

this recognition,” she tells C&EN. “I owe so much to my good mentors and chemical education research colleagues on whose work I was able to build.”

Williamson received a Ph.D. in science education (chemical education) from Oklahoma in 1992. She joined the chemistry faculty at Texas A&M in 1997 after serving a number of years on the faculty at Illinois State University.

A member of Texas A&M’s First Year Chemistry Program, Williamson has balanced teaching some of the department’s largest introductory lecture courses with conducting research designed to improve the teaching and learning of chemistry, often with undergraduate research assistants.

Williamson served as a keynote speaker at the recent European Conference on Research in Chemical Education and as one of the chemical education research feature editors for the *Journal of Chemical Education* from 2002 to 2010. She served on the ACS Division of Chemical Education Research Committee from 2000 to 2005, subsequently chairing the committee from 2011 to 2014.

She has worked with the National Science Foundation to fund her own research and to evaluate the minigrants given at the Gordon Research Conference on Visualization, Science & Education. In addition, Williamson has worked with a number of students in her department’s former master’s of science in chemical education program, directing the chemical education research projects for the degrees and teaching graduate courses in chemical education.

She was honored with a 2014 Texas A&M Association of Former Students Distinguished Achievement Award for Teaching and has worked with nearly 20,000 undergraduate students during her 17 years at the university.

Williamson will present her award address before the Division of Chemical Education.—GLENN HESS

## FRANCIS P. GARVAN– JOHN M. OLIN MEDAL

Sponsored by the Francis P. Garvan–John M. Olin Medal Endowment

As an undergraduate, **Angela Wilson** was struck by the power of computational chemistry and drawn to its combination of chemistry, math, physics, and computer science.

That interest grew, and Wilson, 47, is now

Regents Professor of Chemistry at the University of North Texas and director of the Center for Advanced Scientific Computing & Modeling. The center is made up of some 100 university researchers in the sciences and engineering. Wilson is considered a world leader in quantum chemistry methodologies, and her scientific approach and methodologies are implemented in many of the most widely used computational chemistry programs.

“Computational chemistry is fascinating in its ability to address a wide array of problems,” she explains. “My true love is quantum chemistry and trying to get very accurate predictions of energetic properties and answer fundamental questions—like how much energy does it take to break apart a molecule or how much energy does it take to make a reaction occur—and then trying to describe that relationship well.”

A clear indicator of Wilson’s impact is scientific journal citations, say colleagues. One of her articles, for instance, is among the top 10 most cited papers in the history of the *Journal of Molecular Structure: THEOCHEM*. She also has four articles with more than 500 citations and one with more than 1,000.

She has been designated a lifetime national associate of the U.S. National Academies for her “extraordinary service” to the National Research Council. She is also a leader of the International Union of Pure & Applied Chemistry (IUPAC) and a fellow of the American Chemical Society, the American Association for the Advancement of Science, and the American Physical Society.

Wilson has also served on many local and national ACS committees, supporters note, including organizing symposia for ACS national meetings, two of which culminated in books.

Her work at North Texas also includes mentoring high school and college students in a unique statewide program. The Texas Academy of Mathematics & Science each year brings some 375 high school students with abilities and interest in math and science to live on campus for the last two years of high school, she explains.

They earn a high school diploma while working toward a college degree. The students team up with Wilson’s research group. Both learn from the exchange—the high school students learn advanced sci-

ence, and her Ph.D. students gain insight into advising and interacting with younger students.

For Wilson, a high school demonstration led to her chemistry career. A respected chemistry teacher accidentally dropped a large piece of sodium into a water beaker. The reaction blew a hole in the ceiling.

“The accident cleared the halls,” she says, and fixed the field of chemistry in her mind. She went on to college and three internships at the Department of Energy’s

Pacific Northwest National Laboratory in Washington.

She returned to the national lab for postdoctoral work and now chairs its user executive committee for the Environmental Molecular Sciences Laboratory.

Wilson has a Ph.D. in chemical physics from the University of Minnesota, Twin Cities, and a B.S. in chemistry from Eastern Washington University in Cheney, Wash.

Wilson will present her award address before the Division of Physical Chemistry.—JEFF JOHNSON



Wilson

U OF NORTH TEXAS

## PETER DEBYE AWARD IN PHYSICAL CHEMISTRY

Sponsored by E. I. du Pont de Nemours & Co.

Just one generation ago, scientists dreamed of one day probing the secrets of chemistry and biology at the single-molecule level. Thanks to the creativity of researchers such as **Xiaoliang Sunney Xie**, the Mallinckrodt Professor of Chemistry & Chemical Biology at Harvard University, that level of molecular dexterity is fairly common nowadays.

Xie is widely recognized as a pioneer in single-molecule biophysical chemistry for his development and implementation of single-molecule analytical techniques. In the 1990s, Xie demonstrated the feasibility of studying dynamics of individual molecules at room temperature via fluorescence detection.

That fluorescence work underpinned his research team’s real-time observation of enzymes mediating catalytic reactions (turnovers) one reaction at a time. The landmark investigation fundamentally changed researchers’ understanding of biological

kinetics by showing that single-enzyme rate constants fluctuate in time. Such fluctuations have since shown up in many systems.

In the early 2000s, Xie's group developed an electron-transfer method for directly probing conformational dynamics in individual protein molecules responsible for the enzyme fluctuations. More recently, the Harvard group grabbed headlines with its real-time observation of protein production in a living cell, one molecule at a time. That work provided a fundamental way to quantify crucial processes in biology.

The team has also applied its single-molecule techniques to gene-expression studies and DNA-protein interactions in living cells. Those investigations have proved that individual molecules can alter a cell's phenotype, demonstrating the importance of single-molecule measurements.

In 2012, Xie and coworkers invented a single-cell whole-genome amplification method. The technique enables nearly the entire genome of a single cell to be sequenced in a way that can detect a single point mutation. With the aid of this method, two babies were born in 2014 via

in vitro fertilization, free from their parents' genetic diseases associated with point mutations.

Xie and coworkers are also credited with developing nonlinear vibrational microscopy techniques based on Raman scattering. These methods generate label-free chemical maps of cells, providing new tools for cellular chemistry and medical diagnosis.

As an undergraduate student at Peking University, Xie, now 52, majored in chemistry. Upon graduating in 1984, he moved to the University of California, San Diego, where he earned a Ph.D. degree in chemistry in 1990. He then served as a postdoctoral fellow at the University of Chicago for two years before taking a research position at Pacific Northwest National Laboratory. He began his career as a tenured professor at Harvard in 1999.

Xie is the recipient of many awards and accolades. For example, he is a member of the National Academy of Sciences and

a fellow of various organizations, including the American Physical Society, the American Academy of Arts & Sciences, the American Association for the Advancement of Science, the Biophysical Society, and the American Academy of Microbiology.

Among other accolades, Xie was honored with the Department of Energy E. O. Lawrence Award, the Biophysical Society's Founders Award, and the National Institutes of Health Director's Pioneer Award. He is also an honorary fellow of the Chinese Chemical Society and has received scholarly awards from Germany and Israel.

Xie will present his award address before the Division of Physical Chemistry.—

MITCH JACOBY



COURTESY OF SUNNEY XIE

Xie

Photo: Peter Cutts Photography



Diane Grob Schmidt, Ph.D.  
ACS President

### Saturday, March 21, 2015

10:00 AM-2:00 PM

#### Presidential Outreach Event: Exploring Our World Through Chemistry

(Cosponsored by CCA)

Denver Zoo, 2300 Steele Street

### Sunday, March 22, 2015

8:00 AM-12:00 PM

#### Chemistry Without Borders: The Transnational Practice of Chemistry and Allied Sciences and Engineering

(Cosponsored by IAC, COMSCI, BMGT & SOCED)

Colorado Convention Center,  
Mile High Ballroom 3A (Lower Level)

## PRESIDENTIAL SYMPOSIA AND EVENTS

Sponsored and Recommended by the ACS President

### Sunday, March 22, 2015

1:30-5:30 PM

#### Monday, March 23, 2015

8:30 AM-4:45 PM

#### Nanotechnology: Delivering on the Promise

(Cosponsored by the following ACS Divisions and Committees and other scientific societies AGFD, AGRO, ANYL, CARB, CHAS, COLL, ENFL, HIST, I&EC, PMSE, POLY, SCHB, MPPG, CA, CCS, CCPA, COMSCI, DAC, IAC, SOCED; American Institute of Chemical Engineers, Gordon Research Conferences, Materials Research Society & National Academy of Engineering)

Colorado Convention Center,  
Mile High Ballroom 3A (Lower Level)

### Tuesday, March 24, 2015

8:30-11:30 AM

#### DOE Nanoscience Research Centers: National Resources for the Nanoscience Community

(Cosponsored ANYL, ENFL, CCPA, CEI & MPPG)

Colorado Convention Center,  
Rooms 506-507 (Street Level)

### OTHER SYMPOSIA RECOMMENDED BY THE PRESIDENT

#### Excellence in Graduate Polymer Research

(Sponsored by POLY and cosponsored by PRES)

Sheraton Denver Downtown Hotel

#### GSSPC: Designed by Nature, Developed by Science: Inter- disciplinary Perspectives on Biocatalysis

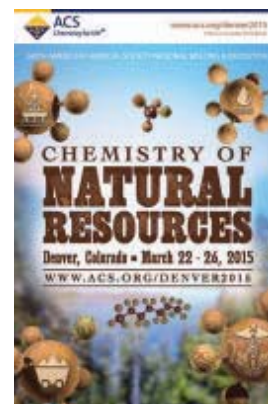
(Sponsored by CHED and cosponsored by PRES, ANYL, BIOL, CATL, ENVR, I&EC, MEDI, & ORGN)

Sheraton Denver Downtown Hotel

#### Department, University and National Models for Faculty Development to Support Adoption of Evidence-Based Teaching

(Sponsored by CHED and cosponsored by PRES, INOR & ORGN)

Sheraton Denver Downtown Hotel



#### The Interface of Chemical and Biological Sciences International Disarmament Efforts

(Sponsored by IAC and cosponsored by PRES, ANYL, CHAL & CPRC)

Hyatt Regency Denver at Colorado  
Convention Center

#### Transitioning between Academic Research into Practical Use: Solar- Energy and Advanced Materials?

(Sponsored by COMSCI and cosponsored by PRES & MPPG)

Colorado Convention Center