ISTC ANNUAL REPORT 2018

To advance global peace and prosperity through cooperative chemical, biological, radiological and nuclear (CBRN) risk mitigation by supporting civilian science and technology partnerships that address global security threats and advance non-proliferation

CONTENT

ABOUT US	1
STATEMENT OF THE CHAIRMAN OF THE ISTC GOVERNING BOARD	2
STATEMENT OF THE EXECUTIVE DIRECTOR	3
OVERVIEW OF ISTC ACTIVITIES	4
TARGETED INITIATIVES	6
PARTY AND PARTNER PROJECTS	9
LIST OF COMPLETED PROJECTS	26
ISTC ORGANIZATIONAL STRUCTURE	27

ABOUT US
2018 ISTC ANNUAL REPORT

HISTORY

- The International Science and Technology Center (ISTC) was founded as an intergovernmental organization in 1992 by the European Union, Japan and the United States of America. Current members include Norway, the Republic of Korea, Armenia, Georgia, Kazakhstan, Kyrgyzstan and Tajikistan.
- ISTC is one of the largest sponsors of nonproliferation research and development (R&D) and science and technology (S&T) projects in the Former Soviet Union (FSU), engaging former defense scientists, engineers and specialists in peaceful and market-sustainable technologies.
- ISTC is headquartered in Nur-Sultan, Kazakhstan. There are branch offices in Armenia, Georgia, Kyrgyzstan and Tajikistan.

FUTURE

- The ISTC Continuation Agreement provides a broader mandate that enables ISTC's flexibility, capability and activities to make a global impact.
- The Center is developing new programs and activities to expand its reach beyond the FSU in response to member countries' needs and priorities.
- The ISTC is in promising discussions with potential new member states to further extend its efforts.
- The ISTC is establishing new partnerships with regional and international organizations in an effort to fund its projects and programs

STRENGTHS

- More than 24 years of experience funding and managing multinational R&D projects and activities.
- A network of hundreds of institutes and thousands of scientists with expertise in many fields including: biotechnology, material sciences, energy production and nuclear physics.
- Transparent procedures to manage almost 1.2 billion dollars for funded projects and activities.
- Full-service project planning and execution with on-site monitoring and audits.
- Turn-key services, including procurement and grant mechanisms, logistics, training instructors and materials as well as audit procedures

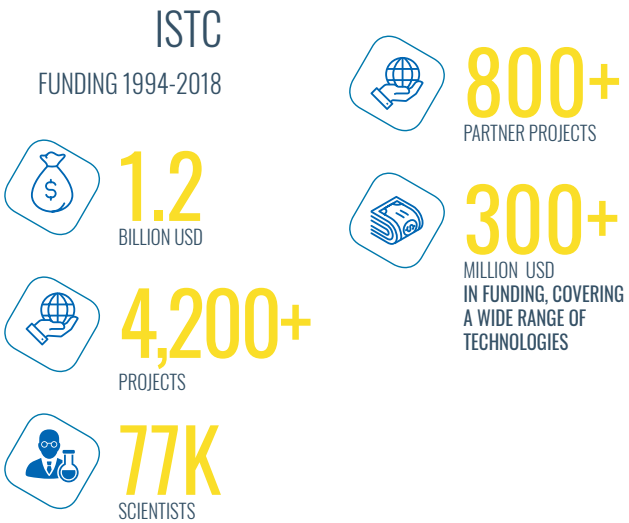
MISSION

- To advance global peace and prosperity through cooperative chemical, biological, radiological and nuclear (CBRN) risk mitigation programs and activities, by supporting civilian science and technology partnerships that address global security threats and advance nonproliferation.
- To prevent the proliferation of weapons of mass destruction (WMD) and their delivery systems.
- To counter new hybrid threats through safety, security and safeguards as well as risk analysis, risk mitigation and capacity-building through training.
- To encourage the development of international scientific partnerships that strengthen global security and foster innovation.
- To support R&D and manage projects that address global problems and apply such research to market-based economies.

TOTAL PROJECT FUNDING 1994-2018

Party	Amount Total (USD)
EU	247,908,138
Japan	66,461,903
USA	229,905,216
Canada	35,302,224
Finland	1,185,960
Sweden	3,831,906
Norway	1,881,450
Korea	5,161,952
Partner *	295,931,777
Other	12,566,221
Total	**$ 900,136,747**

** amount include Partner Programs*



STATEMENT OF THE CHAIRMAN OF THE ISTC GOVERNING BOARD

2018 ISTC ANNUAL REPORT

Transformation and expansion are the driving forces behind the International Science and Technology Center (ISTC) now that all parties have completed their ratification of the Continuing Agreement. In preparation, the parties established a new headquarters, streamlined operations and engaged a wider range of governments in every major region of the world. Citizens from nearly 60 countries now participate in ISTC activities. The network continues to expand, including mutual support with the European Union's flagship program, the CBRN Centers of Excellence and other regional centers.

Many governments – through their ministries, departments and agencies as well as some private and nonprofit entities have found the ISTC to be a very cost-effective and timely vehicle for engaging in science and international security cooperation. With its special diplomatic and tax status, a history of reliable accountability and its professional program managers, parties increasingly turn to the ISTC and its sister organization – the Science and Technology Center in Ukraine (STCU) – when they need expedited implementation.

Successfully reforming business processes, however, is primarily to support the initiatives of the member states to enhance international security and nonproliferation through science engagement and cooperation. Technological change is advancing at a rapid pace. The parties to the ISTC believe that by working together closely, they can better ensure that the benefits from this progress are obtained and shared and that risks are reduced. Because science and technology often involve important health, environmental, safety and security issues, the ISTC is governed by consensus. The ISTC is not an NGO, nor even a regular international organization. The ISTC is an intensely intergovernmental organization with an intimate relationship with the governments of the parties. Parties commit to use the ISTC to further their interests in its core mission. This will continue even as the number of participants expands and more regions become involved.

Having invested well over $1 billion during its first two decades, the revitalized ISTC is now squarely focused on the challenges of the future. Whether in Europe, Asia, Africa or the Americas, opportunities to enhance health and well-being are being expanded by the spread of modern scientific research across national boundaries. At the same time, governments must engage with their scientists, engineers and physicians because disease, environmental degradation, energy shortages, extreme weather as well as political, social and economic instabilities cross borders. Research that clarifies the causes of these dangers and ways to reduce the associated risks becomes more valuable and affordable through cooperation. This synergy is multiplied by the ISTC through the implementation of best practices and the highest international standards in management, accounting, contracts and the protection of intellectual property. This has enabled parties to develop S&T targeted initiatives that reflect their own nation's highest priorities.

Because different parties and partners have different needs, ISTC activities remain diverse and multi-disciplinary. This also permits limited participation by non-parties as agreed by the parties. This has given the ISTC more flexibility to tailor its activities to different requirements and to experiment with new approaches and explore substantive new areas. Originally focused heavily on nuclear science, the ISTC now brings together scientists from party states in diverse fields.

On behalf of the members of the ISTC Governing Board, I wish to emphasis the importance of the steps taken by the parties to complete their legal ratification of the ISTC Continuing Agreement in accordance with their own constitutional requirements and the enactment of the ISTC Statute. Today, the activities of the ISTC rest on a solid legal foundation with the special diplomatic and tax status that provides enhanced effectiveness to the Science Center. From our headquarters in Kazakhstan and with the strong support we have received from the President and Government of the Republic of Kazakhstan, the ISTC is well positioned to engage more parties and to address more challenges. Of course, the contributions of the ISTC rest with the talents and hard work of the scientists, technologists, engineers, mathematicians, physicians and others who form the brain trust for our work. We look forward to welcoming new parties, partners, observers, and other participants to this important work.

Ronald F. Lehman II
Chair, Governing Board
International Science and Technology Center

STATEMENT OF THE EXECUTIVE DIRECTOR
2018 ISTC ANNUAL REPORT

2018 was a year of transformation and expansion following the entry-into-force of the new ISTC Continuing Agreement.

ISTC made great strides in the geographical and thematic diversification of its activities and continued to raise its profile as an intergovernmental organization in new regions. The ISTC accomplished this through S&T engagement and CBRN cooperation, promoting nonproliferation and CBRN security, while fostering economic growth through innovation. The ISTC Secretariat also built on the synergies between ISTC-implemented regional projects and other efforts funded directly by the parties including the activities of EU CBRN Centers of Excellence (CoE). By leveraging these important partnerships with the CoEs and organizations such as the Middle East Scientific Institute for Security (MESIS), the ISTC successfully implemented projects in Africa, the Middle East and Southeast Asia – well beyond the original FSU's reach.

ISTC's efforts to support its expanded mandate were also a major success story in 2018. Streamlined business processes led to a 25% reduction in annual operating costs and a robust 28% increase in project activities. Driven by a new focus on sustainability programs, project activities reached $9.1 million, a $2 million increase from 2017.

The Science Advisory Committee (SAC) has also evolved in recent years, with an increased role in advising the Governing Board and Secretariat on strategic scientific issues. The SAC has worked to increase the quality of project proposals through the development of a new scoring system and interactive proposal submission system to provide more constructive feedback. Additionally, the SAC played a key role in identifying regional scientific priority areas, including water management. As a result, the ISTC held multiple regional seminars and began projects on water contamination/ security and data exchange in Central Asia.

I had the pleasure of joining the Governing Board Chair, EU Governing Board Representative and other EU officials to visit a number of potential new member states. We are in continued dialogue with several interested countries and are planning additional outreach trips in the coming year. The ISTC Governing Board and Party Representatives have provided strong support, guidance and commitment to ISTC expansion. I am hopeful that the ISTC will add new members and partners from around the globe in the near future.

I wish to thank the Governing Board and Party Representatives for their longstanding support and guidance and the entire ISTC staff for their hard work and dedication over the years. This year will mark ISTC's 25th anniversary. We look forward to celebrating the organization's history of success as we continue to transform and expand in 2019.

David Cleave
Executive Director
International Science and Technology Center

OVERVIEW OF ISTC ACTIVITIES
2018 ISTC ANNUAL REPORT

PARTICIPANTS OF ISTC ACTIVITIES IN 2018

Asia

Kazakhstan, Tajikistan, Mongolia, Uzbekistan, Kyrgystan, Turkmenistan, Pakistan, Afghanistan

Africa

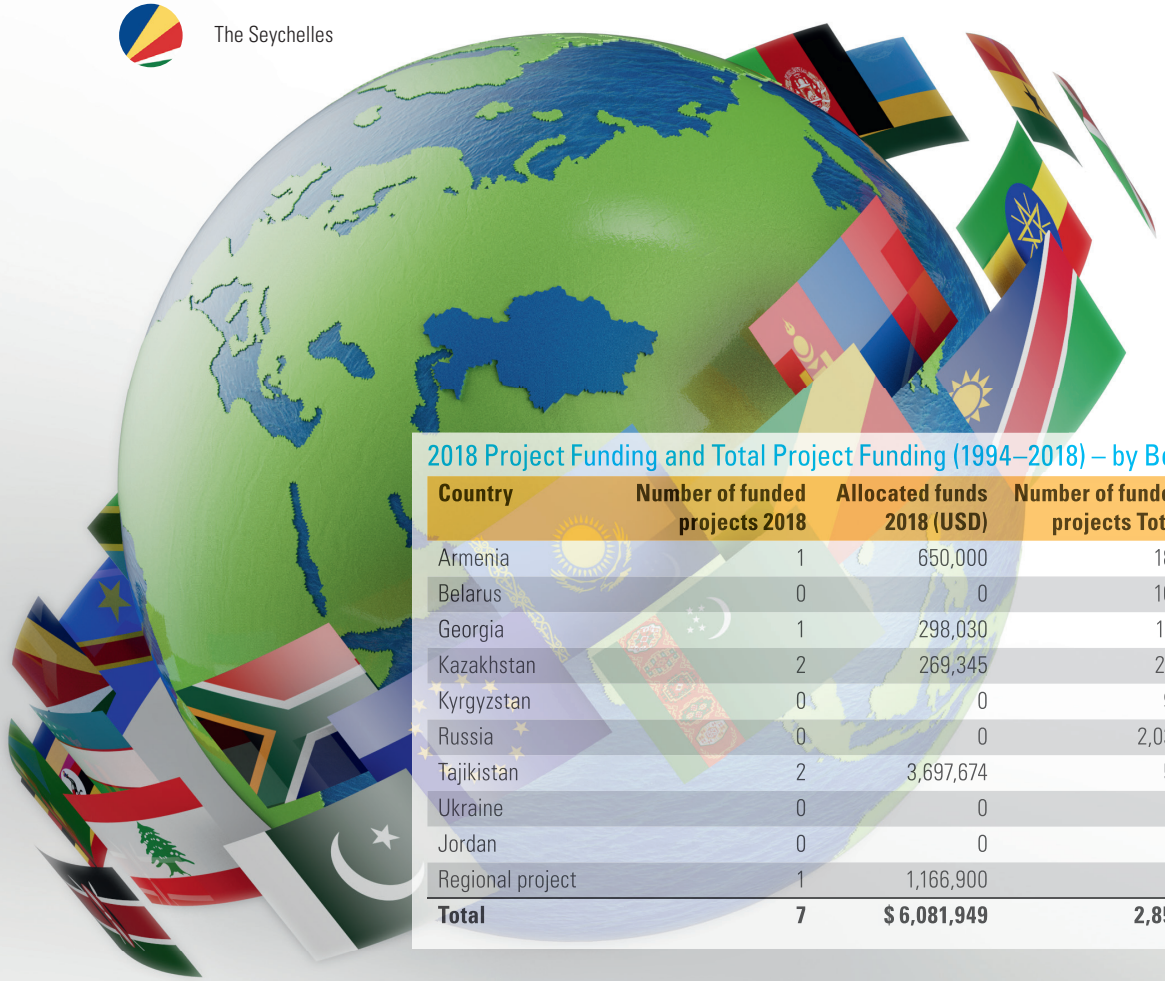
Ethiopia, Uganda, Zambia, Democratic Republic of the Congo, Ghana, Tanzania, Namibia, Burundi, Kenya, Malawi, RSA, Rwanda, The Seychelles

Middle East

Lebanon, Jordan, Iraq

Europe

Brussels, Georgia, Armenia



2018 Project Funding and Total Project Funding (1994–2018) – by Beneficiary Country

Country	Number of funded projects 2018	Allocated funds 2018 (USD)	Number of funded projects Total	Allocated Funds Total (USD)
Armenia	1	650,000	186	47,444,110
Belarus	0	0	100	27,481,454
Georgia	1	298,030	171	33,728,978
Kazakhstan	2	269,345	213	77,381,457
Kyrgyzstan	0	0	94	24,803,073
Russia	0	0	2,033	667,127,177
Tajikistan	2	3,697,674	53	18,788,331
Ukraine	0	0	1	64,296
Jordan	0	0	1	250,000
Regional project	1	1,166,900	3	3,067,873
Total	**7**	**$ 6,081,949**	**2,855**	**$ 900,136,747**

Grants paid by ISTC to Beneficiary Scientists in 2018 and Total Grants paid (1994–2018) – by Country

Country	Number of Paid Scientists in 2018	Amount of Grant Payments to Scientist in 2018 (USD)	Number of Scientists Registered Total	Amount of Grant Payments Total (USD)
Armenia	177	458,898	3,659	30,259,846
Belarus	0	0	1,868	15,923,194
Georgia	138	438,874	2,721	22,262,760
Kyrgyzstan	69	142,620	1,455	11,434,862
Kazakhstan	373	716,122	5,163	41,452,917
Russia	0	0	60,942	434,173,310
Tajikistan	172	407,527	810	8,601,888
Total	**929**	**$ 2,164,042**	**76,618**	**$ 564,108,778**

**Some scientists participated in multiple projects but were registered once for these statistics*

2018 Partner Project Funding and Total Partner Funding (1994–2018) – by Party

Party	Type of Partner Company	Number of projects 2018	Partner Funding 2018 (USD)	Number projects Total	Partner Funding Total (USD)
Canada	Total	0	0	5	622,456
	g	0	0	2	390,000
	n	0	0	3	232,456
European Union	Total	2	4,678,331	146	62,149,666
	g	2	4,678,331	85	50,508,206
	n	0	0	61	11,641,460
Japan	Total	0	0	65	8,469,857
	g	0	0	17	3,169,953
	n	0	0	48	5,299,904
Korea	Total	0	0	11	2,119,189
	g	0	0	7	1,780,000
	n	0	0	4	339,189
United States	Total	3	919,345	578	222,421,609
	g	2	720,000	543	215,466,236
	n	1	199,345	35	6,955,373
****Total:**	**Total**	**5**	**$ 5,597,676**	**805**	**$ 295,782,777**
	Governmental (g)	**4**	**$ 5,398,331**	**654**	**$ 271,314,395**
	Non-Governmental (n)	**1**	**$ 199,345**	**151**	**$ 24,168,382**

*** Please note that the real number of funded Partner Projects is 790 as there are several partner projects where 2 or 3 Partner Companies are involved*

2018 Project Funding and Total Project Funding (1994–2018) – by Technology Area

Tech area	Number of funded projects 2018	Allocated funds 2018 (USD)	Number of projects Total	Allocated funds Total (USD)
Agriculture	2	484,273	97	36,431,569
Biotechnology	2	1,366,245	349	134,782,702
Chemistry	0	0	210	56,069,154
Environment	1	3,511,431	450	142,240,064
Fission Reactors	1	650,000	276	99,245,836
Fusion	0	0	52	15,622,334
Information and Communications	0	0	107	28,536,916
Instrumentation	0	0	138	37,725,405
Manufacturing Technology	0	0	75	21,412,969
Materials	0	0	219	70,026,612
Medicine	1	70,000	245	87,056,490
Non-Nuclear Energy	0	0	64	22,470,981
Other	0	0	18	2,798,135
Other Basic Sciences	0	0	30	6,859,930
Physics	0	0	420	109,012,928
Space, Aircraft and Surface Transportation	0	0	105	29,844,723
Total	**7**	**$ 6,081,949**	**2,855**	**$ 900,136,747**

TARGETED INITIATIVES
2018 ISTC ANNUAL REPORT

BIOSAFETY AND BIOSECURITY

Project 53, "Strengthening the National Legal Framework and Provision of Specialized Training on Biosafety and Biosecurity in Central Asian Countries," aims to:

- Raise awareness and promote collaboration on biosafety, biosecurity, emergency response and incident management issues.
- Strengthen relevant biosafety and biosecurity national legal frameworks and harmonize them with the World Health Organization's International Health Regulation (WHO IHR), Biological Weapons Convention (BWC) and the Codex Alimentarius food safety laws.
- Strengthen the local and regional training infrastructure and tailor local biosafety and biosecurity training to international standards while stimulating regional cooperation.

Funded by the European Union, the project is implemented- in cooperation with the Partner Country National Teams of Experts (NTE) and the European Union Team of Experts (ToE). Partner Countries include Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan and Uzbekistan.

The three-year project was originally EUR 5 M but was increased by EUR 1.52 M and extended six months due to the successful results. In 2018, partner country specialists conducted over 20 workshops and by the end of the project, more than 40 workshops will have been completed, reaching more than 1,200 experts and specialists from Central Asia.

Strengthening Laboratory Biosafety in Armenia

The objective of this EU-funded effort is to enhance the functionality of laboratories by increasing management quality in order to strengthen Armenia's capability to conduct safe, secure, and sustainable EDP disease surveillance and reporting. This will help Armenia comply with the World Health Organization's International Health Regulations and the World Organization for Animal Health's disease-reporting guidelines.

In 2018, ISTC implemented seven workshops involving approximately 38 laboratories and 75 participants, providing a mix of theoretical and practical trainings to assess gaps related to sample laboratory flow, laboratory quality management, laboratory diagnostics, staff Competencies in laboratories, biosafety and biosecurity.

In addition, the ISTC facilitated site assessments and the development of standard operating procedures.

DUAL-USE EXPORT CONTROL

CBRN Export Control on Dual Use Materials and Technologies in Central Asia

The EU-funded project builds on the outcomes of previous partner-to-partner efforts with Kazakhstan and covers dual use export control topics ranging from legal frameworks and EU policy to challenges from S&T developments and ethical aspects of research. The project involves experts from the EC Joint Research Center, Belgium, Argentina, the United Kingdom, France and the United States as well as several academic institutions. Participating countries include Afghanistan, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Turkmenistan and Uzbekistan.

The project facilitates information and experience sharing among participating countries and between various communities of practitioners, such as government, industry, and academia. In 2018, ISTC held a seminar in Yerevan, Armenia, with 108 participants from 10 countries. The group discussed a module-based master course on a model Internal Compliance Program for industries with dual use production, a networking event for scientists and other topics. The participants also engaged in a table-top exercise on a simulated case of chemical weapons proliferation.

In 2018, ISTC also held a grant competition for Ph.D. students and young professionals, seeking articles related

to CBRN nonproliferation, strategic trade control or national and international trade control systems. The Ph.D. grant was awarded to Kamshat Saginbekova, a Kazakh scholar from KAZGUU University. Her research explores politico-economic aspects of trade regulation in Central Asian countries in cooperation with Liege University in Belgium and QIDS of HSE, KAZGUU University in Kazakhstan.

NONPROLIFERATION AND NUCLEAR SECURITY AND SAFETY CAPACITY BUILDING

Nuclear Safety and Security Culture in Eastern and Central Africa

Project 60, "Support to the EU CBRN Centre of Excellence for Central and Eastern Africa in Nuclear Security," supports the region's efforts to safely manage radioactive sources. Participating countries include Burundi, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Malawi, Rwanda, the Seychelles, Tanzania, Uganda, Zambia and Namibia. The project draws on an international consortium of experts, including Vienna-based consultant ENCO, the Finnish Radiation and Nuclear Safety Authority and the Belgian Nuclear Research Centre.

In 2018, the ISTC facilitated several workshops and trainings focusing on existing legislative frameworks, inventory and regulatory control of radiological material, national emergency and contingency plans, EU directives, best practices and the IAEA code of conduct, standards and guidance. ISTC also facilitated expert missions to all the participating countries to discuss legal and regulatory frameworks, management of radioactive sources including orphaned sources, the inventory, accountancy and control of radioactive sources, national response plans and equipment needs for the detection, identification, safety and secure storage of radioactive sources.

As a result of its successful progress to- date, the project was extended until March 2020. In April 2018, the project was highlighted at a side event of the second session of the Preparatory Committee for the 2020 Review Conference of the Parties to the Treaty on the Nonproliferation of Nuclear Weapons in Geneva, Switzerland.

Nuclear Safety and Safeguards in Southern Africa

Project MC 5.01/15 B "Support to Southern African States in Nuclear Safety and Safeguards," aims to strengthen and harmonize nuclear regulatory frameworks for sustainable uranium mining, milling, processing and associated transport in the sub-Saharan region of Africa.

In 2018, the project supported a conference on Enhancing Africa's Capacity on nuclear safety, security and safeguards in SADC Countries, Lusaka and Zambia. 120 professionals attended the conference, which covered topics including nuclear security and safety regimes in the SADC Countries, prudent management practice in relation to transport of nuclear materials and transportation security.

The project also provided regional training on Nuclear Safety, Security and Safeguards in the Transport of uranium ore concentrates (UOC) and other radioactive materials for African countries in Pretoria, South Africa.

SEISMIC MONITORING & HAZARD MITIGATION

The ISTC's Targeted Initiative on Seismic Monitoring hosted a December 3-7 conference in Yerevan, Armenia, discussing lessons learned thirty years after the devastating Spitak earthquake of 1988. The conference participants analyzed the social, seismological and geodynamic legacy of the earthquake and reviewed regional progress seismic hazard and risk assessment. The legacy of the Spitak disaster underlined the need for continued international collaboration in the face of cross-border risks.

The conference brought together leading scientists as well as young scholars to present results of recent studies and discuss innovations and challenges in seismic risk reduction. The conference included visits to Gyumri, one of the cities most affected by the earthquake, and the epicenter of the event.

At the conference, researchers and decision makers in earthquake risk reduction discussed advances in the field and shared lessons learned, discussing recent achievements and ongoing hazards related to regional earthquake activity.

A common theme of the conference discussions was the need to develop and maintain international collaboration in order to understand and respond to phenomena related to natural disasters. This collaboration should include improving and exchanging regional seismic monitoring data, joint training on best practices in data management and analysis, improvements in seismic hazard assessment and improved coordination and communication between scientists, local authorities, and national decision makers in the event of a natural disaster.

Conference participants in front of the National Academy of Sciences.

REPUBLIC OF ARMENIA

PARTY AND PARTNER PROJECTS
2018 ISTC ANNUAL REPORT

DEVELOPMENT IN IRON-BIODEGRADABLE STENTS FE-STENT, POLYMER-COATED, AND DRUG ELUTING STENTS

ISTC Project:	A-2115
Project Manager	Hovhannesyan Ashot
Leading Institute	Scientific Centre of Radiation Medicine and Burns Yerevan, Republic of Armenia
Foreign Collaborator	Prof. Kiejin Lee, Sogang University, Seoul, Republic of Korea
Project Duration	December 01, 2014 – November 30, 2017
Financial Parties	Republic of Korea
Total Cost of the Project	$180,000

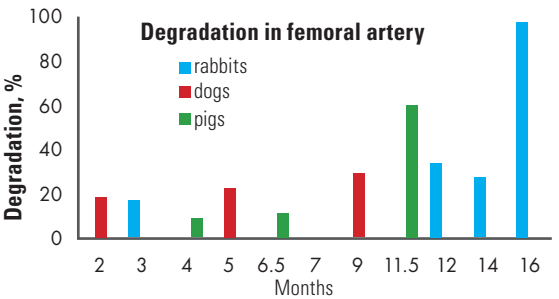
Within the framework of Project A-2115, electroforming was used to produce an iron device directly on cylindrical forms with a small thickness. For the first time, iron model stents were manufactured through electroforming without laser cutting. Upon completion of the project, the technology for obtaining electroformed iron tubing was proposed for commercialization.

The study aimed to test the safety of biodegradable iron model stents in experimental animals. Animal experiments demonstrated that electroformed iron gradually degraded in the blood vessel without any loss of mechanical stability. Histological studies demonstrated the absence of any significant vessel damage. Iron degradation was practically complete after16 months in the femoral artery of rabbits (see figure below).

The obtained value of iron degradation of electroformed iron in direct contact with blood in animals suggests that degradation would be complete after 1.5 to 2 years. The results of ISTC Project A-2115 show that electroformed iron is a suitable metal for the production of stents with a relatively large period of in vivo degradation.

Intravascular implantation of an electroformed iron model stent into femoral artery of a dog.

Figure: Comparative in vivo degradation of electroformed iron model stent in femoral arteries of animals

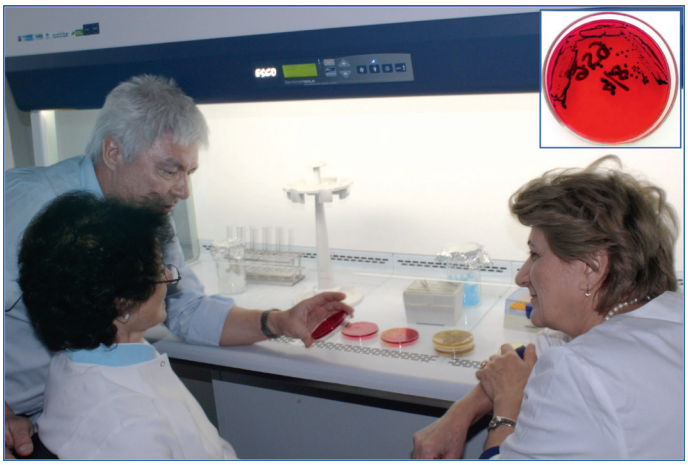


TARGETED ELIMINATION OF MULTIDRUG-RESISTANT (MDR) SALMONELLA BY BACTERIOPHAGES

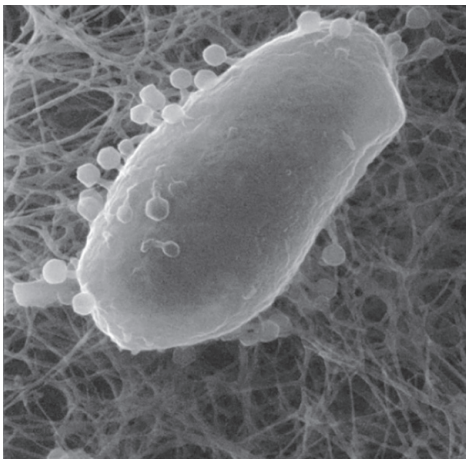
ISTC Project:	A-2140
Project Manager:	Anahit Sedrakyan
Leading Institute:	Institute of Molecular Biology, National Academy of Sciences of Armenia
Supporting Institutes:	George Eliava Institute of Bacteriophage, Microbiology and Virology, Georgia; Tajik Research Institute of Preventive Medicine, Tajikistan
Foreign Collaborators:	Rustam Aminov: Technical University of Denmark; Peter Mullany: University College London, UK; Mario Vaneechoutte: Ghent University, Belgium; Jean-Paul Pirnay: Queen Astrid Military Hospital, Belgium; Aidan Coffey: Cork Institute of Technology, Ireland
Project Duration:	1 January 2016 – 30 June 2018
Financial Parties:	EU
Project Cost:	$509,250

The objectives of Project A-2140 were to identify and characterize the most clinically problematic, highly virulent, persistent and drug-resistant strains of Salmonella that cause excessive morbidity and mortality in participating countries: Armenia, Georgia and Tajikistan and to design phage therapy approaches for efficient control and elimination of these dangerous pathogens from agricultural systems, the human food chain, hospitals and the environment.

A total of 69 highly virulent and multidrug-resistant (MDR) non-typhoidal Salmonella strains were characterized through whole genome sequencing. Specific mixtures of bacteriophages were prepared using the phage clones that demonstrated the best host coverage and highest lytic activity against human Salmonella isolates circulating in Armenia, Georgia and Tajikistan. The therapeutic and prophylactic potential of the developed phage mixture was evaluated in animal experiments. The results indicated that the phage formula elaborated within the scope of this project was efficient against various Salmonella serotypes originating from different countries. It also demonstrated that the phages selected in the scope of the project have potential for their application in veterinary medicine.



Discussion of the results with foreign collaborator Dr. Rustam Aminov at the Institute of Molecular Biology NAS, Armenia.



Salmonella ser. Enteritidis (G_104) cell infected by bacteriophage Hil isolated during the project.

NUCLEAR AND MITOCHONDRIAL GENETIC VARIANTS AND MOLECULAR BASES OF MITOCHONDRIAL OXPHOS DISEASES

ISTC Project:	A-2151
Project Manager:	Davit Babikyan
Leading Institute	Center of Medical Genetics and Primary Health Care
Supporting Institutes:	National Bureau of Expertises, Armenia Tsitsishvili Children's New Clinic as Part of Evex Medical Corporation, Georgia
Foreign Collaborators:	Yu-ichi Goto: National Institute of Neuroscience, National Center of Neurology and Psychiatry, Japan Zeynep Tumer: Kennedy Center, Copenhagen University Hospital, Rigshospitalet, Denmark Robert Taylor: Wellcome Trust Centre for Mitochondrial Research, Newcastle University, UK Leonid Margolis: Eunice Kennedy-Shriver National Institute of Child Health and Human Development, USA
Project Duration:	1 November 2015 – 30 April 2018
Financial Parties	USA, Japan
Project Cost:	$287,221.30

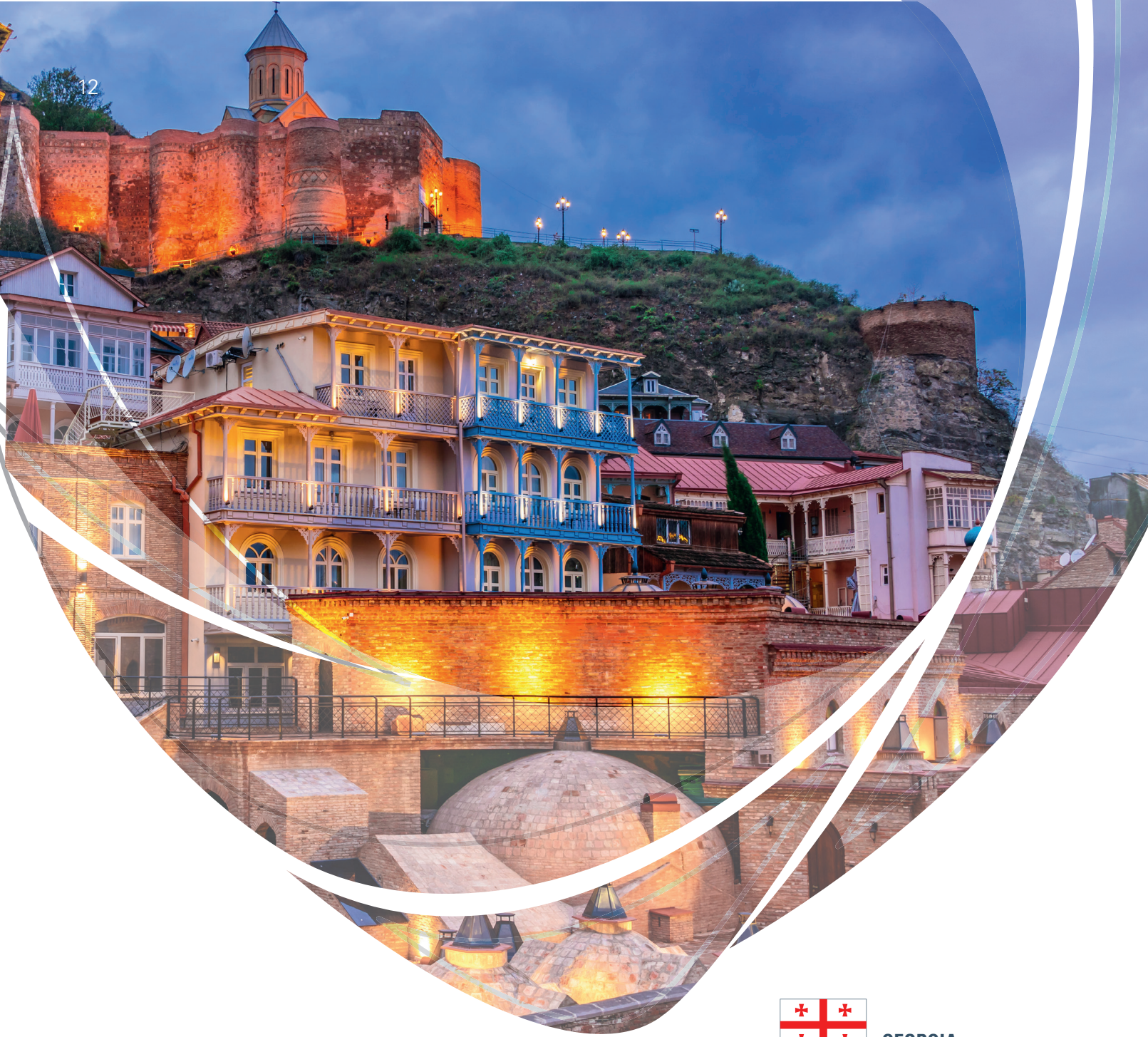
Mitochondrial pathologies (MPs) represent an under recognized and severe health care problem. Project A-2151 allowed investigators to perform the first whole exome sequencing (WES) analysis in the South Caucasian region devoted to this problem. The project realized its final steps during January – April 2018. During this timeline, WES sequencing data was analyzed in combination with cellular functional analyses. A pathogenic role of several candidate genes was discovered, revealing mitochondrial defect in map and molecular mechanisms of MPs and elucidated the complex genotype-phenotype correlations.

The project explored new genetic causes, their triggered cellular dysfunction, which have diagnostic applications, including in prenatal and preimplantation genetic diagnostics. The genetic variant stratification results extended understanding of the relationship of the genotype to the disease clinic. The results allowed re searchers to ascertain the clinical classification, obtain diagnosis non-typhoidal and develop an algorithm of genetic diagnosis through the use of WES analysis of MPs in Armenia and Georgia. The project's final results were first presented during "Human Genome and Health," an international conference in Tbilisi, Georgia, held on 19 –20 May 2018.

Conference in Tbilisi.

A2151 CMG GeneticTeam / Conference in Tbilisi.

Meeting with Georgian colleagues.



GEORGIA

PARTY AND PARTNER PROJECTS
2018 ISTC ANNUAL REPORT

INVESTIGATION INTO VISUALIZATION OF PROSTATE CANCER AT EARLY STAGE OF DEVELOPMENT

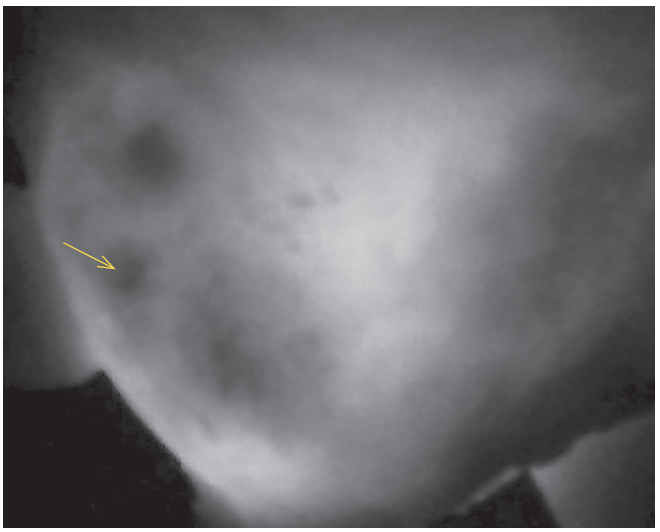
ISTC Project:	G-2188
Leading Institution	Tbilisi State Medical University
Foreign Collaborators	Mayo Clinic, Minnesota, USA, University of Washington, Seattle, USA
Project duration	24 months (March 2016 – March 01.2018)
Financing Party	USA
Project cost	$127,700

After lung cancer, prostate cancer is the second leading cause of cancer-related death in men worldwide. Existing methods are not able to detect prostate cancer at the early stage of its development. There is a need for precise and timely diagnosis of the disease. This project sought development of an advanced, simple, effective method for prostate cancer visualization using infrared light. We built a prototype of a device for early diagnosis of prostate cancer.

The device consists of two parts, a lighted mechanism using light-emitted diodes (LED) and the detection part consists of an infrared-sensitive CCD camera and electronic parts. Developed software forms prostate infrared images (IR). It is possible to detect cancerous outgrowths as small as several millimeters.

Lighting system for prostate illumination. LEDs are shown with arrow. The system will be inserted into a patient's urethral channel.

Device for prostate cancer detection in vivo. This part will be placed in the patient's rectum to observe the prostate with IR light.



IR image of a cancerous prostate. One of the cancer acini is indicated by the arrow. Calibration: 1 cm.

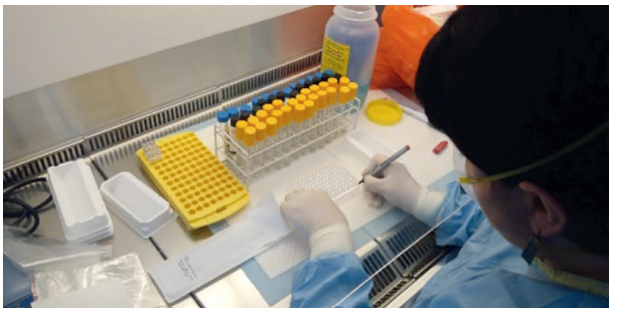
PHARMACOKINETICS OF SECOND-LINE ANTI-TUBERCULOSIS DRUGS AMONG PATIENTS WITH MULTIDRUG-RESISTANT TUBERCULOSIS

ISTC Project	G-2200
Project Manager	Maia Kipiani
Lading Institution	National Center for Tuberculosis and Lung Diseases Tbilisi, Georgia
Foreign Collaborators	Emory University, Atlanta, Georgia USA University of Florida, Gainesville, Florida USA
Project Duration	18 months (December 2015 to May 2017)
Financial Parties	ISTC, NIH/NIAID
Project Cost	$100,000

Within the framework of this project, we will assess the range and predictors of anti-tuberculosis second-line drug concentrations and the influence of these drug concentrations on time to culture conversion and rates of adverse events among patients with MDR-TB. The goal of the study is to evaluate the pharmacokinetics and pharmacodynamics of a novel regimen on which there is currently no available data. Our detailed assessment of the relationship between concentration/MIC and clinical outcomes and the rates of and genetic mutations associated with acquired drug resistance will help guide future regimen design.

The findings could have significant public health implications and will help bridge the gap between TB pharmacology, genomics, the molecular mechanisms of resistance and clinical outcomes. The results of the proposed study will provide data on whether using standard dosing of second-line anti-tuberculosis medications leads to optimal drug concentrations in the majority of patients with MDR TB. Through the combination of serum drug concentrations and M. tuberculosis MIC testing, we will be able to assess the pharmacodynamics of MDR TB treatment.

ISTC training, 2015.



MIC

INCIDENCE AND RISK FACTORS OF TUBERCULOSIS AMONG HIV-INFECTED PATIENTS RECEIVING ANTIRETROVIRAL THERAPY IN GEORGIA

ISTC Project:	G-2217
Project Manager	Natalia Bolokadze
Leading Institution	Infectious Diseases, AIDS and Clinical Immunology Research Center, Tbilisi, Georgia
Foreign Collaborators	University of California, School of Medicine, San Diego, California USA
Project Duration	18 months (March 1, 2016 – August 31, 2017)
Financial Parties	U.S.
Project Cost	$72,175

Project G-2217 study aimed to estimate the TB incidence density rate and to identify factors associated with incident TB in HIV-infected patients in Georgia. The study population comprised a retrospective cohort of HIV-infected individuals entering clinical care between 01/2011–12/2013 at the Infectious Diseases, AIDS and Clinical Immunology Research Center, Tbilisi, Georgia. Patients were followed until death or through December 2015.

Overall, 904 patients were included in the study. A total of 702 (77.6%) patients received antiretroviral treatment to reduce the burden of TB among HIV-infected persons receiving ART. First, a higher median CD4 cell count at ART initiation will significantly reduce the risk of incident TB, which underlines the importance of early ART initiation regardless of CD4 count and disease stage. Also, an intensified case-finding strategy should be implemented to prevent early incident TB among HIV-infected patients.

Pictures of the G-2217 project's team during the working proses.

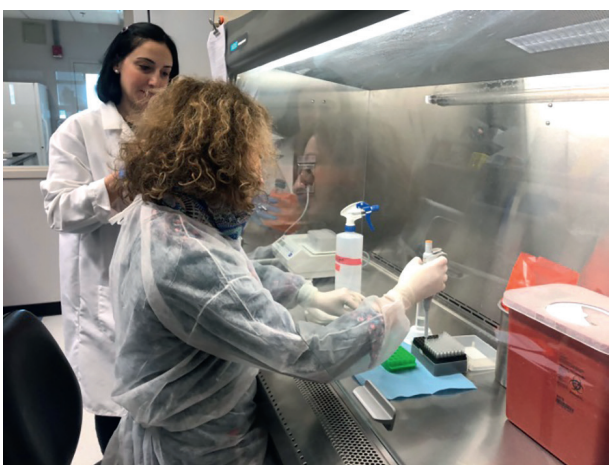
EPIDEMIOLOGY OF CARBAPENEM-RESISTANT ENTEROBACTERIACEAE IN GEORGIA

ISTC Project:	G-2229
Project Manager	Ketevan Sidamonidze
Lading Institution	National Center for Disease Control and Public Health, Tbilisi, Georgia, Tbilisi, Georgia
Foreign Collaborators	Disease Control and Prevention Center, National Center for Global Health and Medicine Hospital, Tokyo, Japan National Institute of Infectious Diseases, Tokyo, Japan Cardiff University, Wales, UK Universiteit Antwerp, Belgium Lawrence Berkeley National Laboratory, Berkeley, California USA
Project Duration	30 months (January 01,2017 – June 30, 2019)
Financial Parties	US, EU, Japan
Project Cost	$150.000

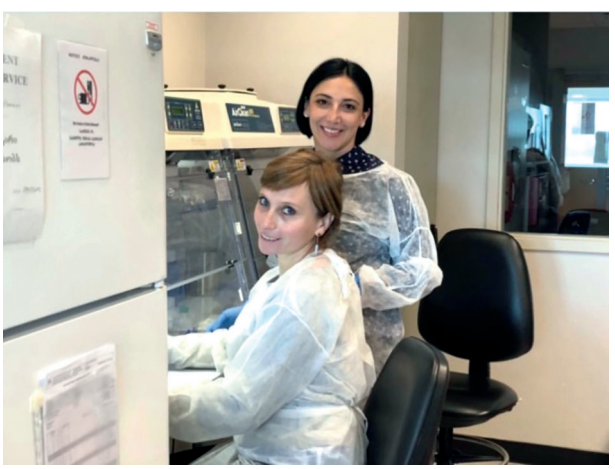
Antimicrobial resistance (AMR) is one of our most serious health threats. AMR is a global problem of increasing significance that takes a costly toll on lives and the health care economy around the world. The proposed study is the first systematic investigation of CRE in the Caucasus region. It includes the data collection for CRE prevalence and risk factor investigations in six hospitals, identification of Enterobacteriaceae strains and antimicrobial susceptibility testing, screening of CRE isolates for the presence of KPC, VIM, IMP, NDM, MOX/CMY and OXA48 and whole genome sequence of CRE isolates.

During the study period, totally 390 clinical samples (104 blood, 165 – sputum, 67 – urine and 54 wound swabs) had been collect. 201 samples were positive (including Acinetobacter baumannii – 52, K. pneumonia – 29, K. oxitoca – 3, Pseudomonas aeruginosa – 37, Pseudomonas luteola – 3, Pseudomonas putida – 2, Pseudomonas oryzihabitans – 3, E. coli – 4, Pseudomonas oryzihabitans-1, Proteus vulgaris – 1, Proteus mirabilis – 1). All isolated cultures were tested on antibiotic susceptibility tests (AST).

Carbapenems resistant cultures were 79 isolates. 20 strains were sequenced using whole genome sequencing and phylogenetic analyses were conducted.



Master mix Preparation process.



DNA extraction from CRE isolates.

REPUBLIC OF KAZAKHSTAN

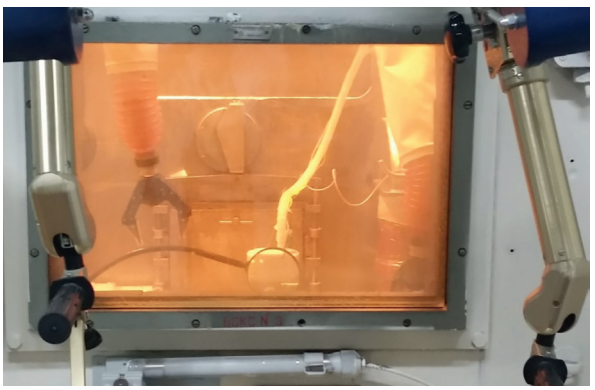
PARTY AND PARTNER PROJECTS
2018 ISTC ANNUAL REPORT

INVESTIGATION OF IRRADIATED HTGR FUEL PROPERTIES

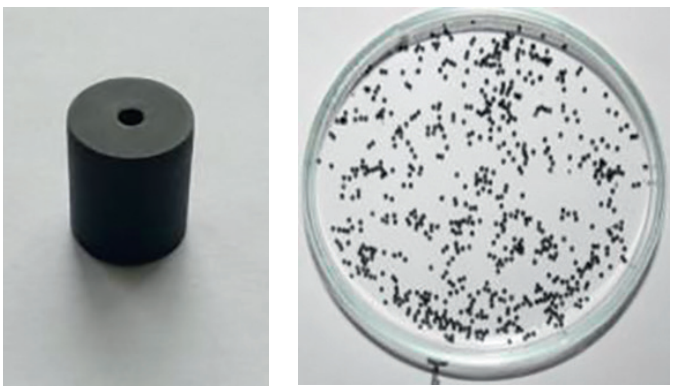
ISTC Project:	K-2222
Project Manager:	Shamil Gizatullin
Leading Institute:	Ministry of Energy and Mineral Resources / Institute of Nuclear of Physics of the Ministry of Energy of the Republic of Kazakhstan, Almaty, Kazakhstan
Supporting Institutes:	None
Foreign Collaborators:	Japan Atomic Energy Agency, Ibaraki, Japan
Project Duration:	01 March 2017 – 31 May 2019
Financial Parties:	JP
Project Cost:	$314,600

For 2018, preparation of the "hot" cell to work with specimens of spent fuel from the HTGR reactor was completed. The device for the electric dissociation and acid leaching of irradiated fuel specimens was fabricated. The mock-up test with two un-irradiated HTGR fuel experimental procedure and operation of the device for dissociation and acid leaching of compact specimens.

The electric dissociation and acid leaching of three irradiated fuel specimens were carried out. Post-irradiation examination of irradiated fuel particles has begun.



"Hot" cell with device for the electric dissociation and acid leaching of irradiated fuel specimens.



Result of the electric dissociation of irradiated fuel specimen.

SPATIAL AND TEMPORAL CHARACTERISTICS OF HUMAN PLAGUE AND CHOLERA EPIDEMICS IN KAZAKHSTAN

ISTC Project:	K-2366
Project Manager:	Zaurbek Sagiyev
Leading Institute:	M. Aikimbayev's Kazakh Scientific Center for Quarantine and Zoonotic Diseases, Almaty, Kazakhstan
Supporting Institutes:	None
Foreign Collaborators:	Department of Environmental Symbiotic College of Agriculture, Food and Environment Sciences, Rakuno Gakuen University, Ebetsy, Japan
Project Duration:	01 March 2018 – 29 February 2020
Financial Parties:	JP
Project Cost:	$200,000

The ISTC Project of K-2366 is a unique project because participants will publish Atlases of plague and cholera cases registered in Kazakhstan since the bacteriological confirmation of cases started in the country. The results of K-2366 will be useful for Public Health of Kazakhstan because the full historical data of plague, cholera outbreaks and risk assessment of the territory of Kazakhstan for these diseases will be published which will help to improve current plague and cholera epidemiological surveillance in the country by targeting monitoring of potential hazardous areas.

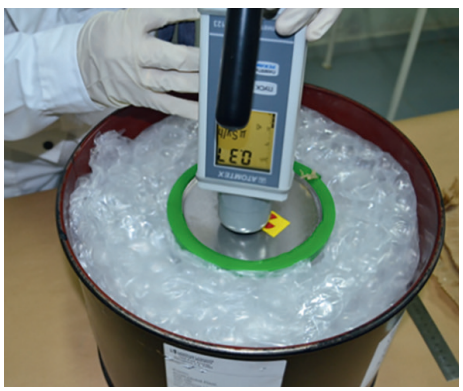
During the first year, the cases of plague and cholera were collected from people registered in Kazakhstan from 1913 to the present with archival photographs. A database of cases of plague and cholera in people who leave in areas with an average climate and amount of precipitation at the date of registration of cases (for further risk analysis) created. Two articles were published in peer-reviewed journals and one article in a medical journal. The project has been awarded one patent in Kazakhstan.

ADVANCEMENT OF NUCLEAR FORENSICS ACTIVITIES IN KAZAKHSTAN

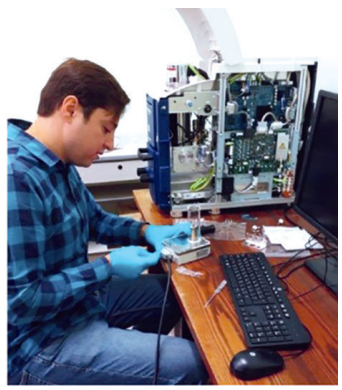
ISTC Project:	K-2400
Project Manager:	Viktor Glushchenko
Leading institute:	National Nuclear Center of the Republic of Kazakhstan / Institute of Nuclear Physics, Almaty, Kazakhstan
Supporting Institutes:	None
Foreign Collaborators:	Ruth Kips, Rachel Lindvall, Lawrence Livermore National Laboratory, Livermore, California US
Project duration:	1 February 2018 – 1 February 2020
Financial Parties:	US Department of Energy / National Nuclear Security Administration, Washington, DC, USA
Project Cost:	$400,000

The objective of Project K-2400 is to develop the Institute of Nuclear Physics as a primary regional technical resource for nuclear forensics and to improve its international role and effectiveness in the nuclear forensics area. To work out the procedures, including analytical studies, the research was based on 10 samples available at INP and a sample of uranium ore concentrate. After completing acceptance, the project continued an analytical study of five samples of uranium ore concentrate, received from the Lawrence Livermore National Laboratory. In addition, the experimental studies to adopt and introduce the analytical methods for determination of uranium in anthropogenic materials were performed. A Hitachi TM 4000 Plus electron microscope for electron microscopy analysis was purchased, installed and tested.

The specific features of the origin of the uranium deposits in Kazakhstan were studied and recorded in the National Nuclear Forensic Library. The project scientists participated in the International Technical Working Group on Nuclear Forensics, the IAEA Technical Meeting on Nuclear Forensics, the International Conference on Radioanalytical and Nuclear Chemistry (RANC) and workshops and training courses on nuclear forensics, organized by U.S. DOE.



Analytical studies of the samples.



Installation of the electron microscope.

Training and workshops in nuclear forensics.

THE ECOLOGY AND PERSISTENCE OF BRUCELLA AND TRANSMISSION POTENTIAL TO HUMANS

ISTC Project:	K-2410
Project Manager:	Mukhit Orynbayev
Leading institute:	The Republican Government Enterprise, on the basic of economic control rights. Research Institute for Biological Safety Problems, Gvardeiski, Kazakhstan
Supporting Institutes:	National Reference Center of Veterinary, Nur-Sultan, Kazakhstan Scientific and Practical Center of Sanitary and Epidemiological Expertise and Monitoring, MoH of RK, MH of RK, Almaty, Kazakhstan
Foreign Collaborators:	None
Project duration:	1 September 2017 – 1 September 2021
Financial Parties:	University of Florida, Gainesville, Florida USA
Project Cost:	$514,731

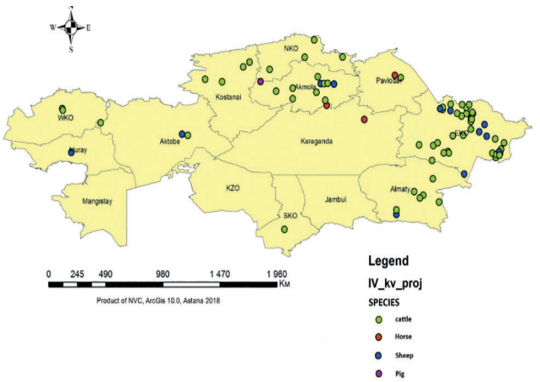
Project K-2400 carries out a multi-year analysis of brucellosis monitoring in Kazakhstan. Three field trips for sample collection from wild animals were conducted. Samples from saigas and sera of wild animals (roe deer, saigas, wild boars, and gazelles) were collected from 2012–2016 and studied by ELISA for the presence of antibodies against brucellosis. Sera were studied using the APF method. Blood samples and saigas placentas were examined by PCR for the presence of the brucellosis pathogen. Sera samples of animals were collected from unfavorable farms for serological studies.

As a result of these activities, the brucellosis pathogen and antibodies to them were not detected in the samples from wild animals. Farm animals provided 15 brucella cultures. It has been established that for a decade the incidence of brucellosis in Kazakhstan was observed in the

southern regions of the republic. The epidemic situation is unstable in the West Kazakhstan and Atyrau oblasts. A negative indicator is the presence of "hidden" source of brucellosis. The project team formed a database for the confirmed cases of acute brucellosis in humans and animals and built GIS maps.

Saiga corral in the network.

Collection from placenta at calving sites.



Sampling areas for serological and bacteriological tests according to animal species.

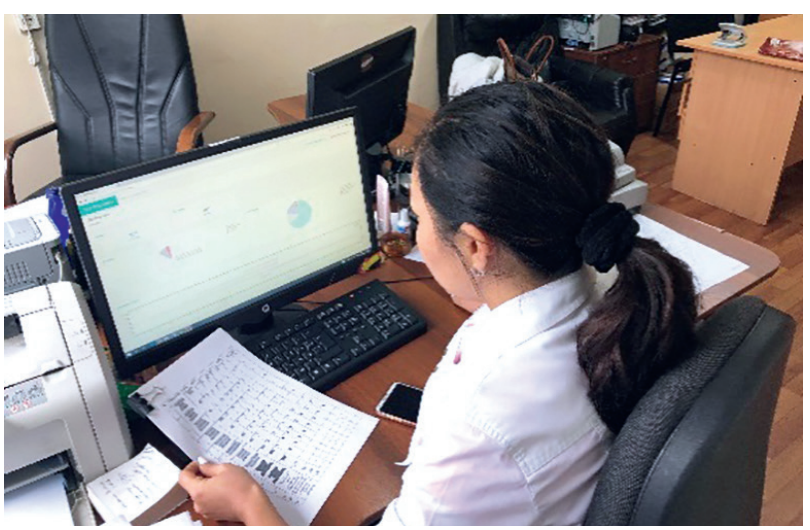
DEVELOPMENT OF KAZAKHSTAN TB PORTAL

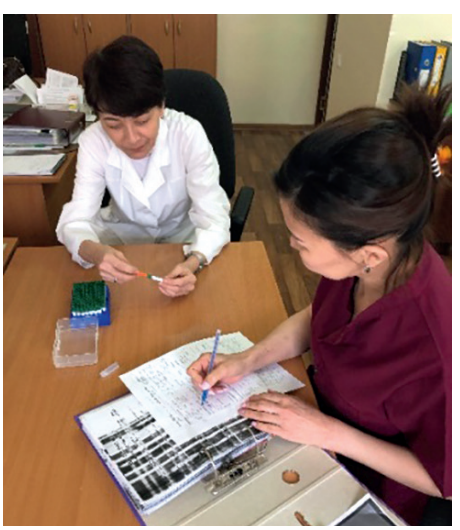
ISTC Project:	K-2411
Project Manager	Berikova Elmira, PhD
Leading Institute	National Science Center of Phthisiopulmonology, Almaty, Kazakhstan
Supporting Institutes	N/A
Foreign collaborators	U.S. Department of Health & Human Services / National Institute of Health / National Institute of Allergy and Infectious Diseases, Bethesda, Maryland USA (Gabrielian A)
Project Duration	April 1, 2017 – March 31, 2018
Financial parties	U.S. Department of Health & Human Services / National Institute of Health/ National Institute of Allergy and Infectious Diseases, Bethesda, Maryland USA
Project Cost:	$70,000

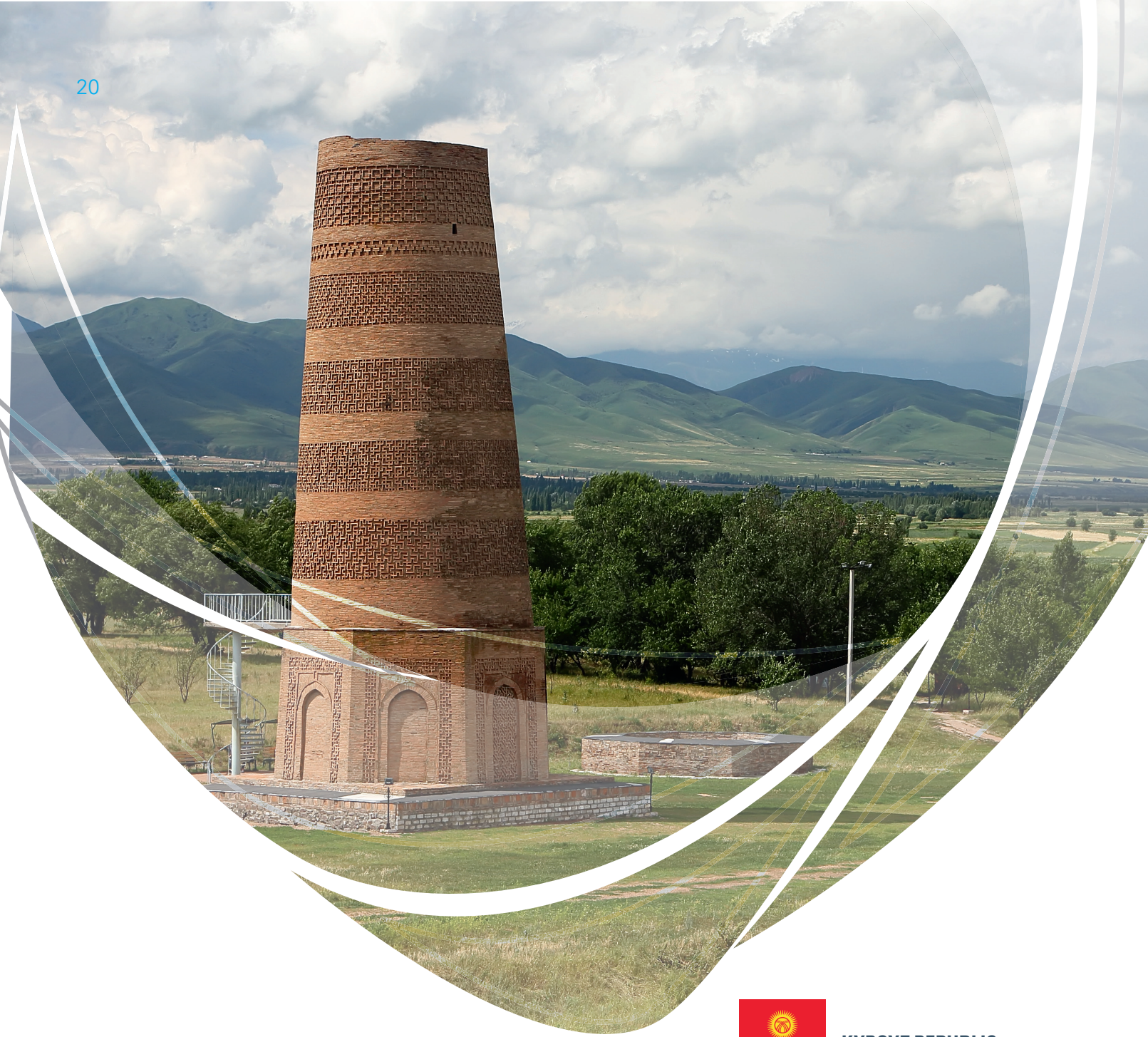
The objective of Project K-2411 is to improve global research capabilities of the tuberculosis (TB) researchers by developing the Kazakhstan TB Portal. Materials and methods used include a web-based database system developed using the Belarus TB Database and TB Portal model. The data of the National TB register, including clinical, radiological and laboratory tests, were used. In the beginning, the main cohorts of patients were identified for entry into the TB portal.

During the ISTC project, a regularly updated TB database was developed, which contains information on 100 TB cases (pulmonary and extrapulmonary), including drug-resistant forms.

DNA was isolated from 96 MDR and XDR TB patients and sent to a sequencing center for full-genome sequencing. The comparative and statistical analysis will be conducted after the bioinformatics analysis of the sequencing strains is complete. These results will be used to assist in assessing the epidemic situation, drug sensitivity analysis and TB mapping of the country.







KYRGYZ REPUBLIC

PARTY AND PARTNER PROJECTS

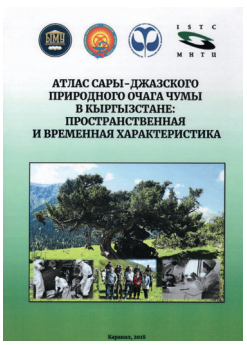
2018 ISTC ANNUAL REPORT

MOLECULAR-GENETIC MONITORING AND PASSPORTIZATION OF TRANSBOUNDARY SARI-DZHAS FOCUS OF PLAGUE WITH GIS TECHNOLOGIES IN KYRGYZSTAN AND KAZAKHSTAN

ISTC Project:	KR-2111
Project Manager:	Gulmira Sariyeva
Leading Institute:	K. Tynystanov Issyk-Kul State University
Supporting Institutes:	Karakol Department of Quarantine and Dangerous Infections
Foreign Collaborators:	Centers for Disease Control and Prevention (CDC) / National Center for Infectious Diseases/ Division of Vector-Born Infectious Diseases, Fort Collins, Colorado USA (Kosoy M.) University of Texas / Medical Branch, Galveston, Texas USA (Motin V.L.) Institute of Environmental Sciences of Montpellier University, France (Morand S.)
Project Duration:	18 December 2014 – 17 August 2018
Financial Parties:	USA, EU
Project Cost:	$415,600

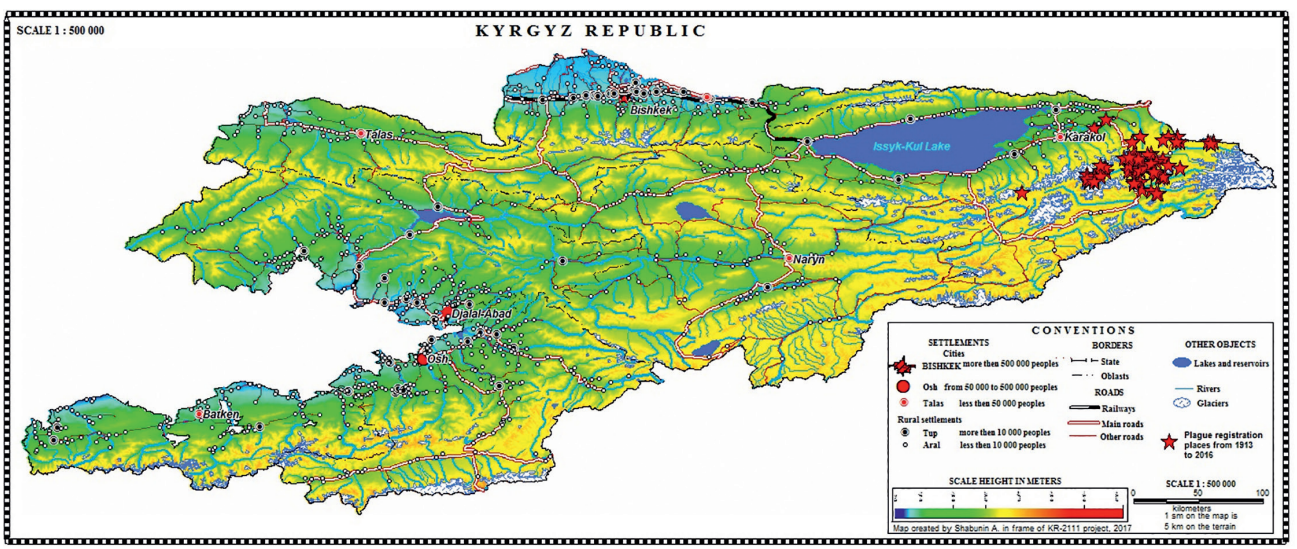
Project KR-2111 significantly improved theoretical understanding of plague circulation in the high-altitude areas of Kyrgyzstan involving environmental factors like climate/ vegetation changes and increased human activity. First, the anti-plague service used molecular genetics for diagnostics and genotyping of plague strains, which revealed that Kyrgyz strains belong to an ancient branch of Yersinia (O.ANT2, O.ANT3) with the highest virulence and resistance to severe mountain conditions.

Knowledge of phylogenetic of domestic strains allows tracing of their movement not only inside the Kyrgyzstan but also throughout Central Asia. Acquired project equipment will be used by participating institutions for a long time and contribute to sustainable development of the biomedical sector.



The Atlas of the Sari-Dzhas natural plague focus published in framework of ISTC Project KR-2111.

Students of Issyk-Kul State University use the laboratory equipment acquired by the project.



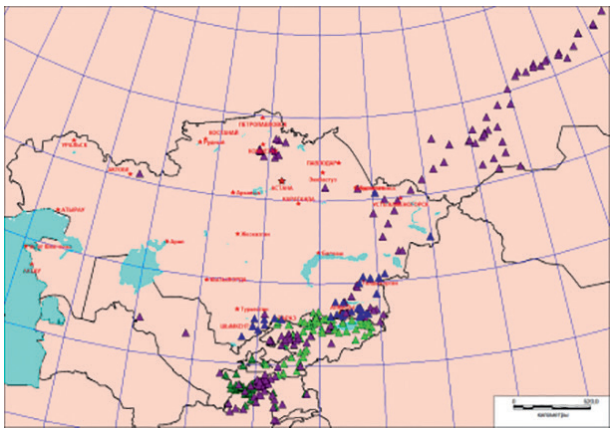
The map of the Sari-Dzhas natural plague focus with marked points of isolation of plague strains during 1940–2017.

CENTRAL ASIA SEISMIC HAZARD ASSESSMENT AND BULLETIN UNIFICATION

ISTC Project:	KR-2398
Project Manager:	Anna Berezina
Leading Institute:	Institute of Seismology, NAS, Bishkek, Kyrgyzstan
Supporting Institutes:	Institute of Geology, Dushanbe, Tajikistan, LTD Seismological Experimental Methodological Expedition, Almaty, Kazakhstan, Institute of Geophysical Research, Kurchatov, Kazakhstan
Foreign Collaborators:	Lawrence Livermore National Laboratory, Livermore, California USA Michigan State University, East Lansing, Michigan USA Onur & Seemann Consulting, Victoria, British Columbia, Canada
Partners:	U.S. Department of Energy / National Nuclear Security Administration, Washington, DC, USA
Project Duration:	1 February 2018
Project Cost:	$800,000

Central Asia is a tectonically active and complex region characterized by high levels of seismicity, and many catastrophic earthquakes. Central Asia also contains or is within regional distance of many of the world's nuclear test sites. Seismic networks in the region were developed during the Soviet era, when it was common practice to operate independent networks in each republic. The current distribution of seismic networks generally remains the same, though networks are now nationally operated.

To improve seismological research and knowledge in Central Asia, Project KR-2398 digitizes and merges data from the Kyrgyzstan, Tajikistan and Kazakhstan networks into a single database. The project has performed a full inventory of the seismological archives of participating organizations. This inventory has identified seismograms from 1927 to 2017, seismic bulletins (station and event) dating back to 1949 and seismic station meta-data covering the entire history of seismic monitoring in Central Asia. (Figure1). The project created the first joint database of all the active faults in Central Asia, which will be fundamental for future seismic hazard assessment. Strong motion data and active fault data is necessary for accurate seismic hazard assessments.



Map of seismic stations location across Central Asia.

REPUBLIC OF TAJIKISTAN

PARTY AND PARTNER PROJECTS

2018 ISTC ANNUAL REPORT

ARBOVIRUSES AND ARBOVIRAL INFECTIONS IN THE REPUBLIC OF TAJIKISTAN

ISTS Project:	T-2119
Project Manager:	Dilshod Kadamov
Leading Institute:	E.N. Pavlovskii Institute of Zoology and Parasitology AS RT
Supporting Institutes:	Tajik Research Institute of Preventive Medicine
Foreign Collaborators:	Ralph E.Harbach: The Natural History Museum, Department of Life Sciences Roger Hewson: Public Health England, Virology & Pathogenesis Department
Project Duration:	1 November 2015 – 30 April 2017
Financial Parties:	Counter Proliferation and Arms Control Directorate, Ministry of Defence (MOD)
Project Cost:	$430,000

The results of Project T-2119 indicated the presence of natural foci of Western Nile and Issyk-Kul viruses in Southwest Tajikistan and Tigrovaya Balka National Park. This was evidenced by the results obtained from molecular genetic studies of mosquitoes living in these districts. Our studies showed also the presence of natural foci of the West Nile virus in Northern Tajikistan. The study of tick virus presence showed that ticks infected with the CCHF virus were detected in nine districts of southern Tajikistan. The CCHF virus was found in anatolicum ticks, both in ticks collected animals and from hungry animals alike.

The project results formed the basis for the monitoring and evaluation plan of the integrated transmissive diseases vector control program in the Republic of Tajikistan, which contributes to the improvement of epidemiological surveillance of vector-borne diseases. For the first time, a rapid PCR method was tested using methodology developed by the laboratory of our collaborator for rapid diagnostics of especially dangerous infections.

MOLECULAR CHARACTERIZATION OF FIELD ISOLATES AND IMPROVING SURVEILLANCE FOR RABIES IN TAJIKISTAN

ISTC Project:	T-2198
Project Manager:	Karomatillo Khamroev
Leading Institutes:	National Food Safety Diagnostics Center of the Committee for Food Security, Government of the Republic of Tajikistan (NFSDC of the FSC)
Supporting Institute:	None
Foreign Collaborators:	OIE Reference Laboratory and WHO Collaborating Center for Rabies, Animal and Plant Health Agency (formerly Veterinary Laboratories Agency)
Project Duration:	1 February 2016 – 31 January 2019
Financial Parties:	UK Ministry of Defence
Project Cost:	$397,171

Activities were carried out under Project T-2198 were useful in diagnosing rabies in animals and monitoring the prevention of disease in humans. During 2018, systematic control was carried out to collect biological materials from various animal species suspect of carrying rabies. Systematic monitoring of people subjected to bites from animal species across the country was executed by epidemiologists and veterans. Educational posters and booklets were prepared and distributed to schools and villages.

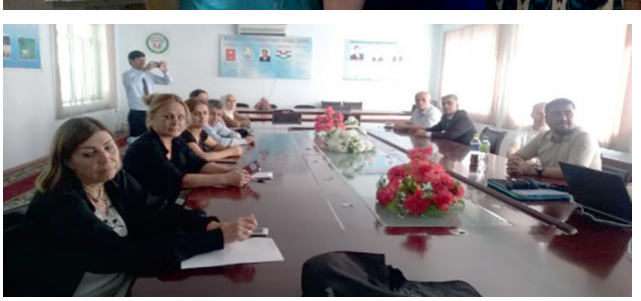
Wildlife monitoring was conducted throughout the year with the goal of studying various types of rabies transmitters. The project was supported by five local institutions, whose specialists were involved in implementation of the tasks. The project provided the necessary equipment and materials to the trained local specialists to continue working independently on rabies monitoring at the level of international standards.

IMPROVING CAPABILITIES TO DETECT AND CHARACTERIZE BRUCELLA IN THE VETRINARY AND PUBLIC HEALTH SECTORS IN THE REPUBLIC OF TAJIKISTAN

ISTC Project:	T-2199
Project Manager:	Davlyatova Mayram
Leading institute:	National Food Safety Diagnostic Center (NFSDC)
Supporting institutes:	1. The State Sanitary Epidemiological Surveillance Services of the Republic of Tajikistan 2. Dushanbe dairy Kombinat (DDK) 3. State Research Institute Veterinary Academy of Agricultural Sciences of Tajikistan
Foreign Collaborators:	Animal and Plant Health Agency (APHA) – Weybridge Arms Control and Counter Proliferation Policy (ACP), Ministry of Defence (MOD)
Project Duration:	1 January 2016 – 31 December 2018
Financial Parties:	UK Ministry of Defence
Project Cost:	$391,819

The main objective of Project T-2199 in 2018 was to provide trainings to the Tajik experts in bacteriological and molecular methods of Brucellosis diagnostics. The project introduced molecular methods of studying the characteristics of Brucella in Tajikistan which differentiates existing varieties of Brucella from internationally recognized vaccine strains to reduce the need for cell culture which is necessary for serotyping of Brucella. The project also included an element of scientific research to modify the existing Bruceladder to differentiate field strains from local vaccine isolates (Strain 82). To identify common strain of Brucellosis among people and animals and to develop measures to reduce and eliminate infection.

Experts from the APHA conducted trainings on development of molecular technology skills to identify Brucella by RT - PCR and Bruceladder on the basis of conventional PCR for the staff of SSESS, NCFSD and veterinary institute at the National Center for Food Safety Diagnostics (NCFSD).



LIST OF COMPLETED PROJECTS
2018 ISTC ANNUAL REPORT

LIST OF PROJECTS COMPLETED IN 2018

Project No	Short Title	Lead Institute	Funding Party	Collaborator Country
#A-2115	Biodegradable stents	The Scientific Centre of Radiation Medicine and Burns	RK	RK
#A-2116	Chemoprotection against mycotoxicoses	Institute of Molecular Biology	EU	Germany, France, Denmark
#A-2134	Radiation and Probiotics	Armenian National Agrarian University	JP, USA	Slovakia, JP, USA
#A-2151	Molecular pathogenesis of mitochondrial OXPHOS diseases	Center of Medical Genetics of NAS RA	EU, JP	Denmark, JP, UK
#G-2117	Stable enzymes for fuel ethanol	Agricultural University of Georgia	RK	RK
#G-2126	Radio waves propagation in magnetized collision plasma	Georgian Technical University	USA	USA
#G-2188	Prostate cancer visualization	Tbilisi State Medical University	USA	USA
#G-2200	MDR TB pharmacokinetics	National Center for Tuberculosis and Lung Diseases / NCTBLD	Partner	USA
#G-2211	Effectiveness and Feasibility of HIV Testing in Health Care Settings	Georgian AIDS and Clinical Immunology Research Center	Partner	USA
#G-2212	Determinants of HCV Control	Georgian AIDS and Clinical Immunology Research Center	Partner	USA
#G-2216	Georgian MSM Cohort Study	Georgian AIDS and Clinical Immunology Research Center	Partner	USA
#G-2217	Incidence of Tuberculosis among HIV-infected patients in Georgia	Georgian AIDS and Clinical Immunology Research Center	Partner	USA
#K-2080	Irradiation behavior of oxidation-resistant graphite	National Nuclear Center of the Republic of Kazakhstan / Institute of Nuclear Physics	Partner	Japan
#K-2086	Development of a method for obtaining and using of tuberculous bacteriophage	The Republican Government Enterprise on the basic of economic control rights "Research Institute for Biological Safety Problems"	EU, JP	Germany, Japan
#K-2125	Fast Neutron reactor Effect on Environment	National Nuclear Center of the Republic of Kazakhstan / Institute of Nuclear Physics	USA	USA
#KR-2105	Aerosol and Climate	Kyrgyz-Russian Slavonic University	EU	Germany, France, USA
#KR-2111	Molecular monitoring and GIS-technologies in biorisk management of plague	Issyk-Kul State University named after K. Tynystanov	EU, USA	USA
#T-2109	Hydrogen and Thermolysis gas production by use of energy of idle water flow	Tajik National University	USA	USA
#T-2113	Optical and radar meteoroids	Institute of Astrophysics	EU	Poland, Spain
#T-2119	Arboviruses in Tajikistan	Institute of Zoology and Parasitology named after E.N. Pavlovsky	Partner	UK
#T-2192	Hepatitis D virus infection in the Republic of Tajikistan	Institute of Gastroenterology, Academy of Sciences, Republic of Tajikistan	EU	Germany, Sweden

ISTC ORGANIZATIONAL STRUCTURE
2018 ISTC ANNUAL REPORT

PERMANENT GOVERNING BOARD PARTIES

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Japan
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European Union
Eddie Maier
Deputy Head of Unit
DG DEVCO / Unit D5-Instrument for Stability, Nuclear Safety Department
European Commission / European Aid Co Cooperation office
(DG AidCo)
J59 04/055
B-1049 Brussels/Belgium
Tel: +32 2 29 56 138
Fax: +32 2 29 66 228
E-mail: Eddie.Maier@ec.europa.eu

Japan
Toshiaki Kobayashi
Director of International Science Cooperation Division
Ministry of Foreign Affairs of Japan
2-2-1, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8919, Japan
E-mail: toshiaki.kobayashi@mofa.go.jp

United States of America
Sarah Banerjee
International Relations Officer (ISN/CTR)
Office of Cooperative Threat Reduction
Bureau of International Security and Nonproliferation
U.S. Department of State
Tel: +46 76 058 8975
E-mail: BanerjeeSS@State.gov

Norway
Hege Schultz Heireng
Senior Adviser Norwegian Radiation Protection Authority
Tel: +47 67 16 26 31
Mob.: +47 478 85 717
Website: http://www.nrpa.no

Republic of Korea
Dr. Kim Guang Hoon
KERI
Seoul, Republic of Korea
E-mail: ghkim@keri.re.kr

Republic of Armenia
Samvel Haroutunyan
Chairman
Science Committee
Ministry of Education and Science
Republic of Armenia
22 Orbeli Brothers str., 0028,
Yerevan
Tel: +374 10 210140 (111)
Fax: +374 10 2010140 (114)
E-mail: info@scs.am
www.scs.am

Republic of Kazakhstan
Gulnara Aubakirova
Acting Head of the International Cooperation Department of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan
Tel: +7 7172 74 24 57
E-mail: aubakirova_gulna@mail.ru

Kyrgyz Republic
Sharipa Zhorobekova
Full member (academician) of the National Academy of Science of Kyrgyz Republic
Tel: +996 312 391948
Fax: +996 312 646294
E-mail: jorobekova@istc.kg

Republic of Tajikistan
Farhod Rahimi
President
Academy of Sciences of the Republic of Tajikistan
Tel: +992 37 221 50 83
Fax: +992 37 221 49 11
E-Mail: frahimi2002@mail.ru;
frahimi2002@yahoo.com

Georgia
Zviad Gabisonia
Director General
Shota Rustaveli National Science Foundation of Georgia
Tel: +995 2 200 220 (4422)
E-mail: gabisonia@rustaveli.org.ge

Nino Gachechiladze
Deputy Director General
Shota Rustaveli National Science Foundation of Georgia
Tel: +995 2 200 220 (4033)
E-mail: gachechiladze@rustaveli.org.ge

SECRETARIAT CONTACT INFORMATION

Nur-Sultan, Kazakhstan
Tel: + 7 7172 769534
E-mail: istcinfo@istc.int
Website: www.istc.int

Executive Director
David Cleave
Nur-Sultan
Tel: + 7 7172 769513
E-mail: cleave@istc.int

Deputy Executive Director
Aidyn Turebayev
Tel: +7 7172 769511
Fax: + 7 7172 769511
E-mail: turebayev@istc.int

ISTC Branch Office, Armenia
Yerevan, Republic of Armenia
Hamlet Navasardyan
Tel: +374 60 62 35 17
Fax: +374 10 58 44 83
E-mail: navasardyan@istc.int

ISTC Branch Office, Georgia
Tbilisi, Georgia
Irina Khomeriki
Tel: +995 32 223 700
Fax: +995 32 912 386
E-mail: khomeriki@istc.int

ISTC Branch Office, Kyrgyzstan
Bishkek, Kyrgyz Republic
Dinara Kerimbaeva
Tel: +996 312 431 171
Fax: +996 312 431 171
E-mail: kerimbaeva@istc.int

ISTC Branch Office, Tajikistan
Dushanbe, Republic of Tajikistan
Mukhabatsho Khikmatov
Tel: +992 37 227 8737
+992 918 64 7107
+992 934 01 0172
Fax: +992 37 227 9394
E-mail: khikmatov@istc.int

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