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Experts: Advancing the quantum industry in New Mexico will take more than just scientists

By Megan Gleason / Journal Staff Writer
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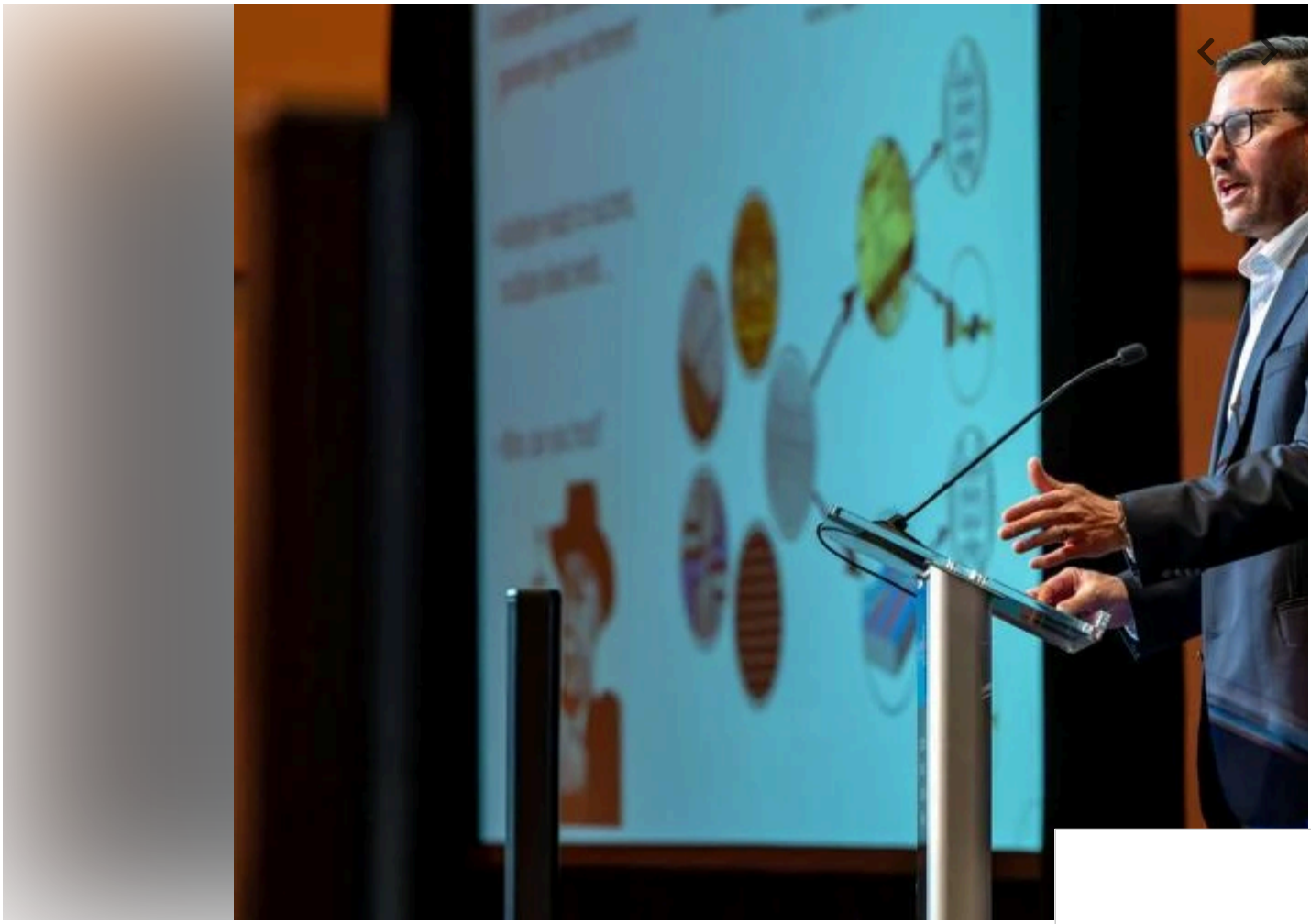

Dan Stick, senior scientist at Sandia National Laboratories, talks about quantum computing during an event dubbed "Con

Can quantum companies create a practical utility-scale quantum computer within the next decade?

The outlook is optimistic, according to Dan Stick, senior scientist at Sandia National Laboratories. He spoke on Tuesday in Santa Fe at an event about innovation in New Mexico, hosted by Sandia, Los Alamos National Laboratory and the Council on Competitiveness.

The panels touched on New Mexico's gaining momentum in producing the latest, most advanced quantum technology. New Mexico and Colorado last year won $41 million in federal funds, one of 12 tech hubs, to advance quantum tech.

Sandia officials on Tuesday emphasized the need for a collaborative culture across public and private sectors, specifically to achieve technological advancements in quantum computing.

The quantum computer Stick referenced stems from work that the Defense Advanced Research Projects Agency is collaborating on with private companies to create an industrially useful quantum computer.

“That means that the value of the algorithms that they are running on that quantum computer exceed the costs of making and operating the quantum computer,” he said. “And so if this happens in the next eight years, that would be extremely transformative.”

Looking at quantum on a more local level, Sandia Labs hopes to launch a quantum demonstration facility this year where private sectors, academia and the labs can work on and test full-scale quantum computers, Stick said.

“If you’re a company, you should be aware of what the universities and the labs are doing, so that you can think about how that might help tail into your future roadmaps,” Stick said. “If you work at a national lab, you should be aware of what these companies’ roadmaps are.”

Institutions like the University of New Mexico funnel workers into the ecosystem and help create spinoff companies, while labs do applied research and have access to state-of-the-art facilities, he said. He also brought up the industry sector, which has the drive to execute plans.

“I list these things in order to give you a flavor of how all of these properties can be necessary to advance quantum computing,” Stick said.

Sandia offers a few New Mexico-specific programs aimed at greater collaboration with the private industry, including the New Mexico Small Business Assistance program and the TRGR Technology Readiness Initiative, said David Kistin, Sandia's manager of technology and economic development. The goal: getting private companies to utilize the expertise of the labs.

He said such programs have led Sandia to partner with thousands of companies in every county of the state and have provided millions of dollars worth of technical assistance.

Another major economic development asset for New Mexico that's part of Sandia's partnership strategy, Kistin added, is the Sandia Science and Technology Park — a 340-acre community home to companies like BlueHalo and GridFlow.

"We do work really well with all of our partners at the city of Albuquerque, state of New Mexico, in the private sector, nonprofit sector," Kistin said. "And when we combine all these incentives and all these great opportunities, we start to create some really interesting, interesting incentives for businesses to launch here and grow here, to come here."

In addition to that collaboration, Stick said entities need to move technological goalposts forward. It's especially true for the labs' missions of federal defense, as other countries also race to advance quantum technology.

Stick used a molecule known as FeMoco, a cofactor used for fixating nitrogen into fertilizer that takes a substantial amount of energy, as an example. It's a very complicated molecule to simulate, he said.

In 2016, estimates to simulate the molecule on a quantum computer took 100 million quantum bits, or qubits, over more than four days. A 2021 estimate from a university-commercial lab collaboration revealed it's now closer to taking 4 million qubits over four days.

"Moving the goalposts forward is an essential contribution for these types of collaborations," Stick said, "because they actually drive enthusiasm for making something that otherwise seems very far away."

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