

# Center of Excellence for Young Researchers of Brest State Technical University

Pavel A. Kachurka, Siarhei I. Parfamuk, Volha A. Kachurka

**Abstract**—The student research work in the Brest state technical university is described. To improve conditions for research work the Centre of excellence for young researchers of the Brest state technical university in the format of a virtual informational resource in the form of a website was created. The website provides information about the research work of undergraduate and graduate students; announcements and reports on scientific activities; project activities, ensuring the dissemination, sustainability and synergies of projects; useful experience and success-stories of young researchers.

**Keywords**—research, young scientists, support, university.

## I. INTRODUCTION

At the beginning of 2017 over 8100 students of first and second stages of higher education study at the Brest State Technical University. Each year 30% of full-time students are involved in research work. The main areas of student research are: participation in national and international scientific and practical conferences, publications, the presentation at the exhibitions, participation in student scientific associations.

Since 2009 the Council of Young Researchers operates in university. Its goals include the support and development of scientific-research works of young researchers as one of the most important factors in the preparation of highly qualified specialists and capable of a high theoretical and practical level to independently solve complex scientific problems.

Young researchers often work at a narrow scientific field and do not know tons about the achievements of their colleagues from other faculties and universities. Therefore, the university became necessary to create a contact platform for young researchers. The Center of excellence for young researchers of the Brest State Technical University was established to solve this problem.

## II. STUDENT SCIENTIFIC RESEARCH

The main objectives and directions of student research in the Brest state technical university are:

- multidisciplinary training of specialists (engineers, masters, postgraduates and PhDs);
- ensuring a high level of basic and applied knowledge gained by young researchers in the process of scientific works;
- ensuring the participation of young researchers in research and applications, carried out on the basis of state budgetary and contractual works and directed to address specific scientific, technical, socio-economic problems of Brest region and the Republic of Belarus;
- the search for new forms of participation and training of scientific work;
- the development of students' scientific associations, design and technology, research circles, student research laboratories, art studios;

P. Kachurka, Brest State Technical University, Brest, Belarus, (e-mail: paulermo@gmail.com)

S. Parfamuk, Brest State Technical University, Brest, Belarus, (e-mail: parfom@mail.ru)

V. Kachurka, Brest State Technical University, Brest, Belarus, (e-mail: volha.kachurka@gmail.com)

- ensuring the active participation of students in scientific events;
- promotion of scientific and technical creativity of youth, exchange and dissemination of the university best practices and effective forms of student research development;
- enhancing creativity and efficiency to the students by involving them in research activities;
- promote the implementation and use in the national economy of science and technology advances.

Subjects of research of young researchers are determined within themes of contractual and state budgetary research conducted at the university on the instructions of the National Academy of Sciences of Belarus, ministries, departments, institutions and enterprises, as well as the themes, chosen by the developers.

The main forms of attracting students to the research are:

- research work as part of Student Research Societies, including thematic scientific circles, educational, scientific and industrial complexes, the architectural studio, etc.;
- individual work with talented youth, participation in conferences, exhibitions, contests, competitions, inventive activity of the university, preparation of reports and articles. In particular, in the framework of the annual Student University Conference "Science Week";
- educational and research work, which includes the study of special courses, elective courses, individual lessons on the basics of scientific research (for example, "Fundamentals of research and innovation", "Basics of research, invention and innovation in mechanical engineering");
- conducting of personal and collective creative exhibitions on architecture, design, painting, drawing, participation in international and republican competitions of the best graduation projects on architecture and design (Kazan, Saratov, Samara, Minsk);
- perform tasks on the state of scientific and technical programs, grants, and contracts with the organizations; work as part of the university research groups, created for design and engineering work on the contract;
- implementation of research in the framework of international cooperation with higher educational institutions of the Russian Federation, Ukraine, the Republic of Poland and the Federal Republic of Germany;
- training and internship abroad, training in leading foreign universities. For example, in the department of architectural design and drawing in Poland (Poznan Academy of Arts, Bialystok University of Technology), in Germany (Biberach). Internship students in the framework of the quadripartite cooperation between the University of Lodz University of Technology; study abroad as part of the student exchange program Erasmus Mundus.

The University maintained comprehensive plans for the organization of student research on faculties and specialties for all students studying at the university. A great contribution to the organization and activation of student research make scientific schools of the University, including:

- "Development of high-performance structural foundations", scientific supervisor Prof. Poita P.S.;
- "Neural information processing technology", scientific supervisor Prof. Golovko V.A.;
- "The structural system of prestressed and reinforced concrete (materials, technology, design, safety issues)," scientific adviser Prof. Tur V.V.;
- "Brest hydrological school," scientific supervisor Prof. Volchak A.A.;
- "Non-stationary modes of thermal processes (pulsating combustion)" Pulsar ", scientific supervisor Prof. Severyanin V.S.;
- "Development of new designs and methods of calculation span structural coatings for

civil and industrial construction", scientific supervisor Prof. Dragan V.I.

Student research laboratories are actively working in the university. For example, a student's scientific and architectural workshop "Module", including the section of the Belarusian Association of Architecture Students, "Builder", "Mechanic", "Auto", "ECOM", etc.

Students' Scientific Association "ECOM" was created on the initiative of the Department of Accounting, Analysis and Audit of the Brest state technical university. In 2009 "ECOM" has got financial support of the Special Fund of the President of the Republic of Belarus for the Social Support of Gifted Students "Have won public recognition promising developments" in the amount of 21 million BYR.

"ECOM" is the organizer of the annual International Student Research Forum for the regional universities' "Student Scientific winter in Brest", which participants are student teams from Russia, Ukraine, Kazakhstan and Belarus.

Student research laboratory "Robotics" was created on the initiative of the Department of intelligent information technologies of The Brest state technical university. "Robotics" has got the support from Special Presidential Fund for the Support of Talented Youth in 2012 and 2016 for development activities of 119 million BYR.

Since 2012 student research laboratory "Robotics" is the organizer of the conference of young Researchers and students "Robotics and artificial intelligence. Problems and Prospects".

"Robotics" in 2014 won in the Republican contest of professional skills' first championship WorldSkills Belarus - 2014 in the field "Mobile Robotics", which gave the right The Brest state technical university team to represent our country at the World Championship of working WorldSkills professions, which was held in August 2015 Sao Paulo (Brazil).

Also, the university young researchers conducting research within 4 problem laboratories, 7 student scientific sessions, mugs for preparing students for the International Olympiad in Theoretical Mechanics at the discretion of the Contest tasks on programming, mathematical circle, and others.

### III. CENTERS OF EXCELLENCE FOR YOUNG RESEARCHERS

To improve conditions for scientific-research work of young researchers of the university through aggregation of information from open sources and from direct participants in research and international activities of the University, in the framework of the TEMPUS project 544137-TEMPUS-1-2013-1-SK-TEMPUS-JPHES "Centers of Excellence for young REsearchers (CERES) the Centre of excellence for young researchers of the Brest state technical university (the Centre) was created.

The operation of the Centre is in the format of a virtual informational resource in the form of a website, on which the aggregation of information from the Council of young researchers of the Brest state technical university, from public sources, and from direct participants in research and international activities of the university.

The Centre solves the following tasks:

- formation of positive image of the young scientist and involvement in the research activity of students and undergraduates;
- information support of research and education of undergraduates and postgraduates, including the publication of results of their activities and the facilitation of cooperation with enterprises;
- the stimulation of the academic mobility and participation in international research projects and scholarship programs;
- ensuring the sustainability and dissemination of results of international projects of the University, aimed at young researchers, including the synergy of their results;
- integration of information resources and services of other universities, is intended for

- young researchers;
- create a contact platform for young researchers of the university;
- information and contact to support the operation of the Council of young researchers of the Brest state technical university.

The subjects of the Center activities are:

- monitoring and analysis of activities of young researchers of the Brest state technical university;
- the establishment of information exchange among young researchers and specialists of the Brest state technical university: the dissemination and exchange of information on print and electronic sources of professional information about grants, funds, programs of support of young researchers and specialists, conferences, schools, scientific seminars, etc.;
- facilitate the organization of conferences and other scientific events for young researchers of the Brest state technical university;
- integration of information resources and services of other universities, is intended for young researchers;
- create a contact platform for young researchers of the university.

Website development and operational management, interaction with the structural units of the Brest state technical university for information and accommodation provided by the working group of the international technical assistance project "CERES".

In the process of development of the virtual Centre were the main blocks of the site content (see table 1).

To ensure sustainability and relevance of the information provided on the website were analyzed information and control communication on the basis of which formed a working group whose members are responsible for different directions in the work of the Centre (see figure 1).

TABLE 1  
THE CONTENT OF THE WEBSITE

Information	Section of the website	Sources
1 Announcements and reports about activities of the Council of young researchers of the Brest state technical University	Science and education	The Council of young researchers of the Brest state technical University
2 Reports (information, photos) about the activities within the framework of international projects of the University, as well as announcements of key ones	Mobility, international cooperation	Web sites of projects, project coordinator, International Department
3 Reports (information, photos) about foreign training of students, undergraduates, graduate	Mobility, education, scholarships, international cooperation	Participants of the internships, International Department
4 Data available for students, undergraduates, postgraduates scholarship programs and grants	Mobility, education, science	The Council of young researchers of the Brest state technical University, web sites, International Department
5 Announcements and calendar of scientific events, conferences, forums	Science, publications	The Council of young researchers of the Brest state technical University, web sites, Research Department
6 Announcement of competitions of scientific works, scholarship, etc., as well as reports of their results	Science, scholarships, international cooperation	Research Department, Postgraduate students Department
7 Data about graduate students' topics, publication activity, participation in conferences, etc.	Science, publications	Research Department, Postgraduate students Department
8 Helpful resources and links for undergraduate and graduate (programs, registration materials, etc.)	Science, education	Web sites, Research Department
9 References and sections related to CERES-portal	International cooperation	The Internet portal of the TEMPUS CERES project

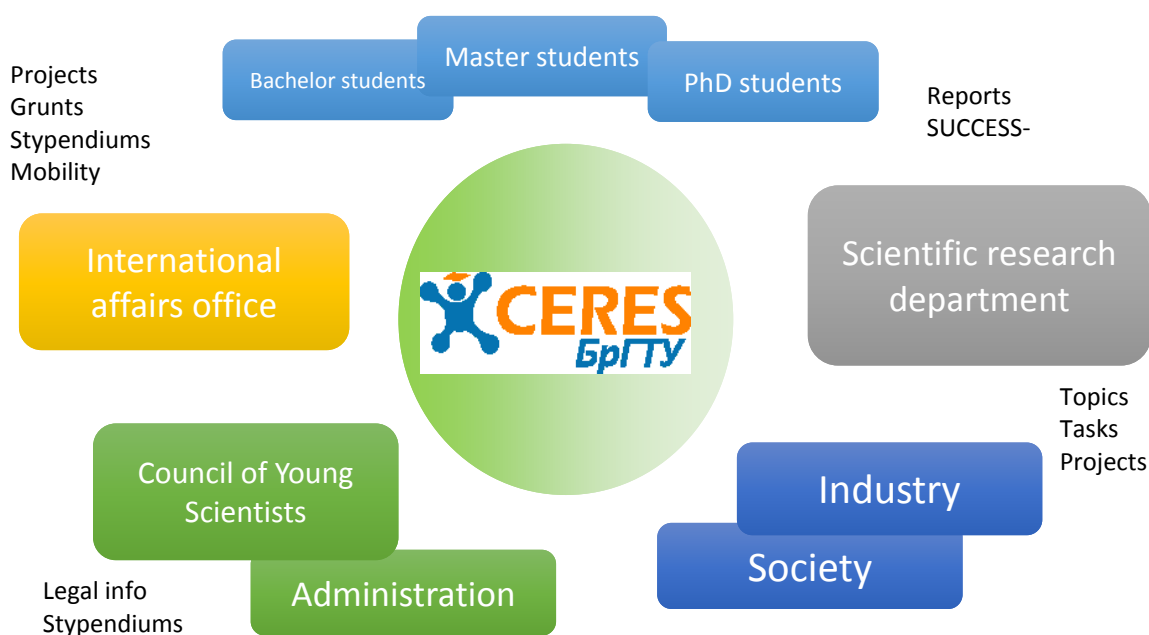


Fig 1 – Direction of obtaining and presenting information Centre

At this stage in the work of the Centre involves technical specialists (programmer, system administrator), editors, representatives of the Scientific Research Department and the International Department of the University, Council of young researchers. The Centre is supported by the university administration (the work is conducted under the leadership of Vice-rector for scientific work), as well as the deans and the Department of graduate studies (being a liaison with students and graduate students respectively).

#### IV. CONCLUSION

Created in the Brest state technical university a virtual "Centre of excellence for young researchers of the Brest state technical university" is the Internet site <http://ceres.bstu.by> in line with modern trends and standards as in design and technical implementation, and the extensibility and functionality.

At this stage, the website also provides information about the research work of undergraduate and graduate students; announcements and reports on scientific activities; project activities, ensuring the dissemination, sustainability and synergies of projects; useful experience and success-stories of young researchers.

The Centre's work is positively received by the audience of the IX Republican scientific conference of young researchers and students "Modern problems of mathematics and computer engineering", which was presented to the plenary a report on the Center.

Long-term tasks in the development of the Center are:

- joining the CERES network: interaction Centers in the partner universities of the project CERES;
- CERES-portal: the occurrence of the website in the single portal project for involving industrial partners and universities outside the project consortium;
- maintaining a database of young researchers, projects, tasks, not only within the University;
- the entry point for young researchers: placing and updating arrays useful information for young researchers – how to study in graduate school, how to make a thesis where to submit jobs, how to choose a theme, who will be the head, etc.