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Overview of the II International Conference “MIP: Engineering-2020: Modernization, Innovations, Progress: Advanced Technologies in Material Science, Mechanical and Automation Engineering”

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Overview of the II International Conference “MIP: Engineering-2020: Modernization, Innovations, Progress: Advanced Technologies in Material Science, Mechanical and Automation Engineering”

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Abstract. The overview describes the main directions and results of the II International Conference MIP: Engineering-2020 held in Krasnoyarsk in April 16-18, 2020. It gives the details about the participants and the proceedings.

The Volume contains Proceedings of the II International Conference “MIP: Engineering-2020: Modernization, Innovations, Progress: Advanced Technologies in Material Science, Mechanical and Automation Engineering” which was held in Krasnoyarsk, Russian Federation in April 16-18, 2020.

The purpose of the Conference MIP: Engineering-2020 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, 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 MIP: Engineering-2020 was jointly organised by the International and Russian Union of Scientific and Engineering Associations (Moscow, Russia), Krasnoyarsk Regional Union of Scientific and Engineering Associations and Krasnoyarsk Science and Technology City Hall.

The main partner organisations in preparing and organising the Conference in Krasnoyarsk as well as of the previous scientific events [1-6] were Siberian Federal University and Krasnoyarsk Scientific Centre of the Siberian Branch of the Russian Academy of Sciences.

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), Voronezh State Technical University (Russia), Baku State University (Azerbaijan) as well as specialists from Russian and foreign leading industrial enterprises.

The international scope of the Conference was confirmed by the participation of representatives from 13 countries besides Russia (Austria, Azerbaijan, Belarus, Bulgaria, Czech Republic, Ukraine, Kazakhstan, Vietnam, Palestine, China, Uzbekistan, Turkey and Tajikistan):



- Abai Kazakh National Pedagogical University, Kazakhstan
- AC2T research GmbH, Wiener Neustadt, Austria
- Al-Farabi Kazakh National University, Almaty, Kazakhstan
- Azerbaijan State University for Oil and Industry, Baku, Azerbaijan
- Belarusian State University, Minsk, Belarus
- Bukhara branch of Tashkent institute of irrigation and agricultural mechanization, Bukhara, Uzbekistan
- Bukhara Engineering-Technological Institute, Bukhara, Uzbekistan
- Charles University, Prague, Czech Republic
- China Aviation Industry General Aircraft Zhejiang Institute Co., Ltd, China
- Department of Management Information Systems, Al Istiqlal University, Jericho, Palestine
- Department of Non-Destructive Testing Instruments and Systems, Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine
- Djizzakh State Pedagogical Institute, Djizzakh, Uzbekistan
- Donbass National Academy of Civil Engineering and Architecture, Ukraine
- Donetsk National University, Ukraine
- Gulistan State University, Gulistan, Uzbekistan
- Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria
- Institute of retraining and advanced training of public education workers, Tashkent, Uzbekistan
- K. Satpayev Kazakh national research technical University, Kazakhstan
- Khoja Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan & Turkey
- M. Auezov South Kazakhstan State University, Kazakhstan
- Minsk Research Instrument-Making Institute JSC (MNIPI JSC), Minsk, Belarus
- Namangan State University, Namangan, Uzbekistan
- National Aviation Academy of the Azerbaijan, Baku, Azerbaijan
- Navoi State Mining Institute, Navoi, Uzbekistan
- Samarkand branch of Tashkent University of information technologies named after Mukhammad al-Khwarizmi, Samarkand, Uzbekistan
- Samarkand State University, Samarkand, Uzbekistan
- Shenzhen MSU – BIT University, Shenzhen, China
- State Technical University, Tashkent, Uzbekistan
- Tajik National University, Dushanbe city, Tajikistan
- Tashkent Institute of Railway Engineers, Uzbekistan
- Tashkent Institute of Textile and Light Industry, Tashkent, Uzbekistan
- Tashkent pharmaceutical Institute, Tashkent, Uzbekistan
- Tashkent State Technical University named after I. Karimov, Tashkent, Uzbekistan
- Tashkent University Information Technologies named after Al-Kharezmi, Tashkent, Uzbekistan
- Tashkent Pediatric Medical Institute, Uzbekistan
- The Tajik state university of finance and economics, Dushanbe, Tajikistan
- Urgench branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi, Uzbekistan
- Vietnam Maritime University, Hai Phong, Vietnam
- Vietnam National University, Ho Chi Minh city, Vietnam
- Vietnam Naval Technical Institute, Vietnam
- Viettel aerospace institute, Vietnam

The participants from Russia represented more than 230 universities, scientific institutes and organisations, industrial enterprises:

- A.K. Aylamazyan IPS RAS, Veskovo village, Russia
- Academy of the FPS of Russia
- Academy of the Investigative Committee of the Russian Federation
- Achinsk branch of Krasnoyarsk State Agrarian University

- Administration of the Krasnoyarsk Region Governor
- Baltic State Technical University "VOENMEH" named D.F. Ustinov, St. Petersburg
- Bashkir State Pedagogical University n.a. M. Akmulla, Ufa
- Belgorod State National Research University
- Belgorod State Technological University named after V. G. Shukhov
- Biysk Technological Institute (branch) of the Altay State Technical University
- Blagonravov Mechanical Engineering Research Institute of the Russian Academy of Sciences, Moscow
- Bratsk State University
- Cheboksary Cooperative Institute
- Chuvash State University named after I.N. Ulyanov, Cheboksary
- Chechen State University, Groznyy
- Corporate Property and Transaction Department of Joint Stock Company "Verkhnechonskneftegaz"
- Department "Logistics and Management" of Kazan National Research Technological University
- Department of Business Statistics and Economics of Kazan National Research Technological University
- Department of Chemistry and Technology of Organic Nitrogen Compounds of Kazan National Research Technological University
- Department of Customs Registration of Siberian State University of Science and Technology, Krasnoyarsk
- Department of Economics and Business Process Management of Siberian Federal University, Krasnoyarsk
- Institute of Business Process Management and Economics of Siberian Federal University, Krasnoyarsk
- Department of electrotechnical complexes and systems of Siberian Federal University, Krasnoyarsk
- Department of Information Systems of Orel State University named after I.S. Turgenev
- Department of Geoecology of Saint-Petersburg Mining University
- Department of Mechatronics, Mechanics and Robotics of Orel State University named after I.S. Turgenev
- Department of Petroleum Engineering Technology of Ufa State Petroleum Technological University
- Department of Process Automation, machinery and industrial safety of Mytishchi branch of Bauman Moscow State Technical University
- Department of Standardization, Certification and Technological Management of the Kazan National Technical University
- Department of technical mechanics and the equipment of pulp and paper industry of Ural State Forest Engineering University
- Department of Technosphere Safety and Production Certification of Samara State Technical University
- Department of thermal engines, automobiles and tractors of Vyatka State Agricultural Academy, Kirov
- Derzhavin Tambov State University
- Design Bureau «Mars»
- Don State Technical University, Rostov-on-Don
- Engineering School of the Far Eastern Federal University, Vladivostok, the Primorye Territory
- Far Eastern State Transport University, Khabarovsk
- Federal budget - funded research Institute of applied mechanics of the Russian Academy of Sciences
- Federal budget - funded research Institute of Machines Science named after A.A. Blagonravov of the Russian Academy of Sciences
- Federal Research Center Krasnoyarsk Science Center of the SB RAS
- Federal Scientific Centre of Agroecology, Complex Melioration and Protective Afforestation of the Russian Academy of Sciences, Volgograd
- Federal Scientific Research Institute for System Analysis of the Russian Academy of Sciences, Moscow
- Federal State Autonomous Educational Institution of Higher Education "M. K. Ammosov North-Eastern Federal University"
- Federal State Autonomous Educational Institution of Higher Professional Education "Southern Federal University", Taganrog

- Federal State Budget Educational Institution of Higher Education “Ufa State Petroleum Technological University”
- Federal State budget institution of higher education «Tyumen industrial University»
- Federal State Budgetary Scientific Institution Federal Scientific Agroengineering Center VIM, Moscow
- Financial University under the Government of the Russian Federation
- GTSU named after Acad. M.D. Millionschikov, Grozny
- Gubkin Russian State University of Oil and Gas, Moscow
- Yakovlev Chuvash State Pedagogical University, Cheboksary
- Institute for Design Problems in Microelectronics of Russian Academy of Sciences, Zelenograd
- Institute for Systems Analysis Federal Research Center “Computer Science and Control” of Russian Academy of Sciences, Moscow
- Institute of Chemistry and Chemical Technology SB RAS, Federal Research Center “Krasnoyarsk Science Center SB RAS”
- Institute of Computational Mathematics and Informational Technologies of Kazan Federal University
- Institute of Computational Modeling SB RAS, Krasnoyarsk
- Institute of Engineering Science of Ural Branch of the Russian Academy of Sciences, Ekaterinburg
- Institute of High Current Electronics SB RAS, Tomsk
- Institute of Informatics and Telecommunications of Reshetnev Siberian State University of Science and Technology, Krasnoyarsk
- Institute of Mineralogy of Ural Branch of the Russian Academy of Sciences, Ekaterinburg
- Institute of Strength Physics and Materials Science SB RAS, Tomsk
- Irkutsk National Research Technical University
- Irkutsk State Agricultural University named after A.A. Ezhevsky
- Irkutsk State Transport University
- Izhevsk State Technical University named after Kalashnikov
- Joint Stock Company “Avionica”
- JSC "ECO-Engineering", Achinsk;
- JSC "IRCOS", Moscow
- JSC "RPC "Istok" named after Shokin", Moscow Region
- JSC "VMP" Vyksa metallurgical plant, Vyksa, Nizhniy Novgorod region
- JSC “NPO PM Small Design Bureau”, Zheleznogorsk, Krasnoyarsk region
- JSC “Russian Space Systems”, Moscow
- JSC «Concern «Sozvezdie»
- JSC «GSH Group», Moscow
- JSC "NPO" SPLAV "named after A.N. Ganicheva, Tula
- K.G. Razumovsky Moscow State University of technologies and management (the First Cossack University), Moscow
- Kabardino-Balkarian state agricultural university named after V.M. Kokov, Nalchik
- Kaliningrad State Technical University
- Katanov Khakass State University, Abakan
- Kazan Federal University
- Kazan National Research Technological University
- Kazan State Power Engineering University
- Kazan State Treasury Powder Plant
- Kemerovo State University
- Khabarovsk State University of Economics and Law
- Khakas Technical Institute of Siberian Federal University, Abakan
- Krasnodar Higher Military School
- Krasnoyarsk complex aviation rescue center EMERCOM of Russia, Krasnoyarsk
- Krasnoyarsk Science and Technology City Hall of the Russian Union of Scientific and Engineering Association
- Krasnoyarsk State Agrarian University
- Kuban State Agrarian University named after I.T. Trubilin, Krasnodar
- Kuban State Technological University, Krasnodar
- Kurgan State University
- Lavochkin Science and Production Association, Moscow
- Lebedev Physical Institute, Moscow
- Limited Liability Company Diagnostica+, Tomsk
- LLC "IT Universe", Samara
- LLC "Nexus", Artemovsky
- LLC «RN–Vankor»
- LLC «Yandex.Taxi», Moscow
- Lomonosov Moscow State University

- Main personnel Department of the Ministry of Defense of the Russian Federation, Moscow
- Management Department of Federal State Budget Educational Institution of Higher Education “Irkutsk National Research Technical University”
- Marshal of the Soviet Union Budennyi Military Academy of Communications, St. Petersburg
- Mechanical Engineering Research Institute of the Russian Academy of Sciences
- Medicine Cybernetics and Computer Science Department of General Medicine Faculty of Penza State University
- Military Academy of logistics named after General A. V. Khrulev, St. Petersburg
- Military Training and Scientific Center of the Air Force "Air Force Academy named after Professor N.E. Zhukovsky and Yu.A. Gagarin"
- MIREA - Russian Technological University, Moscow
- Moscow Aviation Institute (National Research University)
- Moscow City University
- Moscow Polytechnic University
- Moscow State Technical University named after N. E. Bauman
- Moscow State University of Civil Engineering (MSUCE)
- Moscow State University of Technology "STANKIN"
- Moscow State University of Technology and Management named after K.G. Razumovsky (the First Cossacs University)
- Moscow University of the Ministry of internal Affairs of the Russian Federation named after V. J. Kikot
- Moscow Witte University
- Murmansk Marine Biological Institute
- Murmansk State Technical University
- Murmansk Arctic State University
- Murom Institute (branch) of Vladimir State University named after A.G. and N.G. Stoletovs, Vladimirskaya oblast'
- Mechanical Engineering Research Institute of the Russian Academy of Sciences
- National Research Center “Kurchatov Institute”
- National Research Irkutsk State Technical University
- National Research Moscow State University of Civil Engineering
- National Research Nuclear University MEPHI, Moscow
- National Research Tomsk State University
- National Research University «Moscow Power Engineering Institute» (Branch) in Smolensk
- National Research University Higher School of Economics, Moscow
- National Research University Power Engineering Institute
- National University of Oil and Gas «Gubkin University», Moscow
- National University of Science and Technology MISIS, Moscow
- Nizhnekamsk Institute of Chemical Technology (branch) of Kazan National Research Technological University
- North-Caucasian State Academy, Cherkessk
- North-Caucasus Federal University, Stavropol
- North-Eastern Federal University, Yakutsk
- Northern Arctic Federal University named after M.V. Lomonosov, Arkhangelsk
- Nosov Magnitogorsk State University
- Novokuznetsk Branch-Institute of Kemerovo State University
- Novosibirsk State Technical University
- NUST MISIS, Stary Oskol
- Omsk State Agrarian University named after P. A. Stolypin
- Omsk State Technical University
- Orel state University n.a. I. S. Turgenev
- Orenburg State University
- P.N. Lebedev Physics Institute, Russian Academy of Sciences, Moscow
- Pediatric Medical Institute
- Penza Cossack Institute of Technology (branch) of K.G. Razumovsky
- Penza State University
- Peoples' Friendship University of Russia
- Perm National Research Polytechnic University
- Peter the Great St. Petersburg Polytechnic University
- Petrozavodsk State University
- Platov South-Russian State Polytechnic University (NPI), Novocherkassk
- Plekhanov Russian University of Economics (Voronezh branch)
- Polzunov Altai State Technical University, Barnaul
- ProjectMarket LLC

- Research and company «Kubaneftmash», Krasnodar region, Akhtyrsky
- Research Institute of the Federal Penitentiary Service of Russia, Moscow
- Reshetnev Siberian State University of Science and Technology
- Rival Production LLC, Yekaterinburg
- Rostov Institute for Protection of Entrepreneurship
- RUDN University, Moscow
- Russian Academy of Sciences, Miass
- Russian State Social University, Moscow
- Russian State University of the Justice, Voronezh
- Russian state University of tourism and service, Moscow region
- Russian Technological University
- Russian University of Transport (MIIT) Moscow
- Ryazan State Radio Engineering University
- Saint Petersburg Mining University
- Saint Petersburg State University of Aerospace Instrumentation
- Saint-Petersburg National Research University of Information Technology, Mechanics and Optics
- Saint-Petersburg State Forest Technical University
- Saint-Petersburg University of State Fire Service of Emercom of Russia
- Samara National Research University
- Samara State Agrarian University
- Samara State Technical University
- Saratov State Vavilov Agrarian University
- Scientific and technological complex "New Technologies and Materials" of National Research University FSAEI HE «SPbPU"
- Scientific Research Laboratory of Safety and Electromagnetic Compatibility of Radioelectronic Facilities of Tomsk State University of Control Systems and Radioelectronics
- Sevastopol State University
- Shukshin Altai State University for Humanities and Pedagogy, Biysk
- Siberian Federal University, Krasnoyarsk
- Southern Federal University, Rostov-on-Don
- SSC Joint Stock Company "State Research Institute of Chemistry and Technology of Organoelement Compounds", Moscow
- St. Petersburg Mining University, Department of Transport and Storage of Oil and Gas, Saint Petersburg,
- St. Petersburg National Research University of Information Technologies, Mechanics and Optics
- St. Petersburg State University of Economics
- Stary Oskol Technological Institute named after A.A. Ugarov (branch)
- State Budget Educational Institution of Higher Education "Nizhny Novgorod State University of Engineering and Economics", Knyaginino
- State University of Management, Moscow
- State Medical University, Samara
- Stock Company «Experimental Design Bureau «Electroavtomatika» named after P A Yefimov, Saint Petersburg
- Surgut State University
- T F Gorbachev Kuzbass State Technical University, Kemerovo
- Tambov State Technical University
- The Academy of Federal Guard Service of Russian Federation
- The Bonch-Bruевич Saint-Petersburg State University of Telecommunications
- The department of chemical plant machinery and equipment, Institute of Chemical Engineering, Ural Federal University, Ekaterinburg
- Togliatti State University
- Tomsk State University of Architecture and Building
- Tomsk State University of Control Systems and Radioelectronics
- Tula State University
- Tver State Technical University
- Ufa State Aviation Technical University
- Ufa State Petroleum Technological University, Sterlitamak
- Ulyanovsk Civil Aviation Institute,
- Ulyanovsk State Technical University
- University of the Ministry of Internal Affairs of St. Petersburg
- Ural Federal University named after First President of Russia B.N. Yeltsin, Ekaterinburg
- V A Trapeznikov Institute of Control Sciences of the Russian Academy of Sciences, Moscow
- V.I. Vernadsky Crimean Federal University, Simferopol
- Vladimir State University named after Alexander and Nikolay Stoletovs
- Volga State University of Technology, Yoshkar-Ola

- Volga State University of Water Transport (Samara branch)
- Volgograd State Agricultural University
- Volgograd State Technical University
- Volzhsky Polytechnic Institute (branch) of the Volgograd State Technical University, Volzhsky, Volgograd Region
- Voronezh institute of high technologies
- Voronezh institute of the Russian Federal Penitentiary Service
- Voronezh Institute of the Russian Ministry of the Interior
- Voronezh Regional Clinical Oncology Center
- Voronezh State Medical University named after N.N. Burdenko
- Voronezh State Technical University
- Institute of Control Sciences named by V.A. Trapeznikov of Russian Academy of Sciences
- Voronezh State University of Forestry and Technologies named after G.F. Morozov
- Vyatka State Agricultural Academy, Kirov
- Yuri Gagarin State Technical University of Saratov
- Krasnoyarsk State Medical University named after Professor V.F. Voyno-Yasenetsky

The program of the Conference consisted of keynote and plenary talks, presentations of the participants. The Conference in all 5 sections took place at the Krasnoyarsk Science and Technology City Hall for those participants who could come and participate in the scientific session of the conference. There was also online section for those scientists from other cities and countries with travelling restrictions due to the situation with coronavirus infection (COVID-2019). The Organizing Committee took the decision not to postpone or cancel the Conference because the issues of discussion were of great interest, and the Conference had been planned in advance. The Organizing Committee expresses gratitude to the scientists of The Siberian Scientific Center of the Russian Academy of Sciences, Professors of the Siberian Federal University and Reshetnev University etc. who could come to the City Hall and make reports as well as to participate in the online session. More than 80 participants who could not come due to the restrictions connected with COVID-19 presented poster presentation which can be found at the website of the conference and took part in the online session with reports which had been prepared and sent to the Organizing Committee beforehand. The online section was held on the Proficonf platform (<https://proficonf.com/ru/>) which let all the participants to watch the reports and ask questions online as well as to write them in the chat format. The speakers answered the questions online. The participants who could come to the City Hall also participated in the discussions and question sessions. The overall technical quality of the conference was good, the platform lets to add more than 100 participants simultaneously. The participants can watch the reports, write questions and speak. The moderator can change the roles so that the speaker can answer questions and make comments.

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 and information systems. Great interest was aroused by the section about cybernetics, economics and 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, cybernetics, data protection in automation systems, chemical, ecological and power engineering, etc.

A wide range of fundamental and applied problems in various production and technological systems has undergone consideration during the video conference. The programme of the Conference included the following 5 sections:

- Material Science and Aerospace Technology
- Mechanical and Automation Engineering for Industry 4.0

- Chemical, Ecological and Power Engineering
- Information Reliability and Data Protection in Automation Systems
- Cybernetics, Economics and Organization of Mechanical Engineering Production

This was the 2nd Conference which attracted even more participants with very urgent reports. All the participants evaluated the results of the Conference as highly important for the sustainability of modern society industrial development.

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.

More than 650 reports were submitted to the Organizing Committee of the Conference MIP: Engineering-2020. 437 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 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 [1-6].

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].

Acknowledgements

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