AMR-TB Participants

Aston University is a long established research led University known for its world class teaching quality and strong links to industry, government and commerce. Aston University is currently ranked 8th overall for graduate employment and in the UK's top 40 universities. The University has strong central support teams, such as Business Partnership Unit, providing support and advice on IP management, commercialisation of research results and industrial outreach; Research Support Office, Finance and Human Resources, who are extremely experienced in the set up and delivery of European funded research projects. This central support and expertise will be available to the RISE consortium.

Department of Mathematics is part of the Systems Analytics Research Institute, the research areas of which are very diverse, covering both theoretical and practical aspects of information analysis, non-linear and stochastic differential equations and the study of complex systems. The main strength of the Department is in the application of principled mathematical and statistical approaches to a broad range of problems, most of which relate strongly to the area of complexity. The underpinning methodology used includes principled approaches from probabilistic modelling, Bayesian statistics, statistical mechanics and non-linear stochastic and deterministic differential equations, complex systems theory. The Department has high international visibility in the areas of pattern analysis, probabilistic methods, non-linear dynamics and the application of methods from statistical physics to the analysis of complex systems, and, in particular, complex molecular systems. There are several state of the art computer clusters at the department suitable for high performance computation. Dr Nerukh's group possesses a dedicated cluster tuned for high performance molecular dynamics simulations. Dr Stich's group has access to specialized software for population dynamics simulations.

Saint Petersburg State University is one of oldest Russian University that is included in 500 best World Universities according to THE World University ranking; In particular, it shares 81-90 positions in THE World Reputation Ranking 2016. Many outstanding scholars have been a part of the SPbU community, including nine Nobel Prize winners. SPbU today offers 106 undergraduate programmes and 165 master programmes and areas of specialization for more than 30,000 students and the best university Research Park in Russia.

SPbU has more than 400 partner universities in about 70 countries, and it is a member of a number of international associations and research funding programmes: Erasmus Mundus, Erasmus+, Finnish-Russian Cross Border University, Finnish-Russian Student Exchange Program, Santander Universities, TEMPUS, and many others. SPbU has all equipment required for evaluating the corresponding tasks in the project, in particular, Research Park of SPbU and labs of Biological Faculty will be carried out preparing the library of bacterium strains sequences, performing KatG expression and measuring its structure and spectroscopy.

Saint Petersburg State Research Institute of Phthisiopulmonology of the Ministry of Healthcare of the Russian Federation (St. Petersburg State Research Institute of Phthisiopulmonology) is the oldest scientific and clinical institution in Russia founded in 1923 in Leningrad. Today the Institute is one of the largest phthisiatric centers of Russian Federation providing high technology advisory, therapeutic and surgical treatment. The Institute is funded by the State and it cooperates with numerous international organizations (WHO, the Northern Dimension Partnership in Public Health and Social Well-being, Barents Euro-Arctic Council etc.). The Institute is a multidisciplinary scientific and clinical institution, carrying out research and educational activities in the field of phthisipulmonology and other related medical and biomedical specialties. The Institute consists of three large modern equipped clinical premises: therapy of tuberculosis and thoracic surgery; surgery of diseases of the musculoskeletal system, urology, gynecology; surgery of osteoarticular tuberculosis in children and adolescents.

Kursk State University was founded in 1934 and it is ranked number 51 among Russian universities according to Webometrics Transparent Ranking: Top Universities by Google Scholar Citations (January 2017 Edition: 2017.1.1). Kursk State University comprises both the academic and the research activities in wide areas of science, social studies, and humanities. The focus areas reputed among the international scientific community include molecular acoustics and thermodynamics, physical chemistry, mathematical biology.

Research Center for Condenced Matter consists of two divisions: i) the Laboratory of Molecular Acoustics ii) Department of Theoretical Physics (multidisciplinary research focused on the methods for modeling of spreading and relaxation phenomena, signal processing (especially, by the wavelets) including biophysical applications, and prediction of the thermodynamic properties of liquids at high pressures). The Center has all computational equipment required for evaluating the corresponding

partial task of the project: modern desktop computers supplied with software aimed at dynamical systems, of general technical computing.

The Center for Molecular Biology "Severo Ochoa" (CBMSO) is one of the leading Centers for Molecular Biology in Spain, and it is a partnership between the Spanish Research Council (CSIC) and the Autonomous University of Madrid (UAM), which provides the benefits of both kinds of environments. The CBMSO possesses a high performance computation cluster with more than 600 processors endowed with rapid communication, which originated in the Bioinformatics group presently directed by Dr. Ugo Bastolla. Dr. Bastolla is a recognized expert in the field of the computational study of protein evolution with selection on protein folding stability and protein dynamics studied with elastic network models in torsion angle space, two fields of expertise that will strongly contribute to the success of the present project. Moreover, he has also a previous experience on the modelling of genetic networks as Boolean networks, another proposed activity of the present project.

The **University of Surrey** is ranked within the top 10 Universities in the UK, and 93% of research in The Faculty of Health and Medical Sciences was rated world-leading or internationally excellent in the latest government Research Excellence Framework. The University of Surrey is committed to improving human and animal health under the 'One Health – One Medicine' vision through an interdisciplinary program of research and teaching in human and animal health. The Faculty of Health and Medical Sciences has recently opened a new School of Veterinary Medicine which complements the established School of Biosciences and Medicine. This project will be carried out in the Department of Microbial Cellular Sciences which hosts several groups working on pathogenic mycobacteria, providing a stimulating academic environment with joint laboratory meetings and journal clubs. Over the past 15 years, the University has invested heavily in core facilities, spending >£33m on bioscience and 'omic facilities. Relevant to this project: (i) New containment level 3 facilities with dedicated support staff; (ii) Bioinformatics/computational biology core facility with Research Officers dedicated to assisting researchers in processing data and modelling biological systems; (iii) Bioimaging and Flow Cytometry Facility including new Nikon A1 confocal microscopes with environmental chambers and motorized stage; (iv) Genomics laboratory with equipment and staff support for nucleic acid analysis.

The **National Polytechnic School** (Spanish: Escuela Politécnica Nacional), also known as EPN, is a public university in Quito, Ecuador. The campus, called "José Rubén Orellana", is located at the sector center-oriental of Quito. Its student body numbers approximately 10,000 of which thirty percent are women. The main campus encompasses ten teaching and research faculties, in addition to four technical and specialized institutes. EPN was founded in 1869 with the aim of becoming the first technical and technological center in the country. Since its beginnings, EPN adopted the polytechnic university model, which stresses laboratory instruction in applied science and engineering. At the campus, there are some libraries with a content primarily oriented to engineering and scientific topics.

EPN has been consistently ranked among the top universities (the so-called Group A) in Ecuador. The Physics Department, home to Dr. Ramon Xulvi-Brunet, performs investigation in astrophysics, applied physics, interaction radiation-matter, materials, spectroscopic methods, nanostructures and biological systems.

Taras Shevchenko University of Kiev was ranked the first best position in Ukraine regarding the adequacy of alumni to the labor market of Ukraine. According to Scopus (2009), Taras Shevchenko University has the highest research paper output of any Ukrainian university, and is also the top research producer (as assessed by total paper citation count). The university features in the Webometrics Ranking of World Universities (2010) at 1,346 out of 8,000 in the world, at 63 out of top 100 universities of the Central and Eastern Europe, and a leading academic institution in Ukraine.

The University currently maintains relations and, in some cases, student exchange programs with universities of forty countries; a figure which includes a number of former republics of the Soviet Union. These are 14 faculties and 6 institutes.

The Faculty of Physics consists of 10 departments: Astronomy and Astrophysics, Experimental Physics, General Physics, Quantum Field Theory, Molecular Physics, Optics, Theoretical Physics, Metal Physics, Physics of Functional Materials, Nuclear Physics.

Specializations: Astrophysics, Experimental Nuclear Physics, Quantum Field Theory, Laser and Optoelectronic Engineering, Medical Physics, Molecular Physics, Solid State Optics, Theoretical Physics, High-Energy Physics, The Physics of Metals, the Physics of Nanostructures in Metals and Ceramics, Physics of Radiation Medicine, Physics of Functional Materials, Materials Physics, Photonics, Nuclear Power.

Palladin Institute of Biochemistry of the National Academy of Sciences of Ukraine has made a significant contribution to biochemistry. Achievements of outstanding scientists O. V. Palladin, D. L.

Ferdman, R. V. Chagovets, M. F. Guly, V. O. Belitser, V. P. Vendt et al. have become the national asset, their relevance still persists. Hundreds of monographs, paper collections, manuals, thousands of reviews, papers, encyclopaedic references have been published. Over 300 authors' certificates and patents for inventions have been secured, in particular for: a preparation to stop hemorrhages and accelerate healing of wounds (VIKASOL), BK-8 protein blood substitutes and protein preparations of blood coagulation system (factors VIII and IX), MEBIPHON anti-tumor preparation, MEDIKHRONAL anti-alcohol preparation, KALMIVID vitamin-mineral preparation to treat osteoporosis, VIDEIN vitamin D3 preparation and water-soluble vitamin D3 preparation for babies, compositions of effective fodder additives for farm animals etc. Major results have been obtained, facilitating the development of new biotechnologies, of a new generation of analytical biosensor tools, methods of chemical modification of natural biologically active substances. Lately Institute's scholars have created a unique collection of hybridomas - producers of monoclonal antibodies for diagnostics and treatment of various pathological processes.

The principal research trends of the Institute are: studying the structure, physical and chemical properties and biological functions of complex protein and supramolecular systems; biochemical mechanisms of metabolism regulation by low-molecular substances (vitamins, coenzymes, peptides, metal ions etc.); developing state-of-the-art biotechnologies (novel methods of production and practical application of biologically active substances and diagnostica in medical and veterinary practice, as well as biosensors for medicine, industry, agriculture and ecology).

The Institute also serves a scientific base for the Biotechnology Branch of Biochemistry Department of T. Shevchenko Kyiv National University, for the Centre of Shared Use of Research Facilities, Center for Analytical Research of Proteins and Peptides, Biological Testing Center. Numerous researchers from Kyiv and others cities attend Institute's academic library, containing 82 thousand periodicals and books. O.V. Palladin Memorial Museum was set up in 1973 and has been the center of studying the history of Ukrainian biochemistry.

RIKEN has large activities in computational sciences; The K computer, the world's first 10-PFLOPS supercomputer, was developed and operated by RIKEN. RIKEN also has a long history to develop special-purpose computers for scientific simulations. It also has strong research activities in both computational and experimental biology. These functions will contribute to the proposal.

Prof. Makoto Taiji is the author and implementer of a unique specialised computer for Molecular Dynamics, MDGRAPE. The machine won 3 Gordon Bell Prize (1995, 2006, 2009) for best performance, making it the faster computer in the world in its class.

The spectroscopic techniques available at **University of Messina** are: Raman spectroscopy, IR absorption, Terahertz spectroscopy, FT-IR and Raman microscopy. The available instrumentations are: Raman Horiba Jobin-Yvon T64000, IR Vertex 80v Bruker spectrometer, FT-IR Bruker based-THz IR spectrometer, FT-IR LUMOS microscope with FT-IR system for ALPHA macrosampling and Raman BRAVO module. In addition, UNIME uses also the following techniques at the International Large Scale Facilities: neutron spectroscopy, as neutron diffraction, elastic, quasi-elastic, inelastic and small angle scattering, at the Institute Laue Langevin (ILL, Grenoble, France), the Laboratoire Léon Brillouin (LLB, Saclay, France), the ISIS Facility (Rutherford Appleton Laboratory, Oxford, UK), the Berliner Neutron Scattering Center (BENSC, Berlin, Germany), the Paul Scherrer Institute (PSI-SINQ, Villigen, Switzerland); e synchrotron radiation spectroscopy, as inelastic and small angle scattering, at the European Synchrotron Radiation Facility (ESRF, Grenoble, France).