

HFSS 2025

2nd International Conference on Highly Flexible Slender Structures

22-26 September 2025, Kaiserslautern, Germany

<https://hfss.uniri.hr>

Mini-Symposium **MS-06 Nonlinear Dynamics of Slender Structures**

Organized by

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The current technological innovations in the field of soft robotics, flexible locomotion devices, vibration mitigation and energy harvesting, and morphable systems have sparked a renewed interest in the nonlinear dynamic response of slender structures.

This special session will focus on novel analytical and numerical methods for analyzing the transient behavior of nonlinear slender structures. General-purpose simulation software can be inefficient or even useless for systems with complicated material structure, moving contacts, material flow through the control volume, impacts and friction, etc. Problem-oriented simulation techniques are often necessary to solve specific practical problems, or they can be useful to investigate new effects and concepts. The following non-exhaustive list provides examples of various phenomena and approaches relevant to the Mini-Symposium:

- Axially moving structures and Arbitrary Lagrangian-Eulerian kinematic description
- Variable-length structures and configurational forces
- Aeroelasticity and fluid-structure interaction
- Dynamic instabilities and parametric resonances
- Non-conservative systems
- Vibrations of damaged structures
- Non-smooth systems, contact problems with impacts and friction, transport problems
- Asymptotic analysis methods
- Computer algebra assisted development of simulation tools
- Snapping mechanisms
- Nonlinear metamaterials and metastructures

Acknowledgement: Support from the European Research Council (ERC) under the European Union's Horizon Europe research and innovation programme, Grant agreement No. ERC-ADG-2021-101052956-BEYOND is gratefully acknowledged.