

Using fun to inspire generations

UW professor's showmanship sparked people to get excited about science

Devi Shastri Milwaukee Journal Sentinel | USA TODAY NETWORK - WISCONSIN

Bassam Shakhshiri stood before a packed theater, all eyes riveted on the bright red handkerchief in his hand. "The blue is there. It's hiding," Shakhshiri said, having playfully promised his audience that he could change the cloth's color. "I'm going to show you." The chemistry professor dunked the rag into a beaker of clear liquid, instantaneously turning the cloth a deep blue. Children yelled out in surprise. Though the conjuring may have looked like magic, it was anything but: the color change was the result of science, as commonly-used chemical indicators signaled that they'd been dunked into an acidic or basic solution. Still, like any good showman, Shakhshiri didn't dive into how he pulled off the trick. His aim was not to deliver a lecture but to put on a performance, one that heightened people's curiosity and inspired them to question the world around them.

That particular show was in 2019, the 50th anniversary of "Once Upon a Christmas Cheery in the Lab of Shakhshiri," an hourlong presentation of flashy chemistry demonstrations performed between singing, dance numbers by nutcracker "lab assistants" and special guests (including, of course, Santa Claus).

Shakhshiri, 81, retired from the University of Wisconsin-Madison last month, bringing an end to a decades-long career teaching chemistry and putting on the science show, which went from popular to legendary over the course of his career.

His retirement comes as science struggles for its place in America's public discourse, with well-established information called into question — or discarded in favor of politically-influenced bunk — on issues such as the COVID-19 pandemic and climate change.

Shakhshiri devoted his career to making a difference in how people understand science, championing science literacy, and encouraging students and audience members alike to understand what science is, what it can do for society and what its limitations are.

"I would like for everyone to do good in the world," he said. "To always work for the common good."

Teaching that spanned generations

As a child growing up in Lebanon, Shakhshiri was fascinated by colors.

He remembers his mother knitting him a yellow sweater. "Why is this sweater yellow?" he had asked her.

She replied that it was made of wool. But wool comes from sheep, he asked again, and sheep aren't yellow. His parents encouraged that type of curiosity throughout his life.

"I never heard from them, 'Ah, that's too complicated, you'll learn more about that when you grow up,'" he said. "I grew up in a nurturing environment where even when they did not know answers to the questions I was asking, they would encourage further exploration."

Why do the leaves change color in the fall? When the wind blew across the Mediterranean Sea, why did the waves have whitecaps? Were they related to the white clouds in the sky?

"I was asking questions all the time," he said.

Shakhshiri's family moved to the U.S. in September 1957, when his father took a public health teaching role at Harvard. Shakhshiri was weighing several interests when he enrolled in college at Boston University, including politics, religion, philosophy. But he still had burning questions about science. He decided to major in chemistry, to find the answers for himself.

He went on to earn his doctorate and in 1970, he joined the UW-Madison chemistry faculty with a distinct goal: to improve the teaching of basic chemistry, particularly the large introductory courses.

"The vast majority of students enrolling in freshman chemistry were not going to become chemists," he said. "My primary focus was to be helpful and inspiring to everyone to learn chemistry and to learn about how chemistry is connected to society, how it affects our daily lives."

In teaching those large lectures, Shakhshiri reached thousands of UW students across generations, many of whom have posted their well-wishes

About this feature

Each week, we'll be profiling difference-makers in our community. Some may be newsmakers; some may be unsung heroes. We'll talk to them about their motivations and their life journey, and in the process weave a portrait about what it's like to live in this place, at this time. If you have suggestions for subjects, please send them to james@journal.com. We'd love to hear from you.

and memories of this class on social media in the wake of his retirement.

In fall 2003, Shakhshiri's chemistry class was one of the first lectures then-freshman Sarah Nelson walked into. Coming from a high school of 200 people, seeing a packed science lecture hall was "incredible."

"My freshman roommate was also in his class and she was just a chemistry major and even she enjoyed that class," Nelson said. "He was really captivating, just one of those people that kind of commands a room pretty naturally."

Nelson graduated with her bachelor's in microbiology and now works as a research scientist at Promega Corp., a Madison-based life sciences company. She went on to develop her own passion for science education, volunteering to conduct simple chemistry demonstrations in her children's schools once a year.

She said she shares a lot of the same goals as her former professor in doing that outreach, including trying to make science accessible and trying to get people curious about things.

"I don't remember all of my college professors — I don't think that anybody remembers all of their college professors," she said. "But he's one that I will never forget."

A simple mantra: 'Science is fun'

Shakhshiri first learned about the idea of a Christmas lecture from a mentor while working as a post-doctoral lecturer at the University of Illinois at Urbana-Champaign.

The idea traces back to the famous English scientist Michael Faraday, who gave the first one in 1825, when science education was inaccessible to most young people. The series continued to this day, with the exception of four years during World War II, including broadcasts on British television.

Shakhshiri started his own Christmas lectures as soon as he got to Madison, using the last lecture of the semester to preview the experiments he'd be teaching in his next class.

By his second year, word had spread and his lecture hall was packed. He decided to open up the shows to the public and present them in the evenings. Eventually, Wisconsin public television called, asking if he wanted to broadcast the spectacle on TV, too.

"I was inspired looking at their faces," Shakhshiri said of the audiences. "Watching their body language, surprising them. It was very, very nurturing to me and encouraging to me. And then I would hear from teachers and parents, 'Well, what did you do to make this happen?'"



Santa Claus helps University of Wisconsin-Madison Chemistry Professor Bassam Shakhshiri conduct a chemistry experiment that results in making internally mirrored glass ornaments during the second of two 50th anniversary shows of "Once Upon a Christmas Cheery in the Lab of Shakhshiri" to a sellout audience at the Middleton Performing Arts Center in Middleton on Dec. 1, 2019. JEFF MILLER / UW-MADISON



On stage at far left, Rodney Schreiner helps University of Wisconsin-Madison Chemistry professor Bassam Shakhshiri perform a chemistry experiment during "Once Upon a Christmas Cheery in the Lab of Shakhshiri" to at the Middleton Performing Arts Center on Dec. 1, 2019. JEFF MILLER / UW-MADISON

He wrote a series of books, explaining how to conduct the experiments. He traveled around the state and country to put on shows, often taking graduate students with him. Once, he was giving a lecture in Laramie, Wyoming. When he got to the hotel and flipped on the TV looking for the weather, one of his old Christmas lectures was on.

Shakhshiri recalled Ira Flatow, the host of "Science Friday," once joking in an interview that, "Bassam has never met a microphone he doesn't like."

In 1977, he became the founding director of the UW System Undergraduate Teaching Improvement Council and in 1983, he founded the UW-Madison's Institute for Chemical Education. He served as the president of the American Chemical Society — one of the world's largest scientific organizations — and spent six years as the National Science Foundation's assistant director for science and engineering education.

When he arrived at the NSF in 1984, the budget for his program had been slashed to \$16 million — all of it already awarded for graduate fellowships. By 1990, as a result of his all-in advocacy, the budget allocation increased fourfold. Shakhshiri was forced from the agency that year, sparking uproar from allies and critics alike amid what he then described to The Scientist as a debate over the agency's balancing of scientific research and education.

That was a debate that existed early on in Shakhshiri's career, said Rodney Schreiner, an emeritus senior scientist in UW-Madison's chemistry department. Shakhshiri taught Schreiner as a graduate student in the early '70s, and the two went on to work together for 49 years, including on the Christmas lectures.

The motto Shakhshiri stamped onto buttons and shirts proclaiming "science is fun" was not always without its critics.

"He has received some criticism from a few scientists that 'fun' is the wrong word, that it's not serious enough," Schreiner said. "And he says that, 'If you're not having fun doing science, you're not doing it right.' Yes, it's an in-

tellectual activity that gives you great intellectual satisfaction, but also, the whole person is involved. Emotions are there, too."

Attitudes around science education have seen a generational change since, Schreiner said, with many young scientists embracing the power of science education and engagement.

Nathan Sanders, a founder of ComSciCon, an organization that hosts a series of science communication conferences for graduate students in the U.S. and abroad, said Shakhshiri's career was inspirational to the group's work. The professor empowered students to be effective science communicators, Sanders said.

"That's not a message that students typically hear," he said. "It's often the case, especially, to be honest from faculty, that students are told, 'You need to complete your degree and then you can do this great thing. You need to finish the work you're doing now and then you'll be a true scientist.'"

It comes down to a simple teaching philosophy that Shakhshiri carries into all his lessons, regardless of audience connection. It's important to establish a connection before diving into heavy topics like climate change or "alternative facts," he explained.

It can be hard to even catch the moments when Shakhshiri, between the glitz and glam of his science demonstrations, deftly tosses in blunt parallels to real life. The dry ice that created a plume of fog when put into water? It was solid carbon dioxide, a common greenhouse gas. The chemical reaction that created an acid? Well, that's important in the context of ocean acidification.

Back in that 2019 performance, which would turn out to be his final Christmas lecture, the professor used his final moments on stage to remind his audience of the collective power science literacy can provide.

"All of us, each one of us, we all have awesome responsibilities — not only to ourselves but to the future generation — that we love so much and try to protect our planet and try to mitigate climate change," he said.