Leopoldina
Nationale Akademie
der Wissenschaften

# Curriculum Vitae Prof. Dr. Tresa Pollock

**Name:** **Tresa Pollock**

**Main areas of research: High temperature materials, ultrafast laser material interactions, alloy design, 3-D materials characterization, Integrated Computational Materials**

Tresa Pollock is an American materials and engineering scientist doing research on structural materials and optical coatings for the ultrashort pulse lasers that are used in microfabrication, tomography and material diagnostics. The central focus of her research is high temperature materials for airplane engines as well as the field of energy generation.

**Academic and professional career**

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| since 2010 | Alcoa Professor and Head of the Materials Department, University of California, Santa Barbara, USA |
| 2000 - 2010 | L.H. and F.E. Van Vlack Professor, Materials Science and Engineering, University of Michigan, USA |
| 1996 - 1998 | Guest scientist, General Electric, Research and Development |
| 1995 | Guest scientist, Rockwell International Science Center, USA |
| 1991 - 1999 | Professor of Materials Science and Engineering, Carnegie-Mellon University, USA |
| 1989 - 1991 | Materials research engineer, General Electric Aircraft Engines, Engineering Materials Technology Laboratories |
| 1989 | PhD, Materials Science Engineering, Massachusetts Institute of Technology, USA |

**Functions in academic societies and committees**

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| 2016 | Principal Editor, Metallurgical and Materials Transactions |
| 2005 - 2006 | President, Minerals, Metals and Materials Society (TMS) |

1997 - 2015 Associate Editor, Metallurgical and Materials Transactions Journals

**Honours and awarded memberships**

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| since 2015 | Member, German National Academy of Sciences Leopoldina |
| since 2009 | Fellow, Minerals, Metals and Materials Society (TMS) |
| 2008 | AIME Raymond Award |
| 2007 | ASM Jeffries Lecture |
| 2005 | Member, US-National Academy of Engineering |
| 2005 | TMS Magnesium Technology Award |
| 2005 | Lee Hsun Award, Chinese Academy of Sciences |
| since 2005 | Member, Chinese Academy of Sciences |
| 1999 | ASM Silver Medal Research Award |
| 1997 | Outstanding Materials Engineer, Purdue University, USA |
| 1995 | ASM Bradley Stoughton Award |
| 1992 | Young Investigator Award, National Science Foundation |

**Main areas of research**

Tresa Pollock is an American materials and engineering scientist doing research on structural materials and optical coatings for the ultrashort pulse lasers that are used in microfabrication, tomography and material diagnostics. The central focus of her research is high temperature materials for airplane engines as well as the field of energy generation.

In her work Tresa Pollock deals with ultrafast laser material interactions, alloy design, 3-D materials characterization and high temperature materials. As an example, she investigates materials and alloys that will be able to withstand extreme heat stress. Her work in the field of nickel-base alloys for turbine engines led to improvements in the efficiency and safety of jet engines. She also developed structural materials that are being used in the automobile industry and in energy production whereby they are exposed to enormous stress.

In the field of energy generation, Tresa Pollock works with materials for thermoelectrics, fuel cells and energy plants fuelled with natural gas and alternative fuels. The materials used in this field include light alloys that have a high degree of resistance as well as protective coatings that can withstand extreme environments. Further aspects of her work include recycling, reprocessing and reutilization.

In the research field of Integrated Materials Computation, the fields of material development,

product development and manufacturing processes are linked together with the assistance of computers. Tresa Pollock assesses micromechanical phenomena and microstructural development in order to predict essential attributes like bond strength and chemical potential as well as the absence of cracks in, and the crash resistance of, specific materials. The ultimate goal is optimized components, a more efficient development process and economically viable manufacturing processes.

Tresa Pollack also considers the environmental soundness of materials in her research. Her work is interdisciplinary and sets its sights on a material's practical applications. For this she has established a nexus between science, industry and professional societies.