

# Bio and Medical R&D Cooperation with Russia

## through the International Science and Technology Center (ISTC)



**ISTC as a mechanism to stimulate cooperation with Russia  
on innovation**

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**Deputy Executive Director, ISTC**

**12<sup>th</sup>, November 2010**



[www.istc.ru](http://www.istc.ru)

# ISTC - Background



- Founded in 1992 by the governments of the **EU, Japan, USA and Russia**; operations began in 1994; Later, **Norway, S. Korea** and in **2004, Canada joined as Funding Parties**
- Comprised of 39 nations, with the status of a diplomatic mission facilitating international R&D projects and commercialisation
- ISTC is one of the largest sponsors of R&D in Russia supporting former defence scientists and the broader scientific community
- ISTC is headquartered in Moscow and has offices in Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan and Tajikistan



# ISTC Main Objectives



- Help to **solve** international science & technology problems
- Promote **sustainability** and reinforce the **transition to the market economy** in Russia, Georgia and other members of the CIS
- **Integrate** Russian and CIS scientists into the global scientific community



# ISTC Project Location



[www.istc.ru](http://www.istc.ru)

# R&D Network



- **Network** of over 900 R&D Institutes and research centers in Russia, Georgia and CIS
- More than 70,000 **expert scientists**
- Over 2,750 completed or on-going **projects** to the value of USD \$850 Million
- 6,000 **project proposals**



# Service Oriented



A wide range of services focused on  
Business and Research Development:

- **Technology Matchmaking**
- **R&D Project Management**
- **Commercialization Support Program**
- Sustainability Support Program
- Competency Building
- Event and Workshop Management
- Travel and Logistical Support



# R&D Projects via ISTC



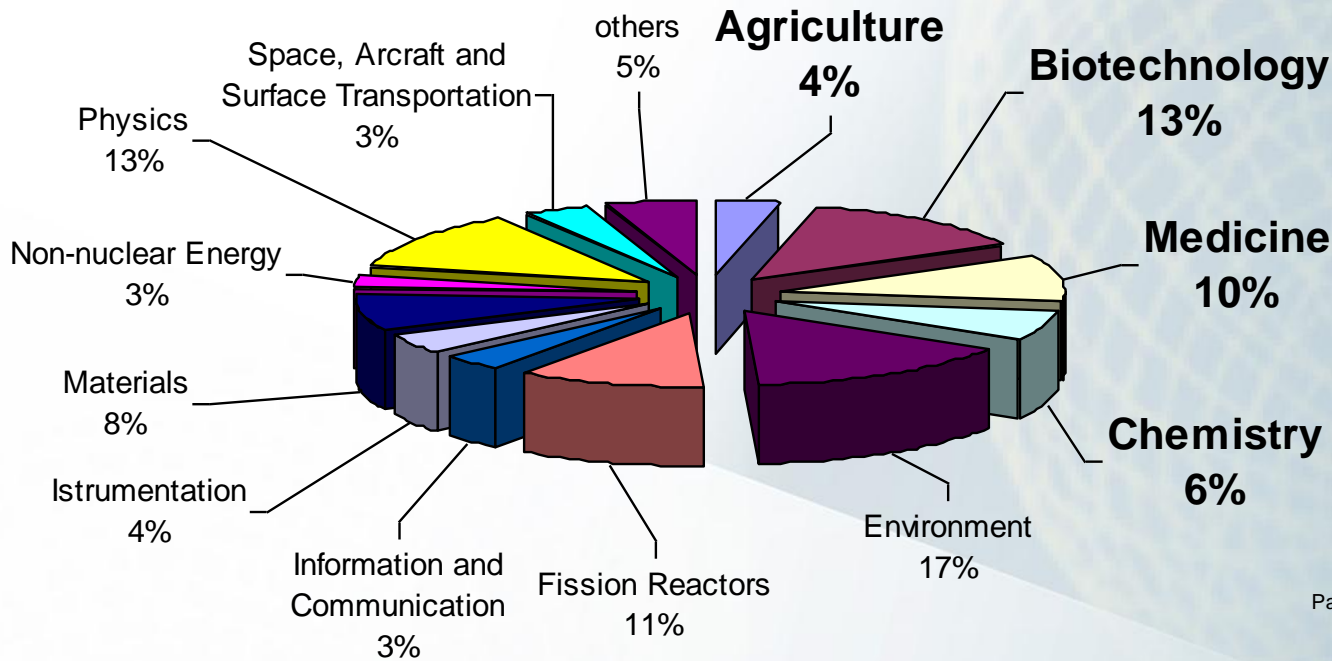
- **Regular Projects**
  - Financed by Governments
  - Technical advice from **Collaborators**
  - IP Retained by Institute / Scientists
- **Partner Projects**
  - Financed in full by ISTC **Partners**
  - IP Negotiated between Partner & Scientists



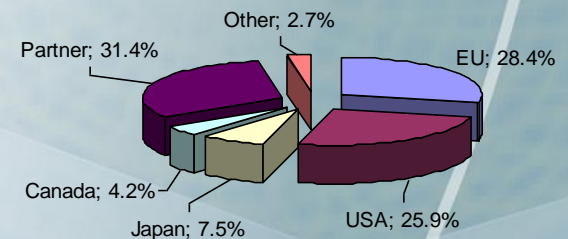
# Technological Areas of Projects



USD \$854 million (2749 projects)



Funding Party Shares





# ISTC Partners in 2010

## 430 +



[www.istc.ru](http://www.istc.ru)

# Japanese Partners of ISTC



**ISTC has 74 Japanese Partners:**

- 63 Private Companies
- 11 Universities / Research Organisations

**USD \$ 7.3 million via 66 R&D Projects**

**Also Japanese Universities & Companies  
act as ISTC Collaborators  
on Japan Funded Projects**



# Japanese Workshop Series and Japan Promotion



## (Japan Workshops)

- Phage Therapy
- Probiotics research
- Infectious Diseases in Russia
- Environmental / Bio / nano technologies
- Radiation Health Effects
- Cytogenetic Biodosimetry
- Brain Science and Technology

## (Japan Promotion)

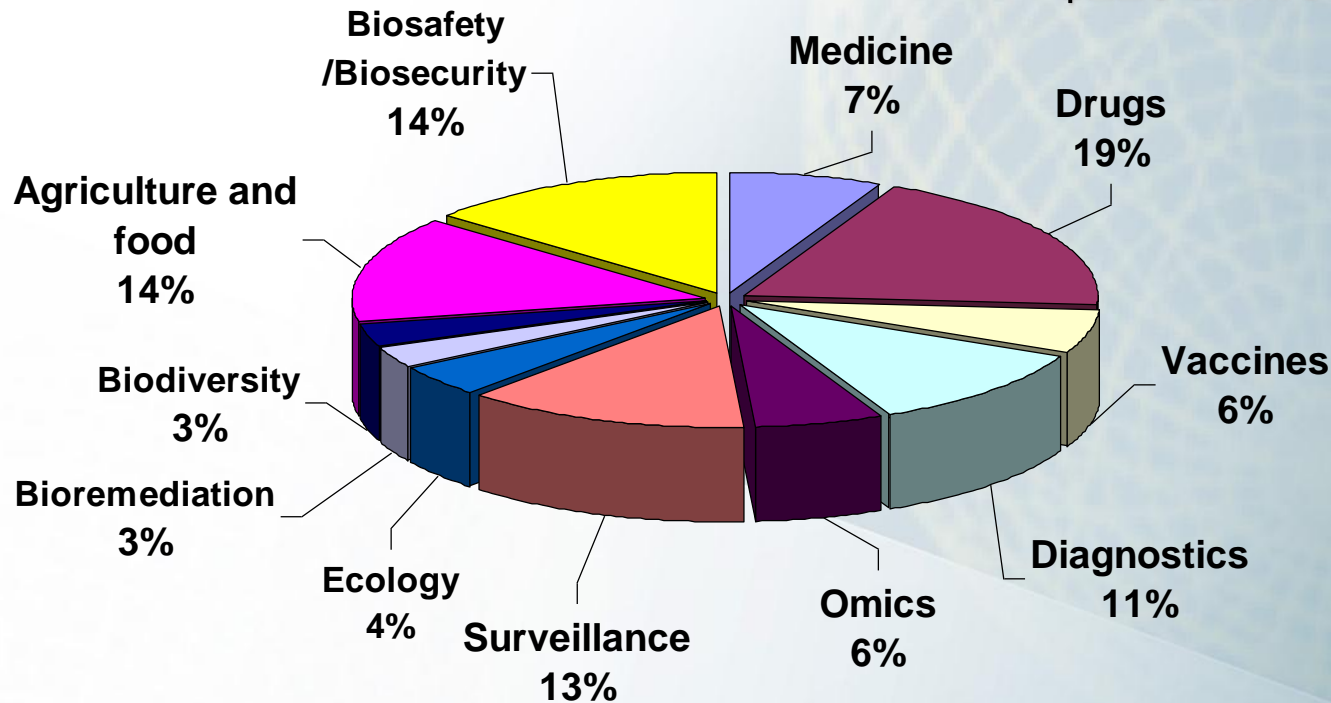
- JETRO BIOLINK FORUM
- Bio Forum & Bio Expo Japan
- “Renewable Energy” International Exhibition and Conference in Japan
- BIOJAPAN and CEATEC



# Technical directions of the Bio-Medical ISTC projects



**\$220 Million, 600 projects**



# ISTC Targeted Initiatives



- **Drug Design & Development (3D-TI)**
  - **Probiotics & Health**
  - **Counter Bio-Terrorism**
  - Fuel Cells
  - Law Enforcement Technology
  - Laser Technologies
  - Nuclear Forensics
- - Develop a portfolio of ISTC projects and support activities toward organized fundings
- Long-term cooperative R&D among Research Institutes and other relevant national/international organizations



# Drug Design & Development Targeted Initiative (3D-TI)



- Support Innovative Medicine R&D
- Enhance Preclinical Development and Production Capacities
- Identify Drug Design and Development Projects w/Commercial Potential



# Science and Technology in the Prevention of Biological Threats Targeted Initiative (STPBT-TI)



- Prevention of Biological Threats:  
Microorganism Tracking, Counter-Action,  
Containment
- New Techniques and Technologies for  
Detection of biological threats  
Diagnosis in the case of incidents  
Special attentions to Safety of Food Supplies



# Probiotics & Health

## Targeted initiatives (TI-PROBIO)



- Russian Nobel Laureate E. Metchnikoff initiated the Concept of “Probitics”
- Preservation and improvement of human health through the use of Probiotics
  - Development of efficient treatment and prophylactic microbial preparations
  - Development of food stuff for functional nutrition
- Coordination among research institutes, government organizations, and business





# Large Scale Data Analyses



- New Methods of Computational Annotation of Bacterial Genomes: Development and Application
- Comparative Genomics and Metagenomics: Models, Algorithms and Large Scale Analysis;
  - Institute of Strategic Stability, Moscow, Russia (ASJ) Russian Academy of Sciences / Institute of Problems of Information Transmission, Moscow, Russia
  - Forschungszentrum für Umwelt und Gesundheit GmbH / Institute for Bioinformatics, Neuherberg, Germany
  - INRA-UEPSD, France



# New Quality of Disease Surveillance



**RF Pandemic Flu Preparedness with participation of WHO & CDC**

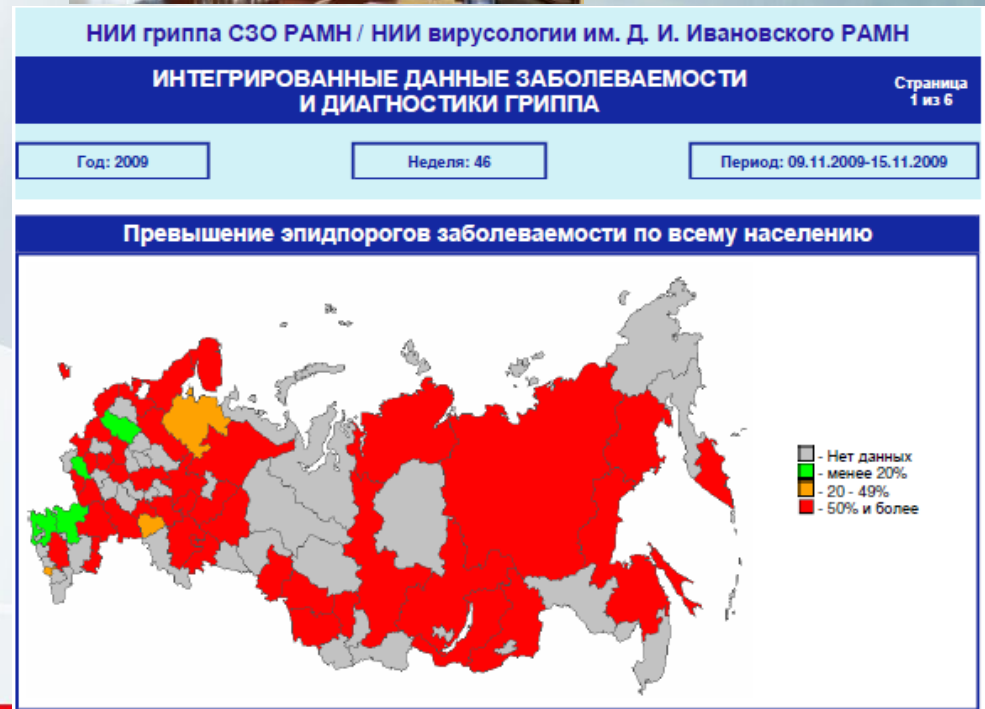
**Research Institute of Influenza, St Petersburg  
Ivanovsky Institute of Virology, Moscow**

**+50 regional RF laboratories**

**Main tasks:**

- **improving reporting to RF MOH, WHO**
- **Comprehensive and standard methods of flu diagnostics**
- **Training of lab staff**

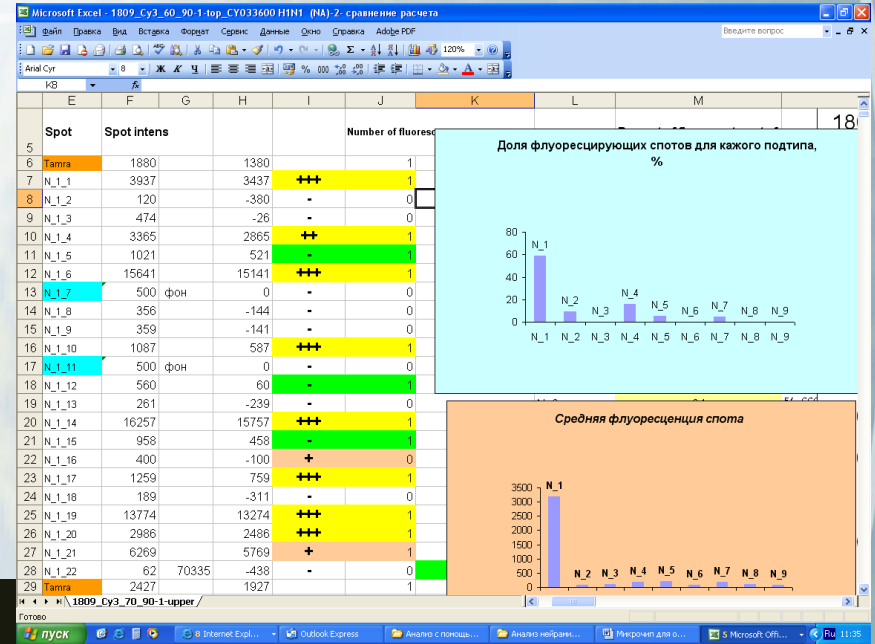
**Result – front line of pandemic flu detection in RF May- August, 2009**  
**Training Centre for other regional labs including Rospotrebnadzor**



# New Diagnostics Tools



**BIOCHIPS: 9 projects for \$3 million**  
 Application: MDR/XDR-TB orthopox virus, herpes virus, HCV/B, HIV, STD, biosecurity, individual genetic identification, blood safety, seasonal & pandemic flu



**New company created to produce microchips for RF MOH (OOO Biochip-IMB, [www.biochip.ru](http://www.biochip.ru))**

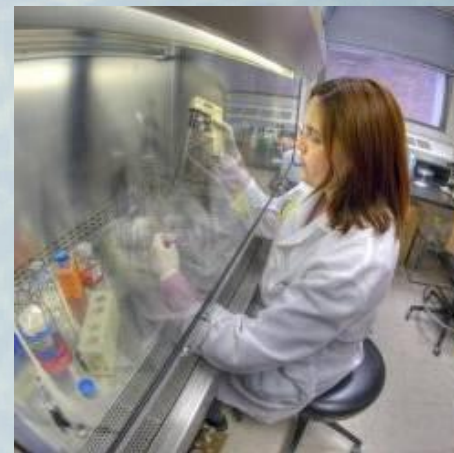


# Drug Discovery



## *in silico* modelling:

- Search of structures
- Prediction of biological properties and toxicity
- Screening (HTPS)
- New targets & docking
- Delivery systems



## Support of Consortiums & Clusters:

**ORCHEMED Consortium** - Established in 2004 to advance drug development efforts of its members for licensing to pharmaceutical companies

**TB Consortium** – Established in 2007 to advance TB research in RF  
Creating of the RF “National System of Biological Screening (NSBS)”  
**CIS Collaborative Drug Discovery Hub**

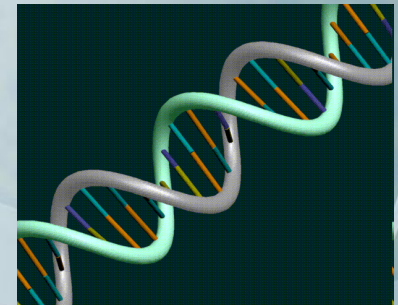
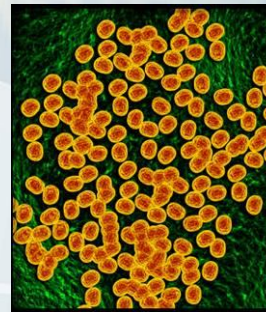
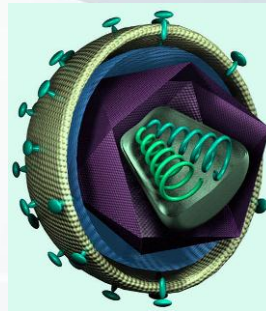


# Vaccine Development



## Main directions :

- **Socially important infections (16)** – HIV (5), TB (2), hepatitis (2), influenza (2), measles, hantaviruses, pertussis, rubella (5);
- **Extremely dangerous infections (15)** – glanders, TBE, tularemia, legionellosis, rabies
- **Animal diseases (9)**– Marek’s disease, PRRS, classical swine fever, postweaning diarrhea and salmonellosis, avian laringotracheitis, sheep pox, FMD, brucellosis,
- **Cancer (2)**
- **Delivery systems (1)**
- **Adjuvants (1)**



# Probiotics



- **Study of Biodiversity of Lactic acid bacteria**

Danone Research

w/ Moscow State University

the Institute of Immunology Engineering in  
Lyubuchany

- **Yamamura Georgia Yogurt**

Yamamura milk Co.

w/ Prof. Dalakishvili

Georgian Academy of Sciences /

A. Natishvili Institute of

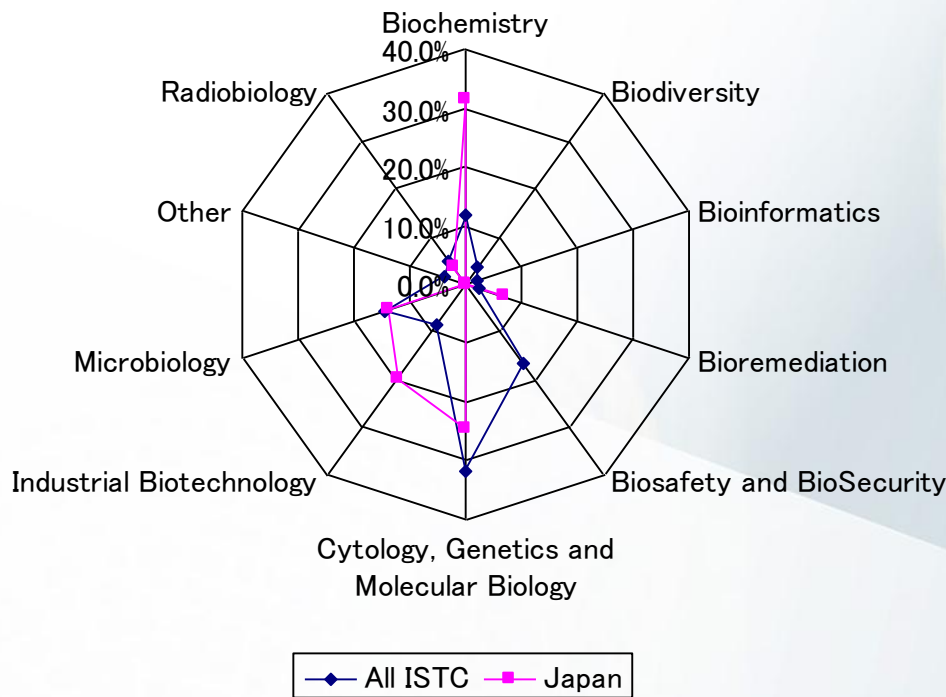
Experimental Morphology



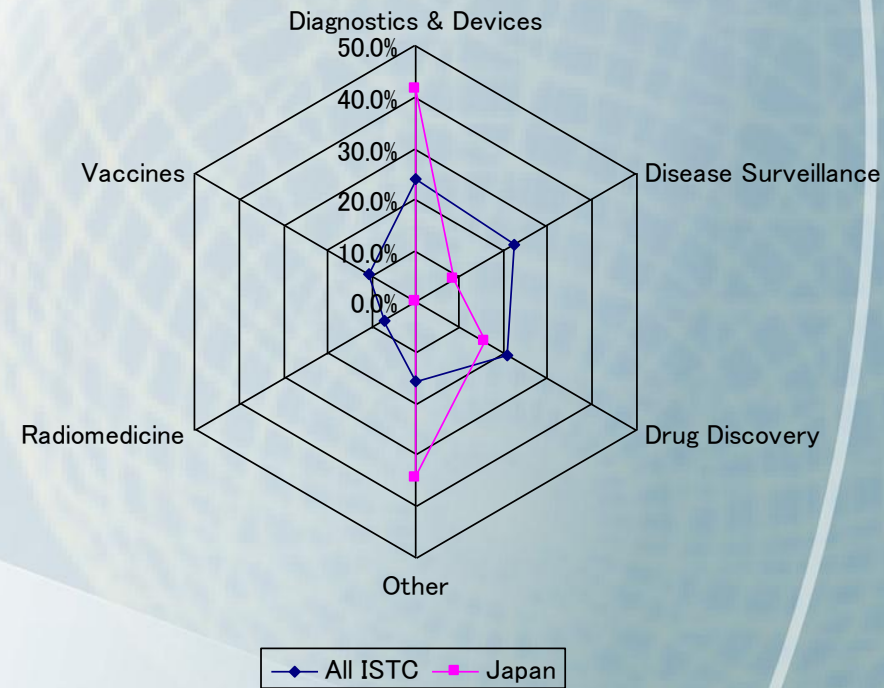
# Allocation of Research Funds in Bio-Med fields



## Biotechnology



## Medicine



# Opportunities are here !

## from recent Promising Technologies



- Studies and Evaluation of Entomopathogenic Fungi as Bio Pesticides Producers
- Determination of epidemiological factors and control of fungal disease complex on cereal crops in Russia using biotechnology and information technology
- New diagnostic test-system for anti-cancer therapy
- New approaches to bacillary spores disinfection with the help of integrated influence with minimal-optimal radiation doses
- Diagnostics of Colorectal Cancer
- Incapsulation of Pre- and Probiotics
- Biodegradable Fe-stents
- Probiotics of Georgia and “Caucasian Longevity” Phenomenon
- Bionanomaterials
- Substances for Plant-Based Medicine
- Hepatocellular carcinoma in the Republic of Tajikistan





# Opportunities are here !

## from recently Completed Projects (1)



- Development of Electrochemical Biosensors Using Nano Structured Materials Involving Carbon-Containing Compounds
- Multi-functional Bioactive Nano-structured Coatings for Load-Bearing Implants
- New Approaches to Bacillary Spores Desinfection with the Help of Integrated Influence with Minimal-Optimal Radiation Doses
- Development of Test Kits to Diagnostically Significant Antigens of Yersinia Pestis with the Use of Combinatorial Phage Libraries of Miniantibodies
- Microflora of Inflammatory Process in Chronic Prostatitis and Urogenital Tracts in Men and Phage Therapy Prospects
- Development and Production of Reagents for Diagnosis of Dangerous Bacterial Zoonotic Infections
- Production and Usage of Polyvalent, Polycomponent Clinical - Prophylactic
- Bacteriophage Preparation for Treatment of Diseases Caused by E. coli, Salmonella and Shigella
- The Surveillance of New Antibiotics from Kazakhstan Soils Actinomycetes, Active Against Methicillin-Resistant Staphylococci with Multiple Drug-Resistances



# Opportunities are here !

## from recently Completed Projects (2)



- **Development of New Effective Pharmaceuticals for Combined Chemotherapy of Infections**
- **Methylation as Epigenetic Factor in Progression of Cervical Tumors Associated with Human Papilloma Virus Infection**
- **Electronic Structure and Conformational Dynamics of Biologically Active Organic Compounds and Proteins Related to Developing New Diagnostic Express Methods for Biomedical Applications**
- **New strategy of anti-tuberculosis BCG vaccination: oral administration in conjunction with heterologous protective antigens prime-boost delivery strategy**
- **Development and Research of New Biomaterials on the Basis of Polymers and Metal-Polymer Nanocompositions**
- **Implementation of an Irradiation Base for Clinical Studies on Neutron Capture Therapy at the IRT MEPHI Nuclear Reactor with use of an Epithermal and Thermal Neutron Beam Contrast Agent Dynamics in Ultrasound Biomedical Applications**



# Opportunities are here !

from recently Completed Projects (3)



- Smart Biosensor Systems for Analysis of Blood Esterases, Assessment of Esterase Status of Organisms, and Biomonitoring
- New approaches to designing anti-HIV compounds targeting late steps of HIV-1 replication
- Recombinant Human Interferon-Beta
- Double-Stranded RNAs
- Viral Gastroenteritis in Russia
- Early Nonphototoxic Luminescence Diagnostic of Cancer
- HIV-1 integrase inhibitors
- Bionanotechnology for Bacteria Detection
- Porous Dental Implants
- Monolithic Sorbents for Biochromatography
- Thromboresistant Polymers for Implantants
- National Tuberculosis Reform Program, Republic of Armenia
- Foot and Mouth Disease Control Program in Kyrgyz Republic
- Pectin Production



# Thank you for your attention!

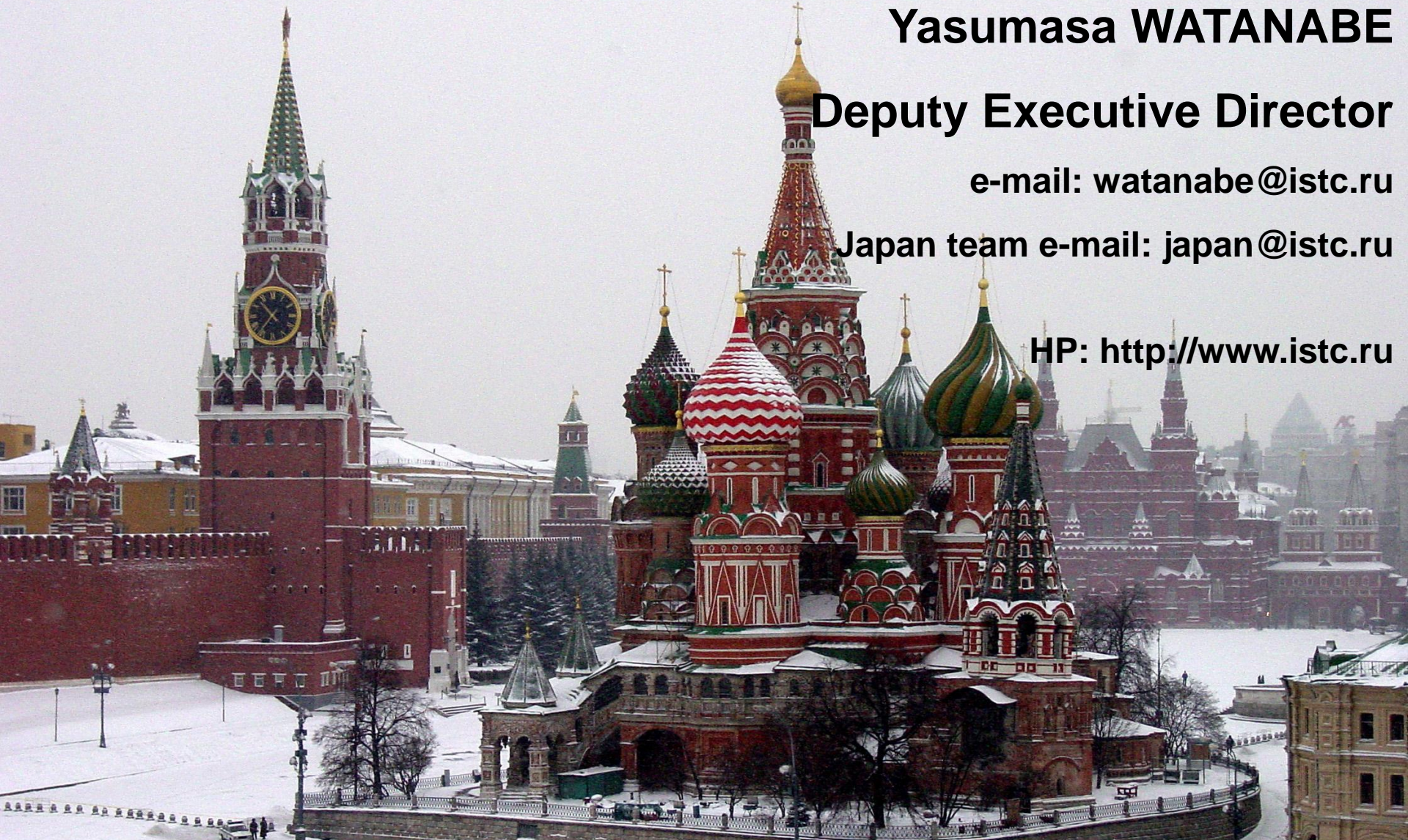
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**The International Science and Technology Center**