisfaction about the progress made and also identified new areas of cooperation. Three fresh coordinated calls between DST-RFBR, DST-RMES, and DBT-RMES were launched in the month of October 16.

The 17th India-Russia Annual Summit Enhances S&T Links, Prime Minister Narendra Modi and Russian President Vladimir Putin held wide-ranging talks covering the entire expanse of bilateral engagement following which the two sides signed a total of 16 MoUs, including the MoU between Department of Science & Technology (India) and Federal Agency for Scientific Organisations (Russia), and made a few announcements to boost ties in sectors like science and technology.

The first Ever Indo-Russian Bridge to Innovation to connect the Network of Start-up of both the countries was initiated by the support of Department of Science and Technology. Delegation comprising young entrepreneurs/Start ups and Two official from Department of Science and Technology had participated in this event. The Delegation met with various agencies, accerlators and companies interested in their product. Ambassador of India, Mr. Pankaj Saran met with the whole delegation including partnering company from Russia and congratulated the whole team.

Tomsk Polytechnic University jointly with Siberian State Medical have developed an innovative system for early-stage diagnostics of neurodegenerative diseases. Tomsk State University offers new materials to develop technology that would enable inexpensive hydrogen production for eco-friendly renewable batteries (fuel cells) for remote areas in need of energy. The Institute of Cytology and Genetics RAS have discovered a universal marker for cancerous stem cells as well as a method of destroying such cells. Tyumen State University have come up with liquid microlenses which mimic accommodative system of the eye for medicine and navigation systems. ITMO University have developed for drug development purposes an optically active nanodimensional super-crystal that enables separation of organic molecules. Moscow Institute of Physics and Technology have solved the problem of photodetectors being sensitive to light within a certain narrow bandwidth. Scientists from the Peter the Great Saint Petersburg Polytechnic University have developed a new technique for analyzing signals of laser correlation spectroscopy (LCS) used for determining the sizes of nano-and micro-particles in solutions, and

plan to introduce this method in medical research, ecology monitoring and in control of technical liquids.

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.

With regards
Dr. Abhishek Vaish

I. Bilateral / Multilateral Cooperation

1. 17th India-Russia Annual Summit Enhances S&T Links.

PM of India and President of Russian Federation shake hands during the 17th Indo-Russian Summit

On 15th Oct, 2016, Prime Minister of the Republic of India, HE Mr Narendra Modi and President of the Russian Federation, HE Mr Vladimir V Putin met in Goa, in the framework of the 17th India-Russia Annual Summit. Prime Minister Narendra Modi and Russian President Vladimir Putin held wide-ranging talks covering the entire expanse of bilateral engagement following which the two sides signed a total of 16 MoUs, including the MoU between Department of Science & Technology (India) and Federal Agency for Scientific Organisations (Russia), and made a few announcements to boost ties in sectors like science and technology, trade and investment, hydrocarbons, space and smart cities.

Within the framework of the MoU between DST-FASO cooperation will be supported in the following forms:

1) Exchange of information about conducted conferences, forums, exhibitions, seminars that are of mutual interest;

2) Support and provision of conditions for the formation of scientific projects aimed at the conduct of joint research, themes of which are determined jointly by the Parties;

3) Conduct of joint scientific events (seminars, conferences, round tables) aimed at establishing of direct connections between scientists of the two countries in the fields determined by the Parties;

4) support of establishment of direct connections between scientific organizations, scientists and specialists of the Parties;

5) Provision of media coverage of the joint scientific activity aimed at the popularization of science;

6) Development of inter-disciplinary and multi-institutional projects with the involvement of industry.

Realization of the cooperation will be insured and provided by the Joint work group formed from the equal number of representatives from both sides.

Scientific organizations managed by FASO Russia are actively involved in projects and agreements with research organizations in India, take part in the congresses, forums, conferences and round tables related to various areas of science within the framework of Russian-Indian cooperation.

In 2017, grand celebrations will be held to mark the 70th anniversary of the establishment of diplomatic relations between India and Russia. Concerned ministries and agencies have been requested to organize celebrations depicting width and depth of multi-faceted relations that the countries have spanning diverse fields including science and technology. The leaders welcomed elaboration of an Action plan towards this goal.

2. BRICS Young Scientists Conclave held in Bengaluru.

The core strength of BRICS is its diverse young population that comprises 65% of workforce of BRICS countries together and is complemented by the surging scientific and technological prowess in the world. Recognizing this huge opportunities before the youth, in July 2015 BRICS leaders endorsed India's proposal to create the "BRICS Young Scientist Forum" with India as the coordinating country.

In line with this agreement, on 26-30 Sep, 2016 the "BRICS Young Scientist Conclave" (as an integral part of the "BRICS Young Scientist Forum" initiative) was successfully hosted by the Department of Science & Technology, GoI (DST). The event was organised and coordinated by the National Institute of Advanced Studies (NIAS) in Bengaluru.

More than 40 young scientists from BRICS countries participated in the event and discussed some exciting ideas in the field of affordable healthcare, energy solutions and computational intelligence. The Conclave served as a platform to harness solutions/ideas on country-specific problems and common challenges faced by BRICS nations. In order to stimulate and encourage young minds, BRICS Innovative Idea Prize for Young Scientists has been instituted.

Scientists, techno-entrepreneurs and researchers from each BRICS nations between 22 to 35 years formed a part of the Conclave. Besides bringing these participants in the leading role at the Conclave, the Conclave also provided them with abundant opportunities to interact with trail-blazers, leaders and pioneers of S&T through workshops, interactive sessions and lectures.

The event was inaugurated by Professor K Kasturirangan, the former Chairman of the Indian Space Research Organisation. Some of the lead speakers at the conclave included Dr Ashutosh Sharma, Secretary of the Department of Science and Technology, Dr K Vijay Raghavan of the Department of Biotechnology, Dr VK Saraswat who is a member of the NITI Ayog and Dr Baldev Raj, Director of NIAS.

The list of Russian Participants included:

1. Mr. Dronov Aleksey, Moscow Institute of Electronic Technology (Technical University).
2. Mr. Yamaev Renat, OAO 'Moslift';
3. Mr. Gornovskii Artem, Moscow State University of Mechanical Engineering;
4. Mr. Kosach Lev, Moscow State University of Mechanical Engineering;
5. Ms. Nadezhda A. Taranova, AN Bach Institute of Biochemistry, Research Centre of Biochemistry of RAS;
6. Ms. Timoshenko Anastasia Alekseevna, Koltzov Institute of Developmental Biology, RAS;
7. Ms. Spechenkova Nadezhda Andreevna, Koltzov Institute of Developmental Biology RAS;
8. Mr. Martyanov Artem, National Institute of Aviation Technologies.

3. Three Indo-Russian joint research calls for proposals launched.

a) Joint Research in STI

DST and RMES invite Indian and Russian scientists / researchers to submit proposals for Joint Research Projects in the following areas:

- Energy & Environment;
- Manufacturing Technology;
- Information & Communication Technologies;
- Earth Sciences;
- Oceanology;
- Seismology.

Deadline Date 31st Dec, 2016. Expected start of projects: June, 2017. The duration of each project is three years. Industrial partners in both countries are encouraged to provide support to the projects. Industrial partner participation in the project will give extra points for the project during the evaluation process.

Indian side could be up to annual funding of Rs. 6,000,000 and on Russian side up to Rbls 5,000, 000. Terms of the project grant, including the type of support available are listed on www.dst.gov.in for participants from India and on www.fcpir.ru for participants from Russia.

b) Joint Research in Biotechnology

Department of Biotechnology, Ministry of Science and Technology (MST), India and Russian Ministry of Education and Science (RMES), Russia invite Joint Research Proposals in the area of Biotechnology. The following research areas will be given priority:

- Genomic & Proteomics Instrumentation
- Nano-Devices
- Bioenergy - Photosynthesis based only
- Bio-reagents

Last date of submission is 1st Dec 2016. The duration of a project will be three (3) years only.

The total grant earmarked for this call is ~USD1140000 with a maximum of up to ~USD380000 per project spread over three years. The funding agency in each country will support expenses for their own respective national researchers. Funding procedures and eligible costs are subject to national regulations.

c) Joint Research in Fundamental Sciences

DST and RFBR invite Indian and Russian scientists / researchers to submit proposals for Joint Research Project in the following areas of basic sciences under DST-RFBR cooperation:

- Mathematics, Mechanics and Informatics;
- Physics and Astronomy;
- Chemistry;
- Biology and Medical Sciences;
- Earth Sciences;
- Telecommunications and Computer Sciences;
- Fundamental of Engineering Sciences.

Deadline Date for submission is 15th Nov 2016. The duration of each project will be two years initially. After the completion of this period, an application for additional one year may be considered on the merit of the progress. Expected Starting of Project: April 2017.

Each project will receive annual funding of up to equivalent of US $ 20,000 (roughly Rupees 1,200,000/-from DST to the Indian partner and up to Rbls. 600,000/- from RFBR to the Russian partner).

4. 4th BRICS STI Ministerial Meeting held at Jaipur.

BRICS leaders at the STI Ministerial Meeting on 8 Oct, 2016

To boost the scientific relationship and forge better collaborations between the BRICS countries, the 4th S&T Ministerial meeting of the Ministers for Science & Technology of the BRICS member countries was held on 8 Oct, 2016 at Jaipur.

The meeting was chaired by the Minister for Science & Technology and Earth Sciences, Dr Harsh Vardhan. Respective country delegations were led by Deputy Minister of Science and Education of the Russian Federation, Mr. Alexey Lopatin; Vice Minister for Science, Technology and Innovation of Brazil, Mr. Álvaro Toubes Prata; Vice Minister of S&T of Peoples Republic of China, H.E. Mr. Jiang Hua and Minister of Science and Technology of South Africa H.E. Madam Naledi Pandor.

In his welcoming speech, Dr Harsh Vardhan elucidated that during its Chairmanship India is adopting a five-pronged approach, viz. Institution Building, Implementation, Integration, Innovation and Continuity. The emphasis is made on institution building, implementation of previous commitments, tapping synergies of the existing BRICS cooperation mechanisms, exploring some new areas of cooperation and maintaining continuity in the existing areas.

During India's Chairmanship, significant progress has been reportedly achieved in joint knowledge creation in the areas of Photonics; Material Science & Nanotechnology; Biotechnology & Biomedical Sciences; Energy; Geospatial Technology; Astronomy; Prevention & Mitigation of Natural Disaster, Water and Solid State Lighting.

In alignment with the theme of India's Chairmanship "Building, Responsive Inclusive and Collective Solutions", the Jaipur Declaration was unanimously adopted by all the BRICS countries. The member countries resolved to intensify, diversify and institutionalize STI cooperation through the BRICS research & innovation initiative. Additionally, in order to harness the innovativeness of the youth, India's proposal to establish a BRICS Science and Technology driven Entrepreneurship and Innovation Partnership Programme was agreed by all the member countries.

This ministerial meeting was preceded by the 2nd BRICS STI Funding Working Group Meeting on 6 Oct, 2016 and 6th BRICS STI Senior Officials Meeting (BRICS-SOM) on 7 Oct, 2016 respectively.

5. BRICS-Biomed Brings Paves Way for More Indian-Russian Biotech Projects

Representatives from five countries at BRICS-Biomed Round table.

BRICS-Biomed Consortium was created in 2014 for developing new biomedical technologies for diagnosis and treatment of human diseases in the BRICS countries as well as creation of technological base for new biotech areas of industrial sector. The BRICS Biomed Cooperation plans to establish BRICS Biomed centres in Kanyakumari, Bangalore, Hyderabad and Delhi by 2025.

On 12 Oct, 2016 BRICS-Biomed Consortium organized the round table "BRICS-Biomed: First Results and Prospects" in New-Delhi. Over 500 participants including representatives from government agencies and local industry attended this highly awaited large-scale event. In the framework of the round table the Russian delegation from Tomsk National Research Medical Center met YS Chowdary, Minister of State for Science and Technology, & Earth Science. Russian experts successfully proposed two projects on development of next-gen coronary stents and portable ECG recorders respectively. As a result, they will forward project proposals to India with a view to introduce Tomsk developments into the Indian market.

Nano-coating stents – developments in the first project proposals – can disintegrate the crystalline formations of the lipids in the artery. Besides, such nano-coating stents possess a longer shelf life than that of the existing nano-coating based stents. At present this technology is undergoing the national phase of patenting in the USA and the European Union. Preclinical trials are planned on large-sized test animals and, subsequently, limited clinical trials.

The second development – a portable ECG recorder – allows recording an electrocardiogram at home and transmitting the data immediately via the Internet to the Institute of Cardiology. Such a device is regarded by the inventors as necessary to have in every house, as this would help to diagnose cardiac arrhythmias as well as preinfarction and infarct states, thereby reducing the risk of sudden cardiac death. The device is currently undergoing clinical trials. The research teams for both the projects are interested in attracting investments.

According to Dr Akhmedov, Chairman of the BRICS-Biomed and Head of the Tomsk Centre, Indian-Russian cooperation would get another boost thanks to strong mutual interest in biotechnology and good funding opportunities from the Indian government and private investors. In the future Russian specialists would like to propose more new technologies and ideas for joint projects in this field. The Research Institute of Cardiology, which operates under the Tomsk Center, reportedly has around 20 biomed projects in addition to those already proposed.

The Tomsk Center acts as the functional integration of scientific organizations of high medical profile and is the first of this kind in Russia. Its aim is to bring together the scientific potential of various institutions, provide for transfer of scientific developments of the Institute's laboratories in practice clinics and enable joint use of high-tech research equipment. The Tomsk National Research Medical Center of the Russian Academy of Sciences comprises of Research Institute of Oncology; Research Institute of Cardiology; Mental Health Research Institute; Institute of Pharmacology and Regenerative Medicine; Institute of Medical Genetics; Research Institute of Obstetrics and Gynecology; Tyumen Cardiology Research Center.

6. India-Russia Bridge for Indian Hi-Tech Startups established.

A high-level training Program "India-Russia Bridge Innovation Program (IRBI)" for Indian hi-tech startups, policy makers and ecosystem partners is a novel bilateral

initiative which was conceived and formulated between the two countries to explore the possibility of supporting and accelerating cross border innovation and technologies promoted by Indian start-ups into Russian market. The three major objectives and benefits of the training program are: Acquire knowledge, understanding of the Russian market and its innovation and start up ecosystem; Get insights of Russian startups through networking events to explore possibility of mutual collaboration; Understanding of good practices of cross border trade through exposure on Russian business environment. The program is implemented by Society for Innovation and Entrepreneurship, IIT Bombay in association with Indian Embassy at Moscow and Global Venture Alliance.

Meeting with head of Agency of Innovations in Moscow under IRBI Programme.

On 17-29 Sep, 2016 a program was arranged for 10 startup founders/leaders and 4 officials from India. The Program took place in Moscow and immersed 10 startup founders into the Russian market as well as provided contacts and facilitated meetings with partners, clients and experts that would help them enter Russian market.

A series of workshops and master classes were conducted to assist in understanding the local economy, market, legal and financial systems of Russia and opportunities that these present to local & foreign entrepreneurs. Some examples of workshops and master classes included a workshop «Business model that are viable in Russia» and "Presenting the startup business to potential clients" workshop.

IRBI Participants at Ambassador's reception

A number of meetings were arranged with leading Russian corporations, government institutes of development and local companies to understand cooperation points and find partners, participation in weekly networking events learning more about Russian business and culture. Some of the meetings and networking events included visits to Agency for Strategic Innovations for discussing National Technological Initiative (NTI) program, to Strogino Technopark, MSU State University Science Park, Skolkovo Technopark and a networking event with International Union of Instrument and ICT Engineers.

A number of meetings for officials have been organized and conducted to create a strong bond on the government level between the institutes of development that foster innovation in both countries. The Embassy reception was arranged with representatives of Russian innovation ecosystem as Skolkovo Foundation, Technopark Skolkovo, Agency for Strategic Innovation, Russian Venture Company.

As a result, the Indian entrepreneurs got a solid understanding of the Russian ecosystem, business culture, environment, geographical challenges and opportunities, etc. They had an opportunity to test and tweak their business model against the requirements of the local market, identified networks with potential corporate and government partners and entrepreneurs to initiate working/penetration in the Russian market. Also, they had an opportunity to share best practices with Government, Policymakers, Industries, Startups and Investors.

7. 9th Indian-Russian Working Group on S&T held in Delhi.

Dr Nikolay Toivonen (left) and Dr Arabinda Mitra (right) shake hands at the 9th IRWG meeting in New-Delhi

The ninth meeting of Indo-Russian Working Group on Science and Technology was held in New-Delhi on 9th Sep, 2016. The meeting was co-chaired by Dr Arabinda Mitra, Advisor & Head, International (Bilateral) Cooperation Division of Department of Science and Technology (DST) and Dr Nikolay R Toivonen, Director, International Department of the Russian Ministry of Education and Research (RMES). A 21-member Russian delegation and a 17-member Indian delegation representing various Working Subgroups and lead partner agencies, participated in the meeting.

The Working Group reviewed and assessed positively progress in bilateral cooperation activities under various scientific programmes including DST-RMES Programme of Cooperation in Science, Technology and Innovation, DBT-RMES Biotechnology Cooperation Programme, DST-RSF Basic and Exploratory Scientific Research Programme, DST-RFBR Basic Science Cooperation Programme as well as DST-RFBR Inter-Disciplinary Science Programme. The progress under DST-RFBR Basic Science Cooperation programme, which shall be completing 10 years in 2017, was particularly praised. In this regard both DST and RFBR agreed to launch a series of events, such as meeting of stakeholders, exhibition of posters and meeting of young researchers.

The cooperation between the Department of Science and Technology (DST) and the Fund for Assistance to Small Innovative Enterprises (FASIE) was welcomed. Taking into account the importance of mutual cooperation for scientific innovative programme and the necessity for creation of a joint programme, a meeting between representatives of DST/DBT and FASIE was recommended for discussing the proposed DST-FASIE program at the earliest.

Ongoing activities of the following thematic working subgroups were discussed: Biotechnology; Medicine; Standardization and Metrology; Meteorology; Oceanology. Taking into account the long-term positive experience of cooperation in the field of ocean engineering and ocean technologies, the proposal to establish a Russian-Indian Centre for Ocean Engineering and Ocean Technologies was endorsed. In addition, oceanographical research in Lazarev and Cosmonauts seas and also in Prydz bay region where both countries have their research bases, was supported.

A positive cooperation between the National Centre for Antarctic and Ocean Research (NCAOR) Goa, through Ministry of Earth Sciences and Russian Arctic and Antarctic Research institute was also supported. Studying natural changes in the Antarctic climate was considered an important area of research.

In the framework of the meeting the Round table dedicated to the new field of cooperation was held. The participants noted the progress of bilateral S&T cooperation as well as progress in the implementation of joint scientific projects and encouraged scientists exchange for developing joint research. Participants also highlighted the importance of industrial development of the results of scientific-technical cooperation, including the results of mutual research on the prospective ways of innovative R&D to solve actual scientific and technological problems of mutual interest.

The effort of the Council for Scientific and Industrial Research (CSIR) for strengthening Indo-Russian S&T Linkages was praised. The collaboration between CSIR-Institute of Himalayan Bioresource Technology (IHBT) and Lisavenko Institute of Horticulture for Siberia on hippophae research . Early conclusion of the Traditional Knowledge Digital Library (TKDL) Access Agreement between CSIR and the Federal Service for Intellectual Property (Rospatent) was recommended, as well as the proposal for cooperation on skill building in specialized high-tech areas.

The bilateral initiative in the field of fiber optic and satellite quantum telecommunications was supported. It is assumed that the support in scientific research and development in quantum communication, mutual pilot quantum telecommunication networks projects based on Russian and Indian technologies for secure data transmission in corporation, state organization, data storage and processing center and critical infrastructure will be provided.

II. Science, Technology & Innovation in Russia.

1. Advanced Diagnostics System for multiple sclerosis and Parkinson's developed

Scientists at the Tomsk Polytechnic University (TPU) have partnered up with colleagues from the Siberian State Medical University (SSMU) to develop an innovative system for early-stage diagnostics of neurodegenerative diseases, such as multiple sclerosis, Parkinson's and others. At the core of the new diagnostics is virtual reality; a person is immersed in a virtual environment for physicians to conduct functional tests. Researchers model the VR environment as they deem fit, and then register changes in the way the testee moves.

The system the TPU/SSMU team is developing consists of augmented reality glasses, a contactless movement sensor, and a mobile platform. The developers use some of the already existing devices, such as the Google AR glasses and the Kinect contactless sensor controller. For a test, a person puts on the glasses and gets immersed in virtual reality where the skyline/horizon is changed. The movement sensor detects changes in his body's position in 20 points. While a healthy person adapts easily to the virtual environment and keeps his balance, a neurodegenerative patient fails to do both.

In experiments, the impact of the virtual reality on about 50 volunteers was observed. Each test lasted about 10 minutes. The volunteers included both healthy people and confirmed neurodegenerative patients. As a result, the system identified how noticeably one's current status differed from a norm. Different patients respond differently to a virtual environment. For example, Parkinson's

patients had their upper extremity tremor revealed more manifestly.

According to Mr Tolmachov, a professor at TPU and associate professor at SSMU, it is highly important to diagnose neurodegenerative diseases at early stages, when help is still possible. The project team would take another year to complete the research part of the effort, with clinical trials and an array of certification procedures to follow. The ultimate cost of the system is expected to be significantly lower than that of international analogs.

The information on each participating universitity is covered in the Institute profiles section of this Newsletter issue.

2. TSU Nanomaterials to help Create Hydrogen for Batteries

Researchers at the Tomsk State University (TSU) are using new materials to develop technology that would enable inexpensive hydrogen production for renewable batteries (fuel cells) which appear to be eco-friendlier than the existing competition and could be used in any hard to reach areas in need of energy, for example, in Africa or the Arctic, the TSU website announced.

Such batteries use pure hydrogen and oxygen. While the latter can be obtained from the air, getting the former poses a problem. It's difficult and costly to transport. However, using nanomaterials that react with water, an innovative product by TSU and its local partners at Advanced Powder Technology, can enable hydrogen production right where it's needed, said Edward Dreizin, a professor at the New Jersey Institute of Technology and a visiting professor at TSU.

The Siberian scientists have developed nanodispersed powders that can be produced by applying electric explosion technology. The TSU-created nanoparticles give materials certain properties required, and have wide applications, from energy to aerospace, to medicine.

According to Prof. Dreizin, the TSU team is shooting for a complete cycle from the development and fine-tuning of the materials to commercialization. Researchers from the U.S., Italy and Jamaica are also expected to join the effort. The TSU group is currently busy looking for funding for their endeavor.

3. Effective Analgesic without Side Effects Has Been created.

Scientists at the Institute for Problems of Chemical and Energetic Technologies (IPCET), SB RAS, with the participation of TSU colleagues, have developed tiovyurtsin – a generic drug for the treatment of pain of various etiology. A feature of the new analgesic is having none of the side effects typical of steroid and non-steroidal anti-inflammatory drugs.

The team used glyoxal as a raw material for the new drug– a substance for which the industrial technology of synthesis was developed by chemists at Tomsk State University. High-energy compounds are also based on glyoxal. At the intermediate stage of synthesis, the scientists withdraw a small portion of the substance, modify it, and then obtain a drug with excellent pharmacological characteristics.

Preclinical tests were carried out at the ED Goldberg Research Institute of Pharmacology and Regenerative Medicine (Tomsk). The results showed that the new analgesic suppresses pain syndromes of various etiology and has a longer period of effectiveness than other painkillers, but has no toxic effects on the body. According to experts, tiovyurtsin is in the IV class of danger - low-hazard substances. The extent of its toxic effects on the body by gravity is only comparable to overeating.

Furthermore, in the case of prolonged use of the drug (28 days), drug dependence has not developed, the breath does not suffer, and there is no stimulating effect on the central nervous system, which indicates the absence of the effects observed in the use of morphine.

According to Alexander Vorozhtsov, Professor at TSU, new technology is a big step forward for modern pharmacology. Previously, the use of glyoxal as a raw material for the synthesis of hexaazaisowurtzitane had a primarily defense application. Only in recent years these chemicals began to be considered for application in medicine.

This issue is under discussion in the scientific and medical literature, but the priority publications on the subject and now the practical experience with it have been only by Russian scientists.

Preclinical tests of the new drug are in the final stage. This development already has a patent, and this joint project of Biysk and Tomsk scientists is planned to be implemented in the Federal Program Development of the Pharmaceutical and Medical Industry of the Russian Federation for the Period to 2020 and Beyond.

4. Novosibirsk Scientists Can Now Decisively Deal With Cancerous Stem Cells

Specialists at the Novosibirsk-based Institute of Cytology and Genetics of the Russian Academy of Sciences have discovered what they call a universal marker for cancerous stem cells, and have developed a method of destroying such cells, which has reportedly led to successful treatment of two different malignant tumors in lab mice.

According to Evgeniya Dolgova, PhD, adding DNA fragments to cancerous stem cells results in the cells capturing the fragments. This is the very principle the new Novosibirsk marker has been built on. The scientists added a special fluorochrome dye to a DNA probe, and cells that captured it began to gleam red in a certain spectrum. The researchers believe the discovery might lead to a real breakthrough in studying the few cells that trigger serious cancers.

The research team also decided to see if the DNA technique, coupled with others, could stop tumor growth. They found that DNA fragments that got into a cancerous stem cell after a special chemotherapeutic drug, cyclophosphan, impacted it thwarted the cell's reparation process, and the cell died soon.

That led to successfully treating 50% of lab mice used in the experiment, and later the mice gave birth to healthy progeny. Applying the new therapeutic approach to a solid form of cancer (when a tumor intertwines with muscles and keeps growing as solid neoplasm) was reported to be also successful.

Plans are to test the new cancerous stem cell destruction therapy on other sorts of malignant tumors. The researchers are working on an improved diagnostic and monitoring method for ovary and stomach cancer therapy, using the new marker. Assessing the number of cancerous stem cells prior to and after treatment is expected to help physicians determine whether the disease has been dealt with for good, or relapses are possible. The results of the ongoing research by this team were published in US medical journal Oncotarget**.**

5. Liquid Microlenses Applicable in Medicine and Navigation Systems created

Scientists from Tyumen State University (TyumSU) have come up with liquid microlenses which mimic accommodative system of the eye, that is, they are able to focus due to changes in the

surface curvature. This development might find its application in medicine and navigation systems.

Researchers have synthesized a solution which by irradiation with a light beam aggregates into a drop und acts as a plane-convex lens. Alexander Malyuk, a Research Assistant from the Laboratory of Photonics and Microfluidics at TyumSU stated, that the surface curvature can be easily fine-tuned by varying the irradiation intensity. In other words, the more intense light scientists apply, the smaller the diameter of the lens becomes, the bigger the curvature, and the shorter the focal distance researchers get. And vice versa, the less intensive light that is applied, the greater the diameter of the lens becomes, the smaller the drop in curvature, and the larger the focal distance they get.

The limits of tunable focal distance are defined by starting solution properties as surface tension, viscosity, vapor pressure, and many others. According to Malyuk, the development can be successfully applied in microbiology and medicine, in navigation systems, in laser control and diagnostics, as well as in systems and devices for data transmission.

Two scientific articles summarizing the new results have already been prepared for publication, further studies devoted to boosting the efficiency of liquid microlenses are scheduled at TyumSU.

Over the last decade, adaptive liquid optics has drawn particular interest among researchers from all over the world. By comparison to solid analogous devices, liquid optics can focus an unlimited number of times without wearing away and what's important is that the process can go faster due to the liquid's fluidity. Thanks to the tunable focal distance within a broad range, the liquid lenses enable the reduction of the most complex optical systems.

6. New Super-crystal Easier to Develop New Drugs developed

Researchers at St Petersburg-based ITMO University have developed an optically active nanodimensional super-crystal with unusual architecture that is believed to enable the separation of organic molecules. This is expected to help simplify new drug development technology considerably.

The super-crystal is reportedly an assembly of achiral semiconductor quantum dots (QDs) a few nanometers in size, which are arranged in a helix. The QD-based super-crystal is said to exhibit giant optical activity and almost complete dissymmetry in optical absorption (or chirality, which is a geometric property of some molecules and ions that are non-superposable on their mirror image). Such super-crystals could be widely used in pharmacology to identify chiral biomolecules.

According to Ivan Rukhlenko, Had of ITMO's nanostructure modeling and design laboratory, as with any chiral nanostructure, such super-crystals have wide applications. In pharmacology, they could be used to recognize chiral medicinal molecules. Arranged in a helix around the molecules, QDs can display unusual shared properties that could increase the molecules' absorptive characteristics by a hundred times or more. That, in its turn, would help boost the accuracy of identifying the molecules in a solution substantially. In addition to pharmaceutical science, the optically active super-crystals could be used in a range of technical applications to polarize light.

7. Moscow Team sharpen Vision Of Photodetectors

Scientists at Moscow Institute of Physics and Technology partnered with colleagues from Saudi Arabia and China have joined efforts to solve the problem of photodetectors being sensitive to light within a certain narrow bandwidth. The researchers

have discovered the ability of ultraviolet to change a simple photodetector, widely used in smartphones, printers and an array of other devices, into a broadband one. The results of the research have been summirized in "Advanced Functional Materials" journal.

As a rule, photodetectors react to narrow wavelengths, which creates lots of problems for developers. According to Vadim Agafonov, Head of MIPT's Molecular Electronics Center, photodetectors that are able to "feel" broadband emission are in strong demand but are also very difficult to put together as materials for them are hard to come by; substances that are transparent for UV are usually nontransparent in the infrared spectrum span, and vice versa.
The researchers have found a rapid, economical and efficient way of broadening the photodetector's sensitivity range. They looked into polymer photodetectors that work using their internal photo-effect, with the light rearranging electrons in the polymer, making it electrically conductive. Such photodetectors are different from conventional semiconductor ones as they are cheap and easy to produce, and can be made bendable. Experiments showed that UV emission can alter the device's sensitivity upon impacting the surface of some of the photodetector's components.

8. Open Innovation Forum 2016

On 26-28 Oct, 2016 the 5th annual Open Innovations Forum, the most prominent event in the field of developing Russian innovative sphere took place at Skolkovo technopark. For three days more than 12,000 guests from more than 100 countries Skolkovo technopark shared experience and knowledge in spheres of technological entrepreneurship and innovative development. Open Innovations 2016 hosted more than 90 various events - panel discussions, presentations, lectures, workshops, pitches.

Within the framework of the forum the round table discussion on "Request for innovation: global research projects" was held. The discussion focused on unification of the BRICS and EU member counties' scientific and technological policies, the instruments of detecting the demand, searching for the partners and getting the governmental support for conducting the joint research aimed at further capitalization of the research results on the international level. The round table was chaired by Mr A Lopatin, Deputy Minister of Science and Education of the Russian Federation (RMES), and moderated by Sergey Salikhov, Director of the Department of Science and Technology RMES. Apart from important Russian business representatives such as Roche Moscow and ABB Russia. notable speakers included Mr V Ušackas, Head of the Delegation of the European Union in Russia, Dr Abhishek Vaish, Counsellor on Science and Technology of the Indian Embassy in Moscow, Neville Arendse, Director General for Bilateral Cooperation of the Ministry of Science and Technology South African Republic, and Michael Dobis, Head of the Department of Science, Embassy of Germany in Russia.

9. Laser Correlation Spectroscopy sharpened for Medical Research Use

Scientists from the Peter the Great Saint Petersburg Polytechnic University (SPbPU) have developed a new technique for analyzing signals of laser correlation spectroscopy (LCS) used for determining the sizes of nano-and micro-particles in solutions. The innovation can be applied in the analysis of liquid samples in medical research, in ecology monitoring, and in control of technical liquids. Therefore, the scope of the newly introduced method by far exceeds those of existing tools. In their method, the precision in measuring of particles with various sizes surpassed the capabilities of current mass-produced devices by 20-60%

depending on the number of components in the researched solution.

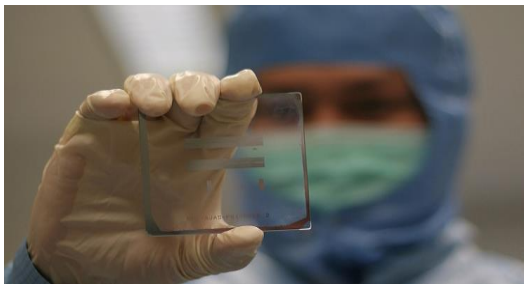
Making use of optical observations, LCS allows for defining diffusion factors of particles in solutions and hence for measuring their size. Before, the possible applications of LCS were limited, as the small particles, analyzed in a solution, had to be of uniform size. With this ground-breaking approach, Russian researchers have succeeded to overcome this obstacle.

In this study, various methods of treating LCS signals were compared. As a result, the algorithm based on the development of Soviet mathematician and physicist Andrey Tikhonov (the Tikhonov regularization) was selected. The usage of this algorithm facilitated the implementation of a faster method for solving a system of nonlinear equations, which in turn led to accelerating the cycle of retrieving particles sizes from experimental data by several times. Additionally, the precision of defining particles sizes in multi-component solutions was substantially increased by introducing an additional computational parameter to test the researched solution for the number of components.

The new method of analysis can be applied for conducting complex medical studies, for instance in researching the impact of various factors (pharmaceuticals, allergens etc) on the proteins of blood plasma and choosing optimal pharmaceutical and medical treatment. Moreover, the development could be useful in the ecological monitoring of water resources and in control of the composition of technical liquids.

The authors of this innovation have already received a registration certificate, which is a special type of a patent, but issued for programs. Now, the project team is preparing to implement the technology. The results of the study have been presented at several international conferences and symposia with the last one being The Fourth International Symposium Optics and Biophotonics.

10. Scientists develop "smart foil" for mounting industrial transducers



Piezoelectric crystals are needed in the aircraft and oil industry.

Researchers from Peter the Great Saint Petersburg Polytechnic University (SPbPU) have come up with a new technological breakthrough for mounting piezoelectric crystals (material able to accumulate electricity in response to applied mechanical stress) onto conducting substrates, the media center of SPbPU announced. The technology has been dubbed "Smart Foil".

Piezoelectric crystals are needed for transducers at radiolocation stations, particularly in the aircraft and oil industry. However, when working with these crystals, one has always faced a problem of attaching piezoelectrics to the conducting surfaces. Usual conducting adhesives do not demonstrate required conductivity, and their adhesion is not durable enough. Basically, the application of classical soldering is impossible, as crystals are extremely fragile and thermally-sensitive.

Scientists have offered up a new method for mounting such transducers: the cold soldering by reaction self-heating nano brazing. In this technique, the transducer is covered by several thousand nano-sized layers which form a "smart foil". The layer comprised of foil can interact with each other over the course of the self-propagating high-

temperature synthesis. During this reaction, the foil is heated up to 1,700 °C and melts attaching the transducer to the surface.

The temperature is high enough to fasten the transducer, but it fails to penetrate deep into the attached material and damages the transducer. The new method allows for mounting transmitting blocks with soldering durability, with conventional soldering this is not possible for such elements.
According to SPbPU's media center, the development was set as a trade secret, but it already has found applications in several industrial enterprises as OAO "Microwave systems", OAO "Fomos-Materials" and others.

In future, the technology of creating such self-soldering crystals will be developed further for attaching complex microelectromechanical systems on the grounds, as well as in the maintaining super-high frequency modules.

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

1. Tomsk National Research Medical Center of the RAS

Director: Dr Shamil Akhmedov
Location: Tomsk, Russia
Contacts: Tel: (3822)51-10-39; Fax: (3822)51-40-97; Email: center@tnimc.ru; shamil@cardio-tomsk.ru; Website: http://www.tnimc.ru/en/

The Tomsk National Research Medical Center of the RAS acts as the integration of scientific organizations of high medical profile and is the first of this kind in Russia. It brings together the scientific potential of various institutions, provides for transfer of scientific developments of the Institute's laboratories in practice clinics and enables joint use of high-tech research equipment.

The mission of the Center is to create a knowledge economy; to carry health and life of people, using high technologies based on the achievements of advanced scientific thought and world experience in the field of basic and applied life sciences.

The Centre comprises of

- Research Institute of Oncology;
- Research Institute of Cardiology;
- Mental Health Research Institute;
- Institute of Pharmacology and Regenerative Medicine;
- Institute of Medical Genetics;
- Research Institute of Obstetrics and Gynecology;
- Tyumen Cardiology Research Center.

The Center works in the following directions:

a) Research in the area of the most socially important human diseases (oncology, child and adult cardiology, psychiatry, addictology, obstetrics, gynecology and perinatology, genetics and pharmacology);
b) Development and testing of innovative technologies of personalized diagnostics, treatment and prevention most socially important human diseases and comorbid conditions;
c) Transfer of developed R&D designs and technologies into industry and practical healthcare for improving demographical situation in the county;
d) Development and implementation of innovative genomic and post-genomic technologies of diagnosis, treatment and prevention of human diseases;.
e) Creation of new drugs and diagnostic products of natural and synthetic origin, including drug development on the basis of organic and biochemical synthesis, genomic and post-genomic technology and nanotechnology;
f) Stem cell research; development of methods of pharmacological and non-pharmacological prevention and therapy of degenerative diseases; the

development of tissue engineering methods;

g) Implementation of new methods for screening, diagnosis, treatment and prevention, and making adjustments to existing standards of medical care.

The Tomsk Center cooperates in solving complex S&T tasks with other research institutions, universities, international research centers, commercial organisations and healthcare institutions; expansion of cooperation within the consortium "BRICS-Biomed" to accelerate the integration of international research on the development of biotechnology in medical practice. The Center seeks to expand cooperation under the BRICS Biomed Consortium in order to expedite international scientific integration of biotechnologies into medicine.

The Center has a keen interest in working with Indian partners. Russian experts are currently elaborating with the Indian Side possibilities for joint development and production of next-gen coronary stents and portable ECG recorders with a view to introduce these into the Indian market. Nano-coating stents proposed by them have a long service life and can disintegrate the crystalline formations of the lipids in the artery. The second development – a portable ECG recorder – allows recording an electrocardiogram at home and transmitting the data immediately to the doctor. Such a device would help to diagnose cardiac arrhythmias as well as preinfarction and infarct states, thereby reducing the risk of sudden cardiac death.

The results of the Centre's activities are: generation of knowledge about human health and human diseases; translation of biomedical developments into practice; reducing the burden of socially significant diseases for the individual, family, society and humanity.

2. Siberian State Medical University (SSMU)

Rector: Prof Olga Kobyakova, MD
Address: 634055, Russia, Tomsk, Moskovsky trakt 2
Contacts: Tel +7 (3822)901101 ext. 1619; Email: international.ssmu@gmail.com ;
Website: http://www.international.ssmu.ru/ru/about/core_mission/

Siberian State Medical University, one of the oldest and highest rated medical schools in Russia. Its core mission is to advance patient care and public health in the Russian Federation through teaching, high quality research and clinical excellence.

University Research Centers, Labs and various scientific projects are aimed at advancing fundamental understanding of nature, clinical medicine and health awareness. The research efforts of the University span a wide field of topics from Immunobiology and Bioengineering to Molecular diagnostics. This provides breadth of expertise and excellence in a medical field.

Siberian State Medical University hosts 8 Research Centers in the following fields of medicine:

- Molecular Medicine;
- Innovative Technologies in Morphology;
- Pharmacy and Pharmacology (Pharmaceuticals);
- Biocompatible materials and Bioengineering;
- Laser technologies in medical diagnostics;
- Experimental and Clinical Immunology;
- Evidence-based medicine.

SSMU is the national coordinator of the Technological Platform "Medicine of the Future" that brings together technology

startups and research projects, industry experts and government. It is included in the list of approved and recommended sources for implementation by the Government of the Russian Federation.

The University expresses high interest in cooperation with India by using the existing mechanisms of cooperation. Siberian State Medical University has successfully implemented several international scientific and technological projects in cooperation with the University of Minnesota and the city of Vanderbilt (USA), University of Montreal (Canada), the National Heart and Lung Institute (UK), Kinki University (Japan) and others.

3. I.P. Bardin Central Research Institute for Ferrous Metallurgy

Acting General Director: Mr Vladimir Uglov
Address: Russia, Moscow, Radio street 23/9 build. 2
Contacts: Tel: 7-495-777-9301; Fax: 7-495-777-9300 ; Email: mikhailgalkin@yandex.ru;
chermet@chermet.net
Website: http://www.chermet.net/

Founded in 1944, I.P. Bardin Central Research Institute for Ferrous Metallurgy is Russia's leading research center for invention and development of metallurgical technologies and new materials. It is recognized in Russia and abroad for its scientific research and development of metallics and metallurgical technologies. I.P. Bardin Research Institute team consists of highly qualified scientists and specialists, including 167 specialists with ScD and PhD degrees.

For many years I.P. Bardin Institute has been cooperating with Russia and CIS biggest metallurgical plants, steel consuming enterprises and research institutes. Over more than 60 years of its activity the Institute has developed technologies which had a huge impact on the metal industry and are widely used nowadays: oxygen and synthetic slag use in steelmaking, continuous casting method, secondary steel refining process, fundamentals of electric smelting, etc.

The I.P. Bardin Central Research Institute activities and range of services include:

1) Basic and applied research and technological works for development of metallurgical technologies and new metallics, such as: cokeless metallurgy; steelmaking technologies, including smelting with secondary treatment and continuous casting; ferroalloys and special alloys production technologies and production units; rolled metal production (with and without coating); development of new metallics with predetermined properties, including noncrystalline and nanocrystalline materials; production of powder metallic precision materials and products thereof, as well as equipment for such production; physical metallurgy; physicochemistry of metallurgical processes, development of phase transition theory, strength and ductility of metallics; physics of magnetic phenomena; efficient use of resources in metallurgical production; metallurgical production ecology, recycling of industrial waste and off grade raw materials, etc.

2) Standardization and certification of raw materials, metal products, several consumer goods and quality assurance systems.
3) Scientific, technical, technological and economic audit and consulting on metallurgical industrial facilities, technologies, equipment and manufactured products.
4) Scientific, technical, technological, economic and environmental evaluation of projects for new metallurgical facilities.
5) Economic aspects of ferrous metallurgy.

In the past, the Institute worked very closely with the Research Center of Iron-and-Steel Metallurgy in India located in Ranchi. They had long-term joint research programs at the metallurgical plants in India,

congresses for metallurgists were organized, and training of specialists-metallurgists in the field of electrometallurgy, steel casting, hot and cold deformation of steels and alloys was conducted, and so on. At present the Institute is reestablishing old contacts and elaborating new partnerships with Indian institutions.

4. Prokhorov General Physics Institute of the RAS

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 street 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. IOFAN was founded on the basis of the famous "A" Division (Oscillation and Plasma Physics Labs) of the PN Lebedev Physics Institute. Prominent scientists heading this division in different years developed its traditions and made outstanding scientific discoveries. An excellent research achievement of this Division is the development of the first laser operating on a beam of ammonia molecules by AM Prokhorov and NG Basov (Nobel Prize together with C Townes from the USA in 1964). This discovery marked the beginning of the global development of quantum electronics and laser physics throughout the world.

The Institute consists of 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 the 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.

Key research areas of the Institute:

- Actual 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.

IV. Forthcoming Workshops and Conferences in Russia

VII International Scientific Conference "Modern Methods, Problems and Applications of Operator Theory and Harmonic Analysis"

Dates : 23-28 Apr, 2016
Place : Rostov-on-Don, Russian Federation
Coordinator : Dr AN Karapetyants, Chairman
Contacts : Email: otha.conference@gmail.com; Website: http://otha.sfedu.ru/conf2017/

The theme of the conference is related to the different areas of mathematics, especially harmonic analysis, functional analysis, operator theory, function theory, differential equations and fractional analysis, developed intensively last decade. The relevance of this topic is related to the study of complex multi parameter objects that require, in particular, to attract operators with variable parameters and functional spaces with fractional and even variable exponents.

2. International Conference on Mechanical, System and Control Engineering (ICMSC 2017)

Dates : 19-21 May, 2017
Place : St Petersburg, Russian Federation
Coordinator : Mr Max Mayer, Conference Secretary
Contacts : Tel: +86 1376 333332 3; Email: info2icmsc@yeah.net; Website: http://www.icmsc.org/

The objectives of the conference are to provide high quality research and professional interactions for the advancement of science, technology, and fellowship. This conference provides opportunities for the delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration. The event will include the participation of renowned keynote speakers, oral presentations, posters sessions and technical conferences related to the topics dealt with in the Scientific Program.