

# JOURNAL OF SYMBOLIC COMPUTATION

## SPECIAL ISSUE on

# Algebraic Geometry and Machine Learning

<https://www.journals.elsevier.com/journal-of-symbolic-computation>

## Call for Papers



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### Important Dates:

Submission deadline: May 30, 2021  
Author notification: November 2021  
Camera ready: December 2021

Machine learning research, both from applied and theoretical sides, has exploded in the recent years. In the last few years, algebraic geometry techniques have also been rapidly progressing due to novel mathematical results as well as sophisticated symbolic and numerical methods which can solve various algebraic geometry problems with ever increasing complexities.

Many machine learning problems, for example, exploring optimization landscapes of deep learning and training various machine learning algorithms, can be seen as algebraic geometry problems. A general theoretical question of machine learning, particularly, deep learning, is explainability and interpretability of the model and results it produces. Research efforts have been invested into the theoretical understanding of machine learning ("Explainable Artificial Intelligence" (XAI) from DARPA and the "American AI Initiative"). Some of the recent research papers address these theoretical issues in a unique and rigorous way using algebraic geometry methods. Interestingly, various computational algebraic geometry problems can be posed and solved with machine learning.

On the other end, machine learning has been successfully employed to solve problems arising in both theoretical and computational algebraic geometry: machine learning has been shown to improve algorithms (both symbolic and numerical) to solve polynomial systems, approximate algebraic varieties and discriminant loci, as well as applications to the landscape of algebraic varieties of interest to theoretical physics, especially string theory etc. The neural networks in particular provide a novel representation of the data which may help symbolic as well as numerical computation further.

The literature on this emerging interaction of the two disciplines is scattered. In the proposed special issue, we aim to bring researchers from both the areas together and provide a serious peer-reviewed platform to present their interdisciplinary research. To the best of our knowledge this will be a first ever special issue on this topic.

### Paper Submission:

Papers should be submitted exclusively via EES (Elsevier Editorial System) at:  
<https://www.editorialmanager.com/jSCO/>