

# TEACHING SEMINAR

## Transverse Beam Deflections in Aircraft Structures (and Other Things Around Us)

FRIDAY JANUARY 17TH 2:00PM-3:00PM  
ARMS 1109 OR WEBEX

## ZHERUI MARTINEZ-GUO

Faculty Candidate - AAE Open Search

### ABSTRACT

Beams are common engineering structures designed to take transverse loads. Although beams have historically been used in civil engineering applications, the same analysis can be applied to aerospace structures. For example, aircraft wings are also subject to loads such as lift and drag when in flight, and beam deflection analysis can be used to obtain first-order approximations of deflection. This teaching demonstration, aimed at an AAE204 level equivalent course, focuses on understanding beam deflection behavior from first principles and simplifying assumptions. The transverse deflection equations and resultant deflection profile are derived from the application of various loads and boundary conditions. The demonstration will be guided with relevant example problems and the derivation of the solutions.

### BIOGRAPHY

Dr. Zherui Martinez-Guo is a Research Assistant Professor with Purdue's School of Aeronautics & Astronautics and the current head of the Impact Science Laboratory. He holds a courtesy appointment in Materials Engineering and has joint faculty appointments with Argonne and Idaho National Laboratories. He graduated from Purdue University in 2020 with a Ph.D. in Aeronautics and Astronautics Engineering, focusing on the ballistic/hypervelocity impact and performance optimization of protective armor systems. He was a Russell L. Heath Distinguished Fellow with Idaho National Laboratory's National & Homeland Security directorate prior to coming back to Purdue. His multi-disciplinary research combines experimental efforts in impact dynamics, solid particle erosion, composites science, and advanced materials characterization methods using synchrotron X-rays to develop design optimization and materials selection criteria.



School of Aeronautics  
and Astronautics