

MS 02

Artificial neural networks in material and structural mechanics

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Artificial neural networks (ANN) have gained significant popularity in recent years for many applications in engineering science. Of particular interest are applications related to material and structural mechanics. These include, among others, multiscale material modeling, structural optimization, inverse problems, model order reduction, and real-time simulation. For this minisymposium, we particularly invite contributions on the following topics:

- Physics-informed deep neural networks for structural and material modeling
- ANN applications to predict material properties, used in constitutive modeling
- Geometric learning via convolutional neural networks for computational solid mechanics
- ANN applications in fracture mechanics of solid materials, porous media mechanics, phase-change materials
- ANN for the solution of PDEs
- ANN in process design as, e.g., additive manufacturing
- Supervised/unsupervised ANN approaches in computational mechanics
- ANN in digital twinning and structural health monitoring
- ANN within metamaterial design, nano and microgeometry optimization, and 3D printing
- ANN application within structural dynamics and model-order reduction

Other topics, which include deep learning and reinforcement learning, are also welcome.