IBM Newsroom

Moderna and IBM to Explore Quantum Computing and Generative AI for mRNA Science

Moderna invests in developing quantum computing skills and exploring the use of quantum computing in developing future mRNA medicines

Agreement with IBM includes investments in generative AI to improve product design



CAMBRIDGE, MA and ARMONK, NY / April 20, 2023 / Moderna, Inc. (Nasdaq: MRNA), a biotechnology company pioneering messenger RNA (mRNA) therapeutics and vaccines, and IBM (NYSE: IBM) today announced an agreement under which Moderna will explore next generation technologies including quantum computing and artificial intelligence to advance and accelerate mRNA research and science.

“Since our inception, we have always strived to be at the forefront of cutting-edge technology, leveraging innovations to deliver the greatest possible impact to people through mRNA medicines,” said Stéphane Bancel, Chief Executive Officer of Moderna. “We are excited to partner with IBM to develop novel AI models to advance mRNA science, prepare ourselves for the era of quantum computing, and ready our business for these game-changing technologies. We are aiming for breakthrough advances with quantum computing, so we are investing now in building a quantum-ready workforce, to be fully prepared to harness the power of this technology.”

“IBM’s purpose is to be the catalyst to make the world work better, perfectly exemplified by this partnership with Moderna. We are witnessing a revolution in the world of computing, driven by extraordinary advances in AI and quantum computing,” said Dr. Darío Gil, Senior Vice President, and Director of IBM Research. “Moderna will be able to take advantage of our multi-year research efforts in generative AI for therapeutics that can allow scientists to better understand how molecules behave and may facilitate creating entirely new ones. We are also excited to work with Moderna to help prepare their scientists in the knowledge and use of IBM’s industry-leading quantum computing technologies with the goal of accelerating the discovery and creation of new therapeutics.”

Quantum computing skills development for mRNA medicine design

Quantum computing is a rapidly emerging and transformative technology that utilizes the principles of quantum mechanics to solve problems too complex for classical computers. Moderna scientists will learn how quantum technology could be applied to previously intractable problems for classical computers. Together, the companies will explore the potential application of quantum approaches to Moderna's scientific challenges.

Moderna will participate in the IBM Quantum Accelerator program and the IBM Quantum Network. Under the agreement, IBM will provide access to quantum computing systems, as well as expertise to assist Moderna in exploring cutting-edge life sciences use-cases powered by quantum technologies.

AI models for mRNA medicine design

Moderna and IBM scientists will apply MoLFormer, an AI foundation model that can help scientists predict a molecule's properties, and could help them understand the characteristics of potential mRNA medicines. Moderna's goal will be to use MoLFormer to help optimize lipid nanoparticles, which encapsulate and protect mRNA as it travels within the body, and mRNA, which acts as instructions to cells in order to fight disease. Under this initiative, Moderna and IBM will combine state-of-the-art formulation discovery with generative AI to design mRNA medicines with optimal safety and performance.

About Moderna

In over 10 years since its inception, Moderna has transformed from a research-stage company, advancing programs in the field of messenger RNA (mRNA), to an enterprise with a diverse clinical portfolio of vaccines and therapeutics across seven modalities, a broad intellectual property portfolio in areas including mRNA and lipid nanoparticle formulation, and an integrated manufacturing plant that allows for rapid clinical and commercial production at scale. Moderna maintains alliances with a broad range of domestic and overseas government and commercial collaborators, which has allowed for the pursuit of both groundbreaking science and rapid scaling of manufacturing. Most recently, Moderna's capabilities have come together to allow the authorized use and approval of one of the earliest and most effective vaccines against the COVID-19 pandemic.

Moderna's mRNA platform builds on continuous advances in basic and applied mRNA science, delivery technology and manufacturing, and has allowed the development of therapeutics and vaccines for infectious diseases, immuno-oncology, rare diseases, cardiovascular diseases and auto-immune diseases. Moderna has been named a top biopharmaceutical employer by *Science* for the past eight years. To learn more, visit www.modernatx.com.

About IBM

IBM is a leading provider of global hybrid cloud and AI, and consulting expertise. We help clients in more than 175 countries capitalize on insights from their data, streamline business processes, reduce costs and gain the competitive edge in their industries. More than 4,000 government and corporate entities in critical infrastructure areas such as financial services, telecommunications and healthcare rely on IBM's hybrid cloud platform and Red Hat OpenShift to affect their digital transformations quickly, efficiently and securely. IBM's breakthrough innovations in AI, quantum computing, industry-specific cloud solutions and consulting deliver open and flexible options to our clients. All of this is backed by IBM's legendary commitment to trust, transparency, responsibility, inclusivity and service. Visit www.ibm.com for more information.

Moderna Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including statements regarding: Moderna's ability to utilize quantum computing and artificial intelligence to advance and accelerate mRNA research and science to develop future mRNA medicines; and Moderna's ability to use MoLFormer to help optimize lipid nanoparticles and mRNA. The forward-looking statements in this press release are neither promises nor guarantees, and you should not place undue reliance on these forward-looking statements because they involve known and unknown risks, uncertainties, and other factors, many of which are beyond Moderna's control and which could cause actual results to differ materially from those expressed or implied by these forward-looking statements. These risks, uncertainties, and other factors include, among others, those risks and uncertainties described under the heading "Risk Factors" in Moderna's Annual Report on Form 10-K for the fiscal year ended December 31, 2022, filed with the U.S. Securities and Exchange Commission (SEC), and in subsequent filings made by Moderna with the SEC, which are available on the SEC's website at www.sec.gov. Except as required by law, Moderna disclaims any intention or responsibility for updating or revising any forward-looking statements contained in this press release in the event of new information, future developments or otherwise. These forward-looking statements are based on Moderna's current expectations and speak only as of the date of this press release.

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