The list of winners of the 5th competition for the implementation of projects with pupils of secondary schools within the framework of the Excellence Initiative – Research University programme.

No.	Project name
1	Synthesis of cosmetic ingredients using an innovative immobilized enzyme.
2	Activated carbon as a balanced carrier of enzymes in the synthesis of cosmetic esters.
3	The influence of microgravity on the molecular mechanisms of growth and the orientation of plant organs.
4	Production of organic hygiene products from bio-raw materials.
5	Development of fault-tolerant multi-rotor control algorithms.
6	Air monitoring station.
7	Indoor air quality monitoring system.
8	The influence of processing parameters and aging conditions on the properties of products manufactured with 3D printing technology
9	Stability of building properties of thermal insulation materials in contact with external environmental factors.
10	Control design of modular production system using ET200SP communication module.
11	Design of a virtual robotic stand in the ROBOGUIDE program.
12	Endurance tests of the mobile object (car).
13	Implementation of a 5-axis robot design using 3D printing methods
14	Structure and properties of flame-sprayed coatings obtained using Ni-based powders.
15	Design and execution of a promotional and didactic stand for testing the process of metal alloy processing by stamping and pressing method.
16	Measurement of operating conditions using sensors mounted on a moving object.
17	Design and construction of a self-levelling chassis for use in autonomous vehicles.
18	Design and construction of a fixed wing with an eye tracking system to create a view from the inside of the cockpit.
19	Nexus - your mobile operating centre for technology research, development, and exploration.
20	From nature to technology - biodegradable films and membranes made from natural polymers.
21	Practical application of renewable energy technology.
22	Preparation of the stand for the strength testing of screws and nuts used in civil engineering and construction of machinery in the Materials Testing Laboratory.

23	Desktop AI assistant with atmospheric measurement functions.
24	The use of modern manual techniques of prosthetic modelling in the precise production of prosthetic elements.
25	Identification of the pyrotechnic retarder mass combustion mechanism AI/KMnO 4.
26	Sustainable production of fertilizers for potted plants.
27	Modern technologies for applying metallic coatings.
28	From solvent to dye - indigo synthesis in three steps of toluene.
29	Inventory measurements of the cubature object along with heat loss analysis.
30	Microscopic imaging of iron in cells exposed to stress factors - in cells subjected to genetic modification by CRISPR/Cas9 method of selected cell lines.
31	Automation of environmentally friendly waste-free technologies on the example of an automatic powder dispenser.
32	Presentation platform for classes.
33	MICROWORLD in the technique and surroundings of the school pupil observations with the use of electron and light microscopes.
34	Design and additive manufacturing of 3D printer components for building materials.
35	The influence of manual arc welding parameters on the structure and properties of galvanized body panels connectors.
36	Implementation of the 3D scanner design using various 3D printing methods
37	Quantitative and qualitative identification of microplastics released from synthetic clothing during the operation and washing process.
38	Design and 3D printing mock-up of the car's powertrain.
39	Strength numerical analysis of a crowbar made of various engineering materials and its visualization
40	Arc welding process in augmented virtual reality (VR).
41	Anti-corrosion protection of steel profiles.
42	Design and build of a prototype of a mobile platform enabling the implementation of autonomous tasks.
43	Basalt meal as a rescue for plants in space.
44	Robot SCARA.
45	Laser precision - functional recycled items.
46	Eco-plastic from milk: Casein plastic.
47	Selection of conditions for the production of steel elements printed using the Metal FDM method.
48	On-screen keyboard optimization based on signals from components to track eye movements built into virtual reality goggles.
49	The influence of LMD coating parameters on the structure and properties of the coated layer.

50	Interactive Board: Image Analysis and Visualization in Real Time.
51	Smart home - automatic control of lighting and ventilation in the house using THE LOGO logic controller.
52	Sustainable propylene carbonate synthesis process using DESs: Green chemistry in the production of cosmetic raw materials.
53	Research on the synthesis and properties of synthetic dyes.
54	Laser surface treatment technology of modern steels.
55	Alloys of non-ferrous metals used on internal combustion engine and electric motor components in motor vehicles.
56	Control and visualization of the production process using the CUBE20 network node.
57	Numerical analysis of the mechanical properties of the stair support.
58	Visualization of objects constituting solutions of smart cities on the example of a selected city of Silesia.
59	Manufacture of usable welded structure for the school space.
60	Development of a mobile stand for individual labelling of chemical substances packaging - automatic graphic adjustment of the self-adhesive label to the indicated packaging and capacity - raising the standards of health and safety.
61	Design and analysis of surveys on the perception of social media by secondary school pupils.
62	Ecological sorbents as an innovative approach to wastewater treatment - obtaining and testing sorption capacities on the example of selected dyes.
63	Effect of CO_2 concentration in the medium on food of human cancer cells in vitro culture.
64	The influence of atmospheric conditions on soil pollution and bottom sediments in the area of the Gliwice and Kłodnica Canal - Kędzierzyn-Koźle area.
65	The influence of atmospheric conditions on water pollution and bottom sediments of the Gliwice and Kłodnica Canal - Kędzierzyn-Koźle area.