

# ASU double major discovers the thrill of the unanswered question

## Madeline Linden's path to the School of Molecular Sciences' Dean's Medal

By Jenny Green, ASU News  
April 27, 2026

**Editor's note:** This story is part of a series of profiles of notable [spring 2026 graduates](#).

Madeline Linden did not have a single moment of revelation, no lightning bolt, no cinematic realization in a lecture hall. Instead, her story unfolded the way good science does, evolving incrementally, stubbornly, and with a quiet kind of inevitability.

Linden is graduating in May with a double major in chemistry and mathematics, as well as being a Barrett, The Honors College student and the [School of Molecular Sciences'](#) Dean's Medalist.

By the time Linden arrived at Arizona State University, she knew she liked chemistry. She already knew she liked math. What she didn't yet understand was how deeply those two loves could intertwine, or how far they could take her.

That realization began as a slow burn in Associate Professor [Scott Sayres'](#) physical chemistry lecture.

Quantum mechanics, especially, wouldn't quite settle in her mind. It revealed just enough to draw her in, then held back just enough to keep her questioning. Molecules were no longer static diagrams in textbooks. They became dynamic, probabilistic entities. It was, as she would later describe, "astonishing." And that astonishment didn't fade. It deepened.

Then she joined Assistant Professor [Justin Earley'](#)s research group.

"What truly defines Madeline is her fearlessness in the face of scientific uncertainty," Earley said. "When our team encountered inconsistent experimental results, she did not wait for instruction. Instead, she systematically investigated potential interfering factors, identified oxygen as the culprit

disrupting our photochemical reactions, and independently designed and built a rigorous degassing setup to solve the problem.

“Furthermore, she demonstrated remarkable foresight by suggesting and running Density Functional Theory calculations on chemical precursors to predict energetic favorability before we committed to expensive reagents. This level of intellectual creativity with combining literature search, computational modeling and hands-on engineering is rare even among senior graduate students.”

Her project, involving organic  $sp^3$  color-center qubits (quantum bits) in carbon nanotubes, was not designed for beginners. It lived at the intersection of quantum science, materials chemistry and advanced spectroscopy. The kind of work where even small mistakes could lead to weeks of unusable data.

But Linden found something unexpected in failure: not discouragement, but permission. It changed her. Failure stopped being something to avoid. It became something to examine.

“The most important thing Professor Earley has taught me is the value of knowing what you don’t know,” Linden said. “You can be a genuine expert in your field and still be a student in someone else’s. The willingness to let others teach you, to ask questions without fear, is what separates good scientists from great ones. That lesson has reshaped how I approach everything.”

Outside the lab, Linden’s world expanded just as quickly.

She became a teaching assistant for physical chemistry labs, guiding students through concepts like nuclear magnetic resonance spin and pulse sequences. Topics that, not long before, had challenged her in the same way.

Teaching changed her understanding again. Explaining quantum mechanics forced her to confront its foundations. Each student question sharpened her own thinking.

And beyond campus, at the Arizona Science Center, Linden stood in front of children and families, turning abstract chemistry into something tangible, something they could hold, see, and wonder about.

It mattered to her that science didn’t stay locked behind lab doors. By every measurable standard, Linden has excelled.

She has mastered techniques that many graduate students struggle to command. These include independent computational modeling, advanced spectroscopy and leadership in the lab. Earley, who nominated her for the Dean’s Medal, described her as a “generational talent.”

Here, she shares more about her ASU journey.

**Question: What’s the best piece of advice you’d give to those still in school?**

**Answer:** Get comfortable with not knowing things, and then use that discomfort as a reason to ask questions. It sounds simple, but it’s genuinely hard. There’s a tendency in competitive academic environments to project confidence even when you’re lost. But the students who grow the fastest are the ones willing to raise their hand, sit with confusion, and seek out people who know more

than they do. Intellectual humility isn't a weakness. It's the engine of learning.

**Q: What are your plans after graduation?**

**A:** I am seeking a PhD in physical chemistry at Caltech. My time in Dr. Earley's lab studying molecular qubits has made it clear that I want to keep going deeper. There is so much left to explore at the intersection of quantum chemistry and real-world application, and I cannot wait to do more.

**Q: If someone gave you \$40 million to solve one problem on our planet, what would you tackle?**

**A:** I'd invest it in developing quantum sensors capable of detecting common diseases with dramatically greater sensitivity and early enough detection to change outcomes. Most diseases are highly treatable when caught early; the problem is detection.

Quantum sensing has real potential to revolutionize medical diagnostics, and right now it's underleveraged in health care. With \$40 million, you could fund the research, build interdisciplinary teams, and start translating lab science into something that actually reaches patients. That intersection of quantum sensing and human health is where I want to make a difference.

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*This story originally appeared on [ASU News](#).*

**Main image**



Madeline Linden is the School of Molecular Sciences' spring 2026 Dean's Medalist. She is graduating in May with a double major in chemistry and mathematics. Photo by David Rozul/ASU