

ALI ERDEMIR

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CAREER HIGHLIGHTS:

Over the past three decades, Dr. Erdemir has established himself as a pioneering and distinguished scientist in materials science and engineering, tribology, mechanical engineering, energy, environment, and related disciplines. His dedicated and multidisciplinary research activities have resulted in several key discoveries for which many awards, honors, and patents have been bestowed upon him. His international reputation as a pioneering tribologist elevated his stature to the Presidency of the International Tribology Council (ITC) in 2017, and the Presidency of the Society of Tribologists and Lubrication Engineers - USA in 2016. He is an elected Fellow of the National Academy of Inventors (2022), an elected Member of the National Academy of Engineering (2019), the European Academy of Sciences and Arts (2022), the World Academy of Ceramics (2021), and the Science Academy of Turkey (2021). His research activities are directed towards nano-scale design and large-scale manufacturing of new materials, coatings, and lubricants for a broad range of applications in manufacturing, transportation (including E-Mobility), and other energy conversion and utilization systems where further increases in efficiency, reliability, and environmental compatibility are of primary objectives for a sustainable future.

EDUCATION:

- Ph.D. Materials Science and Engineering, Georgia Institute of Technology, 1986
- M.S. Materials Science and Engineering, Georgia Institute of Technology, 1982
- B.S. Metallurgical Engineering, Istanbul Technical University, Turkey, 1977

EMPLOYMENT HISTORY:

Texas A&M University, J. Mike Walker '66 Department of Mechanical Engineering, College Station, TX-USA

- Professor of Mechanical Engineering and Halliburton Chair in Engineering, since September 2020
- TEES Eminent Professor, February 2020 to September 2020
- Affiliated Faculty, Materials Science and Engineering, since 2021

Argonne National Laboratory, Argonne Illinois-USA

- Argonne Laboratory Emeritus Scientist Applied Materials Division, 2020-present
- Argonne Distinguished Fellow Applied Materials Division, 2010 to 2020
- Senior Scientist Energy Systems Division, 2004-2010

Georgia Institute of Technology, Atlanta, Georgia-USA

- Post-Doctoral Fellow Department of Materials Science and Engineering, 1986-1987

HONORS AND AWARDS:

- **Elected Fellow**, National Academy of Inventors, 2022
- **Elected Member**, European Academy of Sciences and Arts, 2022

- **Elected Member**, The Science Academy of Turkey, 2021
- **Elected Professional Member**, World Academy of Ceramics, 2021
- **Elected Member**, National Academy of Engineering, 2019
- **Elected Member**, The Academy of Medicine, Engineering and Science of Texas, 2020
- **Medal of Distinguished Performance at Argonne National Laboratory**, The University of Chicago, 2011 (The **highest honor** offered at Argonne)
- **Argonne Distinguished Fellow**, the **highest scientific or engineering rank** at the Laboratory, an honor reserved for less than 1.5% of the active employees, 2010-2020
- **R&D 100 Awards** (internationally recognized as the “**Oscars of Innovation**” it has been awarded for the best innovations in the world in a given year since 1962; Dr. Erdemir has received 6 of these Awards with his research team (this is the highest number of such awards received by an individual scientist while at Argonne National Laboratory).
 - **R&D-100 Award** (for the development of “Versatile Hard Carbon Microspheres Made from Plastic Waste”), R&D Magazine, 2015
 - **R&D-100 Award**, (for the development of “Ultra-fast and Large-scale Boriding), R&D Magazine, 2012
 - **R&D 100 Award** (for the development of superhard and slick coatings), R&D Magazine, 2009
 - **R&D 100 Award** (for the development of nano-structured carbide derived carbon films), R&D Magazine, 2003
 - **R&D 100 Award** (for the development of nearly-frictionless carbon films), R&D Magazine, 1998
 - **R&D 100 Award** (for the discovery of boric acid as a solid lubricant), R&D Magazine, 1991
 - **R&D 100 Awards Finalists**, (for the development of a catalytic upcycling process that converts plastic wastes to high-performance lubricants), 2022.
- **Honorary Member**, American Society of Mechanical Engineers, 2023
- **Tribochemistry Award**, Japanese Society of Tribologists, 2023
- **STLE International Award**, Society of Tribologists and Lubrication Engineers, 2020 (the Society’s highest technical honor).
- **Distinguished Tribologists Award**, Japanese Society of Tribologists, 2020 (the Society’s highest technical honor given the first time to a foreign national).
- **President**, International Tribology Council (an umbrella organization for world tribology societies, groups, and associations, a Corresponding Member of UNESCO), 2017-2022
- **President**, Society of Tribologists and Lubrication Engineers, 2016-2017
- **Mayo D. Hersey Award**, American Society of Mechanical Engineers-International, 2015 (the highest honor that ASME bestowed to Tribologists or Lubrication Engineers)
- **Al Sonntag Award**, Society of Tribologists and Lubrication Engineers, 1992 and 2002
- **Edmond E. Bisson Award**, Society of Tribologists and Lubrication Engineers, 1998
- **Innovative Research Award**, Tribology Division of the American Society of Mechanical Engineers- International, 1999
- **Life Member**, ASM-International, since 2019
- **Honorary Member**, Society of Tribologists and Lubrication Engineers, 2020.
- **Life Member**, Society of Tribologists and Lubrication Engineers, since 2017.
- **Fellow**, American Association for the Advancement of Science, (AAAS), 2018
- **Fellow**, American Society of Mechanical Engineers, 2010

- **Fellow**, American Vacuum Society, 2010
- **Fellow**, Society of Tribologists and Lubrication Engineers, 2003
- **Fellow**, American Society for Metals (ASM) International, 2001

Academic Appointments:

- **Honorary Doctorate**, Istanbul Technical University, Istanbul, Turkey, 2024
- **Honorary Visiting Professor**, École Nationale Supérieure d'Arts et Métiers, Aix-en-Provence, France, 2022.
- **Adjunct Professor**, Northwestern University, Department of Materials Science and Engineering, Evanston, IL, USA, 2013-2022.
- **Affiliated Member**, The Hagler Institute for Advanced Studies, Texas A&M University, 2021.
- **Member**, External Review Board, Materials Science Research Foundation, Sandia National Laboratories, since 2021.
- **Visiting Professor**, Kyushu University, Fukuoka, Japan, 2010.
- **Distinguished Engineering Alumni Award**, Georgia Institute of Technology, 2000
- **Visiting Professor**, Ecole Central de Lyon, France, 2000.
- **Affiliated Faculty**, Materials Science and Engineering, Texas A&M University, since 2020.
- **Honorary Doctorate Degree**, Anadolu University, Eskisehir, Turkey, 1998.
- **Commencement Speaker**, 2003 and 2011 Graduation Ceremony of the Istanbul Technical University, Istanbul-Turkey.

PUBLICATIONS (including 5 edited books, 245 refereed journal articles including the 5 listed below):

1. “Advancing the Frontiers of EV Tribology with 2D Materials”, D. Berman, L. Farfan, A. Rosenkranz, A. Erdemir, *Nature Review Materials*, 2024, <https://doi.org/10.1038/s41578-024-00680-3>
2. “Se Nanopowder Conversion into Lubricious 2D Selenide Layers by Tribochemical Reactions”, P. Grützmaier, M. Cutini, E. Marquis, M. R. C. Ripoll, C. Gachot, A. Erdemir, and M. C. Righi, *Advanced Materials*, 35 (42) (2023) 2370300.
3. “Achieving Ultralow-friction and -wear by Tribocatalysis: Enabled by In-operando Formation of Nanocarbon Films”, D. Berman, A. Erdemir, *ACS Nano*, 15(2021) 18865–18879.
4. “Carbon-based Tribofilms from Lubricating Oils”, A. Erdemir, G. Ramirez, O. Eryilmaz, Y. Liao, B. Narayanan, S. Sankaranarayanan, *Nature*, 536(2016)67-71.
5. “Macroscale superlubricity enabled by graphene nanoscroll formation”, D. Berman, S. A. Deshmukh, S.K.R.S. Sankaranarayanan, A. Erdemir, and A.V. Sumant, *Science*, 348(2015)1118-1122.