Professor Chin-Teh Sun

See:
https://engineering.purdue.edu/AAE/People/Faculty/showFaculty?resource_id=1279
https://engineering.purdue.edu/AAE/AboutUs/News/CTSuntoreceiveAIAAASCJamesHStarnesJrAward
https://engineering.purdue.edu/AAE/Spotlights/20101209SpotlightCTSunNorthwesternMeritAward
http://www.scribd.com/doc/76026860/Elasticity-by-CT-Sun
http://www.journalogy.net/Author/10519127/c-t-sun

1968 - Neil A. Armstrong Distinguished Professor of Aeronautics and Astronautics
Composite Materials Laboratory
School of Aeronautics and Astronautics
Purdue University
Composite Materials Laboratory Webpage: http://purdue.edu/aae/cml

Degrees:
Ph.D., Northwestern University, 1967
M.S., Theoretical and Applied Mechanics, Northwestern University, 1965
B.S., Civil Engineering, National Taiwan University, Taiwan, 1962

Interests: Composites, Fracture Mechanics, Structural Dynamics, Smart Materials and Structures, Nano Materials, Acoustic Metamaterials

Awards and Major Appointments:
AIAA Fellow, ASME Fellow, ASC Fellow
Research Award for excellence in faculty research, Schools of Engineering, Purdue University, 2004.
ASTM Committee D-30 Wayne W. Stinchcomb Memorial Award, 2004
Inaugural CT Sun Research Award, School of Aeronautics and Astronautics, Purdue University, 2004
Sigma Xi Purdue University Faculty Research Award, 2005
Listed as ISI Highly Cited Researcher in the Materials Science category, 2006.
ASME Warner T. Koiter Medal, 2007
Inaugural AIAA/ASC James H. Starnes Award, 2009
Alumni Merit Award, Northwestern University, 2010

Research Areas:
Current research interests include the following areas:
Composite Materials and Structures – Advanced fiber composites have gained wide applications in aircraft and aerospace structures. Our research programs cover a broad spectrum in mechanics and design of various composite materials and structures. Research topics include developing methods for testing and modeling high strain rate and fracture behavior of polymeric composites, unconventional modeling of heterogeneous solids, exploring the use of nano particles in reinforcing composites, developing self-assembly methods for processing nanocomposites, improving methods for joining composite structures using adhesives, and developing multifunctional composite materials and structures.
Fractures Mechanics – Fracture mechanics is an important tool in analyzing failure in materials and structures. Our current research focuses on (1) the inadequacy of LEFM in brittle fracture due to the small size of K-dominance zone that renders stress intensity factor alone to be incapable of characterizing fracture toughness; and (2) the physical foundation of cohesive zone modeling of fracture with the attention centered on the cohesive traction law: its physical meaning and conditions it must satisfy.
Nanomaterials – Many nanostructured materials possess highly desired physical and mechanical properties and offer tremendous potentials in many applications. Our research is concentrated on developing multiscale modeling techniques for nanomaterials and their composites and on the use of molecular mechanics to study the mechanical behavior of nanomaterials including nancomposites.
Acoustic Metamaterials – Acoustic metamaterials are materials with man-made microstructures that exhibit unusual mechanical properties such as negative effective modulus or negative mass density that is not found in natural materials. Many of the recently developed metamaterials are in the form of composites. If modeled as a homogeneous classical elastic solid, the effective mass density of a metamaterial would have the form of a second order tensor and is frequency-dependent. Moreover, the microstructure can be designed so that the representative homogenous elastic solid would possess an anisotropic mass density and may become negative in certain frequency range. This unusual property may be used to tailor the wave motion and produce an anisotropic band gap structure of the metamaterial. Many novel applications can be realized using the anisotropy and negativity of the mass density of this metamaterial. Potential applications of acoustic metamaterials are still being explored.

Books and Book Chapters:
M.F. Uddin and C.T. Sun, "Effect of Nanoparticle Dispersion on Polymer Matrix and Their Fiber Nanocomposites," in Major Accomplishments in Composite Materials and Sandwich Structures: An Anthology of ONR Sponsored Research, edited by I.M. Daniel et al., Springer, 2010, V, 693—715, DOI: 10.1007/978—90—481—3141—9_26.

C.T. Sun and Jialin Tsai, "Dynamic Compressive Strengths of Polymeric Composites:Testing and Modeling," in, Dynamic Failure of Materials and Structures Chapter 4, edited by A. Shukla, G. Ravichandran, and Y. D. S. Rajapakse, Springer, 2010.

C.T. Sun and H.H. Huang, "Behavior of Wwave Motion in an Acoustic Metamaterial with Anisotropic Mass Density, IUTAM Bookseries, 2010 Vol. 26, Part 3, 149—163, DOI: 10.1007/978—90—481—9893—1_14, Springer.

C.T. Sun, Mechanics of Aircraft Structures, John Wiley & Sons, New York, NY, 1998. Second Edition, 2007.

Journal Articles:
Many articles listed on the website:
https://engineering.purdue.edu/AAE/People/Faculty/showFaculty?resource_id=1279

The AIAA-ASC James H. Starnes, Jr. Award: C.T. Sun received the inaugural AIAA-ASC James H. Starnes, Jr. Award at an awards luncheon May 6, as part of the 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, held May 4-7, 2009, in Palm Springs, CA.

The American Institute of Aeronautics and Astronautics (AIAA) and the American Society for Composites (ASC) congratulate the winners of the inaugural AIAA-ASC James H. Starnes, Jr. Award, Raphael T. Haftka, Distinguished Professor of Mechanical and Aerospace Engineering at the University of Florida, and C. T. (Chin-Teh) Sun, Neil A. Armstrong Distinguished Professor of Aeronautical and Astronautical Engineering at Purdue University.
The award was presented at an awards luncheon on May 6, as part of the 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, held at Palm Springs, Calif.

The AIAA-ASC James H. Starnes, Jr. Award is presented to recognize continued significant contribution to and demonstrated promotion of the field of structural mechanics over an extended period of time emphasizing practical solutions, to acknowledge high professionalism, and to acknowledge the strong mentoring of and influence on colleagues, especially younger colleagues. The award commemorates James H. Starnes Jr., a leader in the fields of structures and materials.

Sun is being recognized for four decades of unparalleled contributions to composite materials research, scholarly publications, and professional activities, and for his mentoring of students. He received his undergraduate education at the National Taiwan University, obtained a Ph.D. in 1967 from Northwestern University, and joined the faculty at Purdue University in 1968. His research interests include composite materials, fracture mechanics, and nanostructured materials.