

# Celebrating the Best Among Us:

## **The Oleg D. Sherby and Julia and Johannes Weertman Educator Awards**

Jeffrey Wadsworth, and David C. Dunand, Marc A. Meyers, David N. Seidman

Many TMS awards extend the legacy of those who have helped shaped the profession—Cyril Stanley Smith, William Hume-Rothery, and Keith Brimacombe, to name a few—by recognizing achievements that embody their principles and build upon their work. Beginning with the 2018 awards cycle, TMS is pleased to honor three more esteemed members with awards named and conferred to celebrate their professional contributions and personal influence.

The new *Oleg D. Sherby Award* will memorialize Sherby's groundbreaking contributions to the field of high-temperature deformation of complex materials by recognizing individuals who have had or will have a major impact on the understanding of the behavior of materials at high temperature. Established through a generous donation to the TMS Foundation by 2000 TMS Fellow Jeffrey Wadsworth, chief executive officer and president of Battelle, the Oleg D. Sherby Award will comprise a medal, a certificate, and a \$5000 cash prize.

The TMS Educator Award, which has long recognized contributions to metallurgical and materials science and engineering education in all its forms, will be renamed the *Julia and Johannes Weertman Educator Award*. The renamed award is intended to honor both the individual and joint accomplishments

of Julia and Johannes Weertman, including their pioneering research and instrumental roles in the emergence of materials science and engineering as a discipline. Through a fund established within the TMS Foundation by colleagues and friends of the Weertmans and by the Department of Materials Science and Engineering and the McCormick School of Engineering and Applied Sciences at Northwestern University, the award will now include a medallion, a TMS annual meeting registration waiver, and a \$1,500 travel stipend for travel to the TMS annual meeting where the recipient will accept the award.

The inaugural Oleg D. Sherby Award and the Julia and Johannes Weertman Educator Award will be presented at the TMS 2018 Annual Meeting & Exhibition, March 11–15, in Phoenix, Arizona. The deadline for nominations for these and most other TMS society and division awards is April 1, 2017. Visit the TMS Honors and Awards website at [awards.tms.org](http://awards.tms.org) to access the nomination form and review award criteria.

The essays on the following pages also offer a closer look at the legacies of Oleg Sherby and Julia and Johannes Weertman, and have been contributed by the individuals responsible for establishing these two new TMS awards programs.

## Remembering Oleg D. Sherby

Jeffrey Wadsworth, Battelle

Oleg Dimitri Sherby, a world-renowned metallurgist and prominent scientific and technical author and educator, died on November 9, 2015 at age 90.

In 1975, as I was completing my Ph.D. at Sheffield University, England, I wrote to Oleg to ask if there was the possibility of a postdoctoral position at Stanford University. He replied, offering me a one-year appointment, and I joined him in February 1976. It became a partnership that was to last until he died. He had a huge influence on my life and career, and I learned many lessons from him about acknowledging others, the drive for excellence, and the willingness to challenge established thinking.

I felt it was important to establish a TMS award in Oleg Sherby's name, in perpetuity, for several reasons.

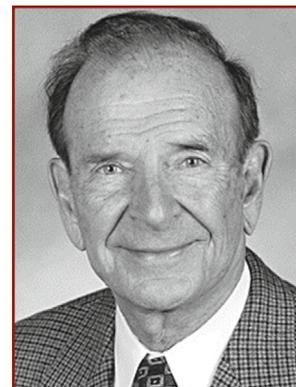
First, Oleg Sherby was famous for his body of work which remains highly cited and broadly read. In particular, his contributions to understanding the high temperature behavior of crystalline materials and the relation between lattice self diffusion and high temperature deformation were seminal. But, his interests encompassed many elements, from modern ultrahigh carbon steels and their ancient counterparts—such as Damascus steels—to superplasticity, to the formation of geological structures.

His career started at the University of California, Berkeley. He then spent two years in England; one at Sheffield University on a National Science Foundation fellowship, and the next as scientific liaison officer in metallurgy with the U.S. Office of Naval Research in London.

He subsequently joined Stanford University where he spent the rest of his professional life. He was a member of the National Academy of Engineering, among his numerous awards and recognitions. (For a memorial tribute including his family history and details of his career, please see: "Oleg Dimitri Sherby" (J. Wadsworth, W.D. Nix), in *National Academy of Engineering of the United States of America: Memorial Tributes*,

National Academies Press, Washington, D.C., in press, 2017.)

Second, I believe our work on Damascus steels and other ancient weapons inspired further studies on the history and manufacture of knives and swords. TMS currently holds a Bladesmithing Competition every other year, with a Bladesmithing Symposium slated in the alternate years to share research and progress on this topic. Starting with the 2017 Bladesmithing Competition, TMS will be awarding the TMS Wadsworth-Sherby Bladesmithing Grand Prize for the best student knife or sword, in memory of that body of research that Oleg and I developed collaboratively. The prize includes a cash award, a medal, and a



Oleg Dimitri Sherby



Oleg Sherby (left) and Jeffrey Wadsworth hot working steel in the mid-1980s.

### About the Oleg D. Sherby Award

**Recognizes:** An individual or small group of collaborators who have made significant contributions to the understanding of the behavior of materials at high temperatures.

**Criteria:** Recipient must have an established record or research and publications in the field of high temperature behavior of materials. In addition, this work must have or will have a major impact on the understanding of the behavior of materials at high temperature.

**Award:** Medal, certificate, and \$5,000 cash prize.

**Nominations:** April 1, 2017 is the deadline for nominations for the inaugural Oleg D. Sherby Award. Visit [awards.tms.org](http://awards.tms.org) for details and the nomination form. For questions or additional information, contact Deborah Hixon, TMS Awards & Recognition Specialist, at [hixon@tms.org](mailto:hixon@tms.org).

bound volume of our works on Damascus steels and related topics. (**Editor's Note:** The Oleg D. Sherby Award described in this article is a separate TMS society award with a specific nomination process, found at [awards.tms.org](http://awards.tms.org).)

Third, Oleg devoted his energy and time to education, teaching undergraduate and graduate courses, and mentoring numerous Ph.D. and master's degree students. We can measure someone's contributions on the tangible achievement scale of awards, papers, citations, and so on. But there is another measure—harder to quantify, but of equal if not more importance—and that is the legacy that they leave through their inspiration and impact on the lives of

others. Oleg achieved superb excellence on each of these scales.

It is appropriate to have a TMS Foundation-funded award for Oleg Sherby so that there will be an ongoing recognition of his achievements. Oleg won prizes named after famous metallurgists and now there will be one named after him. As the years go by, our top materials scientists, in the appropriate fields of research, will be recognized with an award that remembers and recognizes Oleg D. Sherby.

Oleg was a very special person and is deeply missed, but his memory will be fondly remembered, forever, by so many of us.



**Julia Weertman**



**Johannes Weertman**

## The Julia and Johannes Weertman Educator Award

**David C. Dunand, Northwestern University; Marc A. Meyers, University of California, San Diego; and David N. Seidman, Northwestern University**

Renaming the TMS Educator Award with the names of Walter P. Murphy professors emeriti, Julia and Johannes (Hans) Weertman, Northwestern University, is extremely significant as they are both genuine pioneers in the fields of physical metallurgy and materials science and engineering in multiple ways. They serve as outstanding role models in our discipline.

Julia and Hans taught in the Department of Materials Science and Engineering at Northwestern for a total of 65 years. Julia was the first woman admitted to the College of Science and Engineering of the Carnegie Institute of Technology (now Carnegie Mellon University), which awarded her B.S., M.S., and Ph.D. degrees (1950) in physics. Her Ph.D. thesis advisor was I. Estermann of molecular-beam fame. Hans received his B.S. (1948) and Ph.D. degrees (1951) in physics from the Carnegie Institute of Technology, after having served in the U.S. Marine Corps during World War II. His Ph.D. thesis advisor was J.S. Koehler, known for the Peach-Koehler equation for calculating forces on and between dislocations.

Hans and Julia were married in 1950 and are the proud parents of two children and two grandchildren. Julia stayed at home for 13 years with her children, before becoming a member of the faculty of the Department of Materials Science and Engineering at Northwestern. She then switched to the field of mechanical properties of metals, which was a new research endeavor for her.

Hans and Julia were both postdoctoral students at École Normale Supérieure in Paris, France, followed by working at the U.S. Naval Research Laboratory, Washington, D.C., for six years (1962–1968), where Julia worked on problems concerning magnetism. Hans developed models for high temperature, steady state creep of crystalline solids through dislocation climb (1957) and additionally creep mechanism diagrams<sup>1</sup> (1963), later further developed by Ashby et al.<sup>2</sup> (And, this is how the Weertman-Ashby deformation maps were born.) Hans also worked on the sliding of glaciers (1957) and is famous in the field of glaciology—He has an island named for him in Antarctica.

Julia has a world-class reputation in the area of mechanical properties of bulk nanocrystalline metals, which she created from individual nanoparticles. She was also the first woman in the U.S. to serve as a chair of a department of materials science and engineering.

Julia and Hans have served as advisors to about 60 Ph.D. students and 15 postdoctoral researchers and visiting scholars, which is an essential and important part of the educational mission of genuine academics. Their numerous contributions have been widely recognized many times. They have been elected to the National Academy of Engineering, and inducted as fellows of the American Academy of Arts and Sciences and fellows of the John Simon Guggenheim Memorial Foundation. They are also both fellows of TMS, ASM International, the American Physical Society, and the American Geophysical Union.

Hans and Julia made an extremely important, valuable and long lasting contribution to materials science and engineering education with publication of their book, *Elementary Dislocation Theory* (Macmillan Co., 1964) and Oxford University Press, 1992. This was the first book on dislocation theory that was specifically focused on educating advanced undergraduate level students on this very basic and important topic. Their book focuses strongly on the major aspects of dislocation theory, with each chapter containing problems which can be solved analytically, as well as suggested reading material. The topics in their book are still germane and important for understanding the mechanical properties of bulk materials and thin films. This work serves as an excellent introduction for researchers who need to learn about dislocation theory for their own research topics, and is an important link to more advanced books and archival articles.

Hans and Julia Weertman have had a very strong impact on the individuals who initiated this award because of their own research on the mechanical properties of materials and their need for understanding the roles played by dislocations in crystalline solids in various ways. They

also serve as a role models in our academic careers on an almost daily basis. As a member of the board of governors of the Institute for Mechanics and Materials (University of California, San Diego), Julia inspired all the participants by her deep sense of responsibility, insightful advice, and dedicated work.

This award is being sponsored by the entire faculty of the Department of Materials Science and Engineering at Northwestern, the McCormick School of Engineering and Applied Sciences, Marc A. Meyers, University of California, San Diego, and Peter. K. Liaw, University of Tennessee.

### Endnotes

1 "Mechanical Properties, Strongly Temperature Dependent," J. Weertman and J.R. Weertman, in *Physical Metallurgy*, edited by R.W. Cahn, (Amsterdam: North Holland Publishing, 1965), Chapter 16, pp. 793-819.

2 M.F. Ashby, "A First Report on Deformation-Mechanism Maps," *Acta Metallurgica*, 20 (1972), pp. 887-897.



Julia Weertman (facing forward, seated) at the April 2014 ceremony where she accepted the John Fritz Medal for exceptional accomplishments in engineering from the American Association of Engineering Societies. This is one of many honors that she and her husband, Johannes, (standing, right) have received for their contributions to science and engineering.

## About the Julia and Johannes Weertman Educator Award

**Recognizes:** An individual who has made outstanding contributions to education in metallurgical engineering and/or materials science and engineering.

**Criteria:** Recipient must demonstrate contributions to education in metallurgical engineering and/or materials science and engineering. This award is not limited to classroom teachers, but also recognizes contributions through publishing textbooks, building strong academic programs, leading outreach to high school students, or pursuing innovative ways of educating the general populace.

**Award:** Medal, certificate, a registration waiver to attend the TMS annual meeting, and a \$1,500 travel stipend to travel to the TMS annual meeting..

**Nominations:** April 1, 2017 is the deadline for nominations for the Julia and Johannes Weertman Educator Award. Visit [awards.tms.org](http://awards.tms.org) for details and the nomination form. For questions or additional information, contact Deborah Hixon, TMS Awards & Recognition Specialist, at [hixon@tms.org](mailto:hixon@tms.org).

