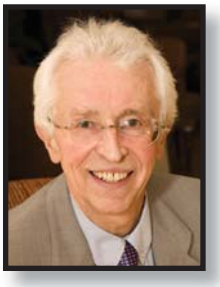
Siegfried S. Hecker Receives the Enrico Fermi Award from DOE



Siegfried S. Hecker was chosen by U.S. Department of Energy Secretary Steven Chu to receive the 2009 Enrico Fermi Award.

Administered on behalf of the White House by the U.S. Department of Energy, the Enrico Fermi Award is one of the most prestigious science and technology awards given by the U.S. government. Recipients are awarded an honorarium of $375,000 and a gold medal.

Hecker is a research professor in the Department of Management Science and Engineering and a senior fellow at the Freeman Spagli Institute for International Studies, both at Stanford University. He received the award for his contributions to plutonium metallurgy, broad scientific leadership, and energetic and continuing efforts to reduce the danger of nuclear weapons around the globe.

Hecker is credited with resolving a long-standing controversy involving the stability of certain structures (or phases) in plutonium alloys near equilibrium that arose from significant discrepancies between U.S. and former U.S.S.R. research on plutonium metallurgy. He also contributed to the understanding of plutonium aging, which is of pivotal importance in assessing the reliability and performance of the U.S. nuclear weapons stockpile.

In Memory of TMS Fellow John Gilman, 1925–2009

Editor's Note: *This tribute was adapted from a submission by Marc Andre Meyers, University of California, San Diego La Jolla, and Stephen Walley, University of Cambridge.*

John Joseph Gilman passed away on September 10, 2009. He was an important figure in materials science, which he contributed to for 60 years. His first paper was published in 1949, and his last one is still at press. Over the years, Gilman authored many papers and books. He had an outstanding career and made contributions seminal to dislocation theory, elasticity and plasticity in crystals, radiation damage, fracture, fatigue, shock and detonation phenomena, and the theory of research management. Gilman sought original approaches to problems such as a new theory he recently proposed in a paper on the formation of basalt columns seen in constitutional supercooling. The paper states that constitutional cooling creates compositional fluctuations leading to the formation of the columns with hexagonal cross sections.

Gilman's career straddled academia and industry. His industrial work started at Crucible Steel Company of America and continued on to General Electric Research Laboratory where he carried out experiments that led to the foundation of dislocation dynamics. Gilman later joined Allied Chemical Corporation, where he founded the Materials Research Center and directed an effort that resulted in the development of the technology to produce metallic glass foil on an industrial scale. He also served as manager of corporate research at Standard Oil Company.

Gilman spent the last years of his life at the University of California, Los Angeles. His academic career was carried out at several universities. Gilman received a B.S. degree in mechanical engineering from Illinois Institute of Technology and a Ph.D. in metallurgy from Columbia University. He received many recognitions during his career, the most prestigious being his election to the National Academy of Engineering. Others include the R.W. Raymond Award and the Champion Mathewson Gold Metal, both from the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) and the Campbell Memorial and Zay Jeffries lectures of ASM International. Gilman was also awarded Fellow status at TMS, ASM International, and the American Physical Society.

His deep insights into materials physics and chemistry have extended themselves to the field of dynamic deformation of materials.

ASM INTERNATIONAL GRANTS TMS MEMBERS AWARDS AT MS&T'09

The ASM International Board of Trustees granted eight TMS members awards during the society's annual awards dinner at Materials Science & Technology 2009. The following TMS members received awards:

- **Martin E. Glicksman:** professor, University of Florida; Honorary Membership Award.
- **Y. Austin Chang:** Wisconsin Distinguished Professor, University of Wisconsin, Madison; Gold Medal and J. Willard Gibbs Phase Equilibria Award.
- **Sungho Jin:** Distinguished Professor, University of California at San Diego; Albert Sauveur Achievement Award.
- **Richard L. Kennedy:** vice president of R&D, ATI Allvac; Hunt Eisenman Award.
- **Lawrence E. Murr:** Murchison Professor, University of Texas at El Paso; Albert Easton White Distinguished Teacher Award.
- **Mathieu Brochu:** assistant professor, McGill University; Bradly Stoughton Award for Young Teachers.
- **Joel V. Bernier:** staff scientist, Lawrence Livermore National Laboratory; Henry Marion Howe Medal.
- **Adam L. Pilchak:** visiting scientist, Air Force Research Laboratory, Universal Technology Corp.; Henry Marion Howe Medal.

Meet a Member: Liz Holm, Creating Unique Kitchen Chemistry

By Francine Garrone

Standing in front of her kitchen stove, Liz Holm is reminded of her days spent in the laboratory. Now a computational materials scientist, her work is done in the virtual world, and those early hands-on experiments are nothing more than a pleasant memory. However, Holm, a member of the TMS Board of Directors, has found canning jams, jellies, and preserves to be a way to relive those laboratory experiences.

A distinguished member of the Technical Staff in the Computational Materials Science and Engineering Department at Sandia National Laboratories, Holm brings her materials science background into the kitchen when making preserves and canning harvest from her vegetable garden and fruit trees. "Food preservation has a lot in common with materials science," she said. "In both cases, we manipulate composition and processing to create optimal properties. But in materials science, it is unusual to eat the product."

Holm became interested in gardening and canning while growing up. Her father was an avid gardener and it is from him that she believes she inherited the attitude "I'm not going to plant it and care for it if I can't eat it."

"In the middle of the summer when the garden is producing all those wonderful things to eat, it is just natural to want to save the surplus for wintertime," she said. "There is nothing to warm up a cold, dark winter night like popping open a jar of peaches from my 50-year-old tree and tasting a bit of the warm New Mexico sun."

Holm began her experiments in kitchen chemistry with the easiest preserving method—freezing jams and jellies—before advancing to high-acid, high-sugar preserves canned in boiling water. She later graduated to pressure-canning low-acid foods.

To make preserves, the fruit or vegetables must first be peeled, blanched (steamed to loosen the skins), chopped, or flavored. Vinegar or lemon juice is then added to make the mixture unfriendly to microbes by giving it a low pH balance. Sugar is also added not only to prevent spoilage, but when combined with pectin, a natural gelling agent, it helps to thicken jams and jellies. Once the mixture is correctly prepared, it is placed in canning jars and sealed using a two-part lid.

Holm then applies heat to the jars to kill remaining microbes and to drive out any air. "In boiling water canning, I immerse the jars in boiling water for a time sufficient to kill microorganisms," she said. "The heat also causes the air in the jar to expand and escape from under the lid. When the jar cools, there is very little air remaining inside, and the negative pressure differential sucks the lid tightly onto the jar. The product is then shelf stable and can be stored at room temperature." Pressure canning works the same way, except the jars are processed at a higher temperature, according to Holm.

Holm's garden consists of tomatoes, cucumbers, green chile peppers, and green beans. She also has peach, pear, sour cherry, apple, apricot, and plum trees. However, not all of the fruit she uses for her preserves comes from her backyard. Holm uses local apples, pumpkins, berries, sweet cherries, watermelon, and cactus too. "There is an orchard in New Mexico that grows wonderful heirloom apples on very old trees," she said. "They don't know what variety they are—they call them No Names—but I've never tasted better applesauce than my No Name applesauce."

Holm preserves some of her foods in light syrup and others have an added touch. "One local favorite is green chile apple jelly, which combines sweet with heat," she said. Holm entered her preserves in the New Mexico State Fair this year for the first time. Her watermelon-rind pickles received a first-place ribbon and her cherry preserves and blueberry jam received second-place ribbons.

"A friend gave me a very old recipe for watermelon pickles that uses some unusual ingredients," she said. "The result is a richly spiced, sweet pickle that looks beautiful in the jar and has a firm but yielding texture. My family loves them, and apparently the judges did too."

Liz Holm poses next to a showcase containing award-winning preserves, including her watermelon rind pickles.

Each month, *JOM* features a TMS member and his or her activities outside of the realm of materials science and engineering. To suggest a candidate for this feature, contact Francine Garrone, *JOM* news editor, at *fgarrone@tms.org*.