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California prepares to accelerate quantum research and industry

The time is ripe to take the next big leap in quantum innovation in California, a jump that would not only accelerate research in the hot field of quantum science, but also would lay the groundwork for highly skilled jobs and a more robust economy. That's why leaders in science, industry and California policy convened at UC Santa Barbara Friday, March 13, for a daylong session dedicated to the discussion of the past, present and, importantly, the future of quantum research and industry in the state.

"We're delighted to host the second convening of Quantum California," said UCSB Chancellor Dennis Assanis, in his opening remarks to the audience gathered at the campus's Henley Hall. Launched last November at UC Berkeley, Quantum California is a statewide public-private initiative established under the year-old California Jobs First Economic Blueprint, which aims to foster sustainable economic growth by building on regional economic strengths. "I know with your work today, we will create an amazing ecosystem," Assanis said.

Attendees and speakers consisted of distinguished researchers in the quantum sciences, including three of UCSB's most recent Nobel laureates, as well as industry partners large and small. The heads from the CA Governor's Office of Business and Economic Development (GO-Biz), the California Labor and Workforce Development Agency, and California Government Operations were also in attendance, as well as Nani Coloretti, cabinet secretary in the Office of Governor Gavin Newsom. The morning session centered on past and present quantum research at UCSB, while the

afternoon was devoted to imagining the future of quantum technologies on the Central Coast.

Indeed, the Central Coast already has the makings of a robust, world-class quantum science and industry ecosystem. UCSB has become an epicenter for quantum research, with two National Science Foundation-supported laboratories — the Quantum Foundry and the California NanoSystems Institute — on campus. The late businessman and philanthropist Roy Eddleman recognized UCSB's leadership in the field by supporting research and education through the Eddleman Quantum Institute (EQI), and the campus's reputation has attracted partnerships with tech companies including Google and Microsoft, with stunning results.

It's a hard-won reputation. Quantum research has been a focus at UCSB for decades, enabled by theoretical and technological prowess. Six of UCSB's eight Nobel laureates received their honors for their work in various aspects of

quantum sciences, putting groundbreaking theories to work in realms such as semiconductor materials, conductive polymers and quantum computing.

"One of the things we have going for us is that we work together," said Ram Seshadri, director of UCSB's Materials Research Lab. Quantum science at UCSB has long benefited from the collaboration between researchers from various science and engineering departments on campus, according to him. "We continue to do this; it's a tradition that goes a long way."

The next step, according to the morning's speakers, is to create the right conditions to accelerate quantum research and industry in the area: Where can processes be streamlined? What infrastructure needs to be built? How can a quantum workforce be developed? The roadmap for this journey is due out later this year, based on input from stakeholders from sessions held later in the afternoon. Some of the early ideas concentrated along the lines of improved and expanded facilities, and cooperation across the sector.

"Strategically, a really long-term focus for this institute at UCSB is space," said physicist David Weld, who co-directs EQI. "That's really a major need and a major limitation for the expansion of quantum science." In addition to research space and shared facilities, space for education and workforce training is crucial, he said, to

bolster ongoing efforts with local colleges to train the next generation of researchers and technologists.

Additionally, the ability to attract the best and the brightest in quantum research could only push the field forward and encourage both fundamental insights and real-world innovations. “Collaboration is critical,” said UCSB computer science theorist Prabhanjan Ananth.

In the near-term, UCSB has embarked on creative solutions for space, including OASIS, an off-campus facility operated by the campus’s Robert Mehrabian College of Engineering that consists of 105,000 square feet for shared access to state-of-the-art fabrication and prototyping. The session’s attendees visited OASIS after morning tours of UCSB’s campus labs and nanofabrication facilities.

The afternoon session included focused discussions with further input from industry members across the sector, as well from state experts on business and policy, centered on how to build a strategy from the bottom up.

“It is the foundational, community-led, bottom-up, statewide economic strategy that’s driving our work,” said Dee Dee Myers, who directs GO-Biz. “It’s the first time we’ve done that in California in more than 20 years,” she said of the state’s economic blueprint. “Now we’re going to take that and help define the sectors that will be most important for future growth, and one of those, of course, is quantum.”

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