



SKOLTECH

Celebrating a decade of innovation

Skoltech has been innovating in **BOTH EDUCATION AND RESEARCH** since its establishment ten years ago.

Welcome to this collection of highlights that celebrates some of the major achievements of Skolkovo Institute of Science and Technology (Skoltech) in the first decade of its existence.

Established in 2011 in collaboration with Massachusetts Institute of Technology (MIT), Skoltech is a unique experiment in both Russia and the world. For example, in the area of education, we are boldly breaking with traditional teaching methods and are seeking to cultivate digital natives by teaching generation Z in their language and style. It hasn't always been easy to instill a new mindset towards education, but we believe it is where the future lies. By blazing a new trail, we hope to create a path that other universities in Russia and elsewhere will be able to follow.

Skoltech is also seeking to break the mould in research, especially in the target areas of artificial intelligence and communications; cutting-edge engineering and advanced materials; energy efficiency and environmental, social and

corporate governance; photonics and quantum technologies; life sciences and health; and advanced studies. Russia has traditionally been strong in fundamental research, but there has always been a large gap between research results and practical applications. Since becoming Skoltech's president in 2016, I've been striving to find ways to bridge this gap. Our motto is excellent research today, economic impact tomorrow. The research highlighted in this collection presents how Skoltech researchers are making real-world impact in areas as diverse as COVID-19, climate change and photonics.

The partnership with MIT has been essential in enabling us to become the innovative institution we are today. Edward Crawley, the Ford Professor of Engineering at MIT, excelled as the first president of Skoltech. His role in creating Skoltech is impossible to overestimate. The MIT partnership continues to bear fruit today — for example, in the past five years, Skoltech and MIT researchers have published more than 150 joint papers. I view MIT as being like an elder

brother in a relationship that is increasingly becoming a mutually beneficial partnership.

As I look back at the past decade, some of the research achievements I'm most proud of include the realization of a room-temperature polariton transistor — a world first (see page 7), the implementation of fifth-generation (5G) telecommunication technology in Russia, the discovery of a new CRISPR-CAS gene-editing system, and the development of potassium-ion batteries. These advances demonstrate that Skoltech is a research-oriented university that has invested heavily in both top-class personnel and equipment. We have created one of the best research environments to attract leaders in their fields. This commitment to research has resulted in Skoltech being listed in *Nature Index's* top 100 young universities since 2019.

Looking to the future, I'm particularly excited about the possibilities that artificial intelligence offers to revolutionize healthcare and medicine. Access to massive amounts of data is needed to harness the full



potential of machine learning. Russia has a strong advantage in this area due to its universal healthcare system for its large population that is generating data on a scale that is impossible to realize in many other countries. I'm also excited about sixth generation (6G) technology in telecommunications. I think it has the potential to realize even greater advances in technology than 5G had. Skoltech researchers will be leading the way in these and other areas.

Alexander Kuleshov
Skoltech President

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