

Modeling Week to be held for the first time in Russia: Polytechnic University will play host to mathematical students

Peter the Great St. Petersburg Polytechnic University has got a unique opportunity to be the first in Russia university to host the International Modeling Week on its site. The event is held annually by the [European Consortium for Mathematics in Industry](#) (ECMI) since 1988. Students from all over the world get together to spend a week working in small groups on solving real industrial problems.

The coronavirus pandemic does not allow Modeling Week to be held in the traditional format: in the habitual form of its organization, the event will take place only in 2021. Nevertheless, Polytechnic University is the first Russian university to host a Virtual Modeling Week on its site. It will be held as part of the International Polytechnic Summer School, which this year has also shifted [to the online mode](#).



From July 5 to 12, 2020, participants in the Week will start working. The organizers will try to preserve the familiar format: instructors present the tasks and assign students to groups. The teams will work on the MS Teams platform. All participants who make final presentations and submit reports will receive international certificates with ECTS credits. Registration of participants will last until June 15:

you can register and read additional information [on the official website of the Week](#)

The students will have to deal applied tasks related to the industry already waiting for them. One of those is aimed at optimizing the bolting process. Loosening bolts is a very dangerous phenomenon when assembling aircrafts. Participants of the Week will study it with the help of a special assembly demonstrator developed on the basis of a specialized software package for modeling the aircraft assembly process. Students will have to develop an algorithm for optimizing the number of mechanical operations during the assembly. The study will be carried out using special software allowing to simulate the installation process of bolted joints, their weakening and tightening and review the stress-strain state of the system when changing its configuration.

Another challenge is the hybrid storage system for peak applications. Household energy consumption is unevenly distributed. To meet peak demands, additional CO₂-intensive generators are switched on at peak loads. To avoid switching on of such generators, a hybrid storage system is proposed. It consists of batteries, heaters and a water cylinder. This system is scheduled for testing in 100 houses located at 6 pilot sites in the UK, Ireland and France that currently are under construction or reconstruction. The task of the participants is to simulate a two-day operation of this system using real data sets and the proposed mathematical methods, to evaluate the reduction of CO₂ emissions.

It is imperative to remind once again that all the tasks that the participants of Modeling Week will work on reflect the needs of real life and have every chance of practical application. Representatives of the Institute of Applied Mathematics and Mechanics and SPbPU International Services take an active part in organizing the Week.

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For reference:

Polytechnic University has been a member of the European Consortium of Mathematics in Industry (ECMI) for many years. Within the framework of cooperation between SPbPU and ECMI, every year Polytechnic University shares its successes with the international mathematical communities [on the official ECMI website](#). Customarily, SPbPU publications are of great interest to the audience.

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