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# MACHINE LEARNING FOR DESIGN TASKS AND INVERSE PROBLEMS

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## MINISYMPOSIUM

Artificial intelligence has made revolutionary advancements across a diverse range of fields, including image recognition. Furthermore, in the domain of computational mechanics, its applications have expanded. Particularly, research on regressions and predictions using feed-forward networks has been extensive. On the other hand, design and inverse problems necessitate the estimation of design solutions or internal states from given design specifications and observations. In such cases, more intricate approaches are required beyond simple deep neural networks, including ingenious structural designs, utilization of generative models, incorporation of the underlying domain expertise (model, equations, knowledge) in the construction and design of neural networks, etc.
We center our attention on this intricate and stimulating domain, inviting a broad spectrum of research related to design and inverse problems.

Building upon existing relevant studies, This MS welcomes novel approaches to both design tasks and inverse problems. Furthermore, within this MS, we welcome methodologies incorporating mechanics models and approaches aimed at enhancing interpretability. This pursuit aims to amplify the accuracy of learning and inference, while also emphasizing the interpretability of outcomes. Practical examples of applications are also welcome.

Within this session, we particularly welcome, but not limited to, research concerning:

- Machine learning for design tasks
- Machine learning for inverse problems
- Physics-based machine learning methods for design and inverse problems
- Explainable / Interpretable machine learning
- Industrial application of machine learning in design and inverse problems