



## **3<sup>rd</sup> INTERNATIONAL BALTIC SYMPOSIUM ON SCIENCE AND TECHNOLOGY EDUCATION "SCIENCE AND TECHNOLOGY EDUCATION: CURRENT CHALLENGES AND POSSIBLE SOLUTIONS (BalticSTE2019)": SYMPOSIUM REVIEW**

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Two years after the second international BalticSTE symposium passed very quickly and here the third international science symposium is already a history too. On the 17<sup>th</sup>-20<sup>th</sup> of June this year, the 3<sup>rd</sup> International Baltic Symposium on Science and Technology Education BalticSTE2019 took place in Šiauliai. The topic of the Symposium was "Science and Technology Education: Current Challenges and Possible Solutions". More than 50 scientists from 20 countries participated in the symposium. Comparing with the symposium which took place in 2017, the geographical distribution of the participants is significantly wider. Ukrainian, Serbian, Romanian, Malaysian researchers participated in the symposium for the first time.

Natural science education requires constant researcher attention in the rapidly changing technological age, new educational methodologies and innovative educational approaches. The symposium reporter analysed topic spectrum is wide – from global warming of the climate, climate change to philosophical methodological and education evaluation questions.

One of this international symposium ideas is – to show that Baltic region countries also actively participate in natural science and technology education research, especially in STEAM context. The second idea is that Baltic countries as well as other small regions of the world need corresponding close communication and cooperation.

The symposium was organised by scientific methodological centre "Scientia Educologica". The main symposium partner was Šiauliai University Institute of Education. Such kind of symposium was organised in Lithuania for the third time after the restoration of Lithuanian independence in 1990.

A welcome speech for the symposium was delivered by Šiauliai university acting vice-rector for studies dr. Renata Bilbokaitė. Musical Greeting was performed by Šiauliai nursery-school kindergarten "Žirniukas" children group (leader, artistic education teacher Regina Varpučianskienė). Music literature programme "Native country talks" was prepared and performed. The symposium participants were also welcomed (remotely) by the IOSTE chairperson dr. Agnaldo Arroio (University of Sao Paulo, Brazil). Welcome speech can be found online at: <https://www.youtube.com/watch?v=EOKu58zhL6Y&feature=youtu.be> President of the Lithuanian Scientific Society prof. Jonas Jasaitis greeted the participants too and wished meaningful discussions.

As it was mentioned, researchers from 20 countries participated in the symposium work. It is very pleasing that researchers from such remote countries as Brazil, Taiwan, Malaysia, Canada, South Korea, South Africa participated. This is a very meaningful

intercontinental link. In addition to these countries, the researchers from Check Republic, Estonia, Finland, Latvia, Poland, Portugal, Belarus, Serbia, Romania, Russia, Slovakia, Slovenia, Ukraine also participated.

Traditionally, 6 main (plenary) reports were planned in the symposium. Due to the objective reasons, prof. Malgorzata Nodzynska from Poland could not take part in the symposium. Prof. Boris Aberšek from Slovenia substituted her. Plenary report subjects comprised a very wide natural science and technology education problematic spectrum. It was discussed about Engineering pedagogy, metacognitive strategies in science and technology education were analysed, Smart and intelligent learning environments were discussed and other.

Plenary presentation authors, presentation topics are given in Table 1.

**Table 1. Information about plenary presentations**

Author (s)	Institution, country	Presentation title
Tiiia Rütmann	Tallinn University of Technology, Estonia	Engineering pedagogy science as the contemporary basis of effective teaching science and technology
Dusica Rodič	University of Novi Sad, Republic of Serbia	Combined measures of students' success: Recent trends and developments in science education research
Boris Aberšek	University of Maribor, Slovenia	Smart and intelligent learning environments and ethical issue
Solange Locatelli	Federal University of ABC, Brazil	Metacognitive strategies in science and technology education: Limits and possibilities
Todar Lakhvich	Belarusian State Medical University, Republic of Belarus	One chemistry – two meanings. Science and education: Comparative analysis of the roles, presentation and applications
Andris Broks	University of Latvia, Latvia	Changes all around us and within science education

On the first day of the symposium poster presentations also took place. On the whole, 6 poster reports were presented: two by Lithuanian researchers, and one from each Poland, Brazil, Taiwan, and Belarus researchers. For example, dr. Violeta Šlekienė made a presentation on the usage of STEAM program in developing and improving of students' experimental skills. Małgorzata Bartoszewicz and Grzegorz Krzyško from Poland presented an experience on popularization of chemistry in non-formal education. Poster presentation made by Elena Vasilevskaya, Svyatlana Vashchanka, Natalia Boboriko was about the rating score system and academic achievements of students. The researchers presented an experience of the Chemistry Faculty of the Belarusian State University, Republic of Belarus.



3<sup>rd</sup> International Baltic Symposium on Science and Technology Education  
(BalticSTE2019)

**SCIENCE AND TECHNOLOGY EDUCATION:  
CURRENT CHALLENGES AND POSSIBLE SOLUTIONS**

17-20 June 2019, Siauliai, Lithuania

KEYNOTE SPEAKERS

**Dr. Dusica Rodic**  
University of Novi Sad, Republic of Serbia  
Title:  
COMBINED MEASURES OF STUDENTS' SUCCESS: RECENT TRENDS AND DEVELOPMENTS IN SCIENCE EDUCATION RESEARCH

**Dr. Todor Lakhvich**  
Belarusian State Medical University, Republic of Belarus  
Title:  
ONE CHEMISTRY - TWO MEANINGS. SCIENCE AND EDUCATION: COMPARATIVE ANALYSIS OF THE ROLES, PRESENTATION AND APPLICATIONS

**Prof. Dr. Małgorzata Nodzyńska**  
Pedagogical University of Cracow, Poland  
Title:  
ANALYSIS OF PIAGET'S THEORY INFLUENCE ON THE TEACHING OF SCIENCE

**Dr. Tiia Rütümann**  
Tallinn University of Technology, Estonia  
Title:  
ENGINEERING PEDAGOGY SCIENCE AS THE CONTEMPORARY BASIS OF EFFECTIVE TEACHING SCIENCE AND TECHNOLOGY

**Prof. Dr. Andris Broks**  
University of Latvia, Latvia  
Title:  
CHANGES ALL AROUND US AND WITHIN SCIENCE EDUCATION

**Prof. Dr. Solange Locatelli**  
Federal University of ABC, Brazil  
Title:  
METACOGNITIVE STRATEGIES IN SCIENCE AND TECHNOLOGY EDUCATION: LIMITS AND POSSIBILITIES

Symposium Website:  
<http://balticste.com/>  
E-mail:  
balticste@gmail.com

Supporting Journals:  
Journal of Baltic Science Education  
Problems of Education in the 21st Century  
Gamtamokslinis ugdymas / Natural Science Education  
Svietimas: politika, vadyba, kokybė / Education Policy, Management and Quality

Symposium Organizers:  
SIAULIAI UNIVERSITY  
SIAULIAI UNIVERSITY  
SIAULIAI UNIVERSITY

Figure 1. Symposium poster.

On the first day of the symposium work in sections was also organised. Traditionally, the topic of the first section was oriented to General Science and Technology Education issues. 5 reports were made here (Lithuanian, Check Republic, Slovakian, Latvian, Portuguese researchers). The second section topic was oriented to Science and Technology Approaches and Praxis. In this section, 7 reports were made (Polish, Lithuanian, Latvian, Check Republic, Taiwanese researchers).

The second day of the symposium was devoted to the cognitive trip. The participants of the symposium visited and got acquainted with some Central Lithuania places of interest. The main route was more than 240 km: Šiauliai – Šeduva – Baisogala – Krekenava – Kėdainiai – Dotnuva – Radviliškis – Šiauliai.

First of all, the symposium participants visited Directorate of Krekenava Regional Park. Krekenava Regional Park was founded in 1992 in order to preserve the landscape of the mid Nevežis river valley, its natural ecosystem and cultural heritage values, to ensure their management and rational use (<http://krpd.am.lt/en/VI/index.php#a/98>). The acquaintance was made with the Visitors' Centre interactive exposition, 30 m observation tower was climbed near the Visitors' Centre which reveals a wonderful view of Nevėžis Valley, old hoof-shaped riverbeds, lakelets, and Krekenava town.



**Figure 2. Symposium participants in the Directorate of Krekenava Regional Park.**



**Figure 3. At the Bison Paddock of Pašiliai.**

Next stop was at the Bison Paddock of Pašiliai, which is one of the most visited and one of the most impressive places in the region of Panevėžys, where you can see the largest European wild animals - Lithuanian aurochs (<https://www.explorebaltics.eu/sightseeing-places/pasiliai-bison-paddock/>). Symposium participants had a unique possibility to see aurochs from close. According to aurochs' paddock workers, at this time 24 aurochs live in the paddock, while in the freedom their population reaches more than 200. Most of the participants saw aurochs for the first time. Also, they got acquainted with the ecological-cognitive aurochs' paddock path.



**Figure 4. Visiting Kedainiai old town.**



**Figure 5. Visiting artificial gypsum mountains.**

Having visited the aurochs' paddock, symposium participants went to Kedainiai. Kedainiai is a town located in the very centre of Lithuania. The officially established geographical centre of Lithuania is only a few kilometres away. In other words, Kedainiai



is the town of six nations and confessions (<http://www.kedainiutvic.lt/tourism/en/>). The participants looked around the old town of Kėdainiai, also visited a multicultural centre, and the Mausoleum of Dukes Radvilas (<http://www.kedainiutvic.lt/tourism/en/objects/evangelical-reformed-church-and-mausoleum-of-dukes-radvilas>). Traditional handicraft centre was also visited. This is so-called the Arnet's House, which is a material heritage of the Scottish community that lived in Kėdainiai in the 17th-18th centuries.

A visit to Kėdainiai was wreathed by a visit to a chemical fertilizer plant "EuroChem Lifosa" (<https://www.lifosa.com/en>). Here, the visitors got acquainted with the plant's production processes, to tell the truth, using the plant's model and the exhibits from the museum. The basic product manufactured at AB "Lifosa" is the nitrogen-phosphorus fertilizer Diammonium Phosphate (DAP), the process of which requires phosphoric acid and sulphuric acid, which are also produced at the Company. The participants could have a walk in the "artificial mountains", which are made of phosphogypsum.

After the visit in the plant, the participants visited a snack bar which was located in Kėdainiai suburb, in which a tasting programme "Let's Create Traditions Together" took place. Symposium participants could taste 5 types of hand-made dumplings, made of the highest quality products.

On the third day of the symposium, two more plenary presentations were made. Dr. Solange Locatelli (Federal University of ABAC, Brazil) talked about metacognitive strategies in science and technology education. The second plenary report of that day was made in the afternoon. Dr. Todor Lakhvich made a presentation on the topic "One chemistry – two meanings. Science and education".

Symposium work took place in two sections as well. The first one was for general natural science and technology education questions, in the second one – practical education process matters were discussed. In general, 23 scientific reports were made in two sections.

On the fourth symposium day, an interactive plenary report on the topic "Changes all around us and within science education" took place, which was made by prof. Andris Broks (Latvian university, Latvia). In the interactive discussion, the colleagues dr. Tamara Rončević (Republic of Serbia), dr. Angela James (South Africa), dr. Kuohung-Huang (Taiwan), dr. Hae-Ae Seo (South Korea), and dr. Louis Trudel (Canada) helped the main reporter.

After an interactive discussion, section work also took place, in which 5 reports were made.

During the whole symposium, various country researchers shared their insights on possible further collaboration.

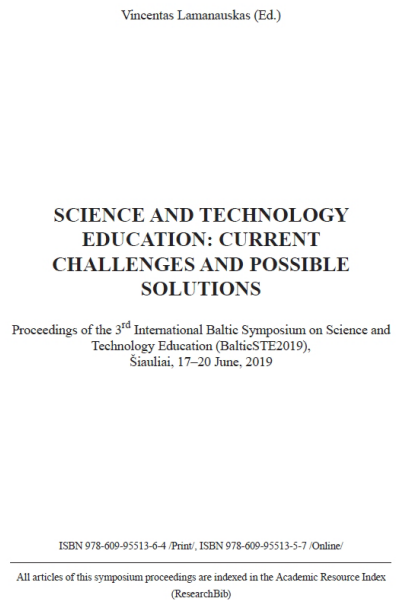


**Figure 6. Symposium participants photo.**

Before the symposium an article collection was prepared and issued. The full version of the publication is very freely available on the internet at [https://www.researchgate.net/publication/333929730\\_Science\\_and\\_technology\\_education\\_Current\\_challenges\\_and\\_possible\\_solutions\\_Proceedings\\_of\\_the\\_3rd\\_International\\_Baltic\\_Symposium\\_on\\_Science\\_and\\_Technology\\_Education\\_BalticSTE2019](https://www.researchgate.net/publication/333929730_Science_and_technology_education_Current_challenges_and_possible_solutions_Proceedings_of_the_3rd_International_Baltic_Symposium_on_Science_and_Technology_Education_BalticSTE2019). In the publication, a total of 45 short papers are published, in which various natural science and technology education problems are discussed.



**Figure 7. Symposium publication cover.**



**Figure 8. Symposium publication title page.**



The authors had also a possibility to prepare and publicise full text articles in scientific journals “Journal of Baltic Science Education”, “Problems of Education in the 21st Century”, “Gamtamokslinis ugdymas / Natural Science Education” and other.

It is important that during the symposium the participants not only presented their research, but also communicated, discussed, shared experiences in a non-formal way. On the other hand, foreign guests visited various Lithuanian places. It was a perfect possibility to introduce the country. Symposium, as a science event, forms possibilities to broaden academic outlook. What is more, the participants individually got acquainted with various Šiauliai city and its countryside places of interest, e.g., Crosses Hill, the museum of Baltic gods and other.

So, the third symposium is also already a history. A wider presentation in English one can find on the internet at: [https://www.facebook.com/pg/ScientiaEducologica/photos/?tab=album&album\\_id=2778326435518108&\\_\\_xts\\_\\_%5B0%5D=68.ARC\\_N87d5-ooFsGpDbArxn4mM1zF4iXOY7-qg2Km8\\_gJLTF-4UxGMnnz9EzzX75sVdHXBeuCS86uaMMWHY9Xk3wAapjSAMNp9bBuoJ\\_vWTdpATzMqfa5W7uiDPsoXi49cY7H49VaRBYEmJ8FFfbAB6vqbJtewdfRWk4-E3ldsEiMslCy4nJRcxPBVcTlGUxq5svxGiMKeuAXwu75VXJ0MKOqTvyINfz7ZMKyp\\_0S5mhT-kRKe68VT2uu-aqRgkvy\\_aMVme3pU6bkweybTUiQDdqgIHkbcQIAGwRJlJGQHyaTj5vE6seSjdHwnzfNpmQqqwCvtHxdmKAGT1XI-76HMmAsbeaPBvMKvJzQdf88albMW0EineICFkEqB7xFU18HtyEsdCU9CjEXBpr\\_nPV\\_uCH0VHRSbqtIwxPeSrntw8Mk5DvVfOqb8op\\_hlkoDOdji5S41gYR5envgSeq60WX&\\_\\_tn\\_\\_=-UC-R](https://www.facebook.com/pg/ScientiaEducologica/photos/?tab=album&album_id=2778326435518108&__xts__%5B0%5D=68.ARC_N87d5-ooFsGpDbArxn4mM1zF4iXOY7-qg2Km8_gJLTF-4UxGMnnz9EzzX75sVdHXBeuCS86uaMMWHY9Xk3wAapjSAMNp9bBuoJ_vWTdpATzMqfa5W7uiDPsoXi49cY7H49VaRBYEmJ8FFfbAB6vqbJtewdfRWk4-E3ldsEiMslCy4nJRcxPBVcTlGUxq5svxGiMKeuAXwu75VXJ0MKOqTvyINfz7ZMKyp_0S5mhT-kRKe68VT2uu-aqRgkvy_aMVme3pU6bkweybTUiQDdqgIHkbcQIAGwRJlJGQHyaTj5vE6seSjdHwnzfNpmQqqwCvtHxdmKAGT1XI-76HMmAsbeaPBvMKvJzQdf88albMW0EineICFkEqB7xFU18HtyEsdCU9CjEXBpr_nPV_uCH0VHRSbqtIwxPeSrntw8Mk5DvVfOqb8op_hlkoDOdji5S41gYR5envgSeq60WX&__tn__=-UC-R). Also, a short video recording about an international science event one can see on the internet at <https://www.facebook.com/watch/?v=315599409388016>. It goes without saying that not everything was successfully fixed. However, the most important thing is that various country researchers could not only present their research results, but also share personal experience, make new collaboration contacts, get acquainted with other researcher carried out research and projects. In addition, a short visual material prepared by Prof. Andris Broks is available here: <https://failiem.lv/u/w7d3wuee>.

It is expected, that the fourth symposium will take place in Šiauliai in June 2021. A detailed information is given in the symposium internet cafe at: <http://balticste.com>.

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