



College of Engineering  
Department of  
Mechanical & Industrial Engineering

## The Robert W. Courter Seminar Series

3:00-4:00pm, Friday, April 8<sup>th</sup>, 2022

1221 Patrick F Taylor Hall



### Flexible and Reconfigurable Composites

by **Anastasia Muliana**\*

**Texas A&M University**

Flexible and reconfigurable systems are usually found in many living organisms, e.g., opening and closing of pine cones due to moisture changes, nastic motion of plants, solar tracking sunflowers, reconfiguration of palm trees due to winds, etc. As flexible and adaptive structures are appealing for many engineering applications, such as deployable sun sails, morphing structures, soft robotics, and architectural facades, engineers have proposed numerous concepts in designing shape reconfiguration structures. These structures are typically made of composite materials that consist of several different materials with different chemical and physical properties and certain micro-macroscopic geometries. This presentation discusses the roles of materials and geometries on the deformations and functionality of flexible and reconfigurable structures. Two examples are presented. The first one is on creating flexible and reconfigurable structures out of wood composite kerf panels to control stress wave propagation. The second one is on understanding the biomechanical properties of bioenergy sorghum stems exposed to bending deformations.

\* Anastasia H. Muliana is a Professor and Linda and Ralph Schmidt Professor in the Department of Mechanical Engineering at Texas A&M University. She received her PhD degree from Civil Engineering Department, Georgia Institute of Technology in 2004. She started as an Assistant Professor in the department in 2004 and was promoted to Associate Professor in 2010 and Full Professor in 2015. Her research focuses on modeling of nonlinear and time-dependent responses of polymers, composites, and active materials, and simulations of adaptive and flexible structures with applications in stents, morphing structures, kinetic architecture, and plant biomechanics. She is a recipient of the National Science Foundation CAREER Award, Air Force Office of Scientific Research (AFOSR) YIP Award, US Presidential Early Career Award for Scientists and Engineers (PECASE) Award, William Keeler Memorial Award, among others. She is a fellow of the American Society of Mechanical Engineers (ASME).