

# SCI-TECH

*"Somewhere, something incredible is waiting to be known."*  
CARL SAGAN, AMERICAN ASTRONOMER

## Devoret, Nobel laureate who taught at Yale, looks back on career

BY ANYA GEIST  
STAFF REPORTER

Michel Devoret woke up on the morning of Oct. 7 in Santa Barbara to unexpected news.

"I woke up at 7 in the morning, and then I saw this traffic on a cell phone and my computer, and I thought it was a joke," Devoret said.

Devoret, a Yale professor emeritus in applied physics, had won the Nobel Prize in Physics alongside his colleagues John Clarke and John Martinis. In the 1980s, the trio worked in Clarke's lab at the University of California, Berkeley, to prove that quantum phenomena could be observed in matter on a larger scale.

Now based at the University of California, Santa Barbara, Devoret also serves as chief scientist for quantum hardware at Quantum Artificial Intelligence Lab. The News spoke with Devoret about his career and lessons he has learned along the way.

After the Nobel Prize was announced, the media attention, Devoret said, was overwhelming.

"My profession is not rock star, it's physicist," Devoret said.

Still, he stressed how meaningful it was to see the field of quantum physics celebrated. The award, he said, reflected not only his work but also the contributions of countless researchers who helped build the discipline.

Devoret's colleagues at Yale echoed that sentiment and emphasized Devoret's value as a colleague.

"We both really enjoyed discussing physics and creating new ideas together," Rob Schoelkopf, a professor of applied physics, said.

Steven Girvin, a professor of physics, wrote in an email to the News

that Devoret was thoughtful about his research.

"He has a very clear sense of direction in his research knowing what directions are likely to be fruitful," Girvin wrote.

Devoret said he was honored to receive the award alongside his colleagues, Clarke and Martinis.

"I am also very pleased to receive it with two other colleagues that I hold in great, great esteem," Devoret said. "It's very nice to be in the company of those exceptional individuals."

Devoret's experiences with science began when he was young. Throughout his childhood, in France, he was interested in learning about electronics, electrical circuits and computers, he said.

"I was exactly what you Americans call a 'nerd,'" he said lightly.

Later on, in high school, he built rockets with a school club — a formative experience that he said taught him the foundations of research.

"When we were making the rockets," he said, "we were rediscovering things that are well known in hydrodynamics and the chemistry of combustion. We were rediscovering these things by trial and error."

It's important to "rediscover" existing theories, he said, because without that foundation, it becomes harder to develop original ideas later on.

Though Devoret once considered studying biochemistry, he found the physical elements of physics work — even the smell of electric soldering — more engaging than working with the chemicals of biochemistry.

"In physics, you had a wealth of little gadgets," he said. "You could

do machining. It was a much, much more interesting environment from a tactile perspective."

Devoret pursued his undergraduate degree in electrical engineering from the École nationale supérieure des télécommunications — since renamed Télécom Paris — before beginning his physics work as a graduate fellow at the University d'Orsay.

It was a standard path, he explained. The French education system wanted to ensure that undergraduate students pursue an applied undergraduate degree that would allow them to find employment even without a doctorate.

"A PhD is something really serious in the U.S.," Devoret said. "It gives you intellectual freedom in a company. It remains unfortunately underappreciated in France."

Still, Devoret enjoyed the work his PhD enabled him to do in France. After spending 25 years working in a French government lab, he moved to the United States, first joining Yale and later moving to Santa Barbara.

### Lessons from a laureate

Over the decades, Devoret has distilled key lessons that have shaped his work and attitudes throughout his career.

One of the most important things in academia, he thinks, is the ability to work well in a group setting. His appreciation for teamwork began at age 18, when he worked as a counselor at a summer camp. He believes that experience informed the way he cooperates with colleagues and peers now.

Working in different countries and at different universities, Devoret has also learned to appreciate when his work is going



YALE NEWS

Michel Devoret, a winner of this year's Nobel Prize in Physics, reflects on his path from high school engineering projects to his philosophy on research and mentorship.

well and when is the right time to move on to a new opportunity.

"You should never, never wait until things degrade to leave," Devoret said.

As a professor, Devoret often advises graduate students to learn from their own mistakes and those of others, so they do not repeat them.

He also emphasizes attention to detail. He is a stickler for neat PowerPoints, he said, and correctly labeled graphs. Such precision, he said, conveys professionalism and lends credibility to scientific work.

His approach to research has always been very purposeful. Research should not be like a "hammer in search of a nail," he explained — developing a tool and then looking for a problem to solve with it.

Instead, research should start with a specific problem and build a mechanism to solve it.

"The question would be, what kind of metallic object can I make that would make two pieces of wood

be connected to each other?" he said.

At the University of California, Santa Barbara, he continues to study quantum sensing, exploring new analysis techniques that probe matter on an atomic level. In contrast, his work at Google focuses on advising the company as it moves into a quantum age.

As for the future of quantum technology, according to Devoret, "technology forecasting is even harder than forecasting the weather."

Though he noted that some technologies have grown and died within a few decades, he believes that quantum technology has a "bright future."

"This field that we started has interested a lot of people," Devoret said, reflecting on his career. "They have made fantastic contributions."

Devoret became a Yale professor in 2002.

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## Yale study identifies rising doctor attrition across specialities

BY EDIS MESIC AND MICHELLE CHEON  
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A recent study from the School of Medicine found that physicians today are leaving medicine more than ever before.

The nationwide analysis of over 712,000 physicians revealed that physician attrition, the rate at which doctors leave their clinical practice, has increased substantially across specialties over the years studied.

"Our results demonstrate increasing physician attrition across the workforce, across specialty groups, regions, and in both rural and urban settings," Lisa Rotenstein, the study's first author and a professor at the University of San Francisco wrote in a statement to the News.

Cameron Gettel, the co-director of the Yale Emergency Scholars Fellowship for Emergency Medicine, traced the start of the team's work to a project that investigated the difference in age of attrition between men and women in the emergency medicine workforce.

The initial project took place around the time of the COVID-19 pandemic, which Gettel described as a "trying time" with many pressures on the medical system that caused some physicians to reconsider their decision to practice medicine.

The preliminary study found that women tended to leave the emergency medicine workforce in their mid-to-late 40s and men in their mid-50s, and that the age was getting even lower over the years studied.

The next question for the team was to look at whether the trend in decreasing ages of attrition extended to other specialties as well.

"A common question I got when I was presenting that report was, 'Well, is emergency medicine unique? Are we bad actors? Are we the ones quitting super early or leaving?'" Gettel said.

What the team found was that from the start of the study in 2013 to 2019, the proportion of physicians quitting their jobs across all specialties, geographies and genders is increasing.

Looking ahead, Rotenstein wrote that the next area for study is examining where physicians are going after leaving clinical practice and how the phenomenon of part-time practice factors into the equation.

For Gettel, the results reflect a systemic issue, rather than certain individual problems in healthcare.

"I think that takes some thought about how to reimagine the healthcare system, to make it more tenable, to make physicians work and provide the care that we need given all the projections of the position shortages in the coming years," he said.

Gettel added that one of the more challenging aspects of researching physician attrition can be navigating findings that are less popular.

He explained that his initial work in emergency medicine directly contradicted and disproved studies from years prior that estimated a surplus of emergency medicine doctors.

"It's important to shine light on those things that need to be

addressed but it can also be sort of challenging beating the drum of what's wrong in the system. It's important to do, but that's been challenging as well to grapple with that in these past few years," Gettel said.

Gettel emphasized that the team hopes their work will help inspire positive change across the healthcare system.

In terms of solutions to mitigate burnout and other factors involved with rising rates of attrition, Rotenstein mentioned that institutions could pay careful attention to groups, such as female or rural physicians, that were found to be at increased risk for attrition.

She also noted that institutions can rethink and reshape the environment of clinical practice.

"Studies have demonstrated common factors that can improve the physician experience, including enhanced team support for practice, provision of technology that can reduce documentation burden, a strong culture of safety and mentorship,

and leadership support," Rotenstein wrote.

Kristine Olson, a national thought leader on professional worklife wellbeing, recommended employee assistance programs with mental-health providers; trained peer supporters who understand the clinical context; access to certified coaching and reliable mentorship and executive sponsorship. In her view, those structures are the precondition for tackling burnout factors that can nudge clinicians toward part-time roles or out of clinical practice.

Looking into the future, Olson wrote that "the organizations who make professional wellbeing their top priority will be resilient and endure any challenges they may face."

The study was published in "Annals of Internal Medicine" in October.

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TIM TAI

The team studied the rate at which physicians quit their practice from 2013 to 2019.

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