

1-2 December
2021

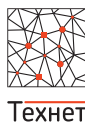
#npt_forum
Saint Petersburg

The Third International Forum

ADVANCED DIGITAL AND MANUFACTURING TECHNØLOGIES



ONLINE



The Third International Forum

ADVANCED DIGITAL AND MANUFACTURING TECHNOLOGIES

The Third International Forum on Advanced Digital and Manufacturing Technologies was held online on December 1-2, 2021 focusing on the main topic of digital transformation of economy based on the use of advanced digital and new manufacturing technologies.

The Forum was organized by Peter the Great St. Petersburg Polytechnic University (SPbPU) and its subdivisions, namely the World-Class Research Center for Advanced Digital Technologies (SPbPU WCRC) and National Technology Initiative Center for Advanced Manufacturing Technologies (NTI Center for AMTs of SPbPU) .

The Forum was supported by the Ministry of Science and Higher Education of the Russian Federation as part of the national project “Science and Universities” and became part of the program of events tied to the Year of Science and Technology.

The scientific and technical agenda of the Forum featured discussions of the methodological principles underlying digital transformation and the use of new digital and manufacturing technologies (primarily digital twins, digital design and modelling as well as artificial intelligence technologies) in a variety of areas such as: development of high-tech products; management of manufacturing and complex systems; field development; medical and biological systems; construction and utilities; development of new materials and manufacturing technologies; resource management, etc.

Speakers and participants of the Forum:

- **members of World-Class Research Center for Advanced Digital Technologies:** SPbPU, St. Petersburg State Maritime Technical University (SMTU), Tyumen State University (UTMN), Smorodintsev Influenza Research Institute of the Ministry of Health of the Russian Federation.
- **representatives of 150+ universities, including:** Bauman Moscow State Technical University (BMSTU), Moscow Institute of Physics and Technology (MIPT), National University of Science and Technology (MISiS), National Research Tomsk State University (TSU), National Research Tomsk Polytechnic University (TPU), ITMO University, National Research Nuclear

University MEPhI (Moscow Engineering Physics Institute), Ural Federal University named after the first President of Russia B. N. Yeltsin (UrFU), Lomonosov Moscow State University, Moscow Aviation Institute (National Research University, MAI), Moscow Automobile and Road Construction State Technical University (MADI), National Research University of Electronic Technology (MIET), Skoltech, Innopolis University, Rybinsk State Aviation Technical University, Samara National Research University, Mendeleev University of Chemical Technology of Russia, Perm State University, Samara State Medical University (SamSMU), Surgut State University, Moscow School of Management SKOLKOVO, Moscow State University of Technology STANKIN, University of California (USA), Tsinghua University (China), University of Cologne (Germany), State Scientific Institution “Powder Metallurgy Institute” (Belarus), and others;

- **managers and specialists of 60+ corporations and high-tech companies, including:** Rostec State Corporation, UEC, UEC-Saturn, UEC-Klimov, UEC-Kuznetsov, Rosatom State Corporation, TVEL, Central Institute of Aviation Motors, Concern VKO Almaz-Antey, Russian Research Institute “Center”, Greenatom, NLMK, AVTOVAZ, Russian Space Systems, Russian Post, Rosseti, Power Machines, Kalashnikov Concern, Sukhoi Company, Krylov State Research Center, Irkut Corporation, Gazprom, Gazprom Neft, OKAN, NAUMEN, Huawei Technologies Co., Dassault Systems, and others;
- **representatives of development institutions and authorities, including:** Ministry of Science and Higher Education of the Russian Federation, Ministry of Industry and Trade of the Russian Federation, Federal Agency on Technical Regulating and Metrology (Rosstandart), State Duma of the Federal Assembly of the Russian Federation, Government of St. Petersburg, Fund for Aid in Development of Small Enterprises in Scientific and Technical Field (Bortnik Foundation), ANO National Technology Initiative Platform (NTI), etc.

22
events



30+
hours



discussions,
lectures and round
tables

4000
views



views
on Youtube

171
speakers



114
organizations



from Russia, USA, Germany,
China, the Republic of Belarus

Over
1000
participants



73
regions
of Russia



as well as the Republic
of Belarus, Ukraine,
Kazakhstan, Estonia,
USA, China and Germany.

TOP-5 events by popularity:

787

Opening of the Third
International Forum
on Advanced Digital
and Manufacturing
Technologies

623

Use of Digital
Twins in
Development:
Practice and New
Cases

251

Digital Twins:
Development
of Standardi-
zation

249

Supercomputer
Technologies and
Supercomputer
Engineering

229

Economic effects
of digital
transformation
of industry

ROUND TABLES



KEY SPEAKERS OF THE FORUM



**Ryazantsev
Oleg Nikolaevich**

Deputy Minister of Industry and Trade of the Russian Federation



**Peskov
Dmitry Nikolaevich**

Special Representative of the President of the Russian Federation on Digital and Technological Development



**Kravchenko
Denis Borisovich**

Deputy of the State Duma of the Federal Assembly of the Russian Federation, Deputy Chairman of the State Duma Committee on Economic Policy, Industry, Innovative Development and Entrepreneurship



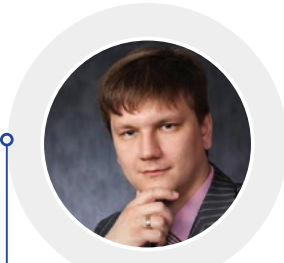
**Knyagin
Vladimir Nikolaevich**

Vice-Governor of St. Petersburg



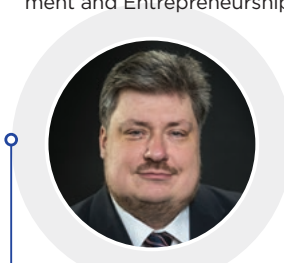
**Rudskoy
Andrey Ivanovich**

Rector of Peter the Great St. Petersburg Polytechnic University, coordinator (initiator) of the World-Class Research Center for Advanced Digital Technologies



**Volkov
Sergey Alexandrovich**

Head of the Department for the Development of Information Modeling Technologies of a private institution of Rosatom State Corporation "Industrial Center for Capital Construction"



**Ivanov
Dmitry Stanislavovich**

Director for Innovative Development of UEC-Saturn (UEC, Rostec State Corporation)



**Borisov
Kirill Yevgenyevich**

Acting Director of the Department of State Scientific and Scientific-Technical Policy of the Ministry of Science and Higher Education of the Russian Federation



**Borovkov
Alexey Ivanovich**

SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative



**Lioznov
Dmitry Anatolyevich**

Director of the Smorodintsev Influenza Research Institute of the Ministry of Health of the Russian Federation, member of the consortium of the World-Class Research Center for Advanced Digital Technologies



**Romanchuk
Ivan Sergeevich**

Rector of Tyumen State University, member of the consortium of the World-Class Research Center for Advanced Digital Technologies



**Turichin
Gleb Andreevich**

Rector of the St. Petersburg State Maritime Technical University, member of the consortium of the World-Class Research Center for Advanced Digital Technologies

The scientific and technical agenda of the Forum featured discussions of the methodological principles underlying digital transformation and the use of new digital and manufacturing technologies (primarily digital twins, digital design and modelling as well as artificial intelligence technologies) in a variety of areas such as:

- development of high-tech products;
- management of manufacturing and complex systems;
- field development;
- medical and biological systems;

- construction and utilities;
- development of new materials and manufacturing technologies;
- resource management.

The Third International Forum on Advanced Digital and Manufacturing Technologies is another round of consistent expert discussions of the current goals and objectives of digital industrial transformation as well as development of a modern system of engineering education in Russia. Previously held landmark events include:



The First All-Russian Forum on New Manufacturing Technologies (SPbPU, 3–5 October 2019), which gathered more than **400** participants, among them managers, specialists and representatives of **40** universities, **10** state-owned corporations, **85** high-tech companies, leaders of Russian science and education, and **10** representatives of federal and regional authorities from all over the country. The program of the Forum encompassed more than twenty events involving discussions of development and use of new manufacturing technologies (NMT) in the modern high-tech industry.



The Second International Forum on New Manufacturing Technologies (SPbPU, 2–3 December 2020, online) was dedicated to the current challenges and global trends of the digital industry in the time of the COVID-19 pandemic. This event involved **150** Russian and international speakers, **500+** participants from **20+** corporations and high-tech companies, **40+** cities and **40+** universities.



The First Online Conference on Modern Training of Engineers (SPbPU, 22–24 June 2020, online) involving **Valery Falkov**, Minister of Science and Higher Education of the Russian Federation, which brought together over **200** representatives of **30+** universities from **21** Russian cities.



The Second Online Conference on Modern Training of Engineers (SPbPU, 1–2 November 2021, online), which also involved **Valery Falkov**, Minister of Science and Higher Education of the Russian Federation, gathering more than **1,500** participants from over **100** universities, research organizations, industrial enterprises and public authorities.

Opening of the Third International Forum on Advanced Digital and Manufacturing Technologies



SPEAKERS

- **Moderator: Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative
- **Dmitry Peskov**, Special Representative of the President of the Russian Federation on Digital and Technological Development;
- **Vladimir Knyagin**, Vice-Governor of St. Petersburg;
- **Denis Kravchenko**, Deputy of the State Duma of the Federal Assembly of the Russian Federation, Deputy Chairman of the State Duma Committee on Economic Policy, Industry, Innovative Development and Entrepreneurship;
- **Kirill Borisov**, Acting Director of the Department of State Scientific and Scientific-Technical Policy of the Ministry of Science and Higher Education of the Russian Federation;
- **Andrey Rudskoy**, Rector of Peter the Great St. Petersburg Polytechnic University, member of the Russian Academy of Sciences;

- **Gleb Turichin**, Rector of the St. Petersburg State Maritime Technical University;
- **Ivan Romanchuk**, Rector of Tyumen State University
- **Dmitry Lioznov**, Director of the Smorodintsev Influenza Research Institute of the Ministry of Health of the Russian Federation

MAIN TOPICS

Digital transformation of industry and the economy as a whole. Trends in the development of advanced digital and production technologies; correlation of revolutionary changes and expected breakthroughs in technologies and production formats with legacy engineering systems; scaling breakthrough technologies. Development of the system of engineering education. Cooperation of science, education, industry, business and government institutions. State and private initiatives in the development of these areas.



Video



Report

The world is forced to digitize, become networked. <...> A number of forecasts are shifting not to the right, but to the left. Many of the events that we thought would happen by 2035 are shifting to 2027–2030. The future is coming sooner than we predict



Dmitry Peskov,
Special Representative of
the President of the Russian
Federation on Digital and
Technological Development

The world abandoned the illusion that we will rebuild in a short time. The key question is how to combine rapid, sometimes radical innovation with the slow, viscous inertia of legacy systems. This is the main task of engineers for the next decade.



Vladimir Knyagin,
Vice-Governor
of St. Petersburg

The pandemic has set trends for the coming years that are built around IT technologies, ecology, medicine, and green energy. Digital twins are not an abstract image of the future, it is a term we face today. I am glad that Polytechnic University, my alma mater, is one of the leading innovative educational institutions in our country welcoming innovators and supporting promising high-tech projects.



Denis Kravchenko,
Deputy of the State Duma of
the Federal Assembly of the
Russian Federation, Deputy
Chairman of the State Duma
Committee on Economic Policy,
Industry, Innovative Develop-
ment and Entrepreneurship

The main task of the WCRC is to create a fundamental scientific and technical reserve for world-class high-tech developments. One of the indicators here is the number of scientific publications in the world's leading journals of the first and second quartiles published on the basis of research. <...> But the main indicator of success for us, of course, is the application of the results of these studies in real industry, economics and medicine.



Andrey Rudskoy,
Rector of Peter the Great
St. Petersburg Polytechnic
University, member of the
Russian Academy of Sciences

Mankind is <...> entering a new industrial revolution, which, apparently, will become a permanent state. In such a state of development, it is very important to remember that competition, both national and technological, between companies is only getting fiercer. And those who cannot meet the requirements of the times and trends will be doomed to oblivion.



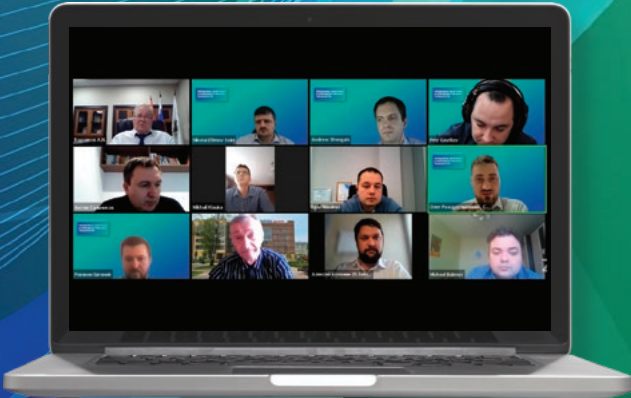
Gleb Turichin,
Rector of the St. Petersburg
State Maritime Technical
University

The forum has become a discussion platform for solving the problems of developing NTI markets and increasing the competitiveness of domestic companies in high-tech global markets. <...> The participants of the forum recognized that the platform should become an annual event, so that the expert community would have the opportunity to “synchronize” in the process of developing the digital economy.



Alexey Borovkov,
SPbPU Vice-Rector for Digital
Transformation, Head of the
SPbPU WCRC, Head of the
SPbPU Advanced Manufacturing
Technologies Center of the
National Technology Initiative

Round-Table Discussion
“Use of Digital Twins
in Development: Practice
and New Cases”



Round-Table Discussion
“Use of Digital Technologies
in Biohazard Protection
Systems”



SPEAKERS

- **Moderator: Oleg Rozhdestvensky**, Deputy Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative, Head of Administration of the SPbPU WCRC;
- **Nikolai Efimov-Soyni**, Head of the Mechanical Engineering Sector, Leading Engineer, SPbPU WCRC;
- **Egor Nazarov**, Head of Laboratory No. 2 NIO-101, MAI;
- **Alexey Bolonin**, Project Manager, Project I5;
- **Anton Salnikov**, Head of Department 077 “Digital Support of the GTE Life Cycle” Central Institute of Aviation Motors;
- **Mikhail Bubnov**, Ph.D., Senior Researcher, chief specialist of the Center for Digital Transformation of the Mendelev University of Chemical Technology of Russia;
- **Mikhail Kiauka**, Engineer, Cross-Industry Technology Department, Researcher of the SPbPU WCRC.

MAIN TOPICS

Understanding the term of digital twin (DT) in the scientific and technical environment in general and in the engineering community in particular. The national standard of the Russian Federation is GOST R 57700.37–2021 “Computer models and simulation. Digital twins of products. General provisions”. DT in production; application of the DT methodology in the design and certification of composite structures; intelligent production platforms; development of a DT demo as a platform for training personnel for the digital economy; DT in petrochemistry and chemical technology; DT as a tool for interaction between research, educational and production teams.



Video



Report



The discussion turned out to be interesting and versatile. Of course, we did not fully cover the topic of using digital twin technology in development, because there is not enough time for round tables, but we looked at the technology from different angles: both from the view point of organizing scientific research, and from the point of organizing development, infrastructure, and the educational process. I hope we will have a more detailed discussion with many of the speakers in the future.

Oleg Rozhdestvensky, Deputy Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative, Head of Administration of the SPbPU WCRC

SPEAKERS

- **Moderator: Daria Danilenko**, Deputy Director for Research, Smorodintsev Influenza Research Institute of the Ministry of Health of the Russian Federation;
- **Moderator: Andrey Vasin**, Director of SPbPU Institute of Biomedical Systems and Biotechnology, Head of the Digital Technologies in Biomedical Systems Scientific Research Institute of the SPbPU WCRC;
- **Kirill Sidorov**, Head of the Regulatory Service Department of the Federal Register of Normative Reference Data (NRD) of the Ministry of Health of Russia;
- **Igor Ilyin**, Director of the Graduate School of Business Engineering, Institute of Industrial Management, Economics and Trade, SPbPU, Leading Researcher of the Scientific Research Institute “Digital Technologies in Biomedical Systems” of the SPbPU WCRC;
- **Vasily Leonenko**, Associate Professor of the Faculty of Digital Transformations, Senior Researcher of the National Center for Cognitive Research, ITMO University, Junior Researcher of

- the Laboratory of Influenza Epidemiology and Upper Respiratory Tract Infections, Smorodintsev Influenza Research Institute of the Ministry of Health of the Russian Federation;
- **Andrey Lomakin**, Scientific Adviser to National Immunobiological Company (Nacimbio);
- **Valentin Shapovalov**, Director of Intelligent Program Systems;
- **Evgeniy Bakin**, Senior Researcher, Pavlov First Saint Petersburg State Medical University.

MAIN TOPICS

Digital Health: basic approaches to building a single data space. Prospects for creating digital twins in the development and production of vaccines. Digital approach to immunization management, development of non-commercial mobile applications for vaccination accounting. Experience in developing a clinical decision support system for the treatment of patients with COVID-19.



Video



Report



If we talk about the development and production of vaccines in general, we can see a revolution unravelling before our eyes marking a dawn of new technologies and new approaches. RNA vaccine is a term that everyone knows now, but it has appeared almost since the beginning of the pandemic. The pandemic has made it possible to introduce these new platform technologies, in particular RNA vaccines, into real practice.

Andrey Vasin, Director of SPbPU Institute of Biomedical Systems and Biotechnology, Head of the Digital Technologies in Biomedical Systems Scientific Research Institute of the SPbPU WCRC

Round-Table Discussion “Digital Technologies for Field Development”



Round-Table Discussion “Economic effects of digital transformation of industry”



SPEAKERS

- **Moderator: Yury Gilmanov**, Head of the Center for Computer-Aided Engineering, Tyumen State University;
- **Rostislav Bilik**, CEO of AGR Software;
- **Denis Adakhovsky**, Engineer of the Central Common Use Center “Rational nature management and physical and chemical research”, Tyumen State University;
- **Alexander Ermakov**, Head of the Technological Track Department, WCRC for Advanced Digital Technologies, Tyumen State University;
- **Fedor Koryakin**, Ph.D. student, Department of Organic and Ecological Chemistry, Tyumen State University;
- **Al Muzaiker Mohammed Ali**, Junior Researcher, Laboratory for the Study of Microfiltration Processes, WCRC for Advanced Digital Technologies, Tyumen State University;

- **Vladimir Vershinin**, Associate Professor, Department of Modeling of Physical Processes and Systems, Tyumen State University.

MAIN TOPICS

Digitalization, automation of the geological database; core digitization. Hydrodynamic modeling to evaluate the efficiency of enhanced oil recovery methods. Thermocapillary mechanism of transfer of microparticles in thin liquid films. Forecasting non-stationary well operation modes and solving multidimensional optimization problems using neural network modeling methods. End-to-end technologies within the framework of an individual educational trajectory at Tyumen State University.



Video



Report

SPEAKERS

- **Moderator: Elena Tishchenko**, Advisor on Digital Economy to the Dean of the Faculty of Economics, Lomonosov Moscow State University, Deputy Head of the Department of Economics of Innovation;
- **Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the WCRC SPbPU and SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative (NTI Center for AMTs of SPbPU);
- **Vladimir Yadykin**, Head of the Manufacturing Processes Simulation and Power Equipment Design Laboratory, NTI Center of SPbPU;
- **Aleksey Gintsyak**, Head of the Digital Simulation of Industrial Systems Laboratory, NTI Center of SPbPU;
- **Dmitry Markov**, Managing Partner of NeuroLab!, Director of the Institute for Business Digitalization of the Russian Academy of Business and Entrepreneurship.

MAIN TOPICS

Economic aspects of digital transformation of industry; effects obtained at all stages of the life cycle of the functioning of an enterprise carrying out digital transformation, transformation of business processes and business models: changing the system of labor distribution, reducing transaction costs, changing corporate culture, creating a new value for the enterprise. Application of simulation modeling tools to describe the dynamics of processes in socio-economic systems.



Video



Report



Modern development of hydrocarbon deposits poses a number of challenges. The use of end-to-end technologies can significantly reduce the cost and the time of mining. The production process consists of many stages, and digital tools can be applied at each of them, increasing the efficiency of field development.

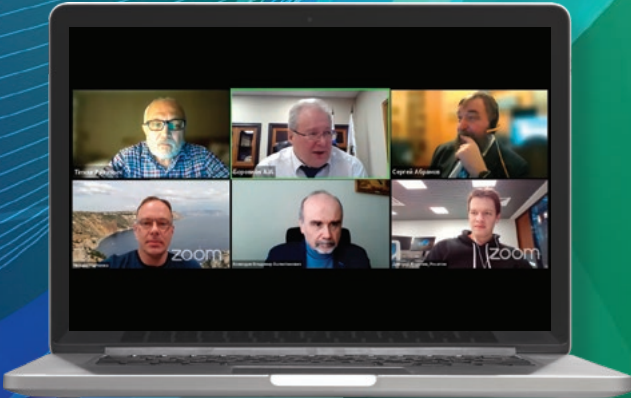
Yury Gilmanov, Head of the Center for Computer-Aided Engineering, Tyumen State University



Digital modeling makes it possible to move from vertically integrated cooperation to the formation of long cooperation chains, both intra-industry and inter-industry. <...> Modeling makes it possible to quickly assemble consortiums for solving unique problems, localization, accumulation of libraries of typical modules for unique assemblies and reengineering of industries.

Elena Tishchenko, Advisor on Digital Economy to the Dean of the Faculty of Economics, Lomonosov Moscow State University, Deputy Head of the Department of Economics of Innovation

Round-Table Discussion “Supercomputer Technologies and Supercomputer Engineering”



Practical Cases: “Technology Transfer Centers: Requirements for Effective Technology Transfer from the Universities”



SPEAKERS

- **Moderator: Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative;
- **Timur Paltashev**, Senior Manager, Radeon Technology Group, Advanced Micro Devices;
- **Sergey Abramov**, Director of the Institute of Program Systems of the Russian Academy of Sciences, Rector of the University of Pereslavl, corresponding member of the Russian Academy of Sciences;
- **Vladimir Voevodin**, Director of the Research Computing Center of Lomonosov Moscow State University, corresponding member of the Russian Academy of Sciences;
- **Mikhail Marchenko**, Director of the Institute of Computational Mathematics and Mathematical Geophysics, Siberian Branch of the Russian Academy of Sciences;
- **Dmitry Fomichev**, Director for Mathematical Modeling, Rosatom State Corporation;

- **Dmitry Karelin**, Deputy General Designer for Research and Development, UEC;
- **Alexander Nikulin**, Head of High-Performance Computing and Digital Twins of Products, UEC.

MAIN TOPICS

Formation of a national supercomputer network. Analysis of the existing supercomputer infrastructure, the status of the industry in Russia and in the world. The special impact of the development of supercomputer technologies and the corresponding infrastructure on the competitiveness of the economy. Outline of AMD supercomputing solutions, including the EXASCALE platform. The need for state support for this strategic industry (in accordance with the practice of developed countries). Development of domestic software for supercomputing. Supercomputer engineering in high-tech industries.



Video



Report



It is necessary to distinguish between supercomputer technologies, including software, hardware, etc., supercomputer modeling and supercomputer engineering – Digital Engineering as a general class. <...> Ten years ago, we proclaimed the dominance of Digital Brainware: otherwise, no matter how hard we try to advance, we will always fall behind.

Alexey Borovkov, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative

SPEAKERS

- **Moderator: Alexander Gavryushenko**, Head of the federal acceleration program TechNet Project, Deputy Head of the Laboratory “Strategic Development of Engineering Markets”, NTI Center of SPbPU;
- **Dmitry Ivanov**, Director for Innovative Development, UEC-Saturn;
- **Mikhail Rayak**, Innovation Adviser, ITMO Highpark;
- **Nadezhda Terlyga**, Deputy First Vice-Rector, Ural Federal University;
- **Stanislav Trufanov**, Director of the Project Office for the Development of Innovative and Entrepreneurial Competencies, Southern Federal University;
- **Ismail Kadiev**, Director of the Center for Intellectual Property and Technology Transfer, Deputy Head for Intellectual Property of the Administration of the NTI Center of SPbPU;

- **Renat Zinnatulin**, Head of the Innovation Department, Perm National Research Polytechnic University.

MAIN TOPICS

Practical cases of Technology Transfer Centers: structural units of higher educational institutions that commercialize the results of intellectual activity, as well as participate in the planning of research, development and technological work. Problems and prospects of technology transfer, experience in organizing a knowledge-intensive high-tech entrepreneurial ecosystem. Student technological competitions.



Video



Report



In the UMNIC program, Peter the Great St. Petersburg Polytechnic University (13 applications), Ufa State Aviation Technical University (12 applications) and Tomsk State University (9 applications) became the leaders among universities in terms of the number of applications that made it to the finals. Thus, we see that universities are systematically working in this direction.

Dmitry Ivanov, Director for Innovative Development, UEC-Saturn

Round-Table Discussion “Advanced Digital Technologies in the Construction Industry”



Round-Table Discussion “Digital Transformation of Public Utilities and Natural Resource Management”



SPEAKERS

- **Moderator: Vladimir Badenko**, Leading Researcher of the Manufacturing Processes Simulation and Power Equipment Design Laboratory, SPbPU WCRC, Doctor of Technical Sciences, Professor of the Institute of Civil Engineering of SPbPU;
- **Sergey Volkov**, Head of the Information Modeling Technology Development Department of the Branch Centre of the Capital Construction of Rosatom;
- **Pavel Glubokov**, Advisor to the Department of Construction of the City of Moscow;
- **Viktor Klepa**, Head of the Digital Construction Management Group at the National Association of Construction Engineering Consultants (NACEC), VCD Director of Intelligent Construction Engineering;
- **Andrey Yashanov**, Chief Design Specialist, BIM Manager, Apex Project Bureau;
- **Marina Minaeva**, Exon Project Manager.

MAIN TOPICS

Life cycle of building information modeling (construction). The main levels of digitalization of the industry: design (BIM technology for project documentation: as-designed BIM), construction (development of a digital plan of the construction site: as-built BIM), operation (models based on the current situation: as-is BIM), disposal (based on project documentation and survey reports). Automation of data exchange between physical and digital objects. Development of the national system of standards “Unified System of Information Modeling” (USIM). Digital construction management.



Video



Report



The presence and direction of automatic data flow between a building and its digital representation determines whether it is a simple digital model, a digital footprint of a building, or its digital twin. Digital twins, however, already function at the design stage, when there is no physical object yet [with the exchange of digital model data with other models, materials, virtual processes, etc.].

Vladimir Badenko, Leading Researcher of the Manufacturing Processes Simulation and Power Equipment Design Laboratory, SPbPU WCRC, Doctor of Technical Sciences, Professor of the Institute of Civil Engineering of SPbPU

SPEAKERS

- **Moderator: Dmitry Serov**, Researcher, Laboratory “Industrial Systems for Streaming Data Processing”, NTI Center of SPbPU;
- **Mikhail Naumenko**, Doctor of Geographical Sciences, Professor, Head of the Geography and Hydrology Laboratory, Institute of Limnology of the Russian Academy of Sciences, full member of the Russian Geographical Society;
- **Anna Kuznetsova**, Director of the Baltvodkhoz Branch, Tsentrregionvodkhoz Water Management Institution;
- **Yuliya Novikova**, Acting Head of the Department for Studies on the Environment and Health of Population in the Arctic Zone of the Russian Federation, North-West Public Health Research Center, Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing;
- **Nikolay Shafranskiy**, Deputy Director for IT, Alliance Electro;
- **Tarlan Gasanov**, CEO of Kingiseppsky Vodokanal;

- **Vsevolod Shevelev**, Head of the Ladoga Fest festival, Roscongress Foundation Project Manager;
- experts from the academic community, public authorities, housing and utilities as well as industrial companies involved in active nature management.

MAIN TOPICS

Digital bathymetric model of Lake Ladoga: history of creation, current state and results of use for limnological studies. Monitoring of anthropogenic impact in the Luga river basin. Information system “Interactive map of drinking water quality control in the Russian Federation”. Organization of continuous monitoring of water and air resources based on automated information system “Precipitation”. Initiative movements for environmental protection: socio-ecological festival “Ladoga Fest”.



Video



Report



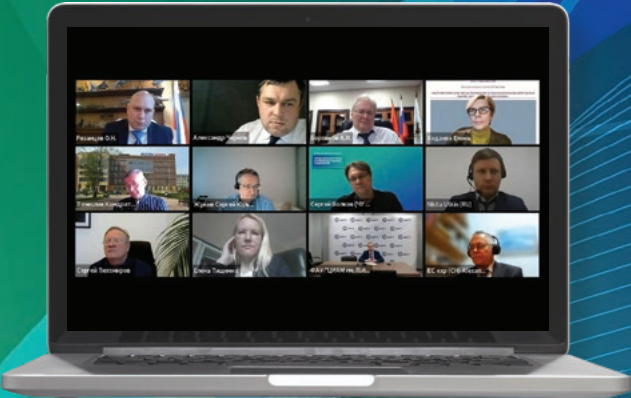
Big data and digital twin technologies are among the most demanded and promising in the modern world. And although the application of such technologies in the field of environmental management already has its own history in our country and abroad, the field for further work and the potential for comprehensive improvement of the housing and communal services and environmental management with the help of digitalization tools are enormous.

Dmitry Serov, Researcher, Laboratory “Industrial Systems for Streaming Data Processing”, NTI Center of SPbPU

Meeting of the TechNet Working Group



Round-Table Discussion “Digital Twins: Development of Standardization”



SPEAKERS

- **Moderator, co-speaker: Kuzma Kukushkin**, CEO of Technet Association;
- **Keynote speaker: Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU WCRC, Head of the NTI Center for AMTs of SPbPU, Leader (Co-Head) of the NTI Technet Working Group;
- **Alexander Fertman**, Director for Science, Technology and Education, Skolkovo Foundation, Deputy Leader (Co-Head) of the NTI Technet Working Group;
- **Irina Borodina**, Senior Project Manager, NTI Project Support Foundation;
- **Alexey Komyagin**, Director of the NTI Competence Center in the field of Bionic Engineering in Medicine based at Samara State Medical University (SamSMU);
- **Dmitry Potemkin**, Senior Researcher, NTI Competence Center in the field of Hydrogen Technologies based at the Federal Research Center Boreskov Institute of Catalysis, Siberian Branch of the Russian Academy of Sciences;

- **Anton Ryazantsev**, Head of the NTI Competence Center in the field of Technologies for Modeling and Development of Functional Materials with Specified Properties based at Novosibirsk National Research State University;
- **Ruslan Permyakov**, Deputy Director for Development, NTI Competence Center in the field of Trusted Interaction Technologies based at the Tomsk State University of Control Systems and Radioelectronics;
- **Arsen Gareev**, Director of the NTI Technological Development Management Center, NTI Project Support Foundation.

MAIN TOPICS

Formats of interaction between the TechNet Working Group and the new NTI competence centers determined during the competitive selection held in the fall of 2021. Presentation of programs and plans for the development of new centers.



Video



Report



For us, as program operators, it is very important that the NTI centers show a clear connection with the NTI markets. Petersburg Polytechnic University in this sense is somewhat easier, since the Technet Association is also nearby in the university ecosystem, and it is more difficult for other centers in this regard. In addition, they need to be involved in active public communication from the very beginning. The Forum of Advanced Digital and Manufacturing Technologies became a pioneer, and this community involvement in the work of NTI centers is very important. All thanks to Technet.

Arsen Gareev, Director of the Center for NTI Technological Development
NTI Project Support Foundation

SPEAKERS

- **Moderator: Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative, Head of Technical Committee 700’s Working Group on Digital Twins;
- **Oleg Ryazantsev**, Deputy Minister of Industry and Trade of the Russian Federation, Chairman of Technical Committee 700 “Mathematical Modeling and High-Performance Computing Technologies”;
- **Alexander Samarin**, Head of the Digital Bank BRICS Project Implementation Unit;
- **Sergey Tikhomirov**, President of Kodeks Consortium, Head of the TechExpert Information Network, Chairman of Project Technical Committee 711 “SMART Standards”;
- **Nikita Utkin**, Director for the Development of Technological Standards of ANO National Technology Initiative Platform (NTI), Chairman of Technical Committee 194 “Cyber-Physical Systems”;
- **Sergey Volkov**, Head of the Information Modeling Technology Development Department

- of the Branch Center of the Capital Construction of Rosatom;
- **Maksim Frantsuzov**, Deputy Head of Department 077 “Digital Support of the GTE Life Cycle”, Central Institute of Aviation Motors.

MAIN TOPICS

International standardization in the field of digital twins, priority areas of standardization in Russia, regulatory and technical barriers to the development of digital twins, industry needs for standards in this area. Development of the national standard of the Russian Federation GOST R 57700.37–2021 “Computer models and simulation. Digital twins of products. General provisions”, which was carried out within the framework of the activities of Technical Committee 700 “Mathematical Modeling and High-Performance Computing Technologies” (TK 700). The standard was approved by order No. 979-st of the head of Rosstandart A.P. Shalaev on September 16, 2021 and comes into force on January 1, 2022.



Video



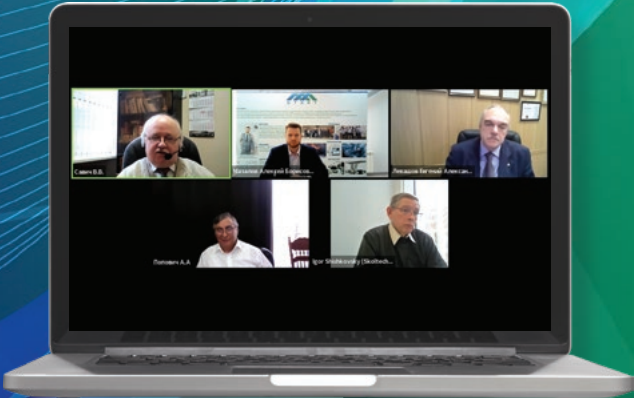
Report



I’d like to assure you that the Ministry of Industry and Trade of the Russian Federation pays special attention to this topic, both in terms of introducing digital twins of complex technical products into practice, and in terms of developing regulatory documents in the field of standardization of declared activities. <...> We are not yet applying this level of technology to an adequate degree, it needs further development.

Oleg Ryazantsev, Deputy Minister of Industry
and Trade of the Russian Federation

Round-Table Discussion
“Functionally Gradient
Materials in Additive
Technologies”



Round-Table Discussion
“Control Systems as a Service:
Cloud-Based Distributed
Control Systems, Cyber-
Physical Systems and
Industrial Internet of Things”

SPEAKERS

- **Moderator: Anatoliy Popovich**, Director of the Institute of Metallurgy, Machine Engineering and Transport of SPbPU, Head of the Synthesis of New Materials and Structures Laboratory of the SPbPU WCRC;
- **Igor Shishkovsky**, Head of the Additive Manufacturing Laboratory, Skolkovo Institute of Science and Technology;
- **Evgeny Levashov**, Doctor of Technical Sciences, Professor, Academician of the Russian Academy of Natural Sciences, Academician of the World Academy of Ceramics, Head of the Department of Powder Metallurgy and Functional Coatings, Director of Scientific-Educational Center of SHC (Self-Propagating High-Temperature Synthesis) at the MISIS National University of Science and Technology and ISMAN (Institute of Structural Macrokinetics, Russian Academy of Sciences);
- **Vadim Savich**, First Deputy Director of Powder Metallurgy Institute;

- **Alexey Mazalov**, CEO of ATC (Additive Technologies Center).

MAIN TOPICS

SPbPU experience in the development and application of new materials and additive technologies. Development of composite and metamaterials, the possibility of their application in industry, medicine and other areas. Master high-entropy alloys for various purposes; development of technologies for spheroidization and compaction of obtained powders. Features of the synthesis of powders from ultra-high-temperature ceramics and the manufacture of ceramic products using additive technologies. Synthesis of intermetallic titanium alloys. Application of additive technologies in air and space crafts, 3D printing with flux-cored wire.



Video



Report

SPEAKERS

- **Moderator: Vyacheslav Potekhin**, Associate Professor of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Director of the North-West Regional Intercollegiate Education and Research Center SPbPU-FESTO;
- **Vyacheslav Shkodyrev**, Director of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Head of the Mathematical Modeling and Intelligent Control Systems Science and Technology Complex of the SPbPU WCRC;
- **Anton Alekseev**, Leading Engineer, North-West Regional Intercollegiate Education and Research Center SPbPU-FESTO;
- **Vladislav Efremov**, Leading Engineer, North-West Regional Intercollegiate Education and Research Center SPbPU-FESTO;
- **Sergey Krasotkin**, Leading Engineer, FESTO-RF;
- **Igor Volkov**, CEO of Bee Pitron SP;
- **Evgeny Pitolin**, Advisor to the CEO at CUSTIS.

MAIN TOPICS

Distributed production control as a cloud service; related difficulties: compatibility between systems of different generations, high costs for integration and scaling of automated control systems from different manufacturers. Experience of interaction between developers and large manufacturing companies regarding the use of cloud management systems. Development of a system for technical diagnostics and management of technological equipment based on the technologies of IIoT and machine vision.



Video



Report



Today, both in Russia and abroad, there is a new trend of new materials for various applications. Without the development of new materials, this or that design or technology will not keep up with the challenges that society sets before us. Designing not only product configurations, but also the properties of the materials from which the products are made, is a key direction in the development of additive technologies.

Anatoliy Popovich, Director of the Institute of Metallurgy, Machine Engineering and Transport of SPbPU, Head of the Synthesis of New Materials and Structures Laboratory of the SPbPU WCRC

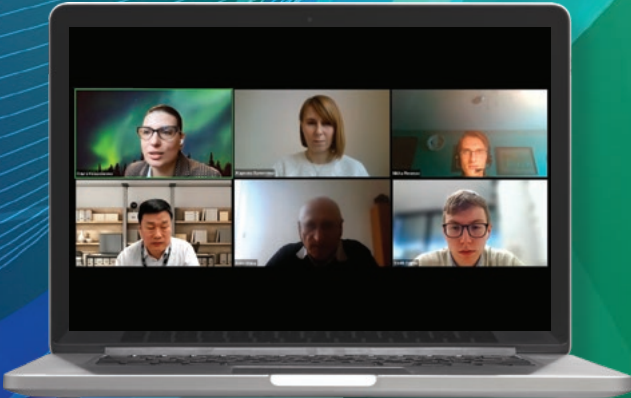


Our group of reports is related to the development of the concept of so-called cyber-physical systems and platform solutions that implement this new concept. We include three big trends in the development of this direction: the trend associated with the intellectualization of systems (this is a class of systems operating under conditions of significant uncertainty), networking (this is the formation of hierarchical network structures) and the concept of self-organizing and self-developing systems. Judging by the number of colleagues who signed up for the session, this topic is interesting both in academic and applied aspects.

Vyacheslav Shkodyrev, Director of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Head of the Mathematical Modeling and Intelligent Control Systems Science and Technology Complex of the SPbPU WCRC

Round-Table Discussion “Modern Electronics”

Part 1: “Technology development and digital transformation of the industry”
Part 2: “Functional materials and technology development”



Round-Table Discussion “LIVE ROAD MAPS of the Markets Covered by the National Technology Initiative”



SPEAKERS

- **Moderator: Olga Kvashenkina**, Head of the Scientific and Technical Center “Neuroprediction of Materials and Technologies of the Electronic Industry” of the SPbPU WCRC, CEO of SNDGroup;
- **Igor Kirichenko**, CEO, Board Member at NAUMEN;
- **Sergey Lettiev**, CEO of NEOTRADE;
- **Rushan Gabdrafikov**, Commercial Director of Nordwex;
- **Boris Khina**, Professor of the Physical-Technical Institute of the National Academy of Sciences of Belarus, Belarusian State Aviation Academy;
- **Valentina Zharkova**, CEO of Laitera;
- **Nikita Pimenov**, Technical Director of OKAN;
- **Yury Polevshchikov**, Chief Specialist of the Sales Department, Ostec-Integra Ltd.;
- **Dong Ge**, Professor of Tsinghua University;

MAIN TOPICS

- **Vasily Osipov**, Researcher, Institut für Physikalische Chemie, Department für Chemie, Universität zu Köln.
- Development of the electronics industry and its digital transformation in Russia and in the world. Cases of developers, manufacturers, retailers; a compromise between the requirements of customers and the capabilities of technology holders. Among the problems of suppliers are: low level of financing, sanctions from the states that are traditionally partners in the industry, short-term investments, weak support for start-ups, lack of standards, etc. Self-propagating high-temperature synthesis (SHS) technology; engineering developments on the use of SHS-foil. Organic electronics.



SPEAKERS

- **Moderator: Kuzma Kukushkin**, Chief Specialist of the Department of TTechnology and Industry Foresight, SPbPU Computer-Aided Centre of Excellence (CompMechLab®);
- **Andrey Siling**, Executive Director of ANO National Technology Initiative Platform (NTI);
- **Alexey Borovkov**, SPbPU Vice-Rector for Digital Transformation, Head of the SPbPU World-Class Research Center for Advanced Digital Technologies, Head of the SPbPU Advanced Manufacturing Technologies Center of the National Technology Initiative, Leader (Co-head) of the NTI Technet Team (advanced manufacturing technologies), Leader (Co-Head) of the National Technology Initiative’s Technet (Advanced Manufacturing Technologies) Working Group;
- **Kirill Potapov**, Head of Division, Department of NTI Architecture and Analytics, ANO National Technology Initiative Platform (NTI).

MAIN TOPICS

Presentation of the project “Performance in the development of methodological materials for the deployment and maintenance of live roadmaps for NTI markets, NTI cross-cutting technologies and NTI regions”, which was implemented by SPbPU specialists by order of ANO NTI Platform in 2021. Conceptual basis of the implemented project, development progress, software, plans for the promotion and implementation of the service in 2022.



When analyzing foreign and Russian electronics, we see that, unfortunately, the picture for the Russian industry is not very bright, although the initiatives that are now being taken by the government contribute to the development of the sphere. If we want to integrate the industry into the global economy, the chain of forming its value involves digital transformation and the introduction of technologies into production and engineering.

Olga Kvashenkina, Head of the Scientific and Technical Center “Neuroprediction of Materials and Technologies of the Electronic Industry” of the SPbPU WCRC



We performed a basic analysis of the foreign experience of live road maps (LRM). It is clear that there are practically no analogues of such a tool. However, on the basis of this analysis, we took into account several recommendations, including: the formation of a universal end-to-end structure of the LRM sections, taking into account not only technologies, but also products and services based on these technologies when compiling the LRM, as well as the use of the “umbrella” principle of the LRM, according to which roadmaps in certain areas fall into the NTI framework roadmap.

Kuzma Kukushkin, Chief Specialist of the Department of Technology and Industry Foresight, Engineering Center “Computer SPbPU Computer-Aided Centre of Excellence (CompMechLab®)”

Workshop for Design & Engineering Companies “Transfer of Advanced Arctic Technologies to Improve Reliability”



Round-Table Discussion “Promising Intelligent Components of Real-Time Manufacturing Systems”



SPEAKERS

- **Moderator: Alexander Bolshev**, Professor of the Graduate School of Hydrotechnical and Energy Construction, Institute of Engineering and Technology, SPbPU;
- **Sergey Frolov**, Associate Professor of the Graduate School of Hydrotechnical and Energy Construction, Institute of Engineering and Technology, SPbPU;
- **Alexander Panfilov**, Associate Professor of the Graduate School of Hydrotechnical and Energy Construction, Institute of Engineering and Technology, SPbPU;
- **Alexander Kharseev**, Team Lead, Process Engineering Department, GT Morstroy;
- **Maksim Nikitin**, Junior Researcher of Digital Design of Power Structures in the Arctic Research Laboratory of the SPbPU WCRC;
- **Igor Kuznetsov**, Research Engineer, Researcher of Digital Design of Power Structures in the Arctic Research Laboratory of the SPbPU WCRC;
- **Ekaterina Shonina**, Ph.D. student, SPbPU.

MAIN TOPICS

Problems of loads on arctic structures. Tasks of digital design in the creation of offshore arctic wind turbines. Numerical modeling of the interaction of a level ice field with an arctic structure of an inclined profile. Digital technologies for modeling wind turbine blades made of composite materials. Conceptual analysis of structures and a method for numerical analysis of the structural strength of offshore arctic wind turbines. Optimization of containment systems for offshore moored structures.



Video



Report

SPEAKERS

- **Moderator: Vladimir Khokhlovsky**, Associate Professor of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Senior Researcher of the Mathematical Modeling and Intelligent Control Systems Science and Technology Complex of the NTI Center of SPbPU;
- **Vyacheslav Shkodyrev**, Director of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Head of the Mathematical Modeling and Intelligent Control Systems Science and Technology Complex of the SPbPU WCRC;
- **Vladimir Tyan**, Professor of the Institute of Oil and Gas Technologies, Samara State Technical University;
- **Sergey Kulnev**, Director for Development, Atomiq Soft;
- **Dmitry Kharitonov**, Marketing Director, Mekhanotronika Scientific and Technical Center;

- **Vitaly Oleynikov**, Head of the Computer-Aided Process Control System Department, SET;
- representatives of RAKURS-engineering.

MAIN TOPICS

Cyber-physical approach to the control of complex technical systems under uncertainty. Solving the problem of structural synthesis of multidimensional control systems. Cross-platform solutions for different levels of automation. Mechatronics, a practical approach to the implementation of a digital substation. Obstacles to the introduction of intelligent control systems, primarily related to issues of secure data migration.



Video



Report



The problem breaks down into many components: extreme external loads on the structure; construction of both offshore and land structures; problems of choosing materials that can function in extreme arctic conditions.

Alexander Bolshev, Professor of the Graduate School of Hydrotechnical and Energy Construction, Institute of Engineering and Technology, SPbPU



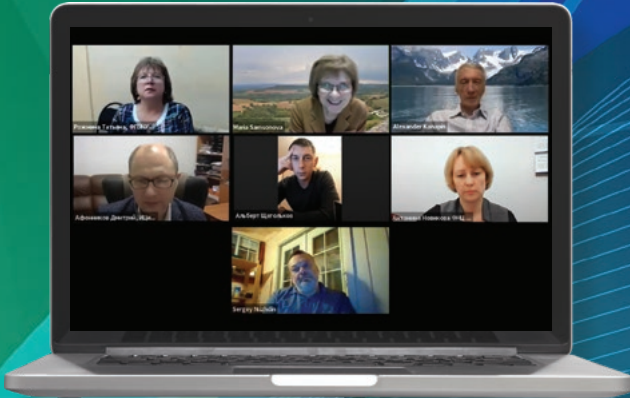
In the field of artificial intelligence, there is such a thesis: “Artificial intelligence is something that is yet to be created.” Thus, the development of the direction we spoke about is a movement towards the negation of “intellectualization”. And we will set new complex, ambitious tasks in the field of artificial intelligence for production control systems.

Vladimir Khokhlovsky, Associate Professor of the Graduate School of Cyber-Physical Systems and Control of SPbPU, Senior Researcher of the Mathematical Modeling and Intelligent Control Systems Science and Technology Complex of the NTI Center of SPbPU

Round-Table Discussion “Master’s Programs of SPbPU’s Institute of Advanced Manufacturing Technologies”



Round-Table Discussion “Use of Digital Technologies to Produce New Varieties of Cultivated Plants”



SPEAKERS

- **Moderator: Valeriy Leventsov**, Director of the SPbPU Institute of Advanced Manufacturing Technologies;
- **Olga Antonova**, Ph.D., Associate Professor of the SPbPU Institute of Advanced Manufacturing Technologies, Deputy Director of the SPbPU Computer-Aided Centre of Excellence (CompMechLab®);
- **Ilya Keresten**, Ph.D., Associate Professor of the SPbPU Institute of Advanced Manufacturing Technologies, Researcher of the Research Laboratory “Digital Design of Power Structures in the Arctic”;
- **Irina Cherepanova**, Chief Specialist, Analyst Team Lead, Centrotech-Engineering (TVEL);
- **Vladimir Shchegolev**, Ph.D. (Economics), Director of the Graduate School of Technological Entrepreneurship, SPbPU Institute of Advanced Manufacturing Technologies;
- **Sergey Ermakov**, Research Engineer, New Technologies and Materials Science and Technology Complex, Institute of Advanced Manufacturing Technologies of SPbPU;
- **Irina Medvedeva**, Senior Manager for Development, Directorate for Technical Development and Quality, Severstal;

- **Anna Vinokurova**, student, Graduate School of Technological Entrepreneurship, Institute of Advanced Manufacturing Technologies of SPbPU.

MAIN TOPICS

Presentation of the educational model of the Institute of Advanced Manufacturing Technologies, basic educational programs and programs of further vocational education. Master’s programs:

- 15.04.03_07 “Computer Engineering and Digital Production” and a joint educational track with LLC Science & Engineering Center Centrotech, Centrotech-Engineering (TVEL, State Corporation Rosatom);
- 27.04.06_03 “Technology Leadership and Entrepreneurship” (International Program in English);
- 27.04.06_04 “Technology Entrepreneurship”;
- 27.04.06_05 “Organization and Management of Digital Science-Intensive Industries”;
- 27.04.06_02 “Management Processes of Science-Intensive Production” (within the industrial chair of Holding LENPOLIGRAFMASH).

Startup as Diploma supported.



Video



Report

SPEAKERS

- **Moderator: Maria Samsonova**, Doctor of Biological Sciences, Professor, Head of the Digital Technologies for Agrobiology Research Laboratory of the SPbPU WCRC;
- **Sergey Nuzhdin**, Ph.D. (Biology), Professor of the University of California, Los Angeles (USA), Leading Researcher of the Digital Technologies for Agrobiology Research Laboratory of the SPbPU WCRC;
- **Elena Khlestkina**, Doctor of Biological Sciences, Director of N. I. Vavilov All-Russian Institute of Plant Genetic Resources;
- **Albert Shchegolkov**, Ph.D. (Agriculture), Researcher of the Breeding Department at Soko;
- **Dmitry Afonnikov**, Doctor of Biological Sciences, Head of the Laboratory of Evolutionary Bioinformatics and Theoretical Genetics of the Institute of Cytology and Genetics;
- **Antonina Novikova**, Ph.D. (Agriculture), Head of the Breeding and Seed Production Center,

Federal Research Center of Biological Systems and Agrotechnologies of the Russian Academy of Sciences;

- **Tatiana Rozhmina**, Doctor of Biological Sciences, Deputy Director for Science and Innovations, All-Russian Research Institute of Flax;
- **Alexander Kanapin**, Ph.D. (Biology), Researcher of the Digital Technologies for Agrobiology Research Laboratory of the SPbPU WCRC.

MAIN TOPICS

Genetic technologies in crop production. Stages of genomic selection. High-throughput phenotyping using digital technologies for genetics and plant breeding. Digital approaches to the domestication of kelp (brown algae).



Video



Report



The Institute of Advanced Manufacturing Technologies of SPbPU is a specific institution, not the same as what is commonly understood as a faculty or an institute. The very principle of work of the Institute differs from the work of other institutions, since the so-called “lean training” is used here. It stems from developments, on the basis of which, through research, we train highly qualified specialists; in this regard, the Institute has a close connection with the NTI Center of SPbPU.

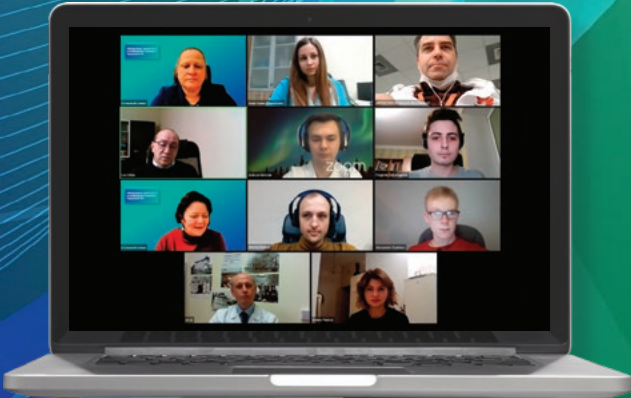
Valeriy Leventsov, Director of the Institute of Advanced Manufacturing Technologies of SPbPU



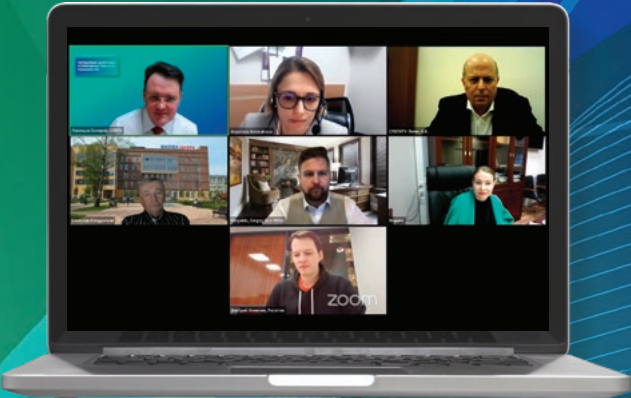
The use of digital twins in breeding makes it possible to select plants according to the predicted value of their genotypes without phenotyping. <...> Genomic selection cannot replace standard breeding programs, but can be integrated into these programs.

Maria Samsonova, Doctor of Biological Sciences, Professor, Head of the Digital Technologies for Agrobiology Research Laboratory of the SPbPU WCRC

Round-Table Discussion
“Industrial Application
of AI Algorithms
and Technologies”



Round-Table Discussion
“Model of Engineering
Training at the Universities
from the Network of Federal
Innovative Venues”



SPEAKERS

- **Moderator: Marina Bolsunovskaya**, Ph.D., Associate Professor, Head of the Industrial Systems for Streaming Data Processing Laboratory of the SPbPU WCRC;
- **Lev Utkin**, Doctor of Technical Sciences, Professor of the Graduate School of Artificial Intelligence of the Institute of Computer Science and Technology of SPbPU, Head of Research Laboratory of Neural Network Technologies and Artificial Intelligence of the Institute of Computer Science and Technology of SPbPU;
- **Andrey Konstantinov**, Engineer of the Research Laboratory Supercomputer Technologies and Machine Learning of the SPbPU WCRC;
- **Ilya Afanasyev**, Team Lead of the Media Algorithms Team, Saint Petersburg Research Center of Huawei Technologies Co.;
- **Denis Miroschnichenko**, Senior Researcher of the Scientific and Educational Center at the Ivanovo State Polytechnic University;
- **Stanislav Urazov**, Doctor and Public Health Educator of the Organizational and Methodological Department for Medical Rehabilitation, City Hospital No. 40;
- **Alina Cherkas**, Research Engineer of the Industrial Systems for Streaming Data Processing Laboratory of the SPbPU WCRC;

- **Alexey Gintsyak**, Head of the Laboratory of Digital Modeling of Industrial Systems of the NTI Center of SPbPU, Researcher of the Industrial Systems for Streaming Data Processing Laboratory of the SPbPU WCRC;
- specialists of the Industrial Systems for Streaming Data Processing Laboratory of the SPbPU WCRC.

MAIN TOPICS

Developments of the SPbPU WCRC in the field of machine learning, review of implemented projects and technological opportunities for their development. Methods for explaining the predictions of machine learning models. Multivariate learning based on multiple attention models. Application of AI algorithms and technologies in digital models of transport systems. Prospects for the use of artificial intelligence in the textile industry; development of a neural network for detecting fabric defects in the textile industry. Development of a classifier for predicting severe course of the disease in patients with a new coronavirus infection. Digital modeling of industrial systems.



Video



Report



The 2021 Gartner research suggests that predictive analytics, hybrid analytics and hybrid modeling will play the main role over the next few years, leading the way in all their diversity.

Marina Bolsunovskaya, Ph.D., Associate Professor, Head of the Industrial Systems for Streaming Data Processing Laboratory of the SPbPU WCRC

SPEAKERS

- **Moderator: Valeriy Leventsov**, Director of the Institute of Advanced Manufacturing Technologies of SPbPU;
- **Mikhail Zhmailo**, Leading Engineer of the SPbPU Computer-Aided Centre of Excellence (CompMechLab®);
- **Vladislav Tereshchenko**, Senior Lecturer of the Institute of Advanced Manufacturing Technologies of SPbPU;
- **Marina Arkannikova**, Ph.D. (Political Sciences), Associate Professor, Director of the Graduate School of Media Communications and Public Relations of SPbPU;
- **Andrey Vasin**, Ph.D. (Biology), Associate Professor, Director of the SPbPU Institute of Biomedical Systems and Biotechnology, Director of the Scientific Research Institute “Digital Technologies in Biomedical Systems” of the SPbPU WCRC;
- **Dmitry Fomichev**, Ph.D., Director for Mathematical Modeling at Tsifrum (Rosatom State Corporation);
- **Sergey Revyakin**, President of the Corporate and Academic Sector at Elsevier;

- **Alexey Lipis**, Dean of the Department of Digital Industrial Technologies of the Saint Petersburg State Marine Technical University;
- **Anastasia Bolshakova**, Associate Professor of the Graduate School of Biomedical Systems and Technologies of SPbPU.

MAIN TOPICS

The experience of the Institute of Advanced Manufacturing Technologies in terms of distance training of masters. Digital transformation of the shipbuilding industry and solutions of St. Petersburg State Maritime Technical University. Creation of scientific and educational centers in the State Corporation Rosatom. Experience of Smorodintsev Influenza Research Institute in terms of launching a new international educational program “Molecular and Cellular Biomedical Technologies” (Virology module). Modern digital tools for engineering development and education of the future. Program “Strategic Communications in Industry 4.0” of the Institute of Humanities of SPbPU.



Video



Report



In our opinion, the training of personnel in the direction of “Advanced Manufacturing Technologies” on the basis of universities can be implemented through the creation of scientific and educational centers, including interuniversity ones, with the involvement of specialists from industry enterprises and development institutions, as well as in collaboration with other related universities. This kind of collaboration contributes to the maximum “spill out” of knowledge and technology for training.

Dmitry Fomichev, Ph.D., Director for Mathematical Modeling at Tsifrum (Rosatom State Corporation)

Events of the Third International Forum ON ADVANCED DIGITAL AND MANUFACTURING TECHNOLOGIES

DECEMBER 1, 2021

1. Opening of the Third International Forum “Advanced Digital and Manufacturing Technologies”
2. Round-Table Discussion “Use of Digital Twins in Development: Practice and New Cases”
3. Round-Table Discussion “Use of Digital Technologies in Biohazard Protection Systems”
4. Round-Table Discussion “Digital Technologies for Field Development”
5. Round-Table Discussion “Economic effects of digital transformation of industry”
6. Round-Table Discussion “Supercomputer Technologies and Supercomputer Engineering”
7. Technology Transfer Centers: Requirements for Effective Technology Transfer from the Universities
8. Round-Table Discussion “Advanced Digital Technologies in the Construction Industry”
9. Round-Table Discussion “Digital Transformation of Public Utilities and Natural Resource Management”
10. Meeting of the TechNet Working Group

DECEMBER 2, 2021

11. Round-Table Discussion “Digital Twins: Development of Standardization”
12. Round-Table Discussion “Functionally Gradient Materials in Additive Technologies”
13. Round-Table Discussion “Control Systems as a Service: Cloud-Based Distributed Control Systems, Cyber-Physical Systems and Industrial Internet of Things”
14. Round-Table Discussion “Promising Intelligent Components of Real-Time Manufacturing Systems”
15. Round-Table Discussion “Modern Electronics”
16. Part 1: “Technology development and digital transformation of the industry”
17. Round-Table Discussion “Modern Electronics”
18. Part 2: “Functional materials and technology development”
19. Round-Table Discussion “LIVE ROAD MAPS of the Markets Covered by the National Technology Initiative”
20. Workshop “Transfer of Advanced Arctic Technologies to Improve Reliability”
21. Round-Table Discussion “Use of Digital Technologies to Produce New Varieties of Cultivated Plants”
22. Round-Table Discussion “Industrial Application of AI Algorithms and Technologies”
23. Master’s Programs of SPbPU’s Institute of Advanced Manufacturing Technologies
24. Round-Table Discussion “Model of Engineering Training at the Universities from the Network of Federal Innovative Venues”



Based on the materials of the Forum, an expert and analytical report will be prepared, reflecting the practices of digital transformation of production and the use of advanced digital and manufacturing technologies in various areas of the economy.

Detailed information about the event, recordings of all broadcasts are available on the Forum website: npt-forum.ru

Peter the Great St. Petersburg Polytechnic University (SPbPU), its World-Class Research Center for Advanced Digital Technologies and NTI Center “Advanced Manufacturing Technologies” invite you to participate in the Fourth International Forum on Advanced Digital and Manufacturing Technologies, which will be held in December 2022.

We welcome leaders and specialists of high-tech companies and corporations, representatives of government authorities, professional community, leading scientific, educational, industrial organizations and all those whose activities are related to the digital transformation of enterprises, development and application of advanced manufacturing and digital technologies.



Peter the Great St. Petersburg
Polytechnic University



World-Class Research Center
for Advanced Digital Technologies



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