



AAAS NEWS & NOTES

Steven Chu addresses a master class at an annual international scientific exchange among Nobel laureates and young scientists.

## Nobel laureate Steven Chu assumes term as AAAS president

Chu calls on scientists to share scientific discoveries with the public

By Anne Q. Hoy

Naturally, Steven Chu cites his work on laser cooling and optical trapping as the most recognized of his scientific career. In 1997, Chu, Claude Cohen-Tannoudji, and William Phillips were honored with the Nobel Prize in Physics for the development of techniques to cool and trap atoms with laser light.

The discovery has since led to precision clocks for space navigation, improved construction of small electronic components, and advanced geospatial positioning systems. It continues to spark emerging applications.

Chu's scientific career is full of achievements driven by a fierce strand of independence and a grounding in experimentation that dates to childhood. His journey offers budding scientists guidance: seek out inspiring professors, be flexible, and find courage to dive into unfamiliar areas at every turn.

"I'm very positive about science and the role it plays for the benefit of humankind," said Chu. "If one looks historically over the past 400 years, all the way up to today, many benefits have come from unfettered, uninstructed, curiosity-driven research that has led to unexpected but huge benefits to society."

At the close of the 2019 AAAS Annual Meeting in Washington, D.C., Chu brings his background and experience to a one-year term as president of the American Association for the Advancement of Science. He hopes to use the position to encourage scientists to better communicate about scientific findings to "help the public

appreciate how science works and help them understand the really, really exciting discoveries."

The middle son in an accomplished family of academics did not stumble into science. His family assumed that he and his two brothers would be scientists or professors, earning a Ph.D. in some scientific branch, and go on to, at least, earn another advanced degree in medicine or law, as most had done in his extended family of Chinese heritage.

As a boy, he spent countless hours building things using then-popular erector sets. Since the three boys shared a bedroom, his mother reserved a spot in the living room of their modest home in Garden City, New York, for his piles of metal parts and the constructions created from them.

He devoted his lunch money to chemistry sets. "I was always building things with my hands, and in those days, you could go to a local chemistry supply store and buy things that actually make rockets and bombs," he said. Another enthusiasm was to read everything by an author until he had exhausted their body of work.

Chu, mesmerized by rockets, fabricated a fleet of matchstick propelled rockets. By twisting aluminum foil around the head of a wooden matchstick and poking a hole for an escape path, he could ignite the phosphorus tip and propel the missiles from a paper-clip launch pad. They made "pew, pew, pew sounds as they took off," he said with a smile.

Chu's mother returned home and entered the kitchen to find the floor covered with burned, aluminum-cladded matchsticks.





Young scientists gather with Nobel laureate Steven Chu at the 68th Lindau Nobel Laureate Meeting in Germany in June 2018.

As her gaze moved to the family's yellow-speckled linoleum table with aluminum trim, her eyes froze on its surface, pockmarked with dozens of burn welts. She started to cry. Chu, who estimates he was in fourth grade, assured her that they could buy a replacement linoleum top at the local lumber yard and he would fix it. "I don't know what gave me the confidence to know I could fix it," he said, and he did.

Throughout his career Chu has encountered many colleagues who pursued similar activities. "There seems to be a strong common denominator among those exploring with chemistry sets, testing rockets and building things with their hands in grade school," he said. "The activities stay with you, and it connects your hands to your brain in ways that younger generations of students today don't have."

Despite good grades, Chu counts himself as his family's "academic black sheep" who only became "a more serious student" in his final year of high school, drawn to physics by a memorable teacher.

It is rare that someone so highly acclaimed who earned a Ph.D. in physics from the University of California, Berkeley, after receiving undergraduate degrees in mathematics and physics from the University of Rochester was ever considered anything but highly accomplished.

He was measured against his older brother, who had set extraordinarily high academic records at their local public high school. "I would say I was blessed with insecurity as a kid, and it keeps me going today," Chu said. Being rejected by Yale and Princeton, he landed at Rochester, which turned out to be the best thing that ever happened to him. It is a great school, he said, and nobody had heard of his brother. Eventually, his family standing was adjusted. His parents were able to attend the Nobel ceremony years later. "As they say, getting a Nobel Prize leveled the playing field," he said.

Chu views AAAS as uniquely positioned to play its role as a multidisciplinary and trusted society. "We build on the work of others and collectively form a deeper wisdom about what's going on," he said. "Science is being questioned for its integrity, and now some people speak about alternative facts. Most scientists assume that

there is an ultimate reality out there. We may not know precisely what it is, but the whole enterprise is committed to get deeper and deeper understanding and appreciation of what that reality may be."

He was elected to become an AAAS Fellow in 2000 and has been a member of AAAS since 1995. William Brinkman, then vice president of research at Lucent Technologies Bell Laboratories, wrote in a nomination letter: "Chu has had a lasting impact and clearly merits the recognition that comes with AAAS Fellowship. Indeed, the AAAS would gain recognition by having Steven Chu as a Fellow."

Today, Chu is a professor of physics and molecular and cellular physiology at Stanford. He is exploring single-molecule biology and ultrasound biomedical imaging, hoping to add to biomedical science. He also is working on a new generation of batteries and other areas of electrochemistry.

Before that, he served as secretary of energy for more than four years. Chu did not know former president Barack Obama when he was offered the cabinet position, a post he used to focus on the administration's efforts to advance energy technologies and wean the nation off fossil fuels. Mitigating the risks of climate change remains the world's biggest challenge, Chu said.

Energy Secretary Chu held the position longer than any predecessor, giving him time to put to work the Advanced Research Projects Agency–Energy (ARPA-E), a program he helped envision as a participant in the 2005 National Academies of Sciences, Engineering, and Medicine's "Rising Above the Gathering Storm" report, identifying novel ways to fund research in clean energy technologies to enhance the U.S. role as a global leader in science and technology by creating technologies to help replace fossil fuels.

During his cabinet tenure, Chu's scientific expertise was called upon to address two major disasters. "Chu, go down there and help BP stop the leak," said Obama after a cabinet meeting at the outset of the 2010 Deepwater Horizon drilling rig explosion some 50 miles off the Louisiana coast.

Chu convened a multidisciplinary group of "out-of-the box thinkers" to work with him and BP to help stop what turned out to be more

***"I'm very positive about science and the role it plays for the benefit of humankind."***

**Steven Chu**, AAAS president

than 200 million gallons of oil and halt subsurface hydrocarbons spewing into the Gulf of Mexico. Their efforts “significantly mitigated many risks in the effort to cap, seal, and ultimately kill the runaway well,” he wrote in a 2013 farewell letter to agency employees. A year later, Chu, John Holdren, the senior White House science and technology adviser; and DOE scientists were called on to help Japan deal with the ramifications of the Fukushima Daiichi nuclear disaster and help the United States understand risks to Americans in Japan and those at home.

Before serving in Washington, Chu was director of the Lawrence Berkeley National Laboratory, where he focused on advancing renewable energy technologies. Earlier, he spent 17 years on the faculty at Stanford, helping to establish Bio-X, another cross-disciplinary

institute that merged biological and physical sciences with medicine. While remaining at Stanford, he also joined the faculty of the University of California, Berkeley, in physics and molecular cell biology before moving to the National Laboratory.

It was at AT&T Bell Laboratories where Chu, who headed the quantum electronics research department, conducted fundamental research that led to the Nobel Prize. His initial breakthrough, he said, came on a snowy evening after virtually all his colleagues had headed home.

The discovery has already led to at least two other Nobel Prizes and transformed physics, chemistry, and biology. “When I began the work, I had no clue that it was going to be that influential. Again, it’s one of the wonderful things about science.”

## 2018 annual election results

Below are the results of the 2018 election. Terms begin on 18 February 2019.

### GENERAL ELECTION

**President-Elect:** *Claire M. Fraser, University of Maryland School of Medicine*

**Board of Directors:** *Maria M. Klawe, Harvey Mudd College; Ann Bostrom, University of Washington*

**Committee on Nominations:** *Marcia C. Linn, University of California, Berkeley; Paula T. Hammond, Massachusetts Institute of Technology; Michelle Vaughn Buchanan, Oak Ridge National Laboratory; Elaine Fuchs, Rockefeller University*

### SECTION ELECTIONS

#### Agriculture, Food, and Renewable Resources

**Chair Elect:** *Edward S. Buckler, USDA-ARS*

**Member-at-Large of the Section Committee:** *Neelima R. Sinha, University of California, Davis*

**Electorate Nominating Committee:** *Isgouhi Kaloshian, University of California, Riverside; Chris van Kessel, University of California, Davis*

#### Anthropology

**Chair Elect:** *Anne Stone, Arizona State University*

**Member-at-Large of the Section Committee:** *Phoebe R. Stubblefield, University of Florida*

**Electorate Nominating Committee:** *Sharon N. Dewitte, University of South Carolina; Joan T. Richtsmeier, Pennsylvania State University*

**Council Delegate:** *Nathaniel J. Dominy, Dartmouth College*

#### Astronomy

**Chair Elect:** *Heidi B. Hammel, Association of Universities for Research in Astronomy*

**Member-at-Large of the Section Committee:** *Nancy A. Levenson, Space Telescope Science Institute*

**Electorate Nominating Committee:** *Lucy McFadden, NASA (Retired); Jill Tarter, SETI Institute*

**Council Delegate:** *Joan R. Najita, National Optical Astronomy Observatory*

#### Atmospheric and Hydrospheric Sciences

**Chair Elect:** *Cindy Lee, Stony Brook University*

**Member-at-Large of the Section Committee:** *Ronald C. Cohen, University of California, Berkeley*

**Electorate Nominating Committee:** *Christopher Field, Stanford University; Margaret A. Palmer, University of Maryland, College Park*

#### Biological Sciences

**Chair Elect:** *David Burgess, Boston College*

**Member-at-Large of the Section Committee:** *Joan E. Strassmann, Washington University in St. Louis*

**Electorate Nominating Committee:** *Mónica Medina, Pennsylvania State University; Phillip A. Newmark, Howard Hughes Medical Institute/University of Wisconsin–Madison*

**Council Delegates:** *David A. Baum, University of Wisconsin–Madison; Susan K. Dutcher, Washington University in St. Louis; Paul E. Turner, Yale University*

#### Chemistry

**Chair Elect:** *Angela K. Wilson, Michigan State University*

**Member-at-Large of the Section Committee:** *Cynthia J. Burrows, University of Utah*

**Electorate Nominating Committee:** *Rebecca J. Abergel, University of California, Berkeley; Theodore Goodson III, University of Michigan*

**Council Delegates:** *Cynthia K. Larive, University of California, Riverside; Debra Rolison, U.S. Naval Research Laboratory*

#### Dentistry and Oral Health Sciences

**Chair Elect:** *Rena N. D’Souza, University of Utah*

**Member-at-Large of the Section Committee:** *Paul H. Krebsbach, University of California, Los Angeles*

**Electorate Nominating Committee:** *Luisa A. DiPietro, University of Illinois at Chicago; David H. Kohn, University of Michigan*

#### Education

**Chair Elect:** *Nancy Pelaez, Purdue University*

**Member-at-Large of the Section Committee:** *Deborah Allen, University of Delaware*

**Electorate Nominating Committee:** *Sarah G. Allen, a federal environmental agency; David J. Asai, Howard Hughes Medical Institute*

#### Engineering

**Chair Elect:** *Nicholas L. Abbott, Cornell University*

**Member-at-Large of the Section Committee:** *Anne Skaja Robinson, Tulane University*

**Electorate Nominating Committee:** *Johnney Green, Jr., National Renewable Energy Laboratory; Gail G. Mattson, Brookhaven National Laboratory*

#### General Interest in Science and Engineering

**Chair Elect:** *Carol Lynn Alpert, Museum of Science, Boston*

**Member-at-Large of the Section Committee:** *Keegan Sawyer, National Academies of Sciences, Engineering, and Medicine*

**Electorate Nominating Committee:** *Jennifer Cutraro, Science Storytellers; Donna Gerardi Riordan, Washington State Academy of Sciences*

#### Geology and Geography

**Chair Elect:** *Linda Rowan, UNAVCO*

**Member-at-Large of the Section Committee:** *Nancy L. Jackson, New Jersey Institute of Technology*

**Electorate Nominating Committee:** *Mei-Po Kwan, University of Illinois at Urbana-Champaign; Lynn M. Resler, Virginia Tech*

**Council Delegate:** *Emily M. Klein, Duke University*

#### History and Philosophy of Science

**Chair Elect:** *Susan Lindee, University of Pennsylvania*

**Member-at-Large of the Section Committee:** *Robert T. Pennock, Michigan State University*

**Electorate Nominating Committee:**

*Helen E. Longino, Stanford University; Roberta L. Millstein, University of California, Davis*

**Industrial Science and Technology**

**Chair Elect:** *Carl J. Williams, National Institute of Standards and Technology*

**Member-at-Large of the Section Committee:** *Sudarsanam Suresh Babu, University of Tennessee, Knoxville/Oak Ridge National Laboratory*

**Electorate Nominating Committee:**

*Philip Shapira, University of Manchester/Georgia Institute of Technology; Edmund G. Seebauer, University of Illinois*

**Information, Computing, and Communication**

**Chair Elect:** *Daniel A. Reed, University of Utah*

**Member-at-Large of the Section Committee:** *Deborah L. McGuinness, Rensselaer Polytechnic Institute*

**Electorate Nominating Committee:**

*Eugene Santos Jr., Dartmouth College; Tandy Warnow, University of Illinois at Urbana-Champaign*

**Linguistics and Language Science**

**Chair Elect:** *Judith F. Kroll, University of California, Riverside*

**Member-at-Large of the Section Committee:** *Richard K. Larson, Stony Brook University*

**Electorate Nominating Committee:**

*Fernanda Ferreira, University of California, Davis; Colleen M. Fitzgerald, University of Texas at Arlington/National Science Foundation*

**Mathematics**

**Chair Elect:** *Barbara Lee Keyfitz, Ohio State University*

**Member-at-Large of the Section Committee:** *Bonnie Berger, Massachusetts Institute of Technology*

**Electorate Nominating Committee:**

*Susan Friedlander, University of Southern California; Talitha Washington, Howard University*

**Council Delegate:** *Joceline Lega, University of Arizona*

**Medical Sciences**

**Chair Elect:** *Mary Fedarko Roberts, Boston College (Retired)*

**Member-at-Large of the Section Committee:** *Pierre A. Coulombe, University of Michigan*

**Electorate Nominating Committee:**

*Valerie P. Pipari, University of Michigan; Andrew I. Schafer, Weill Cornell Medical College*

**Council Delegates:** *Channing J. Der, University of North Carolina at Chapel Hill; Thea D. Tlsty, University of California, San Francisco*

**Neuroscience**

**Chair Elect:** *Thomas D. Albright, Salk Institute for Biological Studies*

**Member-at-Large of the Section Committee:** *Elly Nedivi, Massachusetts Institute of Technology*

**Electorate Nominating Committee:**

*Beverly L. Davidson, University of Pennsylvania; Julie H. Simpson, University of California, Santa Barbara*

**Council Delegate:** *Leslie P. Tolbert, University of Arizona (Retired)*

**Pharmaceutical Sciences**

**Chair Elect:** *Donna M. Huryn, University of Pittsburgh School of Pharmacy*

**Member-at-Large of the Section Committee:** *Karlyne M. Reilly, National Cancer Institute/NIH*

**Electorate Nominating Committee:**

*John E. Macor, Sanofi; Kerry Leigh McPhail, Oregon State University*

**Physics**

**Chair Elect:** *Andrea J. Liu, University of Pennsylvania*

**Member-at-Large of the Section Committee:** *Marilyn Gunner, City College of New York*

**Electorate Nominating Committee:**

*Tony F. Heinz, Stanford University/SLAC National Accelerator Laboratory; Paul L. McEuen, Cornell University*

**Council Delegate:** *Pushpa Bhat, Fermi National Accelerator Laboratory*

**Psychology**

**Chair Elect:** *Morton Ann Gernsbacher, University of Wisconsin-Madison*

**Member-at-Large of the Section Committee:**

*Anthony D. Wagner, Stanford University*

**Electorate Nominating Committee:** *Barbara L. Fredrickson, University of North Carolina at Chapel Hill; Alison Gopnik, University of California, Berkeley*

**Social, Economic, and Political Sciences**

**Chair Elect:** *Nicole Woolsey Biggart, University of California, Davis*

**Member-at-Large of the Section Committee:** *Luís M. A. Bettencourt, University of Chicago*

**Electorate Nominating Committee:**

*Gretchen Goldman, Union of Concerned Scientists; Jill J. McCluskey, Washington State University*

**Societal Impacts of Science and Engineering**

**Chair Elect:** *Tobin L. Smith, Association of American Universities*

**Member-at-Large of the Section Committee:** *Jane Maienschein, Arizona State University/Marine Biological Laboratory*

**Electorate Nominating Committee:**

*Jean Goodwin, NC State University; Rachel E. Levinson, Arizona State University*

**Statistics**

**Chair Elect:** *Rebecca W. Doerge, Carnegie Mellon University*

**Member-at-Large of the Section Committee:** *Victoria Stodden, University of Illinois at Urbana-Champaign*

**Electorate Nominating Committee:**

*Jennifer L. Clarke, University of Nebraska-Lincoln; Richard D. De Veaux, Williams College*

**Call for nomination of 2019 Fellows**

Fellows who are current members of AAAS are invited to nominate members for election as Fellows. A member whose efforts on behalf of the advancement of science or its applications are scientifically or socially distinguished, and who has been a continuous member for the 4-year period leading up to the year of nomination, may by virtue of such meritorious contribution be elected a Fellow by the AAAS Council.

A nomination must be sponsored by three previously elected AAAS Fellows (who are current in their membership), two of whom must have no affiliation with the nominee's institution. Nominations undergo review by the steering groups of the Association's sections (the chair, chair-elect, retiring chair, secretary, and four members-at-large of each section). Each steering group reviews only those nominations designated for its section. Names of Fellow nominees who are approved by the steering groups are presented to the Council in the fall for election.

Nominations with complete documentation must be received by 24 April 2019. Nominations received after that date or nominations that are incomplete as of the deadline will not move forward.

Complete instructions and a copy of the nomination form are available at [www.aaas.org/current-nomination-cycle](http://www.aaas.org/current-nomination-cycle). Questions may be directed to [fellownomination@aaas.org](mailto:fellownomination@aaas.org).



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