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# Unveiling the Syntax Within: Interpreting Grammar Embeddings in Meta’s LLaMA Models

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## Abstract

1       The abstract paragraph should be indented ½ inch (3 picas) on both the left- and  
2       right-hand margins. Use 10 point type, with a vertical spacing (leading) of 11 points.  
3       The word **Abstract** must be centered, bold, and in point size 12. Two line spaces  
4       precede the abstract. The abstract must be limited to one paragraph.

## 5   1   Submission of papers to the M3L Workshop at NeurIPS 2024

6   Please read the instructions below carefully and follow them faithfully.

### 7   1.1   Style

8   Papers to be submitted to the Mathematics of Modern Machine Learning (M3L) Workshop at NeurIPS  
9   2024 must be prepared according to the instructions presented here.

10   Authors are required to use the Mathematics of Modern Machine Learning (M3L) L<sup>A</sup>T<sub>E</sub>X  
11   style files obtainable at the workshop website [https://sites.google.com/view/m3l-2024/](https://sites.google.com/view/m3l-2024/call-for-papers)  
12   call-for-papers. Please make sure you use the current files and not previous versions. Tweaking  
13   the style files may be grounds for rejection.

### 14   1.2   Retrieval of style files

15   The style files for the Mathematics of Modern Machine Learning (M3L) Workshop at NeurIPS 2024  
16   and other conference information are available on the website at

17                               <https://sites.google.com/view/m3l-2024>

18   The file `main.pdf` contains these instructions and illustrates the various formatting requirements  
19   your NeurIPS paper must satisfy.

20   The L<sup>A</sup>T<sub>E</sub>X style file contains three optional arguments: `final`, which creates a camera-ready copy,  
21   `preprint`, which creates a preprint for submission to, e.g., arXiv, and `nonatbib`, which will not  
22   load the `natbib` package for you in case of package clash.

23   **Preprint option**   If you wish to post a preprint of your work online, e.g., on arXiv, using the  
24   NeurIPS style, please use the `preprint` option. This will create a nonanonymized version of your  
25   work with the text “Preprint. Work in progress.” in the footer. This version may be distributed as  
26   you see fit, as long as you do not say which conference it was submitted to. Please **do not** use the

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\*Use footnote for providing further information about author (webpage, alternative address)—*not* for acknowledging funding agencies.

27 final option, which should **only** be used for papers accepted to the Mathematics of Modern Machine  
28 Learning (M3L) Workshop at NeurIPS 2024.

29 At submission time, please omit the final and preprint options. This will anonymize your  
30 submission and add line numbers to aid review. Please do *not* refer to these line numbers in your  
31 paper as they will be removed during generation of camera-ready copies.

32 The file `main.tex` may be used as a “shell” for writing your paper. All you have to do is replace the  
33 author, title, abstract, and text of the paper with your own.

34 The formatting instructions contained in these style files are summarized in Sections 2, 3, and 4  
35 below.

## 36 **2 General formatting instructions**

37 The text must be confined within a rectangle 5.5 inches (33 picas) wide and 9 inches (54 picas) long.  
38 The left margin is 1.5 inch (9 picas). Use 10 point type with a vertical spacing (leading) of 11 points.  
39 Times New Roman is the preferred typeface throughout, and will be selected for you by default.  
40 Paragraphs are separated by  $\frac{1}{2}$  line space (5.5 points), with no indentation.

41 The paper title should be 17 point, initial caps/lower case, bold, centered between two horizontal  
42 rules. The top rule should be 4 points thick and the bottom rule should be 1 point thick. Allow  $\frac{1}{4}$  inch  
43 space above and below the title to rules. All pages should start at 1 inch (6 picas) from the top of the  
44 page.

45 For the final version, authors’ names are set in boldface, and each name is centered above the  
46 corresponding address. The lead author’s name is to be listed first (left-most), and the co-authors’  
47 names (if different address) are set to follow. If there is only one co-author, list both author and  
48 co-author side by side.

49 Please pay special attention to the instructions in Section 4 regarding figures, tables, acknowledgments,  
50 and references.

## 51 **3 Headings: first level**

52 All headings should be lower case (except for first word and proper nouns), flush left, and bold.

53 First-level headings should be in 12-point type.

### 54 **3.1 Headings: second level**

55 Second-level headings should be in 10-point type.

#### 56 **3.1.1 Headings: third level**

57 Third-level headings should be in 10-point type.

58 **Paragraphs** There is also a `\paragraph` command available, which sets the heading in bold, flush  
59 left, and inline with the text, with the heading followed by 1 em of space.

## 60 **4 Citations, figures, tables, references**

61 These instructions apply to everyone.

### 62 **4.1 Citations within the text**

63 The `natbib` package will be loaded for you by default. Citations may be author/year or numeric, as  
64 long as you maintain internal consistency. As to the format of the references themselves, any style is  
65 acceptable as long as it is used consistently.

66 The documentation for `natbib` may be found at



Figure 1: Sample figure caption.

67 `http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

68 Of note is the command `\citet`, which produces citations appropriate for use in inline text. For  
69 example,

70 `\citet{hasselmo}` investigated\dots

71 produces

72 Hasselmo, et al. (1995) investigated...

73 If you wish to load the `natbib` package with options, you may add the following before loading the  
74 `neurips_2024` package:

75 `\PassOptionsToPackage{options}{natbib}`

76 If `natbib` clashes with another package you load, you can add the optional argument `nonatbib`  
77 when loading the style file:

78 `\usepackage[nonatbib]{neurips_2024}`

79 As submission is double blind, refer to your own published work in the third person. That is, use “In  
80 the previous work of Jones et al. [4],” not “In our previous work [4].” If you cite your other papers  
81 that are not widely available (e.g., a journal paper under review), use anonymous author names in the  
82 citation, e.g., an author of the form “A. Anonymous” and include a copy of the anonymized paper in  
83 the supplementary material.

84 **4.2 Footnotes**

85 Footnotes should be used sparingly. If you do require a footnote, indicate footnotes with a number<sup>2</sup>  
86 in the text. Place the footnotes at the bottom of the page on which they appear. Precede the footnote  
87 with a horizontal rule of 2 inches (12 picas).

88 Note that footnotes are properly typeset *after* punctuation marks.<sup>3</sup>

89 **4.3 Figures**

90 All artwork must be neat, clean, and legible. Lines should be dark enough for purposes of reproduction.  
91 The figure number and caption always appear after the figure. Place one line space before the figure  
92 caption and one line space after the figure. The figure caption should be lower case (except for first  
93 word and proper nouns); figures are numbered consecutively.

94 You may use color figures. However, it is best for the figure captions and the paper body to be legible  
95 if the paper is printed in either black/white or in color.

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<sup>2</sup>Sample of the first footnote.

<sup>3</sup>As in this example.

Table 1: Sample table title

Part		
Name	Description	Size ( $\mu\text{m}$ )
Dendrite	Input terminal	$\sim 100$
Axon	Output terminal	$\sim 10$
Soma	Cell body	up to $10^6$

#### 96 4.4 Tables

97 All tables must be centered, neat, clean and legible. The table number and title always appear before  
98 the table. See Table 1.

99 Place one line space before the table title, one line space after the table title, and one line space after  
100 the table. The table title must be lower case (except for first word and proper nouns); tables are  
101 numbered consecutively.

102 Note that publication-quality tables *do not contain vertical rules*. We strongly suggest the use of the  
103 booktabs package, which allows for typesetting high-quality, professional tables:

104 <https://www.ctan.org/pkg/booktabs>

105 This package was used to typeset Table 1.

#### 106 4.5 Math

107 Note that display math in bare TeX commands will not create correct line numbers for sub-  
108 mission. Please use LaTeX (or AMSTeX) commands for unnumbered display math. (You  
109 really shouldn't be using \$\$ anyway; see [https://tex.stackexchange.com/questions/](https://tex.stackexchange.com/questions/503/why-is-preferable-to)  
110 [503/why-is-preferable-to](https://tex.stackexchange.com/questions/503/why-is-preferable-to) and [https://tex.stackexchange.com/questions/40492/](https://tex.stackexchange.com/questions/40492/what-are-the-differences-between-align-equation-and-displaymath)  
111 [what-are-the-differences-between-align-equation-and-displaymath](https://tex.stackexchange.com/questions/40492/what-are-the-differences-between-align-equation-and-displaymath) for more infor-  
112 mation.)

#### 113 4.6 Final instructions

114 Do not change any aspects of the formatting parameters in the style files. In particular, do not modify  
115 the width or length of the rectangle the text should fit into, and do not change font sizes (except  
116 perhaps in the **References** section; see below). Please note that pages should be numbered.

### 117 5 Preparing PDF files

118 Please prepare submission files with paper size "US Letter," and not, for example, "A4."

119 Fonts were the main cause of problems in the past years. Your PDF file must only contain Type 1 or  
120 Embedded TrueType fonts. Here are a few instructions to achieve this.

- 121 • You should directly generate PDF files using `pdflatex`.
- 122 • You can check which fonts a PDF files uses. In Acrobat Reader, select the menu  
123 Files>Document Properties>Fonts and select Show All Fonts. You can also use the program  
124 `pdf fonts` which comes with `xpdf` and is available out-of-the-box on most Linux machines.
- 125 • `xfig` "patterned" shapes are implemented with bitmap fonts. Use "solid" shapes instead.
- 126 • The `\bbold` package almost always uses bitmap fonts. You should use the equivalent AMS  
127 Fonts:

128 `\usepackage{amsfonts}`

129 followed by, e.g., `\mathbb{R}`, `\mathbb{N}`, or `\mathbb{C}` for  $\mathbb{R}$ ,  $\mathbb{N}$  or  $\mathbb{C}$ . You can also  
130 use the following workaround for reals, natural and complex:

```

131 \newcommand{\RR}{\mathbb{R}} %real numbers
132 \newcommand{\Nat}{\mathbb{N}} %natural numbers
133 \newcommand{\CC}{\mathbb{C}} %complex numbers

```

134 Note that `amsfonts` is automatically loaded by the `amssymb` package.

135 If your file contains type 3 fonts or non embedded TrueType fonts, we will ask you to fix it.

## 136 5.1 Margins in L<sup>A</sup>T<sub>E</sub>X

137 Most of the margin problems come from figures positioned by hand using `\special` or other  
138 commands. We suggest using the command `\includegraphics` from the `graphicx` package.  
139 Always specify the figure width as a multiple of the line width as in the example below:

```

140 \usepackage[pdftex]{graphicx} ...
141 \includegraphics[width=0.8\linewidth]{myfile.pdf}

```

142 See Section 4.4 in the graphics bundle documentation ([http://mirrors.ctan.org/macros/](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf)  
143 [latex/required/graphics/grfguide.pdf](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf))

144 A number of width problems arise when L<sup>A</sup>T<sub>E</sub>X cannot properly hyphenate a line. Please give LaTeX  
145 hyphenation hints using the `\-` command when necessary.

## 146 References

147 References follow the acknowledgments in the camera-ready paper. Use unnumbered first-level  
148 heading for the references. Any choice of citation style is acceptable as long as you are consistent. It  
149 is permissible to reduce the font size to `small` (9 point) when listing the references. Note that the  
150 Reference section does not count towards the page limit.

151 [1] Alexander, J.A. & Mozer, M.C. (1995) Template-based algorithms for connectionist rule extraction. In  
152 G. Tesauro, D.S. Touretzky and T.K. Leen (eds.), *Advances in Neural Information Processing Systems 7*, pp.  
153 609–616. Cambridge, MA: MIT Press.

154 [2] Bower, J.M. & Beeman, D. (1995) *The Book of GENESIS: Exploring Realistic Neural Models with the*  
155 *GENeral NEural Simulation System*. New York: TELOS/Springer–Verlag.

156 [3] Hasselmo, M.E., Schnell, E. & Barkai, E. (1995) Dynamics of learning and recall at excitatory recurrent  
157 synapses and cholinergic modulation in rat hippocampal region CA3. *Journal of Neuroscience* **15**(7):5249-5262.

## 158 A Appendix / supplemental material

159 Optionally include supplemental material (complete proofs, additional experiments and plots) in  
160 appendix.