



HEP ML Living Review

“Living again”

<https://iml-wg.github.io/HEPML-LivingReview/>

Hands up -
Who has heard of
the living review?



The what?

A (non-exhaustive) community driven website for papers applying ML in particle physics

Papers categorised into sections based on application and method

Providing a reference point and bib file for the whole community



A Living Review of Machine Learning for Particle Physics [↗](#)

Modern machine learning techniques, including deep learning, is rapidly being applied, adapted, and developed for high energy physics. The goal of this document is to provide a nearly comprehensive list of citations for those developing and applying these approaches to experimental, phenomenological, or theoretical analyses. As a living document, it will be updated as often as possible to incorporate the latest developments. A list of proper (unchanging) reviews can be found within. Papers are grouped into a small set of topics to be as useful as possible. Suggestions are most welcome.

[download](#) [review](#) [GitHub](#)

The purpose of this note is to collect references for modern machine learning as applied to particle physics. A minimal number of categories is chosen in order to be as useful as possible. Note that papers may be referenced in more than one category. The fact that a paper is listed in this document does not endorse or validate its content - that is for the community (and for peer-review) to decide. Furthermore, the classification here is a best attempt and may have flaws - please let us know if (a) we have missed a paper you think should be included, (b) a paper has been misclassified, or (c) a citation for a paper is not correct or if the journal information is now available. In order to be as useful as possible, this document will continue to evolve so please check back before you write your next paper. If you find this review helpful, please consider citing it using `[cite|hepmlivingreview]` in HEPMLbib.

This review was built with the help of the HEP-ML community, the [INSPIRE REST API](#), and the moderators Benjamin Nachman, Matthew Feickert, Claudius Krause, and Ramon Winterhalder.

• Reviews

◦ Modern reviews

- [Jet Substructure at the Large Hadron Collider: A Review of Recent Advances in Theory and Machine Learning](#) [DOI]
- [Deep Learning and its Application to LHC Physics](#) [DOI]
- [Machine Learning in High Energy Physics Community White Paper](#) [DOI]
- [Machine learning at the energy and intensity frontiers of particle physics](#)
- [Machine learning and the physical sciences](#) [DOI]
- [Machine and Deep Learning Applications in Particle Physics](#) [DOI]
- [Modern Machine Learning and Particle Physics](#)
- [Machine Learning in the Search for New Fundamental Physics](#)
- [Artificial Intelligence and Machine Learning in Nuclear Physics](#)
- [Snowmass 2021 Computational Frontier CompF03 Topical Group Report: Machine Learning](#)

◦ Specialized reviews

- [The Machine Learning Landscape of Top Taggers](#) [DOI]
- [Dealing with Nuisance Parameters using Machine Learning in High Energy Physics: a Review](#)
- [Graph neural networks in particle physics](#) [DOI]

Hands up -
Who uses the
living review?

Hands up - Who uses the living review...

To see if their paper has been included

Hands up - Who uses the living review...

To get an overview of what's new

Hands up - Who uses the living review...

For lit review when paper writing

Hands up -
Who uses the
living review...

To get one bib file to rule them all



Who?



We are a diverse team covering all fields of HEP



What's new?

Updated with a new look

Multiple pages

Simple search

Collapsible sections

The screenshot shows the website interface with a dark blue header containing navigation links (Home, Recent, About, Contribute, Code of conduct, Resources, Cite Us) and a search bar. The main content area features the title "A Living Review of Machine Learning for Particle Physics" and an introductory paragraph. Below the text are buttons for "download", "review", and "GitHub". There are also "Expand all sections" and "Collapse all sections" buttons. The "Reviews" section lists "Modern reviews", "Specialized reviews", "Classical papers", and "Datasets". The "Classification" section lists "Parameterized classifiers". A right-hand sidebar contains a "Table of contents" with a list of topics including "Reviews", "Classification", "Regression", and "GANs".

Table of contents



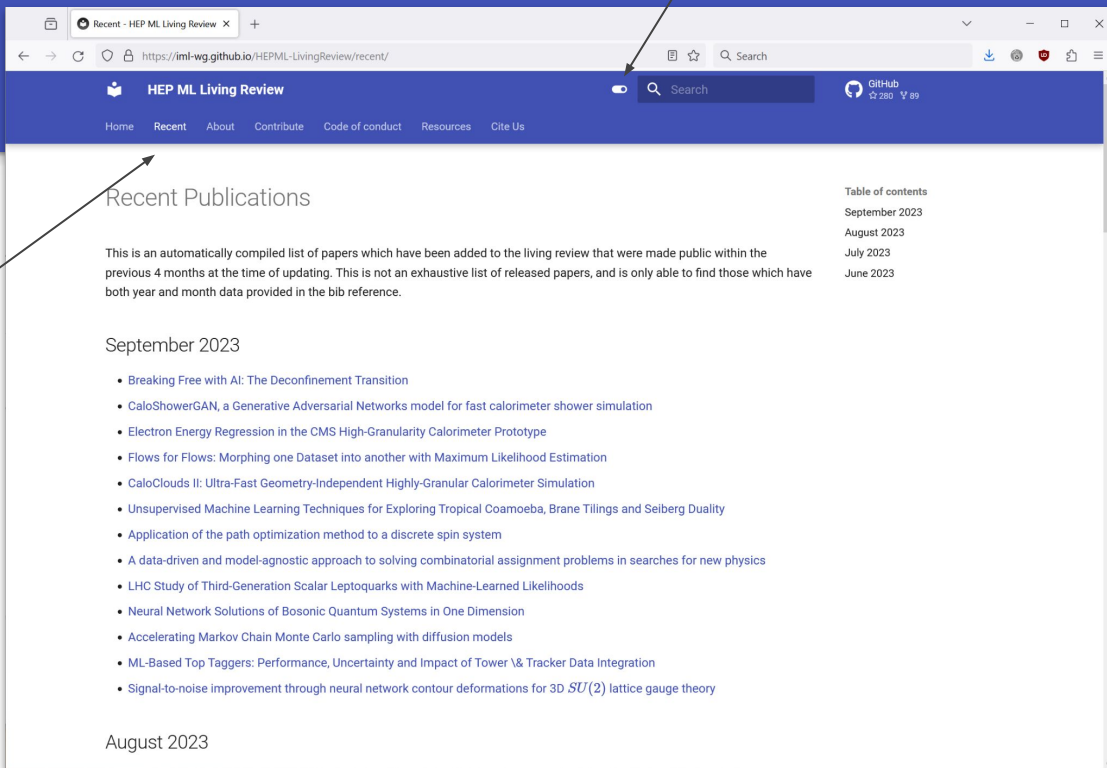


Dark mode

What's new?

Updated with a new look

Recent publications page





What can I do?

- Suggest features / new things
- Add papers via Pull Requests
- Fill out the survey
- Give us input for restructuring (see extra slide)

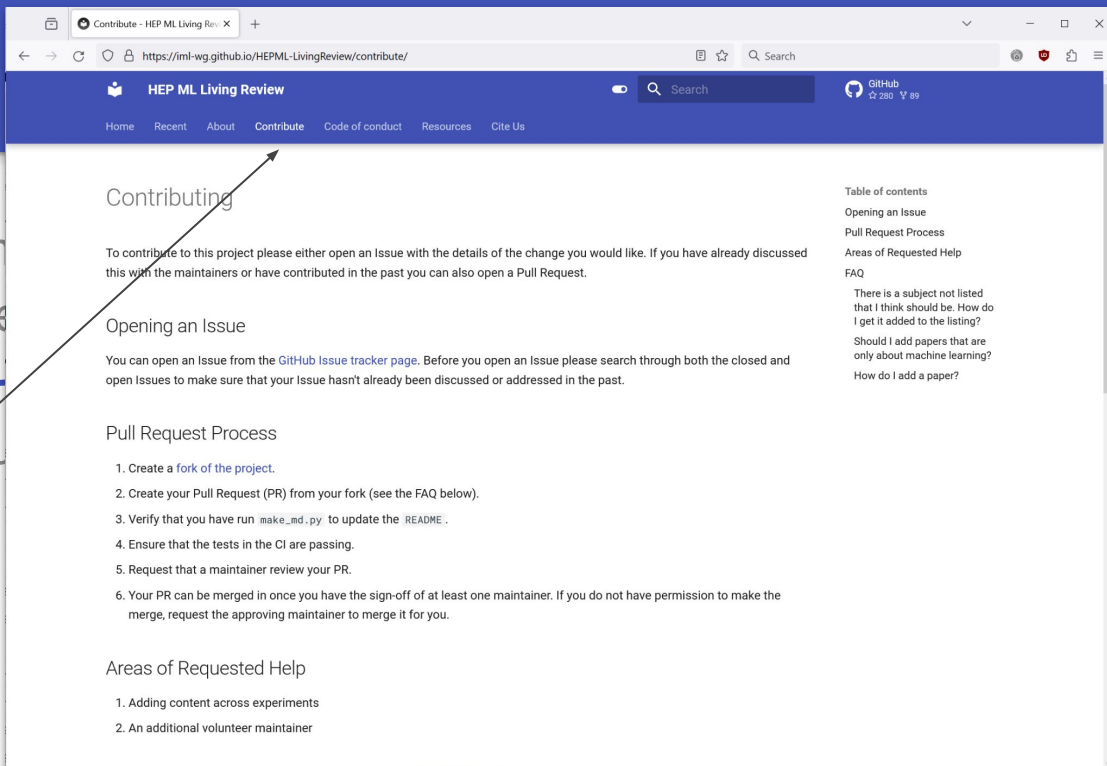




What can I do?

- Suggest features / new things
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- Fill out the survey
- Give us input for restructuring

Click here and contribute!





What next?

- Restructure the sections
- Staying up to date
- Tell us!
- Release an updated pre-print (following [2102.02770](#))





The big restructure

- Currently one big long list
- Target and Applications mixed with ML methods

New Proposal

- Two pages: HEP application + ML method
- But what groupings make the most sense?
- Comment [here](#)





Summary

- It's alive again!
- We need you!
 - A community resource is only as good as the community
 - Make a PR for your paper and add many more at once!
- We're all ears for feedback

SCAN ME

