COLLEGE OF
ENGINEERING, ARCHITECTURE
AND TECHNOLOGY

CEAT

LEADERS LECTURE

NADAR JALILI

Southern Methodist University
Mary and Richard Templeton Dean of Lyle School of Engineering

Dr. Nader Jalili serves as the Mary and Richard Templeton Dean of Engineering at Southern Methodist University's Lyle School of Engineering, where he is also a Professor of Mechanical Engineering. Since joining SMU in March 2023, he has brought a vision of workforce-ready, innovation-driven engineering education grounded in both technical excellence and professional agility.

Before SMU, Dr. Jalili served as Department Head of Mechanical Engineering at the University of Alabama, where he led significant growth in research funding and enrollment. He spearheaded the Alabama Initiative on Manufacturing Development and Education (Alabama IMaDE), focused on integrating education, research, and service to prepare the next generation of highly skilled engineers. Prior to that, he spent over nine years at Northeastern University as a professor and associate department chair, where he played a key role in launching new graduate programs in robotics, mechatronics, and human-machine systems.

Earlier in his career, Jalili was instrumental in building Clemson University's industry-oriented graduate program in automotive engineering – now a major research and development hub in the Southeast. His academic journey began with faculty roles at Northern Illinois University and Clemson after completing his doctoral studies.

An ASME Fellow and highly active researcher, Jalili has served as Principal Investigator or Co-PI on more than $25 million in externally funded projects from NSF, DOE, DOD, and other agencies. He has authored or co-authored more than 375 peer-reviewed publications, including over 150 journal articles, two textbooks, five book chapters, and two U.S. patents. He has chaired numerous ASME committees, served on editorial boards, and received over 30 honors for excellence in research, leadership, teaching, and service.

ENGINEERING THE FUTURE WORKFORCE: A CURRICULUM MODEL GROUNDED IN FORMATION CHARACTERISTICS

National organizations such as the National Academy of Engineering (NAE) and the National Science Foundation (NSF) have underscored the urgent need for engineering graduates to develop "T-shaped" skills – combining deep technical expertise with broad competencies in communication, teamwork, and interdisciplinary integration. While many engineering programs have introduced curricular reforms over the past two decades, widespread and measurable improvements in student outcomes remain elusive.

This presentation proposes a bold cultural and structural transformation in engineering education, centered on the development of Engineering Formation Characteristics (EFCs) – a framework encompassing both core technical knowledge and essential professional skills. EFCs reflect a student's ability to apply engineering fundamentals to real-world challenges while demonstrating the adaptability, collaboration, and ethical judgment needed in today's dynamic workforce.

The initiative advances a "Design Manifold" that spans the entire undergraduate curriculum, embedding industry-relevant competencies through a balance of traditional and modular coursework. These curricular innovations are coupled with enhanced experiential learning opportunities and a scalable integration model. Achieving success will require reimagining departmental culture, fostering cross-disciplinary faculty collaboration, rethinking pedagogy and time allocation, and ensuring robust institutional support. The ultimate goal is to produce versatile, resilient engineers who are prepared not only to meet the demands of the future workforce but to lead it.

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