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## Overview of the III International Conference “MIP -III-2021: Modernization, Innovations and Progress”

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## Overview of the III International Conference “MIP -III-2021: Modernization, Innovations and Progress”

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**Abstract.** The overview describes the main directions and results of the III International Conference MIP-III-2021 held in Krasnoyarsk in April 29-30, 2021. It gives the details about the participants and the proceedings.

The Volume contains Proceedings of the III International Conference “MIP-III-2021: Modernization, Innovations and Progress” which was held in Krasnoyarsk, Russian Federation in April 29-30, 2021. The Conference took place at the Krasnoyarsk Science and Technology City Hall.

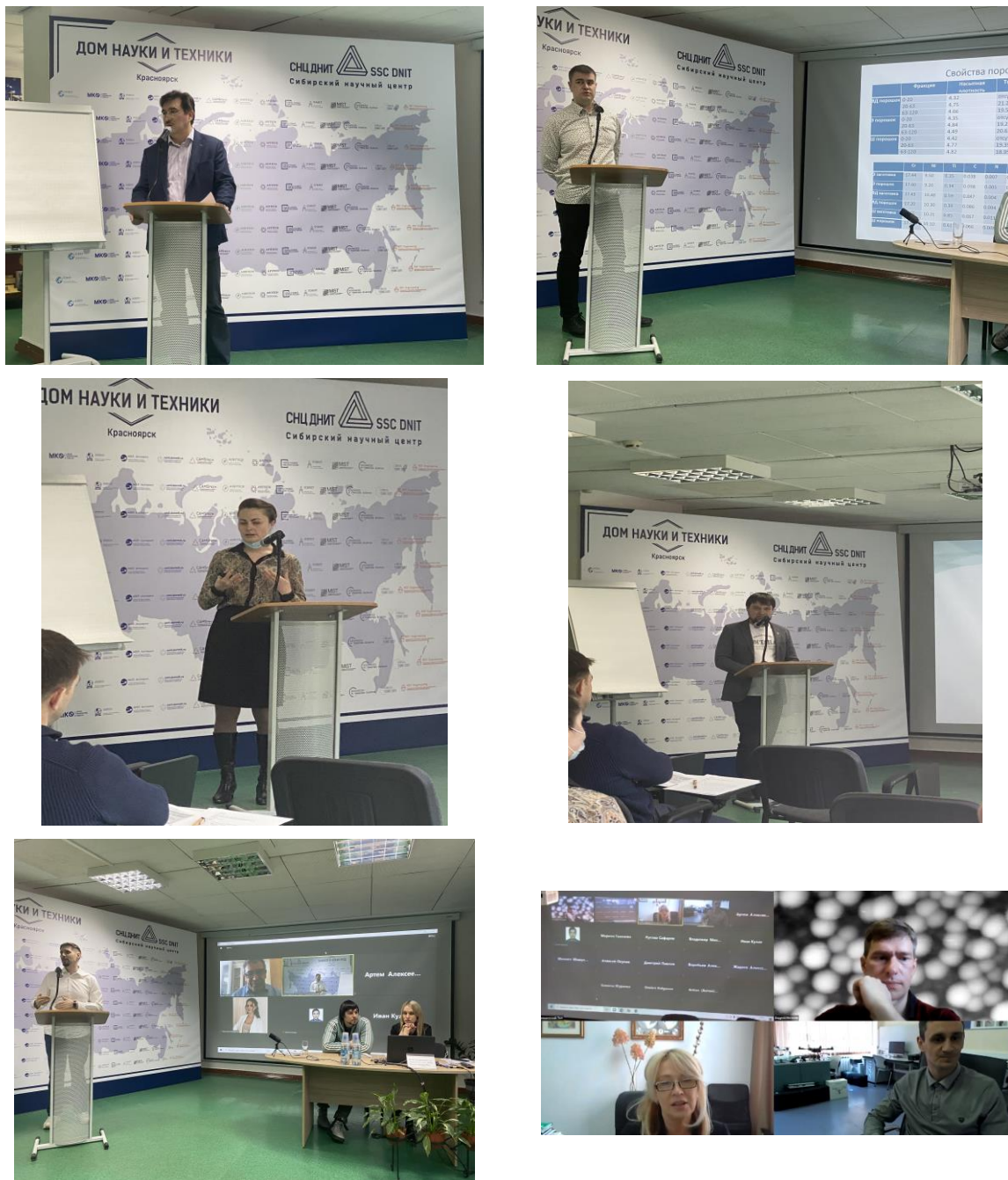
The purpose of the Conference is to share the results and prospects of the achievements in using advanced scientific, innovative and information technologies in materials science, mechanical, aerospace, chemical, ecological and power engineering, metallurgy and design of new materials, economics and organization of mechanical engineering production, automation engineering for industry 4.0, etc. The Conference provided an international forum for the presentation of original results in mathematical modelling for software- and hardware applications in various fields of engineering, natural sciences, cybernetics, computer science, etc.

The Conference was jointly organised by the Russian Union of Scientific and Engineering Associations (Moscow, Russia), Krasnoyarsk Science and Technology City Hall and Siberian Scientific Centre DNIT. Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (Tashkent, Uzbekistan) was the partner university at the Conference.

The main partner organisations in preparing and organising the Conference in Krasnoyarsk as well as of the previous scientific events [1-15] were Siberian Federal University and Krasnoyarsk Scientific Centre of the Siberian Branch of the Russian Academy of Sciences [16-18].

The program of the Conference consisted of keynote and plenary talks and numerous presentations (figure 1). Key speakers represented countries such as Kazakhstan, Uzbekistan and Russia.





**Figure 1.** Keynote and plenary talks.

The Program Committee and Editorial Board included prominent professors and scientists from the Russian Academy of Sciences, Liaoning Normal University (China), Ruhr University in Bochum (Germany), Siberian Federal University (Russia), Tashkent University of Information Technologies (Uzbekistan), SDE II Microsoft (USA), Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (Uzbekistan), Voronezh State Technical University (Russia), Baku State University (Azerbaijan), University of Maribor (Slovenia) as well as specialists from Russian and foreign leading industrial enterprises (figure 2).



**Yury V. Gulyaev** -  
Academician of the Russian  
Academy of Science, Doctor  
of Physics and Mathematics,  
Professor, President of the  
International and Russian  
Union of Scientific and  
Engineering Associations,  
Moscow, Russia



**Igor V. Kovalev** –  
Doctor of Technical  
Sciences, Professor,  
President of Krasnoyarsk  
Regional Union of  
Scientific and Engineering  
Associations, Director of  
Krasnoyarsk Science and  
Technology City Hall,  
Krasnoyarsk, Russia



**Sergey Drukarenko** -  
Candidate of Science, Vice-  
President, First Secretary of  
Russian Union of  
the International and  
Russian Union of Scientific  
and Engineering  
Associations, Moscow,  
Russia



**Uktam P Umurzakov** –  
Dr. Sc., Professor, Rector of  
the Tashkent Institute of  
Irrigation and Agricultural  
Mechanization Engineers,  
Tashkent, Uzbekistan

**Figure 2.** International Programme Committee Chairs.

Members of the International Programme Committee were as follows:

- Alena A. Stupina - Doctor of Technical Sciences, Professor of the Siberian Federal University, Krasnoyarsk, Russia
- Bahadir S. Mirzaev - First Vice-Rector of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Doctor of Technical Sciences, Professor, Tashkent, Uzbekistan
- Takhir Z Sultanov - Vice-Rector for Research and Innovation of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Doctor of Technical Sciences, Professor, Tashkent, Uzbekistan
- Kadyrzhan A Shavazov - Dean of the Faculty of Agricultural Mechanization of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Candidate of Technical Sciences, Associate Professor, Tashkent, Uzbekistan
- Komil D Astanakulov - Head of the Department of Agricultural Machinery, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Doctor of Technical Sciences, Senior Researcher, Tashkent, Uzbekistan
- Maja Fošner - PhD, Deputy Dean of the Faculty of Logistics, University of Maribor, Slovenia
- Alexander Ivanov - PhD, Researcher at the Federal Polytechnic School of Lausanne (EPFL), Lausanne, Switzerland
- Zhang Fengan – Associate Director of International Exchange Office of Liaoning Normal University, China
- Dr Gundula Herwig – Head of Staff Unit for International and European Affairs, Ministry of Science, Research and Culture, Potsdam, Germany
- Aleksey M. Zyuzin - Chairman of the Board of Directors of the House of Science and Technology of Russian Union of Scientific and Engineering Associations, Honored Inventor of the Republic of Mordovia, Russia.



The Editorial Board consisted of the following members:

- Igor V. Kovalev - Doctor of Technical Sciences, Professor, President of the Krasnoyarsk Regional Union of Scientific and Engineering Associations, Director of Krasnoyarsk Science and Technology City Hall, Krasnoyarsk, Russia
- Alena A. Stupina - Doctor of Technical Sciences, Professor of the Siberian Federal University, Krasnoyarsk, Russia
- Hans - Ruediger Fluck - Doctor of Science, Professor of Ruhr University in Bochum, Germany
- Sergey Ognerubov – Candidate of Technical Sciences, PhD, SDE II, Microsoft, USA, Microsoft, USA
- Normakhammad Ravshanov - Doctor of Technical Sciences, Professor, Scientific and Innovation Centre of Tashkent University of Information Technologies, Uzbekistan
- Alekper Aliev - Doctor of Technical Sciences, Professor, Baku State University, head of the department of Information Technologies and Programming, Azerbaijan
- Anna Voroshilova - PhD, Associate Professor, Vice-Director of the Krasnoyarsk Science and Technology City Hall, Krasnoyarsk, Russia
- Oleg Kravets - Doctor of Technical Sciences, Professor of Voronezh State Technical University, Russia
- Karl-Erwin Grosspietsch – PhD, Chairman of The European Organization for Information and Microelectronics, Germany
- Komil D Astanakulov - Head of the Department of Agricultural Machinery, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Doctor of Technical Sciences, Senior Researcher, Tashkent, Uzbekistan.

The international scope of the Conference was confirmed by the participation of representatives from Kazakhstan (S. Utebaev Atyrau University of Oil and Gas, Atyrau; M. Kozybayev North-Kazakhstan State University, Petropavlovsk; Karaganda State Technical University), China (Central South University, Changsha, Hunan; China Aviation Industry General Aircraft Zhejiang Institute Co., Ltd), Uzbekistan (Tashkent State Technical University; Namangan Institute of engineering and technology), Kyrgyzstan (Central-Asian Institute for Applied Geosciences, Bishkek).

The participants from Russia represented more than 100 universities, scientific institutes and organisations, industrial enterprises:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• All-Russia Research Institute of Hydraulic Engineering and Land Reclamation of A N Kostyakov, Moscow</li> <li>• Anton Chekhov Taganrog State Institute (branch) Rostov State University of Economics, Taganrog</li> <li>• Bashkir State University, Ufa</li> <li>• Bauman Moscow State Technical University</li> <li>• Belgorod State Technological University named after V.G. Shukhov</li> <li>• Blagonravov Institute of Mechanical Engineering, Russian Academy of Sciences, Moscow</li> <li>• Boreskov Institute of Catalysis SB RAS</li> <li>• Branch of Ufa State Petroleum Technological University in Salavat, Salavat, the Republic of Bashkortostan</li> </ul> | <ul style="list-style-type: none"> <li>• Buryat State Agricultural Academy named after V.R. Filippov, Ulan-Ude</li> <li>• Center for Physical and Technical Problems of Energy of the North of the Federal State Budgetary Institution of Science of the Kola Scientific Center of the Russian Academy of Sciences, Apatity</li> <li>• Chechen State University</li> <li>• Chelyabinsk State University</li> <li>• Department "Welding Production Technology" of the Ural Federal University named after B. N. Yeltsin, Yekaterinburg</li> <li>• Department of Chemical and Food Production Machines and Apparatuses (Orenburg State University), Orenburg</li> <li>• Department of Petroleum Engineering Technology, Ufa State Petroleum Technological University</li> </ul> |
|--|---|

- Derzhavin Tambov State University
- Don State Technical University, Rostov-on-Don
- Faculty of Biology and Chemistry Chechen State University
- Far Eastern State Technical Fisheries University, Vladivostok
- Federal Research Centre the Southern Scientific Centre of the Russian Academy of Sciences, Rostov-on-Don
- Federal State Budgetary Educational Institution of Higher Education "Murmansk Arctic State University"
- GS Nanotech, Gusev
- Institute of Informatics and Telecommunications, Reshetnev Siberian State University of Science and Technology, Krasnoyarsk
- LLC TEHOSNASTKA-RTD, RF
- Novosibirsk State Technical University
- Institute of Metal Physics named after A. N. Mikheev, Ural Branch of the Russian Academy of Sciences, Yekaterinburg
- Institute of Physics and Technology, Petrozavodsk State University
- Institute of Precision Mechanics and Control, Russian Academy of Sciences, Saratov
- Institute of service and business (branch) of Don state technical University in Shakhty, Rostov Region
- Irkutsk State Agricultural University named after A.A. Ezhevsky
- Irkutsk State National Research Technical University
- Irkutsk State University
- ITMO University, St. Petersburg
- Ivanovo State University
- JSC "Academician M F Reshetnev Information satellite systems",
- Kabardino-Balkarian state agricultural university named after V.M. Kokov, Nalchik
- Kabardino-Balkarian State University
- Kazan Federal University
- Kazan National Research Technological University
- Kemerovo State University
- Krasnoyarsk State Agrarian University
- K-SkAI LLC, Petrozavodsk
- Kuban State Agrarian University named after I.T.Trubilin, Krasnodar
- Kuban State Technological University, Krasnodar
- Kuban State University, Krasnodar
- Lipetsk State Technical University
- Lobachevsky State University of Nizhny Novgorod
- Mendeleev University of Chemical Technology of Russia, Moscow
- Military Academy of Logistics, St Petersburg
- Military Scientific Educational Center of Military-Air Forces "N.E. Zhukovsky and Ju.A. Gagarin Military-Air Academy", Voronezh
- MIREA—Russian Technological University, Moscow
- Moscow Power Engineering Institute (MPEI)
- Moscow State University of Technology "STANKIN"
- Nizhny Novgorod State Agricultural Academy
- Nizhny Novgorod State Technical University R.E. Alekseev
- North-Caucasian State Academy, Cherkessk
- North-Caucasus Federal University
- Novosibirsk State University
- Orel State University named after I.S. Turgenev
- Penza State University
- Perm Institute of the FPS of Russia
- 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
- Petrozavodsk State University
- Platov South-Russian State Polytechnic University, Novochechassk
- Research and Design Institute of Environmental Problems LLC, Orenburg
- Research and production enterprise «Antares», Saratov
- Reshetnev Siberian state university of science and technologies, Krasnoyarsk
- Russian State Agrarian University-Moscow Agricultural Academy named after K.A. Timiryazev
- Saint-Petersburg State University
- Saint-Petersburg University for Aerospace Instrumentation
- Samara National Research University
- Samara Scientific Center of the Russian Academy of Sciences
- Samara State Technical University
- Siberian Federal Scientific Centre of Agrotechnology, Russian Academy of Science
- Siberian Federal University

- Siberian Fire and Rescue Academy of the Ministry of Emergency Situations of Russia, Zheleznogorsk
- Southern Federal University
- Southern Federal University, Rostov-on-Don
- Stavropol State Agrarian University
- T.F. Gorbachev Kuzbass State Technical University, Kemerovo
- Tambov State Technical University
- Thermal Electrical Systems LLC
- Togliatti State University
- Ufa State Aviation Technical University
- Ufa State Petroleum Technological University
- Ulyanovsk Research Institute of Aviation Technology and Production Organization
- Ulyanovsk State Technical University
- University of the Ministry of Internal Affairs of St. Petersburg
- Ural engineering center, Chelyabinsk
- Ural Federal University named after the first President of Russia B.N. Yeltsin, Ekaterinburg
- Volga Region State University of Service
- Volgograd State Agricultural University
- Volgograd State Technical University
- Voronezh Institute of High Technologies

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 mechanical and automation processes in various technological, production and information systems. Great interest was aroused by the section about Cybernetics, Computation and Simulation for Organization of Mechanical Engineering Production.

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 materials sciences, mechanical engineering, aerospace technologies, metallurgy, chemical, ecological and power engineering, cybernetics, data protection in automation systems, etc. The participants who could not come to the Conference due to different reasons including the problem of global cases of COVID-19 prepared video reports and presented on-site presentations which are available on the web-site of the Conference. A wide range of fundamental and applied problems in various production and technological systems has undergone consideration during the video conference.

The Conference also was broadcast in Zoom which allowed participants all over Russia as well as from abroad to participate and make reports as well as to ask and answer questions.

The programme of the Conference included the following 5 sections:

- Material Science and Aerospace Technology
- Mechanical and Automation Engineering for Industry 4.0
- Metallurgy, Chemical, Ecological and Power Engineering
- Processing, Engineering and Applications
- Information Technologies, Reliability and Data Protection in Automation Systems
- Cybernetics, Computation and Simulation for Organization of Mechanical Engineering Production

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, Azerbaijan and Uzbekistan 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 industrial partners.

MIP-III-2021 is a highly demanded event among the scientists and specialists with a competitive submission process. More than 500 reports were submitted to the Organizing Committee of the Conference MIP-III-2021. 105 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, novelty, scientific significance

and relevance to the Conference directions. The proceedings present to the readers the recent advances in the field of material science, mechanical and automation engineering for industry 4.0, data protection in automation systems, cybernetics, information technologies, chemical, ecological and power engineering. These papers reflect modern engineering approaches in all Conference directions, broaden the researches of the previous Conferences [3, 10].

We chose the IOP Conference Series: Materials Science and Engineering 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. The Proceedings of the I Conference MIP: Engineering-2019 were published in IOP Conference Series in June 2019 [3] and the proceedings of the II Conference MIP: Engineering-2020 were published in IOP Conference Series in May 2020 [10].

### Acknowledgements

The Conference was sponsored by JSC “Academician M. F. Reshetnev Information satellite systems”, Zheleznogorsk, Russia; International Union of Scientific and Engineering Associations and Russian Academy of Engineering, Moscow, Russia (figure 3). The Organizing Committee is grateful to the sponsor organizations for sponsor support, financial contribution and cooperation.



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**The International Union of**  
*Scientific and Engineering Public Associations*

Moscow, Russia  
<http://www.rusea.info/>



**Russian Academy of Engineering**

Moscow, Russia  
<http://www.info-rae.ru/>

**Figure 3.** Conference Sponsor Organizations.

MIP Conference Committee highly appreciate the contribution of Professor Oleg Kravets (Voronezh State Technical University, Russia) for cooperation in organization of MIP: Engineering-III-2021 and preparation of the papers for this Volume. We are grateful to scientists and professors of Siberian Federal University, Saint Petersburg State University of Aerospace Instrumentation, Institute of Computational Modeling of Siberian Branch of Russian Academy of Sciences, National Research University Moscow Aviation Institute, South Ural State University (National Research University), Siberian State University named after M.F. Reshetnev, IrGUPS, ITMO University, SKFU, Novosibirsk State University for active participation in the Conference.

On behalf of the Conference Committee and organizers, we would like to thank all the authors who contributed to this Volume as well as to the reviewers, speakers and all the conference participants for their support to MIP-III-2021.

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