

Sigma Xi Today

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Minneapolis Forum Focuses on Education Reform Efforts

Bruce Alberts, president of the National Academy of Sciences, noted that many great scientists can relate stories of how frustration with early science education made their later choice of science as a career almost accidental. He said inquiry-based learning provides the opportunity for students to experience the process and excitement of science, rather than merely trudging through a morass of facts, which often discourages them early on.

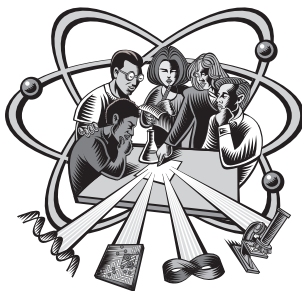
His comments came at the 1999 Sigma Xi Forum *Reshaping Undergraduate Science and Engineering Education: Tools for Better Learning*, held in Minneapolis on November 4-5. Changing the way we teach science is crucial at all levels, Alberts said, from kindergarten through graduate school.

"Inquiry-based learning can serve to preserve that childlike sense of wonder and curiosity that makes what those of us who rediscover the excitement of research later in life feel so fulfilled," he said. "Indeed, learning the process of science – its method and standards of proof, especially – is important for all students to function in our modern world."

The 1999 Forum featured a format of invited sessions, contributed workshops and roundtable discussions, which allowed for lively interaction involving a wide range of related topics and demonstrations. Plenary speakers and panelists addressed the major issues that frame the discussion about education reform, looking at the past, present and future of the reform effort.

Poster presentations and demonstration booths provided a key focus. During breaks, presenters were available to talk about their projects, teaching tools and techniques.

Reshaping Undergraduate Science and Engineering Education Tools for Better Learning



NOVEMBER 4-5, 1999
MINNEAPOLIS, MN

Abstracts of demonstrations and posters will be included in the conference proceedings.

The *Journal of Young Investigators, Inc.*, a Web-based journal for undergraduate research, videotaped much of the forum and annual meeting. Edited video will be available via the JYI Web site at <www.jyi.org> and through the Sigma Xi Web site at <www.sigmaxi.org>.

At the annual meeting, which followed the forum, several workshops addressed Sigma Xi's role in undergraduate education reform and future chapter activities that can support the dissemination of information about effective practices and tools for better learning.

The 1999 Forum was the beginning of a multi-phase Sigma Xi program to foster dissemination of effective practices in education reform. Two pilot workshops early in 2000 will bring the discussion to the institutional level at two universities, with a subsequent series of workshops planned for the following three years at other institutions (see related article on page 94).

In conjunction with the 1999 Forum, an undergraduate education resource page has been developed for the Sigma Xi Web site. This page is intended to serve as a repository for input from individuals as well as from institutions.

"As one of the cornerstone issues of the Sigma Xi Center, science education will continue to be a major focus for Sigma Xi activities in coming years," according to Sigma Xi Executive Director Peter D. Blair. He said other issues providing an initial focus include the public understanding of science and engineering, the health of the research enterprise and ethics and honor in science. The latter topic will be the theme for the 2000 Sigma Xi Forum in Albuquerque, New Mexico, in November.

Funding for the 1999 Sigma Xi Forum was provided by the Burroughs Wellcome Fund, Cisco Systems, Inc., and the National Science Foundation. Sponsoring organizations included the Educational Advancement Foundation, Nature America, Inc., the Center for Study of Gene Structure and Function at Hunter College of the City of New York and The Just/Garcia/Hill Science Web site. Special thanks also go to the *Journal of Young Investigators, Inc.*, for participation and technical support, and to MCNC.

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Adamson Receives Monie Ferst Award



The 1999 Monie A. Ferst Award was presented in September to distinguished University of Southern California chemist Arthur W. Adamson for notable contributions to the motivation and encouragement of research through education.

A pioneer in inorganic photochemistry, Adamson initiated the photochemistry of metal complexes as a modern field in 1958 with publication of the first paper to present the photochemical reactions and quantum yields at various wave-lengths for a representative variety of metal complexes.

He also formulated a set of rules, known as Adamson's Rules, governing the photo-substitutional chemistry of metal complexes. His work has led to major applications in the areas of solar energy conversion, photo-resists for micro-circuitry and memory storage data.

He is the author of what is generally accepted as the most important text and reference book in the field of surface chemistry, *The Physical Chemistry of Surfaces*, now in its fifth edition. His other books include *Understanding Physical Chemistry* and *Concepts of Inorganic Photochemistry*.

Born in Shanghai, China, in 1919, Adamson received his B.S. in chemistry at the University of California at Berkeley and his Ph.D. in physical chemistry at the University of Chicago. He began as an assistant professor of chemistry at the University of Southern California in 1946.

Adamson received the 1979 American Chemical Society (ACS) Kendall Award in Surface or Colloid Chemistry, the 1982 ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry and the 1984 ACS Award in Chemical Education, now renamed the George C. Pimentel Award. In 1992, the ACS established the Arthur W. Adamson Award for Distinguished Service in the Advancement of Surface Chemistry, sponsored by Occidental Petroleum Corp.

The Monie Ferst Award is a national honor that has been given annually since 1977 under the auspices of the Georgia Institute of Technology Chapter of Sigma Xi. It consists of a medal and \$5,000 and is designed to honor a scientist who has inspired his or her colleagues to significant scientific achievements.

The recipient is selected by a committee of three members of the Georgia Institute of Technology Chapter, the chair of the Society's Committee on Awards and Sigma Xi's senior Southeast Regional Director. The award is named for an outstanding engineer and businessman who received his B.S. in mechanical engineering from Georgia Tech in 1911.

Sigma Xi Grants, Prizes and Awards

Since 1886, one of Sigma Xi's primary missions has been to recognize research potential and honor scientific achievement. To that end, the Society has established a number of prizes and awards, as well as the Grants-in-Aid of Research program, which has provided a helping hand on the road to discovery to more than 25,000 young scientists and engineers since it began in 1922.

For information about Sigma Xi grants, prizes and awards, visit <www.sigmaxi.org>.

Delegates Receive Update on New Education Project

About 50 Sigma Xi chapter representatives and guests participated in the planning of a new Sigma Xi chapter-based initiative in undergraduate science education reform during an annual meeting workshop in Minneapolis. The session was led by M. Patricia Morse of the University of Washington and Cathryn A. Manduca of Carleton College.

Morse and Manduca outlined the goals and proposed format for the first phase of the project that includes two pilot workshops to be conducted this winter, one at North Carolina State University and the other at California State University at Long Beach. Sigma Xi chapters will work with campus administrators to design a one-day workshop aimed at disseminating effective practices in undergraduate education and promoting discussion on systemic, institution-wide reform in undergraduate science, mathematics, engineering and technology education. Plans call for follow-up chapter activities to keep the discussion going and stimulate institutional reform.

The two prototype workshops and related efforts are being supported by an initial \$146,000 development grant from the National Science Foundation. Morse and Manduca said the next phase of the project, for which Sigma Xi will seek additional external funding, calls for expanding the effort to an additional 22-25 chapters. It was observed that Sigma Xi's chapter structure offers the advantage of taking the discussion to groups and campuses that have not previously been involved in reform efforts. For more information on the project, visit the Sigma Xi Web site at <www.sigmaxi.org>.

The chapter-based project is an extension of the 1999 Sigma Xi Forum and will likely become a key facet of an ongoing program in science education under development for the Sigma Xi Center in Research Triangle Park, NC.

Seventh Space Station Teleconference Airs on Thursday, February 24

Sigma Xi chapters are encouraged to establish downlinks for NASA's seventh live, interactive satellite program on International Space Station research, which will air Thursday, February 24, from 12:30-2 p.m. (ET).

Called *The International Space Station: Ventures in Space*, the teleconference is designed for research and development professionals and managers in industry and academia and will provide a unique opportunity to learn more about NASA's plans for the economic development of space utilizing the unique environment of the Space Station.

The event is produced by NASA and the WHRO Center for Public Telecommunications in Norfolk, Virginia. To license a site or for further information visit www.spaceite.org.

This year's program will explore strategies planned for commercial space R&D, and will provide a forum for interaction between industry, government and academic researchers who plan to use ISS to expand knowledge and create economic benefits for people on Earth.



A diverse panel of top NASA, university and commercial researchers, international investors, and other experts will take questions and comments on the air. This live event provides an opportunity for the research community to invite industry and investors to interact, forging partnerships that will inspire new business ventures in space.

Lectureship Subsidy Deadline March 1

Sigma Xi offers small subsidies for chapters in need of financial assistance to host a visit from a speaker in its Distinguished Lectureship program. The next deadline for applications is March 1.

In awarding such funds, the Committee on Lectureships gives priority to those chapters that show evidence of being able to derive the greatest benefit from a visit by a Sigma Xi Distinguished Lecturer. Priority for a lectureship subsidy is given to chapters that submit an application, demonstrating a willingness to contribute local funds from the chapter and showing community or institutional support for some of the expenses.

Please use the 2000-2001 Distinguished Lecturer Listing in the November/December issue of *American Scientist*, which is also posted on the Sigma Xi Web site, to submit three choices for a lecturer when submitting a chapter subsidy application. Applications are available online through the Distinguished Lectureship link in the "Programs" section at www.sigmaxi.org.

Two Sigma Xi Members Win Nobels

Two members of Sigma Xi were among those honored with the 1999 Nobel Prize. Egyptian-born scientist Ahmed E. Zewail of the California Institute of Technology won for chemistry, and Rockefeller University cell biologist Gunter Blobel won for physiology or medicine. They join a distinguished list of 178 members of Sigma Xi who have received the Nobel Prize.

Zewail was honored for demonstrating that a rapid laser technique can observe the motion of atoms in a molecule during a chemical reaction. His work in the late 1980s led to the birth of femtochemistry, the use of high-speed cameras to monitor chemical reactions.

"We have reached the end of the road. No chemical reactions take place faster than this," the Royal Swedish Academy of Sciences said. "We can now see the movements of individual atoms as we imagine them. They are no longer invisible." Zewail has held the Linus Pauling chair of chemical physics at Caltech since 1990.

Blobel is the John D. Rockefeller Jr. Professor at Rockefeller University and a Howard Hughes Medical Institute investigator. His studies have focused on the process by which newly made proteins are transported across the membranes of cell structures called organelles.

Because the accurate distribution of proteins to their proper places in the cell is necessary for a cell to function, these findings have an immediate bearing on many diseases, including cystic fibrosis, Alzheimer's disease and AIDS.

Work in Blobel's laboratory revealed the existence of a zip code system in the cell. Each newly made protein has an organelle-specific address, a stretch of the protein referred to as a signal sequence that is recognized by receptors on an organelle's surface.

Sixteen Sigma Xi Chapters Receive Certificates of Excellence

Sixteen Sigma Xi chapters received special recognition at the annual meeting in Minneapolis for their outstanding programmatic activity during 1998-99. Nominees were chosen by the Regional Directors based on chapter annual reports. The following finalists were selected by the Committee on Qualifications and Membership as Chapters of Excellence.

Alaska

Activities included the Alaska High School Science Fair, mentoring K-12 teachers through "Partners in Science" and graduate students through the AAAS Arctic Science Conference, as well as sponsoring a lecture series on science and society issues.

Ball State University

The chapter sponsored the Annual Student Symposium for undergraduates and graduate students, awarded student research grants and developed a speaker exchange program involving Ball State and other area universities.

Baylor College of Dentistry

In the chapter's Habitat for Science Program, minority high school students attended seminars and were matched with mentors for summer projects. The chapter was a cosponsor of Texas Tri-School Research Day, which included a graduate student research symposium and competition.

Clemson University

The chapter was involved in the promotion of research at the high school, undergraduate and graduate levels. Its High School Research Grants Program is conducted jointly with the University of South Carolina and the Central Savannah River Chapter of the South Carolina Academy of Science.

Grove City College

Among other activities, the chapter held lunchtime workshops, fostered independent undergraduate research projects and participated in an undergraduate chemistry student program for local pre-school children called "Chemistry is Fun."

Howard University

The chapter's popular "Science Discovery" program brings minority middle school students to campus for a Saturday of hands-on science. A chapter delegation also visited Congressional representatives, and chapter members served as science fair judges and advisors for science clubs.

Kansas State University

Among other activities, chapter members attended state board of education hearings on revising science standards for K-12 classrooms and testified for strengthening the standards and maintaining an emphasis on evolution as the central theory of biology.

McGill University Chapter

The chapter coordinated celebrations in honor of National Chemistry Week, including a week-long lecture series to capacity audiences on such wide-ranging topics as "Chemistry and Literacy: Scientific Writing in Quebec" and the "Chemistry of Explosives: From Black Powder to Space."

Middle Tennessee State University

The chapter continued its support of *Scientia*, a student-run, electronic research journal, as well as an annual graduate research symposium and lecture series. The chapter also cosponsored the Expanding Your Horizons Conference for girls ages 9-16 and a Women in Science lecture series on campus.

Ohio State University

Seven past chapter presidents were among those attending the chapter's 100th anniversary celebration this year. Speakers included new OSU President William Kirwan and Sigma Xi Executive Director Peter Blair. The chapter also gave special recognition to undergraduate and graduate students who had received research awards.

Pace University

In addition to sponsoring a lecture series and mentoring teachers and students, the chapter was a cosponsor of the Bioethics Forum III: Environmental and Legal Issues in

Research and hosted a popular student Science Day at the university.

Quinnipiac

In addition to being a community resource for speakers, project consultants and science fair judges, the chapter also sponsors public seminars and other programs. It organizes, funds and administers the Robert E. Leonard Award and Certificates of Merit for outstanding undergraduate and graduate student research and holds a pre-college research competition.

Rice University

Texas Medical Center-The chapter joined the national "Partners in Education" program, adopting Northbrook Middle School as a focus for promoting a better understanding of science among sixth- through eighth-graders. Plans call for development of interactive distance learning, with some programs broadcast directly from researchers' labs.

Southern Illinois-Carbondale

The chapter cosponsors Research Day in conjunction with the Illinois Junior Science and Humanities Symposium each spring; honors outstanding science teachers, graduate students and faculty researchers; and holds a diverse public lecture series.

Tifton

In addition to providing all the judges for the Abraham Baldwin College Regional Science Fair and hosting weekly seminars, the chapter initiated the Tift County Underprivileged Children's Program, providing a walking tour of the University of Georgia Experiment Station.

University of Michigan

Chapter members were among the developers of a faculty forum inspired by the controversial Boyer Commission Report, *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. The keynote speaker was study chair Shirley Strum Kenny, president of the State University of New York at Stony Brook.