

AI-Assisted Design and 3D Printing of Mechanical Metamaterials

Associate Professor Lingling Wu

School of Mechanical Engineering, Xi'an Jiaotong University (西安交通大学)

Date: Friday, October 17, 2025 13:00-14:00

Venue: Faculty of Engineering Bldg. 2, Room 31A

Abstract:

With the rapid development of metamaterials in electromagnetics, mechanics, and thermodynamics, their application has expanded beyond device-specific design. By carefully engineering microstructural units, we can effectively control the overall performance of functional materials. This research introduces machine learning approaches into metamaterial design, exploring their significant potential in vibration isolation, acoustic mechanical metamaterials and mechanical neural network metamaterials. We establish a modular design concept for mechanical metamaterials, using machine learning to automatically search for optimal unit combinations, thus realizing intelligent design of mechanical metamaterials. This research enables engineers to flexibly set target performance according to specific application scenarios and automatically identify optimal metamaterial structures.