



World of MEPhI

December' 18

**Dear professors, lecturers,
postgraduates, students and
employees of MEPhI!**

The eventful calendar year is coming to an end. A close-knit team, fulfilling its earlier commitments, has defended the leadership of the University in the implementation of an Academic Excellence Program, expanded its presence in the world science, significantly brought the range of educational programs to the professional requirements of the State Corporation Rosatom and other employers.

All this has been reflected in the national and world rankings, in the results of the Admission campaign; it works for the MEPhI brand and contributes to the involvement of the University in solving problems of national importance, strengthening the international prestige of Russia on the example of the nuclear knowledge export.

I thank everyone who multiplies the achievements of MEPhI through their selfless work.

I wish each of you professional success and well-being, true friendship and love! Dear colleagues, Happy New Year and Merry Christmas!

**Rector of the National Research
Nuclear University MEPhI
M.N. Strikhanov**



HAPPY NEW YEAR!

FOURTH CONSECUTIVE YEAR MEPhI IS MOST POPULAR ENGINEERING UNIVERSITY IN RUSSIA

On December, 12 the international news agency «Rossiya segodnya» (project «Social Navigator») has presented the Fourth Rating of Demand for Universities in Russia – 2018.

In 2018, the research included 444 universities. The evaluation of universities was carried out according to the following indicators: citation of works of employees of the organization, commercialization of

intellectual product and the demand for the scientific product of the organization, as well as the share of graduates who received a referral to work.

According to the rating results, the most popular University in the group of classical universities is the Lomonosov Moscow State University. For the fourth year in a row, MEPhI has become the best engineering University.

MEPhI WINS TWO GOLD MEDALS AT DIGITAL SKILLS-2018 CHAMPIONSHIP



Within three days more than 200 students of colleges, universities, schoolchildren and young employees of enterprises from 14 countries (Russia, China, Australia, Korea, Singapore, Japan, Estonia, Austria, Germany, France, etc.) competed at the DigitalSkills-2018. The participants demonstrated professional skills in 24 competencies related to the current areas of activity of the modern digital industry.

The Director General of the Union «Young professionals (WorldSkillsRussia)» Robert Urazov noted that the corporate championship of DigitalSkills began as a purely IT competition, but turned into a global event that helps students to see themselves in their future profession and understand that «digital» and programming is not the distant future, but what is needed now in any industry.

Employees of the National Research Nuclear University MEPhI participated in two competencies: «Operation of unmanned aircraft systems» and «Quantum technologies». Also, a student of the Lyceum №1511 of the MEPhI Pre-university took part in the competition on «Analysis of information systems security from external threats».

An engineer of the WorldSkills competence center at the National Research Nuclear University MEPhI Vladimir Voronin took the first place in the competence «Operation of unmanned aircraft systems» (expert – engineer of the WorldSkills competencies center of MEPhI Artem Ignatov). In the competition, the participants had to show several skills: flying through the obstacle course; capture and transfer of cargo, skills of remote control of a drone and programming of automatic flight on a given route. At the final stage, the drone had to take a photo of a three-dimensional object, and then it was necessary to create a

model and print it on a 3D printer on the basis of the images.

Vladimir Voronin noted that the main rival was the representative of MSEC who took the second place: «It was very skilled rival. In my practice it was the second championship and the second victory, while he participated in three (out of offset) only during the last month therefore it was quite difficult to compete with him». According to Vladimir, he adheres to the rule which helps him to achieve good results in life: «The secret of success is simple – "Be Brave and Work Hard!" I want to add that it is necessary to find a direction that is after your own heart, and work away. I was lucky to find one. In our laboratory, we work on many projects, and each of them is interesting to the point of insanity. Go ahead!»



A student of the LAPLAS Institute Anisia Klimenko won gold in the competence Quantum technologies» (expert – an engineer of the LAPLAS Institute Konstantin Lukyanov), and her colleague Violetta Sharoglavova (expert – a student of the National Research Nuclear University MEPhI Vladimir Pirog) took the second place in this competency. In this interdisciplinary competence related to the modern branch of quantum encryption and data transmission, the participants performed three modules. The first

task was the assembling of the Bob scheme – a symbol of the signal receiver, measurement of attenuation in the resulting scheme and calculation of some parameters. The second was to configure the settings themselves, work with Alice and Bob's software, and start the generation and transmission of the key through the quantum channel. The third module was about programming on a quantum computer simulator, which took place on the IBM Q Experience platform. «In my opinion, the most difficult was the last module, as it is the most difficult to find information. I am delighted with the championship, mostly with the organization of experts and the platform of our competence. I hope that more and more participants will be interested in this competence, because now it is one of the promising areas and experts in this field are needed,» said Anisia.

A student of the 10th grade of the Lyceum №1511 Mikhail Sukhov (expert – MEPhI postgraduate Ainur Zamanov) participated in the competence «Analysis of information systems security from external threats». Despite his youngest age, he finished fourth among 9 adult participants. This is Mikhail's second achievement this year. In October, he already took the first place in this competence in the VII Open championship of professional skills of Moscow «Moscow masters» by WorldSkills standards

and has a good chance to get to the national championship in this competence. Mikhail solved tasks in the field of steganography and cryptography, conducted an «investigation» of the incident in the application of the bookstore (fictitious), eliminated the problems associated with the attack on the corporate network. «The whole championship was a constant improvement of my skills. It was difficult, but I coped, performed at the level of participants who work in this field,» said Mikhail Sukhov.



MEPHI BECOMES LEADER IN NUMBER OF MEDALS AT WORLDSKILLS INTERUNIVERSITY CHAMPIONSHIP

The National Research Nuclear University MEPhI has become the winner of the II National Interuniversity Championship «Young professionals» by WorldSkills standards, winning the largest number of medals. Representatives of MEPhI performed in 16 of the 44 categories, including «Electronics», «Mobile robotics», «Quantum technologies», etc. Both representatives of the Moscow site and six its branches from different cities of Russia fought for gold of the competition.

The final was intense and bright. Eight new competencies appeared in the program, more than 500 students from 93 universities fought for the awards – this was 10 more than in 2017.

For the second year in a row MEPhI became the leader in the number of medals. University students received 5 gold, 3 silver and 2 bronze medals. On the second place is Bauman Moscow State Technical – 4 gold and 1 bronze medals. The third line of the unofficial medal standings was shared by the State University of Humanities and Technology, Moscow State Polytechnic University, Far Eastern Federal State University and Kazan Innovative University named after V. G. Timiryasova – they have 4 medals. For the first time medals will go to Samara, Orenburg, Amur, Voronezh, Novgorod regions and the Republic of Mari-El.

The General Director of the Union «Young professionals (WorldSkills Russia)» thanked the participants, experts, sponsors and partners, without whom the championship would not have taken place. Robert Urazov stressed that there were no losers at the National Interuniver-

sity Championship: «Those who did not receive a medal, do not stop at this stage. Each championship is an opportunity not only to prove themselves, not just to try, but also to take a step for further professional growth, to future victories.»

The competitions were held with the support of the Moscow Government. It was the capital of Russia that presented the largest team. «Moscow initially supported the National Interuniversity Championship «Young professionals» and hosts the final for the second time. This is quite a pragmatic decision: we are interested in encouraging future young professionals to improve their skills. It is also very important for the Moscow Government to involve universities in the development of professional competencies that are currently in demand in the market. Last year, there were 19% Moscow students among the participants of the championship, today it's 21%,» said the head of the Department of entrepreneurship and innovative development of Moscow Alexey Fursin.

In 2018, MEPhI has increased its' mission in the Interuniversity Championship. The University has held one of the biggest qualifying stages in Moscow and its' 6 branches. 128 students and 110 employees took part in the competition. As a result, a team was formed to participate in the finals of the II National Interuniversity Championship WorldSkills-2018 consisting of 40 people (20 student participants and 20 staff members).

The MEPhI team again achieved outstanding results in the Interuniversity Championship, winning prizes in 13 out of 16 competencies in the competition which was attended by University students.

CHOOSE YOUR FUTURE!

On December 6, MEPhI has held a Job Fair – an annually organized platform for interaction of University students with representatives of various enterprises.

This year, the event was significantly expanded. The program of the Fair was very rich and included not only traditional offers of practice and employment for students, but also a plenary session with employees, career advice for graduates and students, career guidance activities for Lyceum students, presentations of joint programs, as well as master classes, trainings and excursions to enterprises.

Students were able to communicate with representatives of 68 companies, including the State Corporations Rosatom and Roscosmos, the Ministry of Industry and Trade, enterprises of the military-industrial complex, institutes of the Academy of Sciences, enterprises of the Federal Biomedical Agency, as well as such well-known companies as Sberbank, Rosbank, Aeroflot, Mail.ru and others. The organizers tried to make sure that every graduate of 2019 will find a place for practice or work. For the efficiency of students' search for the employer, the space was divided into specialized «territories»: enterprises of high-tech sector, IT technologies and production, finance and audit, science and technology.

Before the event, students and graduates were given invitation cards with a list of companies that are represented at the Fair. Representatives of the personnel services of the enterprises put their signature in front of the company's name, confirming that the company is ready to accept a candidate for a job or internship. This was the main result of visiting the event. According to the results of the Fair, more than 700 students made arrangements about practices and internships and about 400 – about em-

ployment in enterprises, 80 people signed up for an introductory practice.

As the vice-rector of MEPhI E.B. Vesna noted, «Our task is to ensure that 100% of guys choose our key industrial partners as their future employer – those for whom we are developing educational programs. And here Rosatom State Corporation is the undisputed leader. Every year, the corporation employs about 30% of the graduates of the MEPhI Moscow site». By the way, in the framework of the Fair there was held a promotion of the «Rosatom Career Day». About 500 students registered to participate in it!

Employees of employers shared their impressions about the Job Fair in MEPhI, as well as advice to future applicants.

Julia Kuzmina, representative of the industry project of the Rosatom state corporation for training of beginning specialists in the field of project management in the nuclear industry «Fabrika» (Factory):

– We take part in the Job Fair, because we want to meet with students,

attract them to our project and offer them an interesting job. Since our company is international one, we have the most employees from the MEPhI's Institute of International Relations, there are also a lot of people from the Faculty of information security, however, technical areas are also welcomed in our company. We have a good adaptation program, we arrange training, and each trainee is assigned a mentor – a current manager and project manager.

Kristina Yurtaeva, intern of HR-competencies department in «Sberbank»:

– The Job Fair is good because students are given an opportunity to see their points of growth, and for employers – to find potential candidates. Students, first and foremost, pass internships, and those who have this experience in SV can consider to occupy certain positions. Applications are submitted by more than 8 thousand students, we select about two hundred of them who undergo training. As statistics show, every third trainee receives a position in the state.



Arkadiy Sayans, first year senior in the British audit and consulting company «EY»:

– I think the Job Fair is a useful event for students, because a student can find an internship and there is a chance to prove themselves so that to receive an offer of employment. I would like to note that now we have many graduates of MEPhI, I graduated from this University, but in my time there were no such events.

Students also shared their impressions of the event and career plans for the future:

Alexander Novoselov, 6 year, PhysBio:

– I'm finishing my studies this year and I'm already doing my internship. I was attracted by the stand of the Rosatom state corporation. This is a very technological and

innovative company, it seems to me that every MEPhI graduate would like to build a career in it. That is why I could not miss such an event as the Job Fair, where Rosatom can offer me an interesting job. I would like to work in the Analytics Department of the state corporation.

Svetlana Slepneva, 5 year, ICIS:

– There are a lot of different companies, and it's very cool, because everyone can find something interesting. Most of all I was attracted by the company «Severstal». There I met my friend, who spoke about all the advantages of working in the city of Cherepovets. The fact is that there are very good conditions for employment, so I want to apply for the leadership program of the company.



YOUNG SCIENTIST OF SEC NEVOD AWARDED MEDAL OF RUSSIAN ACADEMY OF SCIENCES



On December 13, the Alexandrinsky Palace of the RAS Presidium has hosted a ceremony of awarding medals of the Russian Academy of Sciences for young scientists and students of higher educational institutions. Medals were presented by the Vice-President of the Russian Academy of Sciences, academician Valery Kozlov.

The lecturer of SEC NEVOD Egor Zadeba received a prize in nuclear physics for the cycle of works on "Coordinate-tracking detector based on drift chambers for registration of near-horizontal muon flux generated by ultra-high energy cosmic rays".

The development of a new coordinate-tracking detector started in 2013 in the framework of cooperation between MEPHI and IHEP. Multi-wire drift chambers designed for neutrino accelerator U-70 were transferred to the University. These chambers have a large effective area (~ 2 sq. m.) and high precision of charged particles tracks registration (1 mm) at only four measuring

channels, so it was proposed to use these unique qualities in the new installation for registration of muon groups in the experimental complex NEVOD. Before that, drift chambers had never been used in the research of cosmic rays.

In four years the team of young employees and students under the leadership of Egor Zadeba managed to develop and create a design of a new installation, which records technological systems as well, to implement a network mode with existing detectors of the experimental complex.

The first in the world coordinate tracking installation on the drift chambers for the registration of cosmic rays has been put into operation, it registered events with a density of 15 particles per square meter, which today is a record for installations with very low number of measuring channels.

It should be noted that Egor Zadeba is already a winner of the 2012 competition medals of the Russian Academy of Sciences for University students.

SMART CLOTHES & BIONIC PROSTHESES: RESEARCHERS LEARN TO READ MUSCLE SIGNALS

Scientists and engineers at the National Research Nuclear University MEPHI have recently developed a Myo Interface device capable of reading the muscle's electrical activity and converting it into signals.

The new development will be used to create exercise equipment for those in rehabilitation, smart clothes for athletes that can take electrocardiograms as well as monitor other indicators, and a system to control bionic arm prostheses. It can also be used for remote control of smartphones and Smart House systems.

Myo Interface is a project of a human-computer interface that reads the arm muscles' electric activity, recognizes gestures and translates them into commands for devices, explained Bulat Aitbayev, master's degree student at MEPHI's Higher Engineering School.

«Myo comes from 'muscle' in Greek,» told Bulat Aitbayev. «The electrodes read the electromyographic signals of the muscles, while the interface uses special algorithms to recognize movement patterns and translate them into device commands.»

This project has been underway since 2015. Myo Interface won FASIE's Start-1 grant worth two million rubles; this money was used to assemble the laboratory pro-

totype capable of recognizing up to eight gestures.

In 2017, this project won the Generation-S Pre-Accelerator contest and was ranked first in the Innovation in the Business nomination of the Innovative Radioelectronics competition. In 2018, it also won the Chinese-Russian Industrial Innovation Award.

Recently, the developers have assembled a brand new, autonomous version of the device, which looks like a wristband equipped with Bluetooth and power supply modules, and also has an inertial module that includes a gyroscope and accelerometers.

«Compared with the analogues, our device has a higher accuracy and lower device recognition delay rate,» Aitbayev explained. «It also allows the use of a wider range of various recognition algorithms.»

Developers are planning to use the laboratory prototype to create a system for controlling the upper limbs' bionic prostheses and update the virtual and augmented reality movement tracking system.

Researchers also managed to solve the subject of recognition algorithms, which used to stop working upon removing and attaching the electrodes back again; this allowed the reduction of the preliminary adjustment time. In the future, developers are



planning to register their intellectual property and find industrial partners to implement the project.

The new MEPHI design can be used to create exercise equipment for those in rehabilitation after strokes or other traumatic situations that cause temporary paralysis; to make smart clothes for athletes that can take electrocardiograms or electromyograms, as well as monitor other health indicators. It can also be used for remote controlling various devices, such as smartphones or Smart House systems.

