

## **Dr. Judith A. Todd** **Vice President (2020-2021)**



**Dr. Judith A. Todd, FASM**  
**P.B. Breneman Chair and**  
**Professor of Engineering Science and Mechanics**  
**Penn State University**  
**University Park, PA**

Dr. Todd is Department Head, P. B. Breneman Chair, and Professor of Engineering Science and Mechanics at Penn State University. Prior to joining Penn State, she was the Associate Dean for Research in the Armour College of Engineering and Science, and Professor in the Department of Mechanical, Materials and Aerospace Engineering at the Illinois Institute of Technology. From 1996 to 2002, Dr. Todd held an Iron and Steel Society Professorship from the Iron and Steel Society of the American Institute of Mining Metallurgical and Petroleum Engineers.

Professor Todd is a Trustee of ASM International (2017-2020), Chair of the ASM Task Force on Diversity, Equity and Inclusion, and was Chair of the Los Angeles Chapter in 1986. She has also served as the 2009 President of the Society of Engineering Science, and as Vice President for Manufacturing, American Society of Mechanical Engineers (ASME) from 2002-2005. Her research interests include: development of advanced materials and manufacturing processes, laser-sustained plasma, laser-materials interactions, mechanical behavior, nondestructive evaluation of materials, and archaeometry. Dr. Todd has published more than 100 technical papers and holds 2 U.S. patents. She is a Fellow of ASM International, the American Society of Mechanical Engineers, and the Association of Women in Science. Professor Todd has received numerous awards, including the Vanadium Award from the British Institute of Materials, Minerals and Mining, and the Board on Minorities and Women Award from ASME. Selected by the National Science Foundation, Dr. Todd received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring from President Bush in 2007. Professor Todd received her B.A., M.A., and Ph.D. degrees in Materials Science from Cambridge University and is a Chartered Engineer (professional engineer) in the United Kingdom.

## **Abstract – *Engineering Science for Society – with Materials Solutions***

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Abstract: In 2008, the National Academy of Engineering announced 14 Engineering Grand Challenges that, “left unsolved, threaten our current standard of living”. Today, in the face of burgeoning human populations, ongoing climate change, rising sea levels, increasing pollution, and natural disasters, the challenges are more relevant than ever. The path forward for ASM is clear. By inspiring students of all ages how to learn, we can provide the scientific and engineering foundations, and suites of tools, needed to address the complexities of tomorrow. We will create a community that is not only unafraid of joining a future workforce not yet envisioned, but is also prepared to step up to leadership roles. We will seek to provide sustainable, energy-efficient, and low-cost materials solutions that advance those less fortunate than ourselves. In this presentation, we will explore how privileged we are to have knowledge and skills that will help to combat disease, reduce energy costs, rebuild our infrastructure, advance our manufacturing industries, and create new products and potentially even artificial organs that will improve the quality of life, at home and abroad. When we apply our materials experience to problems at the intersection of multiple disciplines, we can discover transformational solutions that will contribute to the health, welfare, security and sustainability of our planet, and even worlds beyond.

## **Abstract – *The African Iron Age***

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Abstract: In 1972, Dr. Todd lived for a year in the remote highlands of South-West Ethiopia, with the Deemay people, who were still producing iron by methods used over 2000 years ago. In this talk, we will travel back to the African Iron Age to learn about the bloomery iron process, the importance of iron not just for tools but in warding off the “evil eye”, the day to day life of the Deemay, and the position of the smith caste in society. The role of inclusion analysis in determining patterns of trade in iron artefacts will be discussed.