

SCIENCE IS FUN extravaganza!

WITH UW-MADISON PROFESSOR
BASSAM SHAKHASHIRI AND COMPANY



STAGE SHOWS AND EXPLORATION STATIONS
TOWN CENTER

WISCONSIN INSTITUTES FOR DISCOVERY

SATURDAY, DECEMBER 11, 2011 ♦ 10 AM – 5 PM



SATURDAY, DECEMBER 11

10:00 a.m. to 5:00 p.m.

SCIENCE IS FUN EXTRAVAGANZA

Featuring UW–Madison’s Dr. Bassam Shakhashiri

10:00 a.m. to 4:00 p.m.

EXPLORATION STATIONS

11:00 a.m. and 2:00 p.m.

SHAKHASHIRI IN THE FORUM

4:00 p.m.

CONCERT



Science and Society

Bassam Z. Shakhshiri

UW-Madison Professor of Chemistry
William T. Evjue Distinguished Chair for the Wisconsin Idea
Director, Wisconsin Initiative for Science Literacy
2011 President-Elect, American Chemical Society



It is a great pleasure for me and for my group to participate in the gala celebrations of the dedication of the Wisconsin Institutes for Discovery. The quality of these beautiful state-of-the art research facilities which are the dream of every scientist is exceeded only by the talents of the faculty and students whose research findings aim to advance knowledge and serve society. The generous support from private and public sources attests to the quality of the University of Wisconsin-Madison and affirms the high expectations of society. The wisdom of John and Tashia Morgridge and the citizens of Wisconsin in establishing WID bring to the forefront the UW-Madison mission in teaching, research, and service.

We live in the most advanced scientific and technological society in history. New discoveries have led to improvements and benefits in our daily lives, but also to new societal problems. It is through science that we can make major contributions to improve the quality of life in America and to advance the human condition around the globe. Science is the key to eradicating disease and reducing poverty. Scientific research and technology can provide clean water and nutritious food, meet energy demands, and help lead to sustainable development everywhere.

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Science and Society

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Science brings a wide range of goods and functions to everyone and thus is vital to our democracy. Science literacy is necessary for the democratic process to work. By science literacy I mean an appreciation of science, an understanding of the benefits of technology and the potential rewards and risks associated with advances in both, as well as a recognition 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; to reject shams, quackery, and 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. The level of science literacy in any society is a measure of what it values and its resolve to put these values into practice.

Science and technology are the engines that drive our economy. A top priority for the Nation is to support research and development in modern science, encourage creativity and innovation, and foster collaboration in order to ensure a healthy economy. Explorations for alternative, renewable, and sustainable sources of energy to meet the demands of modern society should be supported by business and government.

SCIENCE IS FUN STAGE SHOWS

Showtimes: 11:00 a.m. & 2:00 p.m.

With Bassam Z. Shakhshiri and Company



Bassam Z. Shakhshiri is a “scientist by training, teacher and public servant by trade, advocate by conviction, optimist by nature,” that is the way he describes himself. The Encyclopedia Britannica cites him as the “dean of lecture demonstrators in America.” He has given over 1300 invited lectures and presentations around the world and been featured widely in the media including the *New York Times*, *Washington Post*, *Newsweek*,

Time, the German language *Business Week*, NBC Nightly News, National Public Radio, CNN, and the Larry King show.

Prof. Shakhshiri is the first holder of the William T. Evjue Distinguished Chair for the Wisconsin Idea, and has been at UW-Madison since 1970. In 1977 he became the founding chair of the UW System Undergraduate Teaching Improvement Council, now the Office of Professional and Instructional Development. In 1983 he was the founding director of the Institute for Chemical Education, and from 1984 to 1990, served as Assistant Director of the National Science Foundation (NSF) for Science and Engineering Education. There he presided over the rebuilding of all the NSF efforts in science and engineering education after they had been essentially eliminated in the early 1980's. His leadership and effectiveness in developing and implementing national programs in science and engineering education have helped set the annual NSF education budget at its current level of over \$900 million. In 2001 he founded the Wisconsin Initiative for Science Literacy and in November of this year, he was voted 2011 President-Elect of the American Chemical Society.



Wisconsin Institutes for Discovery Gala Concert

Science is Fun Quintet

Marc Fink, oboe
Eleanor, Bartsch, violin
Benjamin Seeger, violin
John Berry, viola
Taylor Skiff, violoncello

PROGRAM

I. *Metamorphoses after Ovid, op. 49 (1951)*

Benjamin Britten (1913-1976)

*Bacchus, at whose feasts is heard the noise of gaggling women's
tattling tongues and the shouting out of boys*

*Niobe, who lamenting the death of her fourteen children
was turned into a mountain*

Légerdemain

Antal Dorati (1906-1988)

Le "spiel"-Le "trick"

Marc Fink, solo oboe

II. *Largo from Sonata No. 3 in C major*

J. S. Bach (1685-1750)

Caprice No. 20

Nicolo Paganini (1782-1840)

Eleanor Bartsch, solo violin

III. *Sonata No. 3 (Ballade)*

Eugène Ysaÿe (1858-1931)

Benjamin Seeger, solo violin

IV. *Suite for Solo Cello: Preludio – Fantasia*

Gaspar Cassadó (1897-1966)

Prélude to Suite No. 3 in C Major for Unaccompanied Cello

J. S. Bach

Taylor Skiff, solo violoncello

V. *Divertimento in C Major for Oboe and Strings, op. 9*

Bernard Henrik Crusell (1775-1838)

Allegro-Andante poco adagio-Allegro

Science is Fun Quintet

THE SCIENCE IS FUN QUINTET

Concert: 4:00 p.m.

Marc Fink, Professor of Music, Principal Oboist of the Madison Symphony, and member of the Wingra Woodwind Quintet, has had a close association with Professor Shakhashiri and the WISL, and was appointed a WISL fellow in 2005. Marc's career has taken him around the world, including tours of the North Slope of Alaska with the Arctic Chamber Orchestra, the South Bohemian Music festival in Ceske Budejovice, Czech Republic, the Colon Theatre in Buenos Aires, and Kremlin Kazan International Festival in Kazan, Russia. He has recorded with the Pro Arte Quartet, the University of Wisconsin Russian Folk Orchestra, and with the Wingra Quintet. His former students are active in the professional world, both orchestral and in teaching positions, and he served as former president of the International Double Reed Society, an organization of more than 4,000 double reed enthusiasts all over the world. Marc and his wife Marcia have three college-aged daughters, Leah, Anna, and Eleanor, and 2 non-college aged pugs, Yoda and Jimi. He enjoys tennis, golf, rooting for the Chicago Cubs, and international cuisine.



Eleanor Bartsch, violin, has a diverse repertoire that ranges from baroque music to that of the 21st century. In Madison, Eleanor performs in many chamber groups including the baroque ensembles Madison Bach Musicians and the Wisconsin Baroque Ensemble. She is a member of the Perlman Piano Trio, and is also a frequent performer with the University of Wisconsin >> *continued*

Contemporary Chamber Ensemble. Eleanor is a member of the first violin section of the Madison Symphony Orchestra and Madison Opera Orchestra and has performed twice on Wisconsin Public Radio's The Midday Show, both as a soloist and as part of the Perlman Trio. Eleanor was a winner of both the Minnesota Youth Symphonies Concerto Competition and the University of Wisconsin School of Music Concerto Competition. She is a recipient of the Galamian Award for Violin from the UW school of music and has performed in master classes for Joseph Silverstein, Robert Mann, Nadja Salerno-Sonnenberg, and Pinchas Zukerman. Eleanor began her violin studies at the age of four with Ellen Kim in St. Paul, Minnesota, and continued her studies with Young-Nam Kim. Eleanor has attended the Aspen Music Festival for three summers where she has studied with Paul Kantor of the Cleveland Institute of Music. She is currently a senior pursuing her bachelor's degree at the University of Wisconsin with David Perry.

Taylor Skiff, cello, a junior at UW-Madison, is currently pursuing a B.M. in Music Performance under the tutelage of Uri Vardi. Taylor began studying the cello at the age of nine. His past teachers include Ron Melby, Carina Voly, Ana Ruth Bermúdez, and Wyatt Sutherland. He has performed as soloist with multiple orchestras, including the Wisconsin Chamber Orchestra and the Milwaukee Symphony Orchestra. Presently, Taylor is the assistant principal cellist of the Dubuque Symphony



Orchestra and a member of the Perlman Piano Trio. From 2005-2008, Taylor was the principal cellist of the Milwaukee Youth Symphony Orchestra's Senior Symphony and Chamber Orchestra. In 2007, Taylor won the UW-Milwaukee Young Artist Competition while performing Antonín Dvořák's Cello Concerto. He has also been a past winner of the Civic Music Association of Milwaukee's High School Showcase (2007 & 2008) and the Milwaukee Symphony Orchestra's Young Artist (2008) competitions. In more recent years, Taylor has performed in master classes conducted by cellists Alban Gerhardt, Timothy Eddy, and Ralph Kirshbaum. Taylor currently performs on a cello made by Jay Haide.



Ben Seeger, violin, is a sophomore at UW-Madison, where he studies violin with Felicia Moyer. His previous teachers include Cynthia Bittar, Eugene Purdue, and Vartan Manoogian. He has been coached by and/or performed in master classes for Henning Kraggerud, Nadja Salerno-Sonnenberg, Patrick Strub, Hank Dutt, and Gerardo Ribeiro. In 2007 he soloed with the Wisconsin Youth Symphony Orchestra, and in 2009 he performed with the Madison Symphony Orchestra live on Wisconsin

Public Television. Recently, he was named a finalist in the UW-Madison Concerto Competition. In addition to a bachelor's degree in violin performance, he is also pursuing a degree in mathematics and a certificate in computer science.

John F. Berry, viola, is an Assistant Professor in the Chemistry Department at UW-Madison, where he teaches general chemistry and inorganic chemistry and conducts research on the synthesis and electronic structure of new transition metal compounds. John began playing violin at the age of 10, and has subsequently learned to play viola and piano; his major focus in music, however, is composition, for which he obtained a BA in Music from Virginia Tech in May, 2000. While at Virginia Tech, John performed regularly with the New River Valley Symphony (violin and viola), Opera Roanoke (viola), and the Polivestki String Quartet (viola). Several of John's compositions have been performed, including a solo viola tribute to the late F. Albert Cotton, John's Ph.D. mentor (2007), Sonata for Cello and Piano (2000), Two Movements for Violin and Piano (1997), and his Piano Sonata (1996, revised 2000). He was appointed a WISL Fellow in 2008. In 2009, he played in WISL's "Concert at Chemistry" in the UW-Madison Chemistry Building, which featured the world premiere of his *Sonata for Tuba and Piano*. •



X



The Blind Spot

The cells in your retina send signals to your brain through the optic nerve. The optic nerve is connected to the retina somewhat to the side of the center. Where the optic nerve connects, there are no light-sensing cells in the retina, so there is a small blind spot there.

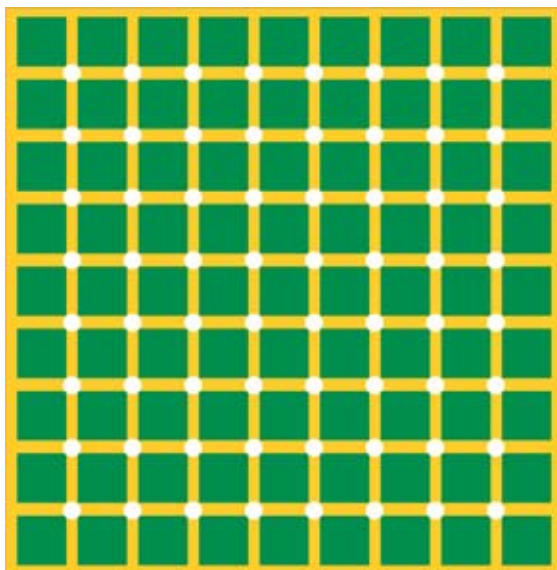
Using the x and dot above, you can observe what happens when an image falls on your blind spot. To observe the blind spot in your right eye, hold the paper about 2 feet from your face, cover your left eye, and look directly at the x. While you continue to look directly at the x, you will see the dot in your peripheral vision. Still, while looking directly at the x, move the paper closer to your face. When the paper is about 15 inches away, the dot will disappear. Continue moving the paper closer to your face, and the dot will reappear when the paper is about 9 inches away. The dot disappears because its image falls upon the blind spot in your retina.

You can observe the blind spot in your left eye by repeating the process, but covering your right eye and looking directly at the dot. This time, it's the x that will disappear, when its image falls on the blind spot in your left eye.

The Grid Illusion

The image at the right is composed of green squares on a yellow background, with white circles wherever four corners of the squares come together. When you look at any one of the white circles, the others will appear to have a spot inside them. The spot disappears as soon as you look directly at a circle.

This dot illusion is a result of the arrangement of cells in the retina at the back of your eye. When you look directly at anything, an image of that object is focused on the center of your



retina. At the center of your retina, the cells are closely packed together, and you have the most precise vision there. In the surrounding areas of the retina, the cells are spaced more distantly, and more than one point of the image activates each cell. Because more than one point activates each cell, the vision is less precise, and in certain circumstances such as in the grid above, you perceive something that isn't there – spots inside the circles.

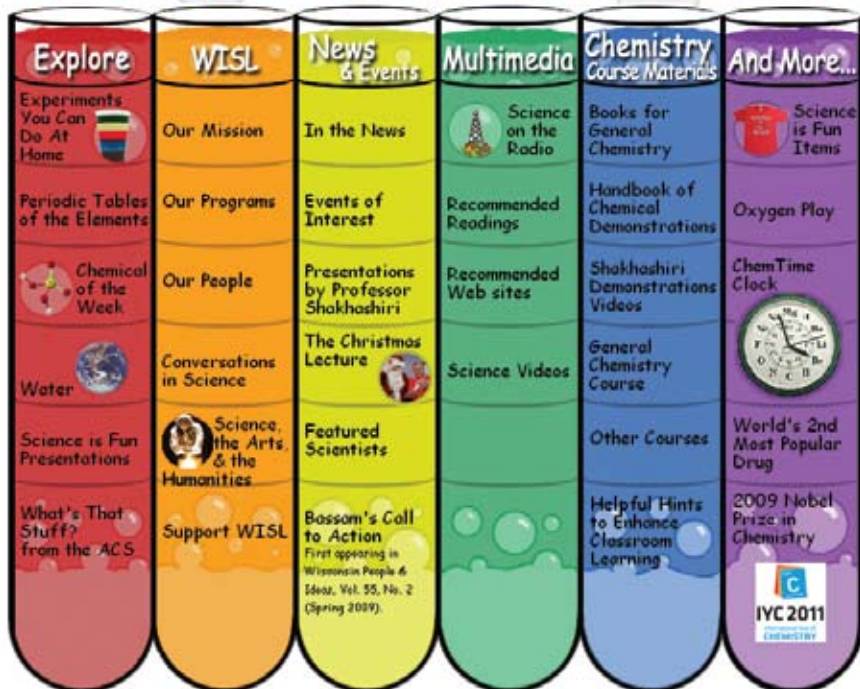
The demonstrations on this page are from Volume 5 of Professor Shakhshiri's Chemical Demonstrations, A Handbook for Teachers of Chemistry, to be published in February, 2011 by The University of Wisconsin Press. It will deal with Light, Color, Vision and Perception.

SCIENCE IS FUN

in the Lab of Shakhshiri

The master of chemical demonstrations and science policy advocate, University of Wisconsin-Madison Chemistry Professor **Boccom Z. Shakhshiri**, shares the fun of science through home science activities, public presentations, scholarship, and other programs of the Wisconsin Initiative for Science Literacy.

40 Years of Once Upon a Christmas Cheery, In the Lab of Shakhshiri ... And Beyond!



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