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## Overview of the International Conference on Agribusiness, Environmental Engineering and Biotechnologies – AGRITECH - 2019

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# Overview of the International Conference on Agribusiness, Environmental Engineering and Biotechnologies – AGRITECH - 2019

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**Abstract.** The overview describes the main directions and results of the International Conference “AGRITECH-2019” held in Krasnoyarsk in June 20-22, 2019. It gives the details about the participants and the proceedings.

The Volume contains Proceedings of the International Conference on Agribusiness, Environmental Engineering and Biotechnologies - AGRITECH-2019 which was held in Krasnoyarsk, Russian Federation in June 20-22, 2019.

The purpose of the Conference is to share the results and prospects of the achievements in using advanced high-tech chemical, biological and information technologies in agriculture and agribusiness, in the fields of energy, chemical, environmental, oil and gas engineering, mining and soil treatment technologies, as well as in modern areas of biodiversity and ecosystem stability research.

The Conference “AGRITECH-2019” was jointly organised by the International and Russian Union of Scientific and Engineering Associations (Moscow, Russia), Krasnoyarsk Regional Union of Scientific and Engineering Associations, Krasnoyarsk Science and Technology City Hall and Krasnoyarsk State Agrarian University.

The Program Committee and Editorial Board included prominent professors and scientists from the Russian Academy of Sciences, University of Maribor (Slovenia), Xingtai University (China), Ruhr University in Bochum (Germany), Siberian Federal University (Russia), Reshetnev Siberian State University of Science and Technology (Russia), Krasnoyarsk State Agrarian University (Russia) as well as specialists from Russian and foreign leading industrial enterprises.

A wide range of fundamental and applied problems in various biological and agri-technological systems has undergone consideration during the meeting.

The Conference was organised in 6 main directions:

- Agribusiness, Economics and Organization of Agritech Engineering.
- Information Technologies, Automation Engineering and Digitization of Agriculture.
- Chemical, Ecological, Oil and Gas Engineering.
- Biological Technologies in Agriculture: from Molecules to Ecosystems.
- Environmental Engineering and Management, Mining and Soil Treatment Technology.
- Biodiversity and Ecosystem Stability.

The program of the Conference which took place in Krasnoyarsk State Agrarian University included keynote and plenary talks as well as numerous presentations of the participants (figure 1).





**Figure 1.** Plenary talks and sections.

The international scope of the Conference was confirmed by the participation of representatives from 6 countries besides Russia (Germany, Kazakhstan, Vietnam, China, Ukraine, Uzbekistan):

- Al-Farabi Kazakh National University, Almaty, Kazakhstan,
- Almaty Technological University, Almaty, Kazakhstan
- Almaty University of Power Engineering and Telecommunications, Kazakhstan,
- Atyrau State University named after H. Dosmukhamedov, Kazakhstan
- Gmbh Anvilex, Germany,
- Kazakh Academy of Transport and Communications named after M. Tynyshpayev, Almaty, Kazakhstan,
- L. Gumilev Eurasian National University, Kazakhstan
- National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine
- Nazarbayev intellectual school, Almaty, Kazakhstan
- Vietnam Maritime University, Le Chan, Hai Phong, Vietnam
- Vietnam National University, Ha Noi, Vietnam;
- Zhangir Khan West Kazakhstan Agrarian Technical University, Kazakhstan
- Research Institute for Irrigation and Water Problems, Tashkent, Uzbekistan;
- Tashkent Institute of Engineers of Irrigation and Agricultural Mechanization, Uzbekistan.

The participants from Russia (more than 30 regions) represented over 200 universities, scientific institutes and organisations, industrial enterprises:

- E. Favorsky Irkutsk Institute of Chemistry,
- A.V. Zhirmunsky National Scientific Center of Marine Biology;
- Academy of Marketing and Social Information Technologies, Krasnodar,
- Achinsk branches of Krasnoyarsk state agricultural university,
- Agricultural Productive Cooperative “Kolkhos Prigorodny”, Yoshkar-Ola,
- Amur State University, Blagoveshchensk,
- ANO CPE MOMENTUM, Moscow,
- ANO CPE MOMENTUM, Chelyabinsk,
- Astrakhan State Technical University
- Astrakhan State University of Architecture and Civil Engineering,
- Baikal Institute of Nature Management of Siberian Branch of the Russian Academy of Sciences, Ulan-Ude,
- Baikal State University, Irkutsk,
- Banzarov Buryat State University; Ulan-Ude,
- Bashkir Research Institute of Agriculture – Subdivision of the Ufa Federal Research Centre of the Russian Academy of Sciences Ufa,
- Bashkir State Agrarian University, Ufa,
- Bauman Moscow state technical university, Moscow,
- Belgorod IVL, Belgorod,
- Belgorod State Agricultural University named after V.Y. Gorin,
- Birsik branch of Bashkir State University, Birsik,
- Blagonravov Institute of Mechanical Engineering, Russian Academy of Sciences
- BSH Bitovie pribory, Saint -Petersburg,
- Bunin Yelets State University, Yelets,
- Buryat State University, Ulan-Ude,
- Center of agrochemical service "Omsk"; Omsk,
- Chechen State Pedagogical University, Grozny;
- Chechen State University, Grozny,
- Chelyabinsk State University, Chelyabinsk,
- Chuvash State Agricultural Academy, Cheboksary,
- Chuvash State University, Cheboksary,
- Complex Melioration and Protective Afforestation of the Russian Academy of Sciences, Volgograd,
- Department of Mathematics and Mathematical Modeling of Novokuznetsk Institute (Branch) of Kemerovo State University, Novokuznetsk,
- Emerson, Russian Federation
- Far Eastern Federal University;

- Far Eastern Higher Combined-Arms Command School, Blagoveshchensk;
- Far Eastern State Agrarian University, Blagoveshchensk,
- Federal Center for Toxicological, Radiation and Biological Safety, Kazan,
- Federal Centre for Agricultural Consulting and Retraining of Agro-Industrial Complex Personnel, Moscow
- Federal research center "Informatics and management" of the Russian Academy of Sciences,
- Federal Research Center "Krasnoyarsk Scientific Center of the Siberian Branch of the Russian Academy of Sciences",
- Federal Research Center of Agroecology,
- Federal Scientific Center "All-Russian Research and Technological Poultry Institute" of Russian Academy of Sciences, Sergiev Posad,
- Federal Scientific Center for Medical and Preventive Health Risk Management Technologies of the Federal Supervision Agency for Customer Protection and Human Welfare, Perm,
- Federal state budgetary institution center of agrochemical service "Krasnodar",
- Federal State Budgetary Scientific Institution «All-Russian Rice Research Institute», Krasnodar,
- Financial University under the Government of the Russian Federation, Ufa Branch
- FRC Kazan Scientific Center,
- G.P. Somov Research Institute of Epidemiology and Microbiology;
- Gubkin branch of Belgorod state technological University named after V. G. Shukhov, Gubkin, Belgorod region,
- I.V.Tananaev Institute of Chemistry and Technology of Rare Elements and Mineral Raw Materials of the Kola Science Centre of the RAS, Apatity,
- Institute of Computational Modelling SB RAS, Krasnoyarsk,
- Institute of Continuous Education in Forestry, Divnogorsk
- Irkutsk National Research Technical University, Irkutsk,
- Irkutsk Scientific Research Institute of Agriculture,
- Irkutsk State Agrarian University named after A. A. Ezhevsky,
- Irkutsk State Transport University,
- Ivanovo State Polytechnic University,
- Izhevsk State Agricultural Academy, Russia
- JSK Proektneftegaz, Saint Petersburg,
- K.G. Razumovsky Moscow State University of technologies and management,
- Kabardino-Balkar state agrarian university named after M M Kokov, Nalchik,
- Kalashnikov Izhevsk State Technical University;
- Kazan Federal University, Kazan, Republic of Tatarstan,
- Kazan Innovative University named after V.G. Timiryasov,
- Kazan National Research Technical University named after A.N. Tupolev–KAI,
- Kazan National Research Technological University
- Kazan State Academy of Veterinary Medicine,
- Kazan State Medical University;
- Kazan State Power Engineering University, Kazan,
- Kemerovo institute (branch) Russian University of Economics named after G.V. Plekhanov,
- Kemerovo state University, Kemerovo, Russia
- Komarov Botanical Institute of the Russian Academy of Sciences, Saint-Petersburg, Russia
- Kozma Minin Nizhny Novgorod State Pedagogical University (Minin University),
- Krasnoyarsk City Hall of Science and Technology, Krasnoyarsk, Russia
- Krasnoyarsk Research Institute of Agriculture SB RAS,
- Krasnoyarsk Sate Agrarian University;
- Kuban State Agrarian University named after I.T. Trubilin, Krasnodar,
- Kurgan State University, Kurgan,
- Kursk State Agricultural Academy named after I. I. Ivanov, K.G. Razumovsky
- L.K. Ernst Federal Science Center for Animal Husbandry
- Lesosibirsk Branch of Reshetnev Siberian State University of Science and Technology, Lesosibirsk,
- LLC «Biolaboratory», Moscow,
- LLC «Dolomit», Krasnoyarsk,
- LLC Vetbiochem, Moscow,

- M. K. Ammosov North-Eastern Federal University, Yakutsk,
- Mari Research Institute of Agriculture, Yoshkar-Ola,
- Mari State University, Yoshkar-Ola,
- Ministry of agriculture and food of the Republic of Tuva, Kyzyl,
- Moscow Power Engineering Institute
- Moscow State Technological University Stankin,  
Moscow state university named after M.V. Lomonosov,
- Moscow State University of Technologies and Management (the First Cossack University),
- MUE «Ufavodokanal», Ufa,
- Murmansk Arctic State University,
- Murmansk Marine Biological Institute,
- Murmansk State Technical University,
- N. F. Katanov Khakas State University, Abakan,
- N. V. Vereshchagin Vologda State Dairy Farming Academy, Vologda-Molochnoe,
- National Library of Bashkortostan;
- Nizhny Novgorod state engineering and economic university, Knyaginino,
- North Caucasus Federal Agricultural Research center,
- Northern (Arctic) Federal University named after M.V. Lomonosov, Arkhangelsk,
- Northern Trans-Ural state agricultural university, Tyumen,
- Nosov Magnitogorsk State Technical University, Magnitogorsk;
- Novosibirsk State University of Economics and Management,
- NTC Privodnaya Tekhnika, Chelyabinsk
- Omsk Agricultural research center, Omsk, Russia
- Omsk Scientific Center, Omsk,
- Omsk State Agrarian University named after P.A. Stolypin;
- Omsk State Technical University,
- Orel State Agrarian University named after N. V. Parakhin,
- Orel State University named after I.S. Turgenev,
- Orenburg State Agrarian University,
- P.A. Stolypin Omsk State Agrarian University;
- Penza State University of Architecture and Construction
- Perm Institute of the FPS of Russia, Perm;
- Perm Military Institute of National Guard Troops of the Russian Federation,
- Perm National Research Polytechnic University,
- Perm State Agro-Technological University named after academician D N Pryanishnikov;
- Perm State National Research University, Perm, Russia
- Petrozavodsk State University
- Pitirim Sorokin-Nikolai Kondratieff International Institute
- Plekhanov Russian university of economics, Moscow,
- Prof. V.F. Voyno-Yasenetsky Krasnoyarsk State Medical University, Krasnoyarsk
- Pskov State University, Pskov,
- Research and Production Enterprise "Bashkirskoe" LLC
- Reshetnev Siberian State University of Science and Technology, Krasnoyarsk,
- RiK-Energo Ild, Ekaterinburg,
- Rostov State Economic University (RINH), Rostov-on-Don,
- Rostov State University of Economics, Rostov-on-Don,
- Russian National Research Medical University named after N.I. Pirogov, Moscow,
- Russian Presidential Academy of National Economy and Public Administration, Perm branch
- Russian State Centre for Quality and Standardization of Veterinary Drugs and Feed ("VGNKI"),
- Russian state social University, Moscow,
- Saint Petersburg State Electrotechnical University;
- Saint Petersburg State Forest Technical University, Saint-Petersburg,
- Saint Petersburg state technological University
- Saint Petersburg State University of Aerospace Instrumentation,
- Saint Petersburg State University of Architecture and Civil Engineering,
- Saint Petersburg State University of Industrial Technology and Design,
- Saint-Petersburg Mining University,
- Saint-Petersburg State University,
- Samara Scientific Center of Russian Academy of Science,
- Samara State Agrarian University, Ust-Kinelsky,

- Samara State Technical University,
- Saratov State Agrarian University, Saratov,
- Science Siberian Institute of Plant Physiology and Biochemistry,
- Sholom-Aleichem Priamursky State University, Birobidzhan;
- Siberian Branch of the Russian Academy of Science, Irkutsk,
- Siberian Federal University, Krasnoyarsk
- Siberian Institute of Plant Physiology and Biochemistry, Irkutsk,
- Siberian Law Institute of the Ministry of Internal Affairs of Russia Russian Federation,
- Siberian University of Consumer Cooperatives, Novosibirsk,
- South Ural Institute of Management and Economics,
- South Ural State University, Chelyabinsk,
- SRO, JSC "ECO-Engineering", Achinsk;
- State regional center for standardization, metrology and testing in the Krasnoyarsk territory, Republic of Khakassia and Republic of Tuva;
- Stavropol branch of the Moscow Pedagogical State University, Stavropol,
- Stavropol State Agrarian University
- T.F. Gorbachev Kuzbass State Technical University, Kemerovo,
- Tatar Scientific Research Institute of Agricultural Chemistry and Soil Science,
- The All-Russian State University of Justice (RLA of the Ministry of Justice of Russia), Moscow,
- Togliatti State University, Togliatti,
- Transbaikalian State University, Chita,
- Tuvan State University, Kyzyl;
- Tyumen industrial University, Tyumen,
- Udmurt Federal Research Center of the Ural Branch of the Russian Academy of Sciences, Izhevsk,
- Udmurt State University, Izhevsk,
- Ufa Research Centre, Russian Academy of Sciences
- Ufa State Petroleum Technological University;
- Ufa State Petroleum Technological University;
- Ulyanovsk State Technical University, Ulyanovsk,
- Ural Federal University named after the first President of Russia B.N. Yeltsin, Ekaterinburg,
- Ural State Forest Engineering University, Ekaterinburg,
- Ural State University of Economics, Yekaterinburg
- V. M. Gorbатов Federal Research Center for Food Systems of RAS, Moscow,
- V. P. Astafyev Krasnoyarsk State Pedagogical University, Krasnoyarsk, Russia
- V.A. Trapeznikov Institute of Control Sciences of Russian Academy of Sciences, Moscow,
- V.I. Ilichev Pacific Oceanological Institute, Vladivostok,
- V.I. Vernadsky Crimean Federal University, Simferopol, Republic of Crimea,
- Vetbiochem, Moscow,
- Vladimir State University named after Alexander and Nikolay Stoletovs, Vladimir,
- Volga State University of Technology,
- Volgograd Regional Public Scientific Organization "Ecological Academy", Volgograd,
- Volgograd State Socio-Pedagogical University
- Volgograd State Technical University, Volgograd, Russia
- Volgograd State University,
- Voronezh institute of high technologies,
- Voronezh Institute of the Federal Penitentiary Service of the Russian Federation, Voronezh,
- Voronezh state technical university,
- Voronezh State University of Engineering Technologies, Voronezh,
- Vyatka State Agricultural Academy, Kirov

The event has offered a platform for bringing together students, postdocs, innovative academics and industrial experts to exchange their ideas and contribute new engineering approaches to research agri-mechanical and automation processes in various technological-, biological- and eco-systems. Great interest was aroused by the section devoted to economics and organization of agritech engineering, biological technologies, biodiversity and ecosystem stability.

The Conference provided the premier interdisciplinary and multidisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, concerns, practical challenges encountered and the solutions adopted in the fields of environmental and biological sciences, agritech engineering, chemical, mining and soil treatment technologies, digitization of agriculture, etc. Although the schedule of the Conference was very tight, there were very vivid discussions among the participants. The participants who could not come to the Conference due to different reasons including the problem of high transportation costs presented on-site presentations which are available on the web-site of the Conference.

All participants were invited to present their papers in this Volume and all submitted manuscripts went through the independent peer review process. We are very grateful to all reviewers from Russia, China, USA, Slovenia, Germany and Republic of Kazakhstan for their time and highly professional comments. We deeply believe that their reviews gave opportunity to improve the scientific quality of the presented papers which may be useful for academic, scientific and agri-industrial partners.

More than 450 reports were submitted to the Organizing Committee of the Conference. 363 reports were selected for inclusion into this Volume after the review process. All the papers were subjected to rigorous peer-review by conference committee members and international reviewers. The papers were selected based on their quality and relevance to the Conference directions. The proceedings present to the readers the recent advances in the field of agribusiness, economics and organization of agritech engineering, biological and information technologies, environmental, chemical, ecological, power, oil and gas engineering. These papers reflect modern engineering approaches in all Conference directions, broaden the researches of the previous Conferences [1-2].

We chose the IOP Conference Series: Earth and Environmental Science (EES) to provide all contributors with the opportunity to publish their papers in an international, peer-reviewed journal. This is understood and appreciated by all the participants of our Conference, and therefore this Volume provides an excellent overview of the main topics of our Conference.

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