

NAUKA 0+ The All-Russian Science Festival

Indian Participation at NAUKA 0+ 2020

This year All-Russian Science Festival NAUKA 0+ celebrated its 15th anniversary.

Embassy of India, Moscow and the Atal Innovation Mission (AIM) - <https://niti.gov.in/aim>; facilitated more than 200 Indian participants for the festival.

The Projects of Indian students were highly appreciated. Results of the Scientific jury “Scientists of the future 2020” had three winners. Congratulations to the winners and many thanks to their Teachers and Mentors.

Competition	Name of Project	State	City	Name	Rank
Scientists of the future 2020	Oil Spill Containment And Reorganisation [O.S.C.A.R]	UP	Noida	AKASH JHA	4
Youth Jury Scientists Of The Future 2020	Formation of Bubbles in Water and it's Perplexing Properties	WB	Kharagpur	Gaurav Gupta	4
		DL	Delhi	Salam Laraib	
	Face Mask Detector	Haryana	Gurugram	Ansh Sanjay Agarwal Shaurya Rajender Gaur	3

All participants and advisers got participation certificates and diplomas.

<https://ub.festivalnauki.ru/2020/winners>

Annual All-Russian Science Festival NAUKA 0+ is the major educational event aimed to engage children, students and young people with science and its achievements. "NAUKA" means "science" in Russian, and 0+ means that the Festival is for a wide audience of all ages.

This is an introduction to the achievements of science, first-hand information about what is happening at the forefront of research. The slogan of the Festival is «Touch Science!»

International Competition of Research Scientists of the Future 2020 is the largest competition for scientific and design activities among high school students. The competition is organized within All-Russian Science Festival NAUKA 0+ by the Ministry of Education and Science of the Russian Federation, the Russian Academy of Sciences, Lomonosov Moscow State University and by its project – Scientific Creativity Lab LANAT.

The task of the participants of the International Contest Scientists of the Future is to implement and present their own scientific and engineering projects. This year about 1000 projects have been applied from several countries.

The international jury evaluated the research works and supervised project activities of the participants. The jury was presented by leading foreign scientists and popularizers of science, Russian Academy of Science professionals, professors from Moscow State University and leading universities of the country

The contest Scientists of the Future is aimed at supporting talented children, developing interest in studying exact, natural and engineering sciences among schoolchildren, creating conditions for the intellectual development of students, disseminating and popularizing scientific knowledge, and improving the pedagogical qualifications of teachers in Russia and other countries.

THE MAIN TOPIC - PHYSICS OF THE FUTURE

Physics is one of the first branches of science to combine experiments and exact mathematics. Now it's achievements are being actively applied in other fields of knowledge. Thanks to physics, geneticists were able to manually edit the genomes of organisms, psychophysicists received tools for studying the finest processes in the human brain, and chemists got accurate models of atoms, which help to predict the properties of new chemical compounds.

Once upon a time, physics gave mankind electricity and radio, radically changed the life. Over the past decades, through the efforts of physicists, the world has received interplanetary probes, deep-sea vehicles and smartphones with Internet access. Many predictions of science fiction writers have come true, it seems that it is already difficult to surprise us with something. But physics is still surprising!

So what's next? In which direction will the vector of progress shift? Will scientists be able to extend our lives? Will artificial intelligence pass the Turing test? What is the physics of the future like? Everyone is able to find the answers to these and many other questions at the NAUKA 0+ Science Festival.

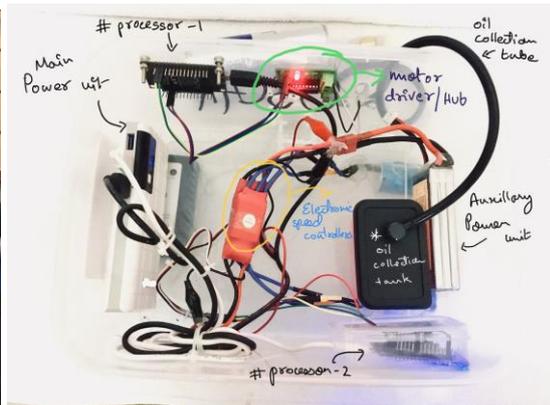
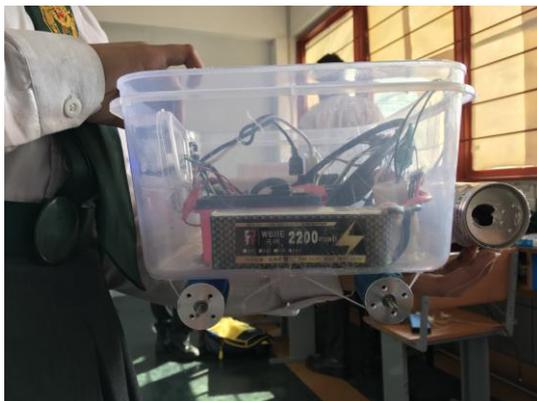
The competition is divided into the following categories:

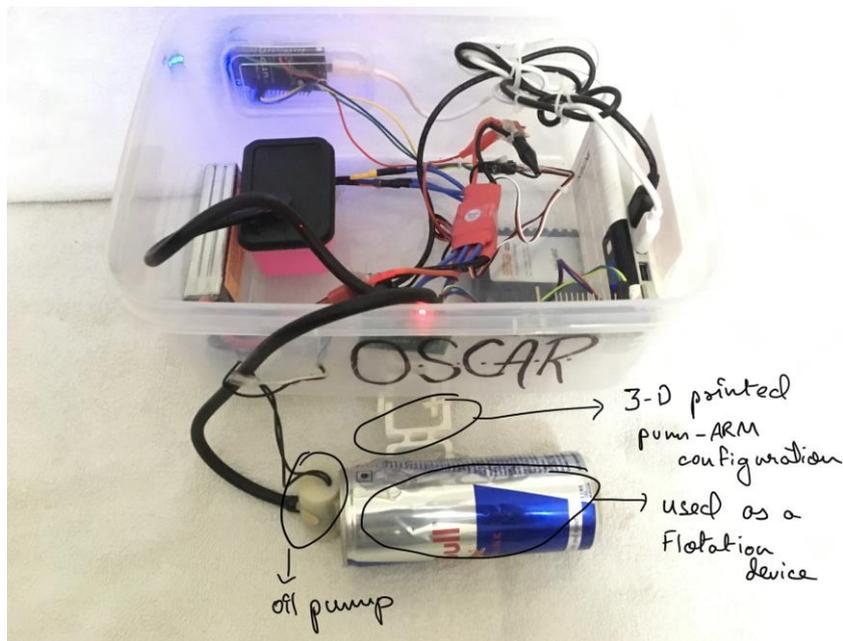
- Physics;
- Mathematics;
- Chemistry;
- Biology and Life Sciences;
- Programming;
- Geology and Earth Sciences;
- Technologies and engineering sciences;
- Electronics, electronic gadgets, Internet of things;
- 3D modeling and prototyping.

Project & Testimonials from Indian Winners:

Physics and astronomy

Scientists of the future 2020	Oil Spill Containment And Reorganisation [O.S.C.A.R]	UP	Noida	AKASH JHA	4
				Manisha Srivastava	





Here's what Akash Jha says about his project:

"My project is about cleaning oil spills efficiently and effortlessly while minimising error, There are several methods already developed to help contain oil spills, but I felt that we needed to do better and hence came up with Oscar.

Oscar is an efficient and affordable unit which will help clean oil spills and chemical leaks. It can be remotely controlled (a designated person who will remotely control the unit and overlook its operations) reducing man-power and human error. When informed about a spill, the controller can guide Oscar to the area in question, upon reaching there it lowers its suction unit, this unit is attached to a floatation device to keep the suction surface level with the oil. Once the oil tank is full it will then go to the shore to further process the collected oil. This model unlike others is electrically powered. Currently used methods include the usage of booms and skippers which are effective but time consuming, in situations like these time is valuable and therefore we need to be more efficient. To tackle this issue the use of an Oscar unit simultaneously can massively improve the efficiency. I have developed a vessel solely dedicated to cleaning oil spills. It has two powerful motors which will be useful to reach the contaminated site in time, we're using two Node MCU's as the processors and have designed user interfaces to control the vessel, to clean the oil-spill we have a very effective oil pump configuration, which with the help of our surface flotation mechanism, separates the oil from water.

Many different electronic components and sensors are calibrated to work simultaneously to maximise the output."

Results of the youth jury Scientists of the future 2020 - Alumni results by [link](#)

Physics and astronomy

Youth Jury Scientists Of The Future 2020	Formation of Bubbles in Water and it's Perplexing Properties	WB	Kharagpur	Gaurav Gupta	4
		DL	Delhi	Salam Laraib	



Scientific Adviser: Dr. Arunabha Adhikari, Ph. D., HOD Physics Dept., West Bengal State University



Fig 1. Formation of Bubbles of different sizes while pouring water in a copper vessel.

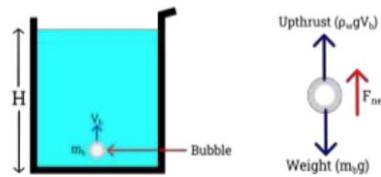


Fig 2. Bubble in the Container and F.B.D of the Bubble

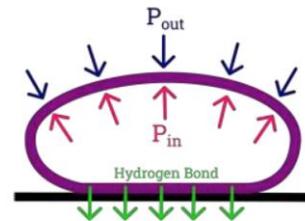


Fig.4. Various Force inside & outside the bubble

Students write about their project:

“Water is an incredible fluid with astonishing facts and mysteries. We studied one of such facts.

While filling water in any vessel, we all have noticed a lot of temporary bubbles of different sizes. These bubbles are scattered over the top of water and they burst as soon as they get exposed to the atmosphere. It’s a pretty common phenomenon, the whole chain of formation & bursting of the bubbles continues till the time we are pouring the water in the container. As soon as we stop pouring

water and the water comes to equilibrium, the top of the water is clear with no sign of bubble.

Now, what else we noticed in some cases is that the bubbles interacted with the container's wall by itself. We observed tiny bubbles bonded to the walls of a Copper and a Steel Container. These bubbles are very stable and were mobile, if carefully detached from the wall. The bubbles are sticking to the wall only in a copper and a steel container and not in the case of Plastic, Ceramic, Aluminum and Glass Container.

The structure of the air bubble can be explained as a balloon with walls made of water and filled with air.

The formation of the bubbles was an uncertain phenomenon until we calculated and deduced its relation with height, mass etc. Therefore, diving deeper into this phenomena of formation of bubbles we figured out the phenomena of bonding of bubbles with the sidewalls of the copper and steel vessels. Further, we deduced a formula for the number of bubbles formed and the force of hydrogen bonding.

We can unleash more of this phenomena with more experiments and study. We will be working on more experiments to get more out of this phenomena.

With more detailed information about the competition and the terms of participation, please visit the official website <https://ub.festivalnauki.ru/en>

Looking forward to new goals and more projects together with Indian Partnership (higher secondary schools, science, engineering and higher academic institutions, and SME/MSME industry, corporate and other levels).

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