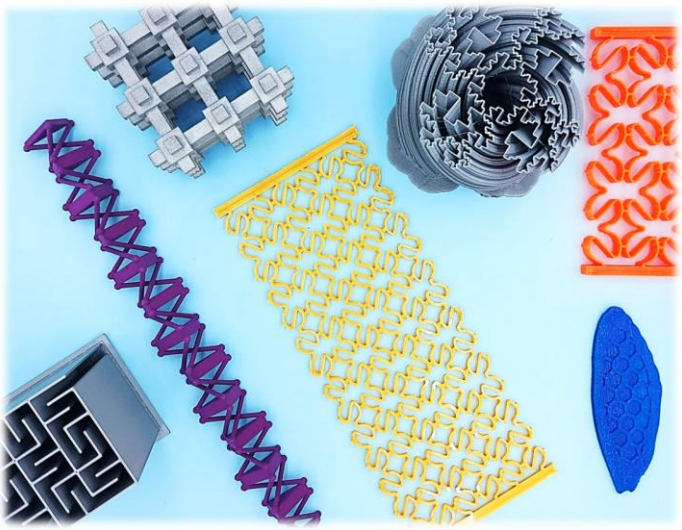
KTH SOLID MECHANICS SEMINAR; Thursday, June 22nd, 16.15; https://kth-se.zoom.us/j/65986944116

Anastasiia O. Krushynska

"Fundamental and practical aspects of modeling mechanical and elastic metamaterials"

Mechanical and elastic metamaterials provide previously unforeseen opportunities to control mechanical and dynamic properties of composites by fine-tuning their structure. In the Metamechanics group, we develop new design strategies for metamaterials with programmable mechanical, tunable dynamical, and multi-functional behavior that will be briefly overviewed in this talk. First, we consider how one can program the structure of mechanical metamaterials subject to simple tensile loading to achieve shape-morphing for plate-type and cylindrical structures and specific deformation modes of a surface with modular actuator arrays in adaptive optics. Then, we summarize the effects of linear viscoelastic material behavior on wave attenuation in pristine and 3D-printed polymer elastic metamaterials. In the final part of the talk, we shed light on the effects of metamaterial-type surface patterns on the control of aerodynamic and acoustic characteristics of 3D-printed flexible wings.



Dr. Anastasiia O. Krushynska is an assistant professor on Dynamics and Vibration at the University of Groningen in the Netherlands leading the Metamechanics group. After getting a Ph.D. degree in Mechanics of Deformable Solids from Kiev National Taras Shevchenko University (Ukraine) in 2008, she worked as a post-doctoral researcher in Ukraine, the Netherlands, France, and as a Cofund Marie Sklodowska-Curie Research Fellow at University of Torino in Italy in the fields of wave dynamics and metamaterials. Her research on metamaterials was awarded with several personal grants (EU Cofund Marie-Curie Fellowship, I-INCE Young Professional Grant, IACM Fellowship for Early Career Female Researchers, National Open Competition grant). She wrote about 45 peer-reviewed journal papers, has 2 patents, and delivered about 20 invited talks at international conferences such as META, Phononics, WCCM (keynote), IEEE and ASA Meetings. He currently serves as associate editor for several international journals, as a referee for more than 60 journals, committee member for the Dutch National Funding agency, and an external referee for the European Commission, French National Research Agency (ANR), Research Grant Council (Hong Kong), and Swiss National Science Foundation. Her group counts five PhD students, whose research activities are focused on investigating fundamental relations between materials and their architecture and developing metamaterials for various applications, including environmental noise attenuation, medical implants, and robotics.