

PAPER • OPEN ACCESS

Overview of I International Conference on Advances in Material Science and Technology - CAMSTech-2020

To cite this article: I V Kovalev *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **919** 011001

View the [article online](#) for updates and enhancements.



240th ECS Meeting ORLANDO, FL

Orange County Convention Center **Oct 10-14, 2021**



Abstract submission due: April 9

SUBMIT NOW

Overview of I International Conference on Advances in Material Science and Technology - CAMSTech-2020

I V Kovalev^{1,2,3,4}, N A Testoyedov^{4,5} and A A Voroshilova²

¹ Siberian Federal University, 79, Svobodny pr., Krasnoyarsk, 660041, Russia

² Krasnoyarsk Science and Technology City Hall, 61, Uritskogo Str., Krasnoyarsk, 660049, Russia

³ Krasnoyarsk State Agrarian University, 90, Mira pr., Krasnoyarsk, 660049, Russia

⁴ Reshetnev Siberian State University of Science and Technology, 31, Krasnoyarsky Rabochy Av., Krasnoyarsk, 660037, Russia

⁵ JSC “Academician M F Reshetnev Information satellite systems”, 52 Lenin street, Zheleznogorsk, Krasnoyarsk region, 662972, Russia

E-mail: krasnio@bk.ru

Abstract. The overview describes the main directions and results of the I International Conference “CAMSTech-2020” held in Krasnoyarsk in July 31, 2020. It gives the details about the participants and the proceedings.

We are pleased to present this issue of IOP Conference Series: Materials Science and Engineering (MSE) for the selected revised papers presented in the I International Conference on Advances in Material Science and Technology - CAMSTech-2020, held on July 31, 2020, at the Krasnoyarsk Science and Technology City Hall (Russia). The purpose of the Conference is to share the experience of leading experts in the application of innovative technologies, mathematical methods and information management systems in industrial production, in the fields of aerospace, energy and chemical engineering, materials science and design of new materials, as well as engineering and automation of technological processes, etc.

CAMSTech-2020 Conference 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 [1-8] were: Siberian Federal University, JSC “Academician M F Reshetnev Information satellite systems” and Krasnoyarsk Scientific Centre of the Siberian Branch of the Russian Academy of Sciences.

The papers are related to the following themes:

- Material science and innovative technology;
- Mechanical engineering and automation of technological processes for Industry 4.0;
- Cybernetics, economics and organization of mechanical engineering production;
- Reliability and data protection in automated technological systems;
- Mathematical methods in engineering and technology;
- Energy, chemical technologies and ecological engineering.



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

The Program Committee and Editorial Board included prominent professors and scientists from the Russian Academy of Sciences, University of Maribor (Slovenia), 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 9 countries besides Russia (Germany, Azerbaijan, Belarus, France, Ukraine, Kazakhstan, Vietnam, China, Uzbekistan):

- Tashkent State Agrarian University, Uzbekistan
- Karakalpak State University named after Berdakh, Uzbekistan
- Angara GmbH, Dusseldorf, Germany
- Azerbaijan State Oil and Industry University, Baku, Republic of Azerbaijan
- Belarusian State University, Minsk, Belarus
- Bukhara engineering-technological institute, Uzbekistan
- China Aviation Industry General Aircraft Zhejiang Institute Co., Ltd
- Gomel State Technical University named after P.O. Sukhoi, Republic of Belarus
- Harbin Institute of Technology, China
- Institut de Mathematiques de Bourgogne (IMB), Universite de Bourgogne - Franche Comte, Dijon, France
- Institute of Environment, Vietnam Maritime University, Le Chan district, Hai Phong
- Institute of Mechanics and Seismic Stability of Structures of the Academy of Sciences of the Republic of Uzbekistan
- Karshi Engineering and Economics Institute, Uzbekistan
- L. N. Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan
- M. Kozybayev North-Kazakhstan State University, Petropavlovsk
- Namangan State University, Uzbekistan
- National University of Life and Environmental Sciences of Ukraine, Kyiv
- Research and innovation centre of information and communication technologies at Tashkent University of Information Technologies, Uzbekistan
- Samarkand branch of Tashkent University of information technologies named after Mukhammad al-Khwarizmi, Uzbekistan
- Shenzhen MSU – BIT University, China
- Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
- Tashkent University Information Technologies named after Al-Kharezmi, Uzbekistan
- Tavria State Agrotechnological University named after Dmytro Motornyi, Melitopol, Ukraine
- Urgench branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi, Uzbekistan;
- Wuhan Textile University, China
- Zerek Technopark, Baishev University, Aktobe, Kazakhstan

The participants from Russia represented more than 180 universities, scientific institutes and organisations, industrial enterprises:

- Academic University, Russian Academy of Sciences, St. Petersburg
- K. Aylamazyan IPS RAS, Veskovo village
- Administration CATF Zheleznogorsk
- All-Russian Research Institute of Agricultural Economics
- All-Russian Scientific Research Institute for the Use of Machinery and Oil Products in Agriculture, Tambov
- Astrakhan State Technical University
- Bauman Moscow State Technical University, Moscow
- Belgorod State Technological University named after V.G. Shukhov
- Birsik branch of the Bashkir State University
- Biysk Technological Institute (branch) of Altai State Technical University named after I.I. Polzunov
- Blagonravov Institute of Engineering Science, Russian Academy of Sciences

- Bolhov Plant of semiconductor devices Bolhov
- Branch of the National Research University “MPEI” in Smolensk
- Bryansk State Technical University
- Chechen State University, Ltd "Scientific production firm "Sady Chechni"
- Chuvash State University named after I.N. Ulyanov, Cheboksary
- Company group "Technoserv", Moscow
- Corporate Property and Transaction Department, Joint Stock Company “Verkhnechonskneftegaz”
- Dagestan state University, Makhachkala, Russia
- Department "Transport construction", Moscow State University of Railway Engineering Emperor Nicholas II
- Department Forest Industry, Metrology, Standardization and Certification, Voronezh, State University of Forestry and Technologies named after G.F. Morozov
- Department of Electronics and Nanoelectronics, National Research University “MPEI”, Moscow
- Department of Information Security Tula State University Tula
- Department of Information Technology, State Electrotechnical University "LETI" of V.I. Ulyanov (Lenin), St. Petersburg
- Department of technical mechanics and the equipment of pulp and paper industry, Ural State Forest Engineering University
- Dimitrovgrad Engineering and Technology Institute – Branch of National Research Nuclear University “MEPhI”
- Diplomatic Academy of the Ministry of Foreign Affairs of the Russian Federation, Moscow
- Don State Technical University, Rostov-on-Don
- Federal Agricultural Kursk Center
- Federal Scientific Center of Agrarian Economics and Social Development of Rural Territories
- Federal State Autonomous Educational Institution of Higher Education "M. K. Ammosov North-Eastern Federal University", Yakutsk
- Federal State Budget Scientific Institution Federal Scientific Center “All-Russian Research and Technological Poultry Institute” of Russian Academy of Sciences Sergiev Posad
- Federal State Budgetary Educational Institution of Higher Education "Novosibirsk State Agrarian University"
- Federal State Budgetary Educational Institution of Higher Education "Yakutsk State Agricultural Academy"
- Federal State Budgetary Educational Institution of Higher Education "Siberian State Automobile and Highway University (SibADI)", Omsk
- Federal State Budgetary Educational Institution of Higher Education "Saint Petersburg State Forest Technical University named after S.M. Kirov"
- Federal State Budgetary Institution of Higher Education Moscow State University of Geodesy and Cartography (MIIGAiK)
- Federal State Budgetary Military Educational Institution of Higher Education «The Mozhaisky Military Space Academy» of the Ministry of Defence of the Russian Federation, Saint-Petersburg
- FGBNU FIC “V. V. Dokuchaev Soil Science Institute, Moscow
- FGBOU VO "Chechen State University", Grozny
- Financial University under the Government of the Russian Federation
- General Directorate of EMERCOM of Russia in the Voronezh region
- Grozny State Oil Technical University named after Academician M. D. Millionshchikov
- GS Nanotech, Gusev, Russia
- Information Technology Department, Peoples' Friendship University of Russia, Moscow
- Institute for Informatics and Mathematical Modeling Kola Science Centre of the Russian Academy of Sciences, Apatity
- Institute for Systems Analysis Federal Research Center “Computer Science and Control” of Russian Academy of Sciences
- Institute of Mineralogy of Southern-Urals Federal Research Center of Mineralogy and Geoecology of Ural Branch of RAS, Miass, Chelyabinsk Region
- Institute of Astronomy of the Russian Academy of Sciences, Moscow
- Institute of Cosmophysical Research and Radio Wave Propagation FEB RAS, Paratunka
- Institute of Electrophysics UB RAS, Ekaterinburg

- Institute of geothermy and renewable energy-branch of the Federal state budgetary institution of science of the joint Institute of high temperatures of the Russian Academy of Sciences, Makhachkala
- Institute of Machine Science named by A.A. Blagonravov of Russian Academy of Sciences, Moscow
- Institute of market problems of the Russian Academy of Sciences
- Institute of Natural of Kaluga State University named after K.E. Tsiolkovsky
- Institute of Strength Physics and Materials Sciences, SB RAS, Tomsk
- International Laboratory of Statistics of Stochastic Processes and Quantitative Finance of National Research Tomsk State University
- Irkutsk National Technical Research University
- Irkutsk State Transport University
- Irkutsk State University
- Ivangorods branch of SUAI, Ivangorod
- JSC “Academician M F Reshetnev Information satellite systems”, Zheleznogorsk
- JSC “NPP” Pulsar”, Moscow,
- JSC «Russian space system», Moscow
- JSC «Russian helicopters», Moscow
- JSC «Technomash», Moscow
- Enikolopov Institute of Synthetic Polymeric Materials of the Russian Academy of Sciences, Moscow
- K.G. Razumovsky Moscow State University of technologies and management
- Kabardino-Balkarian state agricultural university named after V.M. Kokov
- Kalashnikov Izhevsk State Technical University, Izhevsk
- Kazan Federal University
- Kazan National Research Technological University
- Kazan state power engineering University
- Kostroma State University
- Krasnoyarsk complex aviation rescue center EMERCOM of Russia
- Krasnoyarsk Science and Technology City Hall
- Krasnoyarsk State Agrarian University
- Kuban Institute of Information Protection, Krasnodar
- Kuban State Technological University, Krasnodar
- Kurgan State University
- Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences
- Lipetsk state technical university
- LLC RN-BashNIPIneft, Ufa
- LLC Vagonputmash group of companies
- Management Department, Federal State Budget Educational Institution of Higher Education “Irkutsk National Research Technical University”
- Marine Hydrophysical Institute, Russian Academy of Sciences, Sevastopol
- Matrosov Institute for System Dynamics and Control Theory SB RAS, Irkutsk
- Mechanical Engineering Research Institute of the Russian Academy of Sciences
- Mendeleev University of Chemical Technology of Russia
- Michurinsk state agrarian university
- Military Institute (engineering) of the Military Academy logistics support named after Army General A. V Hrulev
- Mining University, St. Petersburg
- Baltic State University “VOENMEH” titled D.F. Ustinov, Saint-Petersburg
- JSC "NPP "Compensator"
- MIREA – Russian Technological University
- Moscow Automobile and Road Construction State Technical University (MADI)
- Moscow Aviation Institute (National Research University)
- Moscow Institute of Physics and Technology (National Research University), Dolgoprudny
- Moscow National Research Moscow State University of Civil Engineering
- Moscow State University of Geodesy and Cartography (MIIGAiK)
- Moscow State University of Technology "STANKIN"
- National Research Moscow State University of Civil Engineering
- National university of science and technology “MISiS”
- Nikonov All-Russian Institute of Agrarian Problems and Informatics
- North Caucasus Federal University, Stavropol

- North Caucasus Research Institute of Mountain and Pre-mountain Horticulture, Nalchik
- North-Caucasus Federal University, Stavropol
- North-Eastern Federal University, Yakutsk
- Novosibirsk State Agrarian University
- NRC "Kurchatov Institute" – CRISM "Prometey", Saint-Petersburg
- Octavian.SPb company, Saint-Petersburg
- OOO "Center of diagnostics, examination, certification», Saint-Petersburg
- Oryol State University
- PAO "MRSK of Volga"-“Chuvashenergo”, Cheboksary
- Peoples’ Friendship University of Russia (RUDN University)
- Peter the Great St. Petersburg Polytechnic University
- Petrozavodsk State University
- PRO FERRUM Limited Liability Company, St. Petersburg
- Prokhorov General Physics Institute, Russian Academy of Sciences
- Research and Design Institute of design information, automation and communication on railway transport, Moscow
- Research Institute of Precision Instruments, Moscow
- Reshetnev Siberian State University of Science and Technology, Krasnoyarsk
- Rosinformagrotekh FSBSI, Pravdinsky township
- RUDN University
- Russian State Agrarian University - Moscow Timiryazev Agricultural Academy
- Russian State Social University
- Colloid chemistry department of Russian Technical University
- Russian Technological University
- Russian University of Transport (MIIT)
- Russian Water and Wastewater Association
- Ryazan State Radio-Engineering University
- Ryazan State University
- Saint Petersburg Mining University
- Saint Petersburg National Research University of Information Technologies, Mechanics and Optics
- Saint Petersburg State University of Aerospace Instrumentation
- Saint Petersburg state University of architecture and civil engineering
- Saint Petersburg State University of Civil Aviation
- Saint Petersburg State University of Industrial Technology and Design
- Saint-Petersburg University of EMERCOM of Russia
- Samara National Research University
- Samara State Agrarian University
- Samara State Technical University
- Samara State University of Economics
- Sankt-Petersburg Department of Steklov Mathematical Institute Russian Academy of Sciences
- Scientific and Production Firm "Rotor"
- SFA of EMERCOM of Russia, Moscow
- Shternberg State Astronomical Institute of Lomonosov Moscow State University, Moscow
- Siberian Federal University, Krasnoyarsk
- Smolensk agricultural Academy
- Smolensk institute of Plekhanov Russian University of Economics
- South Ural State University, Chelyabinsk
- Southern Federal University, Don State Technical University, Rostov-on-Don
- Southern Federal University, Taganrog
- St. Petersburg State Forestry University named after S.M. Kirov
- State Hydrological Institute St. Petersburg
- State University of Management, Moscow
- Sterlitamak Branch Bashkir State University
- Stock Company «Experimental Design Bureau «Electroavtomatika» named after P A Yefimov, Saint Petersburg
- Supercomputers and Neurocomputers Research Centre, LLC, Taganrog
- T.F. Gorbachev Kuzbass State Technical University, Kemerovo
- Tambov State Technical University
- Technical Committee for standardization TC 343 «Water Quality» Rosstandart
- Thermal Electrical Systems LLC
- MHD Engineering LLC
- Togliatti State University
- Tomsk Polytechnic University
- Tomsk State Pedagogical University
- Tomsk State University of Control System and Radioelectronics
- TSNIISK Named After Koucherenko V.A. Research Center of Construction Joint Stock Company

- Tver State Technical University
- Ufa State Aviation Technical University
- Ufa State Petroleum Technological University
- Ulyanovsk State Technical University
- University of the Ministry of Internal Affairs of St.Petersburg
- Ural Federal University, Ekaterinburg
- Ural Institute of State Fire Service of EMERCOM of Russia
- Ural State Forest Engineering University, Ekaterinburg
- V.A. Trapeznikov Institute of Control Sciences, Moscow
- V.P. Larionov Institute of the Physical-Technical Problems of the North of the Siberian Branch of the RAS, Yakutsk
- Vladimir State University named after Alexander and Nikolay Stoletovs
- Volga State University of Service, Togliatti
- Vorkuta permanent way division of the Northern Infrastructure Directorate of JSC «RZD»
- Voronezh institute of Advanced Training of Employees of the EMERCOM of Russia
- Voronezh Institute of the Federal Penitentiary Service of Russia
- Voronezh Institute of the Russian Ministry of the Interior
- Voronezh State Technical University
- Voronezh institute of increasing the qualifications of staff of the state fire-fighting service of the ministry of the Russian Federation
- Voronezh State University
- Vyatka State Agricultural Academy
- Yuri Gagarin State Technical University of Saratov

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 technological and automation processes in various production systems. Great interest was aroused by the section about material science and innovative technology and the section about energy, chemical technologies and ecological engineering.

The Conference provided the premier interdisciplinary and multidisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, mathematical methods, practical challenges encountered and the solutions adopted in the fields of materials sciences, mechanical, chemical, ecological and power engineering, aerospace technologies, cybernetics, reliability and data protection in automation systems, etc.

Although the schedule of the Conference was very tight, there were very vivid discussions among the participants. The program of the Conference consisted of keynote and plenary talks and numerous presentations.

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.

A total of 415 papers have been submitted to the conference. Each paper has been peer reviewed by the reviewers specialized in the related field. At the end of the review process, a total of 258 high quality papers were selected and accepted for this publication. These papers reflect modern engineering approaches in all Conference directions, broaden the researches of the previous Conferences [1-8]. We hope that you enjoy the reading of the papers.

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.

Acknowledgements

CAMSTech Conference Committee highly appreciate the contribution of Professor Nikolay Testoyedov, corresponding member of the Russian Academy of Sciences, Director General of Information Satellite Systems – Reshetnev Company (Zheleznogorsk, Krasnoyarsk region, Russia) for cooperation in organization of CAMSTech-2020 and preparation of the papers for this Volume. We are

grateful to scientists and professors of Siberian Federal University, Chechen State University, Institute of Computational Modeling of Siberian Branch of Russian Academy of Sciences, Ufa State Petroleum Technological University, NRC "Kurchatov Institute" – CRISM "Prometey", South Ural State University and Krasnoyarsk complex aviation rescue center EMERCOM of Russia 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 CAMSTech-2020.

We express gratitude to IOP Publishing for an opportunity to publish the Proceedings of the Conference to provide open access and to make them available for worldwide recognition.

References

- [1] 2018 *IOP Conf. Ser.: Mater. Sci. Eng.* **450** 011001
- [2] Kovalev I V, *et al.* 2019 *IOP Conf. Ser.: Earth and Environ. Sci.* **315** 011001
- [3] Kovalev I V, *et al.* 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **537** 011001
- [4] Kovalev I V, *et al.* 2019 *J. Phys.: Conf. Ser.* **1399** 011001
- [5] Kovalev I V and Voroshilova A A 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **734** 011001
- [6] Kovalev I V, Pyzhikova N V and Voroshilova A A 2020 *IOP Conf. Ser.: Earth and Environ. Sci.* **421** 011001
- [7] Antokhina Yu A, *et al.* 2020 *J. Phys.: Conf. Ser.* **1515** 011001
- [8] Kovalev I V and Voroshilova A A 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **862** 011001