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CONNECTIONS

Science, the Arts, and the Humanities

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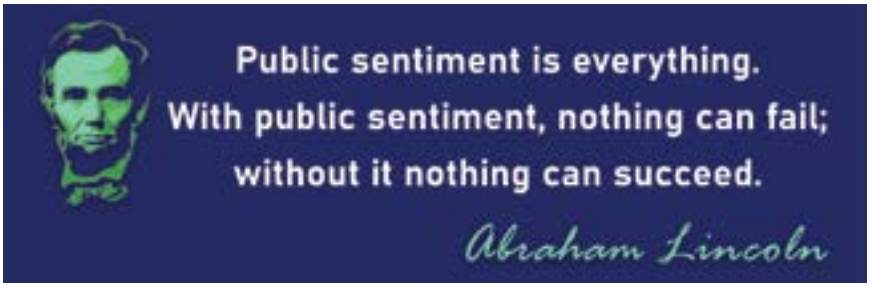
PROF. BASSAM Z. SHAKHASHIRI ON THE IMPORTANCE OF PUBLIC ENGAGEMENT

Engaging with individuals and groups, both locally and around the world, can trigger cerebral and emotional connections to heighten the joy of learning. All must participate in respectful discourse on significant societal issues related to science, religion, politics, the economy, technology, and ethics. Let us all live the Wisconsin Idea.

Creativity, passion, and the urge for expression and exploration are essential human qualities that inspire science, the arts, and the humanities, and thus constitute a common bond among them. People can value, appreciate, and enjoy science without a deep understanding of specific details, just as they can appreciate music without a specialized knowledge of music theory, or appreciate literature, the theater, and the visual arts without being experts in those fields. Exploring the relationships, similarities, and differences in inquiry, creativity, and personal expression among scientists, artists, and humanists is vital.

RAISE YOUR VOICE! VOTE IN EVERY ELECTION.

And recruit at least five eligible voters who haven't voted.



Science and Society

Society is increasingly dependent on science and technology. It is essential for the well-being of our society that all citizens develop an appreciation of science, the benefits of technology, and the potential risks associated with advances in both. Citizens must gain "science literacy."

Science literacy does not require detailed knowledge of any particular field, but rather a broad appreciation and understanding of what science is capable of achieving and, equally important, what science cannot accomplish. Science literacy is necessary for the democratic process to work. We make a distinction between scientific literacy, expertise in a particular field, and science literacy, a broad appreciation and understanding of science and its practitioners, and of what science is capable of achieving and what it cannot accomplish.

Science literacy enlightens and enables people to make informed choices, to be skeptical, and to reject shams, quackery, unproven conjecture, and to avoid being bamboozled into making foolish decisions where matters of science and technology are concerned. Science literacy is for everyone—scientists, artists, humanists, all professionals, the general public, youth and adults alike.

Society makes progress in addressing critical issues by having both a skilled, creative, and productive work force and a citizenry able to judge the risks and enjoy the benefits of advances in science and technology.

Science and society have what is essentially a social contract that enables great intellectual achievements but comes with mutual expectations of benefiting the human condition and protecting our planet.

In a free and civil society people must be virtuous as well as technically skilled. We must ensure that the next generation of scientists is both highly skilled technically and properly educated to carry on their scientific and educational work for the common good.

A CURTAIN CALL FOR IMPRESARIO, TIRELESS ADVOCATE FOR SCIENCE LITERACY — SHAKHASHIRI RETIRES

By Terry Devitt, UW News, August 17, 2021

Bassam Shakhashiri, the kinetic and tireless science educator and 81-year-old University of Wisconsin–Madison chemistry professor who for more than 50 years charmed and amazed audiences with the wonders of science, has retired. His steadfast advocacy for science literacy was a clarion call to scientists and politicians alike.

Best known for his colorful (and sometimes loud) public demonstrations of chemical phenomena, Shakhashiri played to packed houses from Washington to Silicon Valley. His annual program, "Once Upon a Christmas Cheery in the Lab of Shakhashiri," was a staple in Madison, on public television, and — while serving in the late 1980s as an assistant director of the National Science Foundation (NSF) — in the halls of Congress and venues such as the Smithsonian National Air and Space Museum and the National Academy of Sciences.

The goal was always the same: to convey to audiences — by power of demonstration — the value of science to society and the absolute necessity of broad science literacy for understanding everything from human health to climate change.

"Science is a way of looking at the world," says Shakhashiri. "Science literacy is the appreciation of science without a deep understanding of chemistry, physics, biology or any other science. It's an attitude."

Shakhashiri emigrated from Lebanon to the United States at the age of 17 with his parents and two sisters. He joined the UW–Madison chemistry faculty in 1970, arriving on campus one week after the Sterling Hall bombing.

Channeling a desire to reinvigorate the college learning experience, he became the founding director of the UW System Undergraduate Teaching Improvement Council in 1977. In 1983, he founded the UW–Madison Institute for Chemical Education, a nationally recognized center that provides support, tools and inspiration for science educators. ICE has been a leader in helping revitalize science curricula in the nation's schools.

"I wanted to help put Wisconsin on the map in science education," Shakhashiri recalled in an interview in an aerie of an office overlooking Lake Mendota. "Wisconsin was very attractive to me. I learned the meaning of the Wisconsin Idea. I feel it in my bones. I cherish the freedom of scholarly work and public service."

In 1984, Shakhashiri accepted an appointment to serve as NSF assistant director for science and engineering education. He immediately set out to rebuild a program whose budgets were, for all practical purposes, zeroed out by the Reagan administration, leaving

only $16 million in 1981 for graduate fellowships that had already been awarded.

With the support of scientists, an energetic flair, and a knack for getting the ear and sympathy of Congressional leaders, budgets for science education at NSF surged to the $230 million mark by 1990. However, around that time, Shakhashiri was forced from the agency, in large measure because his success at rekindling Congressional support for science education was viewed by some as a detraction from the agency's research mission, he says.

In some quarters, 20 percent of the NSF budget pie was too much: "I wanted to make the pie bigger," recalls Shakhashiri. "I always advocated for the agency."

Today, NSF's science education budgets stand at more than $900 million. In 2007, the National Science Board, which oversees NSF, conferred on Shakhashiri its Public Service Award, an act viewed by some as vindication for the Wisconsin chemistry professor and his uncompromising advocacy.

Returning to Madison, Shakhashiri established himself as a preeminent scholar in science education, over time giving more than 1,500 invited presentations in the United States and around the world.

With collaborators, Shakhashiri authored a five-volume series of chemistry demonstration handbooks, published by UW Press and described as "classics, used year in and year out" by teachers and others to illustrate meaningful lessons in science. The books remain "the best such tools for teachers in any language ever written," extolls Cornell chemistry professor and Nobel Laureate Roald Hoffmann.

In 2001, Shakhashiri was named the first William T. Evjue Distinguished Chair for the Wisconsin Idea, a position he held for 20 years.

"He is a force of nature who is now a legend, especially for his Christmas lectures," says Sean B. Carroll, a UW–Madison emeritus professor of genetics who serves as vice president for science education at the Howard Hughes Medical Institute. "His cleverness, his boundless enthusiasm, and his showmanship no doubt inspired many future scientists and teachers."

To Shakhashiri, "science is fun." He wears the mantra like a uniform, invariably sporting it on a big blue button or a cardinal tee shirt. He is known to dispense the buttons — to everyone from kindergartners to cab drivers — at so much as a smile. Before the COVID-19 pandemic, Shakhashiri and his students could be seen tooling around Wisconsin and beyond in a "Science is Fun" box truck, fostering learning and curiosity in schools, shopping malls and community centers.

"I saw Bassam's demonstrations first perhaps 50 years ago, and loved them," says Hoffmann, a theoretician by trade, whose play about the nature of discovery, "Oxygen," was co-authored with UW alumnus Carl Djerassi and produced in Madison with a memorable assist from Shakhashiri. "The public demonstrations in the play were not done in any other production," recalls Hoffmann, clearly touched by the painstaking effort Shakhashiri poured into the play.

In 2002, Shakhashiri established the Wisconsin Initiative for Science Literacy, a program he will continue to lead. As its name implies, WISL 's mission is to promote literacy among the public in science, mathematics and technology "to attract future generations to careers in research, teaching and public service," and to help UW–Madison graduate students master the communication skills required to effectively share their research with non-experts.

In 2012, Shakhashiri served as president of the American Chemical Society, one of the world's largest scientific organizations with 155,00 members in 150 countries.

"You can't pigeonhole Bassam," says Cora Marrett, the UW–Madison emeritus sociology professor who followed Bassam to leadership roles at NSF, including twice as acting director and a tour leading the agency's education efforts, the same role Shakhashiri defined more than 30 years ago.

Among his accomplishments at NSF, she notes, was being an early advocate for inclusion in science, reaching out to underrepresented populations, including women and people of color.

"It was an emphasis he retained over the years," says Marrett. "It was a deep commitment" to help enable untapped pools of talent to contribute to the enterprise of discovery and, ultimately, society.

Shakhashiri's retirement marks the end of some of the Wisconsin chemist's public engagement activities, including his famous Christmas program, but he says his commitment to public service in the interest of broad science education and literacy is unwavering. "I will continue to live the Wisconsin Idea."

Q&A WITH BASSAM SHAKHASHIRI

University of Wisconsin—Madison chemistry professor Bassam Shakhashiri sat down recently to reflect on his more than 50 years as a science educator, as he faces retirement.

Q: You are passionate about sharing science with students and the public. What sparked that passion and when did you decide science, and chemistry education in particular, was your calling?

A: In my general chemistry courses I wanted students to both learn course content and to connect science to societal progress and problems. I real-

ized that technical training is crucial, but that my role extends to educating students and others to be responsible in their behavior to protect the environment and to always work for the common good. I was influenced in particular by Rachel Carson, Gaylord Nelson, and my father, who was a public health physician. My mother's community work in Lebanon and in the US was a great influence.

Q: Getting scientists and researchers to better engage with students and the public can be a heavy lift. Is the glaring need for more robust science literacy getting scientists motivated to address the challenge?

A: Science and society have what is essentially a social contract that enables great intellectual achievements but comes with mutual expectations of benefiting the human condition and protecting our planet. The grand challenges facing society require technical solutions and public participation. Faculty are more than classroom teachers, researchers and technical trainers. We all do what we do because it interests us, it satisfies our curiosity, we enjoy it. However, we have a responsibility to humanity as a whole. We excel in research and in the classroom, but we must enhance our public engagement efforts to influence societal attitudes and behavior. In a free and civil society people must be virtuous as well as technically skilled.

Q: Given events of the past year, what are your thoughts on the current state of public science literacy? Are there things to be hopeful about science and its relationship to society?

A: Science literacy is an attitude. Relationships are complex and with advances in science the need for connecting science to society requires more care, respect, and trust. I remain confident that scientists will devote a portion of their intellect to effectively connecting with non-scientists.

Q: When you were at the National Science Foundation, there was tension between the education and the research communities when it came to funding. Have we gotten past that?

A: I and others say there is one community committed to advancing knowledge and to serving society. Bureaucratic squabbles can deter progress, but visionary programs for the common good (usually) prevail.

Q: Looking back on 50-plus years of public service in science education, what have been the most memorable and rewarding aspects of your professional life?

A: I am fortunate to have seen smiles and heard voices from so many around the world. Reaching kids of all ages through the Christmas Lecture is deeply meaningful. My work in Washington was made unnecessarily difficult by shortsightedness, but I am pleased and satisfied that I affected the lives of researchers and the general public. My Wisconsin tenured appointment made it all possible.

THE BASSAM Z. SHAKHASHIRI PUBLIC SCIENCE ENGAGEMENT AWARD

This award recognizes one University of Wisconsin-Madison faculty member and one academic staff member who has shown excellence in engaging the public in their work in STEAM (Science, Technology, Engineering, Arts and Math) research. Each award is $5,000.

It is supported by the UW-Madison's Office of the Vice Chancellor for Research, the Morgridge Institute for Research, and the Wisconsin Alumni Research Foundation.

The award is named for Bassam Z. Shakhashiri, emeritus professor of chemistry and the William T. Evjue Distinguished Chair for the Wisconsin Idea, in honor of his "Science is Fun" philosophy and long-term commitment to science education and public engagement.

2023 AWARDEES

Prof. Zuzana Buřivalová (faculty awardee)
Dr. Andrew Greenberg (academic staff awardee)

2024 AWARDEES

Prof. Simon Gilroy (faculty awardee)
Haddie McLean (academic staff awardee)

2025 AWARDEES

Prof. Claudia Solís-Lemus (faculty awardee)
Dr. Michael Notaro (academic staff awardee)

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