# Article information:

A robust solution of a statistical inverse problem in multiscale computational mechanics using an artificial neural network - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0045782520307258>

# Article summary:

1. The paper discusses the mechanical characterization and identification of elastic properties for heterogeneous materials with a complex microstructure.

2. A stochastic modeling of the apparent elastic properties of the microstructure is constructed within the framework of probability theory and information theory.

3. An Artificial Neural Network (ANN) approach is proposed as an alternative to address the statistical inverse problem related to the identification of an ad hoc stochastic model of the random compliance field.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article provides a robust solution to a statistical inverse problem in multiscale computational mechanics using an artificial neural network, which is presented as an alternative to existing methods that require many calls to a computational model and can be time consuming in practice. The article presents a clear overview of existing methods and their limitations, as well as providing evidence for why ANNs are a suitable alternative for this particular problem. However, there are some potential biases that should be noted when considering this article. Firstly, it does not explore any counterarguments or potential risks associated with using ANNs for this purpose, nor does it present both sides equally when discussing existing methods versus ANNs. Additionally, there is no discussion on how reliable or accurate these ANNs are compared to other methods, nor is there any mention of potential errors or inaccuracies that could arise from using them. Furthermore, there is no discussion on how much data would be required for training these networks or what kind of data would be needed in order to achieve accurate results. Finally, while the article does provide evidence for why ANNs are suitable for this particular problem, it does not provide any evidence or examples demonstrating their effectiveness in practice.

# Topics for further research:

* Statistical inverse problem accuracy
* Artificial neural network reliability
* Data requirements for ANNs
* Comparison of existing methods and ANNs
* Risks associated with using ANNs
* Examples of ANNs in practice

# Report location:

<https://www.fullpicture.app/item/c9498fcf7b256300b286ada017a506c6>