caxetexFreeOL · version 0.1
A XeTeX Stylesheet For Overleaf
Using Free Opentype Fonts

Demonstration and Tips

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LaTeX offers a powerful set of scientific typesetting tools but tends to lock users into a single set of aesthetically limited fonts. Changing fonts in LaTeX is so cumbersome that few users ever make the effort – and few such efforts are rewarded. XeTeX is a powerful new engine for compiling LaTeX code that lets users select more readable or beautiful fonts. But even in XeTeX selecting and optimizing a set of replacement fonts is a time-consuming and potentially expensive task.

This document explains how to use the XeTeX stylesheet **caxetexFreeOL** and associated freely available opentype fonts on Overleaf. Using this stylesheet, users can quickly upgrade to a more readable format for scientific papers, presentations, and curricula vitae without spending money on new fonts or time writing new code. Simply import the stylesheet and fonts to your Overlead project as directed below, add

```
\usepackage{caxetexFree}
```

to the preamble of your LaTeX documents, and compile your documents with XeLaTeX instead of pdfLaTeX. There's even a paper template to help you get started.

However, **caxetexFreeOL** also loads a complete suite of packages and settings for beautiful book and paper design – if Latex is the Swiss Army sledgehammer of typography (as John Regehr put it), this sort of style sheet is an effort to jam a few more tools on, then wrap the whole monstrosity in velvet. Out of the many

things caxetexFreeOL was built to do, a few features are documented below, along with suggestions for layout of tables and figures, and thoughts on customizing the package for use with other fonts.[1]

Installation on Overleaf

You can access the Overleaf project of caxetexFreeOL via the following link: https://www.overleaf.com/read/gxwbzvpjswhy. Next, you will need to download the source files for this project in order to add them to your own projects. To do this, select the Overleaf Menu in the top-left corner of the webpage, and then select Source. This will download a .zip file containing the caxetexFreeOL.sty stylesheet and five free Opentype typefaces.[2]

There are two ways to install caxetexFreeOL.sty on Overleaf. You can select Upload Project when creating a New Project, and directly upload the source .zip file. Alternatively, you can open a Blank Project or go to an existing one. After decompressing the source .zip file, you have to first upload caxetexFreeOL.sty to your project directory, then create a new folder named fonts in the project directory and upload all font files to that folder.[3]

Usage on Overleaf

Although caxetexFreeOL uses XeTeX, rather than LaTeX, to compile documents, using it is fundamentally similar to LaTeX, both in terms of workflow and code.

The key differences are in compiling the document. There are three steps to compiling your document with caxetexFreeOL. First, place your tex file in the same project containing caxetexFreeOL.sty and the fonts folder. Second, add

```
\usepackage{caxetexFreeOL.sty}
```

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1 Users seeking more ideas for use of this package might look at the book I typeset using its big brother, **caxetexBook**, which differs mainly in using commercial fonts (Adolph, 2013). Alternatively, you can see **caxetexBook** used in most of the papers on my website – http://faculty.washington.edu/cadolph/articles.

2 The typefaces included in caxetexFreeOL are Linux Libertine (primary typeface), Adobe Source Sans (sans serif typeface), Inconsolata (fixed width typeface), Museo Slab 500 (slab serif typeface), and GFS Porson (Greek typeface). Enterprising users may wish to replace these fonts by editing caxetexFreeOL.sty accordingly.

3 You can ensure that all font files are stored in the correct location by right-clicking the fonts folder and choosing Upload File there.

to the preamble of the tex file. Third, use the Overleaf Menu to set your Compiler to XeLaTeX.

From here on, you can write your Latex document as usual, for the most part. You are welcome to use PaperTemplate.tex as a starting point. The remainder of this manual shows how to use **caxetexFreeOL** to greatest advantage, including some special tricks and tips, as well as a small number of differences from regular Latex.

Support for Numbers

Most fonts contain two kinds of numbers: oldstyle or "lowercase" numerals (1234567890), which are often easier to read when mixed with text or arrayed in tables, and lining or "uppercase" numerals (1234567890), which look more modern and tend to look better in mathematical formulas, where numbers should stand out from variables. The stylesheet tries to use the appropriate number in any given situation, but it is possible to override the defaults.

This section's commands are specific to caxetex.

In text mode, the default is oldstyle numbers (1234567890). If you want a number like 15 to show up as lining, use \lnt{15}. As recommended by most typographers, numbers inside of math mode (that is, inside $$ or an equation environment) will always be lining. For example, using the usual Latex math notation, we might have

$$\Pr(y_i = j | \tau, \beta, \mathbf{x}_i) = \int_{\tau_{j-1}}^{\tau_j} \mathcal{N}(\mathbf{x}_i \beta, 1) \, \mathrm{d}\mathbf{x}_i \beta. \tag{1}$$

(See the Appendix for underlying code.) If you want oldstyle numbers in an equation, wrap each number in \textrm{}.

By default, numbers in a tabular environment will be oldstyle. Control of numbers inside a tabular environment can be tricky, especially if you also want to center a numeric column on the decimal, as is usually desired. To create a column of decimal-centered numeric data set in oldstyle numbers, use column type S. This is usually the most elegant option (see Table 1 below). However, if you want a column of numeric data to be decimal-centered lining numerals, use column type :. In general, to make a specific number in a table to be lining, wrap the number in \lnt{}. This is necessary for most numbers embedded in \multicolumn{} commands, should lining numbers be desired.

Expanded Text Options

Properly installed, the stylesheet includes numerous options for text beyond the usual Roman typeface. In addition to *italics*, **bold**, ***bold italics***, and their *san* **serif variants** – all of which rely on the usual Latex commands – the stylesheet offers support for nicely LETTERSPACED SMALL CAPS and a slab serif font, also available in *italics*.

These are letterspaced SMALL CAPS, which are made using:

```
\textsc{\caps{your text here in lowercase}}
```

As an alternative, these are tightly-spaced SMALL CAPS, which are made using:

```
\textsc{your text here in lowercase}
```

If you want to put text in a slab serif font – trendy and nice for emphasis or display – wrap the text in \textsb{your text here}.[4]

Recommended Caption Styles for Tables and Figures

To ensure XeTeX uses your typeface for numbers in tables, and not the default LaTeX font, it is often best to use the siunitx package to enable the powerful S column for tabular environments.[5] For an example, see Table 1 and the relevant code in the Appendix. Table 1 and Figure 1 (*to add*) also demonstrate recommended caption styles for caxetexFreeOL users.

Making a Figure

Figure 1 gives an example of a graphic floated in a Latex document. Note the informative caption, the careful sizing of the graphic to both fit within the document margins and display text within the figure at a readable size, and the automatic generation and reference of figure numbers. This figure is floated at the top of the nearest available page if possible (option t); otherwise, it will appear at the bottom of a page (option b), or on its own page, clear of text (option p). Try to avoid floating figures in the midst of text (the h option), which usually looks inelegant and interrupts flow.

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[4] \textsb is a special command for my style sheet – it doesn't work unless you load some version of caxetex.

[5] For complex tables, it may also be necessary to revise the options for tabular environments set by \sisetup.

Table 1. Main caption of a regression table.

Covariates	Model 1	Model 2
A covariate	1.0	−2.0
	(0.2)	(0.1)
Another covariate	1.1	3.0
	(0.4)	(1.2)
N	123	99
s.e.r.	0.05	0.10

Note that Model 1's results are in Oldstyle numerals (column type S and Model 2's results are in Lining numerals (column type :). To place an individual number in lining numeral, wrap them in \lnt{}.

A second figure (Figure 2) shows an example where ironically a figure with fewer plots takes up more space (small multiples of plots can be very space efficient). The width of these graphics must be set manually in the \includegraphics{} command and should be chosen to maximize readability and efficient use of space. Try to avoid turning figures sideways; usually it is better to redesign the figure by changing aspect ratios or rearranging plots.

Citation with BibTeX and natbib

There are helpful resources on the web for using BibTeX and natbib; here, I provide some quick examples. One appears on an earlier page on which I cite my own book (Adolph, 2013), which is achieved simply be using \citep{adolph13}. But suppose I wanted to cite another work, this time in a sentence. I might want to say that Borges and Bolaño (2012) make a particular claim. This is an "in text" citation, and can be achieved with \citet{borgesbolano12}.

Using caxetexFreeOL as a Template

For those interested in exploring the use of new fonts in their XeTeX documents, modifying and building on **caxetexFreeOL** may be a relatively easy way to get started, but users should be warned: while XeTeX and OpenType fonts make it easier to use your desired fonts, but if you want to produce professional-quality
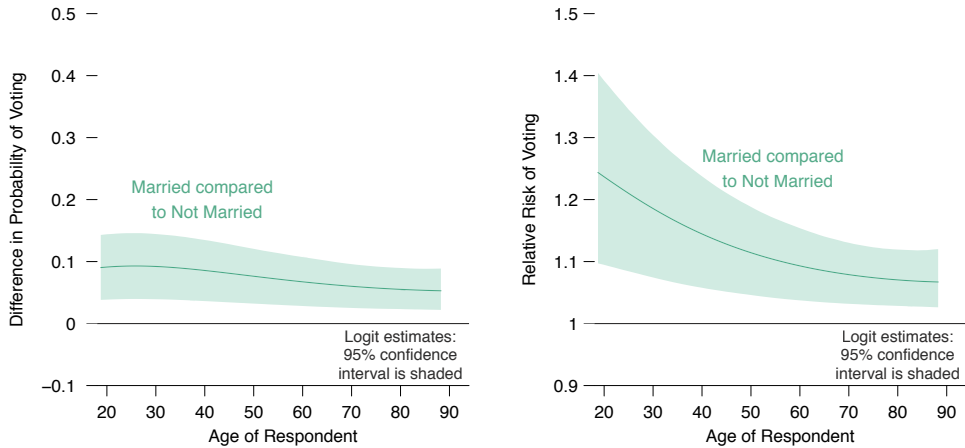
Figure 1. *This is the main part of the caption, in italics.* This is additional caption information. For a graphic like that above, this paragraph should explain way the data show was obtained (if the plot explores new data) or the way the data was calculated (if the plot investigates a model presented in the paper). The caption should be terse, yet sufficiently detailed that an expert flipping through the paper could mostly or entirely understand the figure without reading the main text. Any essential assumptions needed to replicate the results shown in the figure should be highlighted, often in precise numerical detail.

documents, there's more to do than just loading up the new fonts. Unless you truly love type and typesetting, it makes sense to find a system that works for you, get on with the real work of composing scientific papers, and leave the customization of typesetting systems to others.

For those determined to choose new typefaces for Latex typesetting, two considerations limit the field considerably. First, font families need to include associated bold and italic fonts. Second, serifed and san-serifed typefaces should complement each other. If your documents involve mathematical equations, you will also need to choose fonts that look "right" in equations or that match your chosen math and Greek fonts. One strategy is to select typefaces that share a common aesthetic tradition (see Table 2). This document, made with caxetexFreeOL, brings together a mixture of clean, transitional typefaces. My alternative stylesheet caxetexBook uses the more expressive and humanist faces Bembo Book and Gill Sans. Tradi-
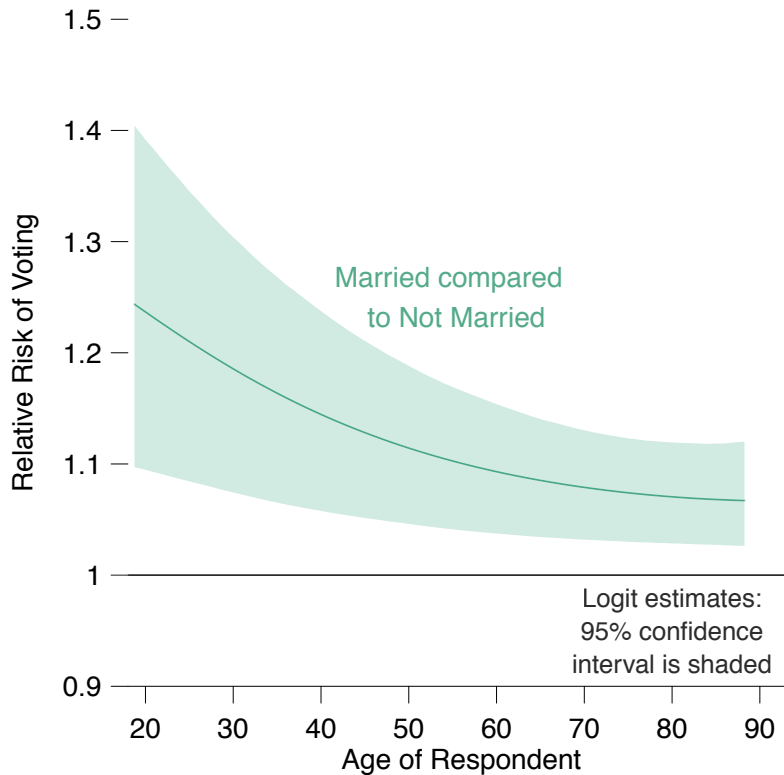
Figure 2. *A second figure, with a single large plot.* Note that this figure has a width of only 4.25 inches; Figure 1 was wider, at 5.10 inches. Setting the graphic above to a wider width would make the graphic comically large.

tional LaTeX uses Donald Knuth's CoMPUTER MODERN fonts, which belong to the neoclassical tradition.[6]

Even after choosing typefaces that go well together, there are several tricky technical issues to work out. First, you will need to rewrite the commands in **caxetexFreeOL** that load the .otf files, being sure to use exactly the right font family name.[7] Then after getting a document to compile using the new fonts, you should

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6 See Karen Cheng's *Designing Type* (Yale University Press, 2007) for helpful specimens and pointers for classifying type into stylistic movements.

7 This is the last argument to fontspec; for example, the font family name of Linux Libertine is Linux Libertine O. One easy way to check font family names is to select the font in LibreOffice, which identifies fonts by this name.

Table 2. A guide to harmonious type combinations.

Cells are exemplary typefaces **Form**	**Style**		
	"Dynamic" Humanist (walker)	"Static" Neoclassical (soldier)	"Geometrical" Constructed (robot)
Roman	Bembo	Bodoni	—
Sans serif	Gill Sans	Helvetica	Futura
Slab serif	Caecillia	Glypha	Rockwell

To mesh type across forms (rows), choose a single style (column) and select typefaces like those in that column. The columns are ideal types, and intermediate mixtures are also possible – this document is typeset using "transitional" typefaces that lie somewhere between humanist and neoclassical styles.

Source: Hans Peter Willberg, *Wegweiser Schrift* (Verlag Hermann Schmidt, 2001); reproduced in Joep Pohlen, *Letter Fountain* (Taschen, 2010), p. 81, and shown here in simplified form.

check for typographical errors or awkwardness and revise the adjustable parameters of caxetexFree as needed. It is typically necessary to adjust:

(1) the *x-height* of various fonts to achieve a good match;[8]

(2) the *leading*, which is set separately for the main text (through the \linespread argument), the captions (through the options to \usepackage{caption}), and the footnotes (through \footnotesep);

(3) the paragraph *indent* length;

(4) the *size* of titles, chapter titles, and section heads;

(5) various *tolerances*; and

(6) the *point size* of the document, normally set in the first line of the .tex file.

If you do embark on changing the fonts in caxetex, you might test your new stylesheet by compiling this document, which embeds the typographical elements most likely to go wrong without stylesheet tweaking. Good luck!

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8 The automatic MatchLowercase option doesn't always work.

References

Adolph, Christopher. 2013. *Bankers, Bureaucrats, and Central Bank Politics: The Myth of Neutrality.* Cambridge: Cambridge University Press. **2 and 5**

Borges, Jorge Luis and Roberto Bolaño. 2012. "A tragically nonexistent story." *Journal of Impossible Literature* 10(3):50–54. **5**

Cheng, Karen. 2006. *Designing Type.* Yale University Press. **7**

Pohlen, Joep. 2010. *Letter Fountain.* Taschen. **8**

Appendix: Code for Examples

Code for Equation 1

```
\begin{equation}
\mathrm{Pr}(y_i = j|\boldsymbol{\tau}, \boldsymbol{\beta},
\mathbf{x}_i) = \int_{\tau_{j-1}}^{\tau_j} \!
\mathcal{N}(\mathbf{x}_i\boldsymbol{\beta},1) \,
\mathrm{d} \mathbf{x}_i\boldsymbol{\beta}.
\end{equation}
```

Code for Table 1

```
\begin{table}[tbph]
\centering

\parbox{2.825in}{\caption{\textbf{Main caption.}}
\label{tab:thistable}}\\
\vspace{-0.8em}
\begin{tabular}{lSS}
\toprule
Covariates & \multicolumn{1}{c}{Model 1} & \multicolumn{1}{c}{Model 2} \\
\midrule
A covariate       & 1.0 & -2.0  \\
                  & (0.2) & (0.1) \\
Another covariate & 1.1 &  3.0  \\
                  & (0.4) & (1.2) \\
\midrule
$N$    & \multicolumn{1}{c}{123} & \multicolumn{1}{c}{99}   \\
s.e.r.            & 0.05 &  0.10 \\
\bottomrule
\addlinespace[0.15em]
\multicolumn{3}{p{2.7in}}{\small Additional details.  This
  portion may wrap around to multiple lines.}
\end{tabular}
\end{table}
```

Code for Figure 1

```
\begin{figure}[tbp]
  \begin{center}
   \includegraphics[width=5.10in,angle=0]{marriedFDRRcrop.pdf}
   \caption[This is the version of the caption to appear in tables of
   contents]{\emph{This is the main part of the caption, in italics.}
    This is additional caption information.  For a graphic like that
    above, this paragraph should explain way the data show was
    obtained (if the plot explores new data) or the way the data was
    calculated (if the plot investigates a model presented in the
    paper).  The caption should be terse, yet sufficiently detailed
    that an expert flipping through the paper could mostly or entirely
  understand the figure without reading the main text.  Any essential
  assumptions needed to replicate the results shown in the figure
  should be highlighted, often in precise numerical detail.}
    \label{fig:shortrefname}
  \end{center}
\end{figure}
```

Code for Figure 2

```
\begin{figure}[tbp]
  \begin{center}
   \includegraphics[width=4.25in,angle=0]{marriedRRcrop.pdf}
   \caption[This is the version of the caption to appear in tables of
   contents]{\emph{A second figure, with a single large plot.}
    Note that this figure has a width of only 4.25 inches; Figure
    \ref{fig:shortrefname} was wider, at 5.10 inches.  Setting the
    graphic above to a wider width would make the graphic comically large.}
    \label{fig:anotherexample}
  \end{center}
\end{figure}
```