

Write PER papers with and markdown!*

*...mostly!



Get the files!
<https://github.com/per-quarto-templates/revtex>

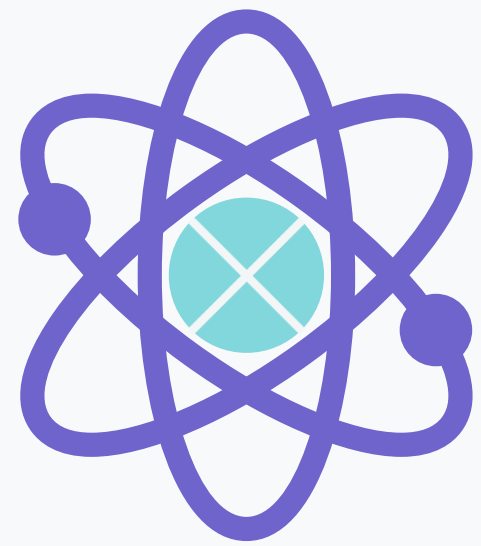
PER-QT: Physics Education Research Quarto Templates

Towards a better PER publication pipeline by building a Quarto extension for PER journals

BACKGROUND

Writing papers in LaTeX is time consuming and error prone, even for experts [1]. A new open-source tool Quarto promises to solve this by compiling Jupyter and RMarkdown notebooks directly to publication ready LaTeX. Unfortunately, most PER journals seek submissions formatted with REVTeX macros that are incompatible with Quarto's compilation approach.

OUR WORK



We have created the `per-quarto-templates/revtex` extension to bridge this compatibility gap. We have built a suite of tests based on the REVTeX author guide to identify compatibility issues and below is a demo of the plugin showing it can be used to make a *PERC Proceedings* style paper.

KEY

- ✓ Supported
- * Partial Support
- ✗ Inline Only

PROBLEMS

Two serious problems remain: (1) **REVTeX's authorship macros** are more expressive than Quarto's, but we have achieved partial support for simple scenarios (2) **REVTeX's table macros** are dramatically different Quarto's default, achieving full support will likely require building a custom writer for the pandoc engine to override the behaviour.

DEMO

Frontmatter

- ✓ Title
- ✓ Abstract
- * Authors

Body

- ✓ Body Text
- ✓ Headings
- * Typefaces

- ✓ Equations
- ✓ Figures
- ✗ Tables

Referencing

- ✓ Hyperlinks
- ✓ Cross-references
- ✓ Bibliography

```
(ABRIDGED) DEMO.QMD SOURCE FILE

1 ---
2 title: [ABRIDGED]
3 author: [ABRIDGED]
4 abstract: [ABRIDGED]
5 bibliography: references.bib
6 format: revtex-pdf
7 metadata-files:
8   - _perc_patch.yaml
9 ---
10 # Introduction (#sec-intro)
11
12 Scientific writing is almost impossible without the ability to reference sources [Knauff_efficiency_2014]; and ideally, we want to be able to reference our source, @knauff_efficiency_2014, in multiple, flexible ways.
13
14 ```{r, echo=TRUE}
15 t_results <- t.test(extra ~ group,
16 data=sleep, paired=TRUE)
17 ```
18
19 # Results (#sec-results)
20
21 ```{r}
22 #| label: fig-sleep
23 #| fig.cap: "Repeated measures data from 10 patients taking one of two sleep aiding drugs. Drug 2 appears more effective."
24 boxplot(extra ~ group, data=sleep, col=c("#add8e6", "#6f64cb"))
25 ```
26
27 Results can be plotted directly from code, just look at @fig-sleep! You can even embed the results of significance tests inline, quoting that with a paired t-test, Treatment 2 appears better than Treatment 1 with  $p = r_tresults$p.value$ .
28
29 ::: {.content-hidden unless-format="pdf"}
30 ```{=latex}
31 \begin{table}
32 \caption{#tbl-means} A manually transcribed table showing the mean extra sleep each treatment grants.
33 \begin{ruledtabular}
34 \begin{tabular}{c c c c}
35 & \textbf{Treatment} & \textbf{Mean Extra Sleep (hours)} & \\ \hline
36 & 1 & 0.75 & \\
37 & 2 & 2.33 & \\
38 \end{tabular}
39 \end{ruledtabular}
40 \end{table}
41
42 :::
43
44
```

PDF OUTPUT

PER-QT Example:
A proof of concept in the style of the *PERC Proceedings*

Astra Sword
The Open University
Michael Fox
Imperial College London

This mini-paper is a proof of concept constructed in the style of the *PERC Proceedings* to illustrate our progress help us identify the major technical hurdles that remain. This shows that most of the major features needed to write an academic paper can be implemented, but there are specific issues around tables. If successful, this project could help PER researchers produce research faster, with better reproducibility, and disseminate it in a wider range of accessible formats.

I. INTRODUCTION

Scientific writing is almost impossible without the ability to reference sources [1]; and ideally, we want to be able to reference any source, Knauff and Nejasmic [1], in multiple, flexible ways.

As important as it is to reference others, we also need to be able to reference other parts of our own work to signpost if we are going to:

- Describe innovative methods (Section II).
- Disseminate novel results (Section III).
- Discuss provocative ideas (Section IV).

II. METHODS

Statistical methods would be hard to write if you could not show the exact formula used, such as Equation 1, which shows Cohen's d . A unique benefit of this format though, is that one can embed the exact code used in analysis, as in the R code below, or just transparently publish your entire source code.

```
t_results <- t.test(extra ~ group,
data=sleep, paired=TRUE)
```

$$d = \frac{\bar{x}_1 - \bar{x}_2}{s} \quad (1)$$

III. RESULTS

Results can be plotted directly from code, just look at Figure 1! You can even embed the results of significance tests

IV. DISCUSSION

Overall, this proof of concept appears to work well so far, but further development and "real world" testing is needed.

FIG 1. Repeated measures data from 10 patients taking one of two sleep aiding drugs. Drug 2 appears more effective.

TABLE I. A manually transcribed table showing the mean extra sleep each treatment grants.

Treatment	Mean Extra Sleep (hours)
1	0.75
2	2.33

[1] M. Knauff and J. Nejasmic, An Efficiency Comparison of Document Preparation Systems Used in Academic Research and Development, *PLoS ONE* 9, e115069 (2014).

THE FUTURE

Adapting this extension robustly to other journal formats will take time, but the potential benefits are huge. A major one is that QMD files also compile to HTML and Word! Scan the QR code at the top of this poster to see HTML and Word versions of the demo!

JOIN US!

We'd love to have you involved!

Please send us an email if you would like to "road test" the extension or join us in developing it further!



PRESENTER:
Astra Sword (she/her)
astra.sword@open.ac.uk



CO-AUTHOR
Michael Fox
michael.fox@imperial.ac.uk



Imperial College London