

L^AT_EX for efficient scientific presentation- an illustration using a simple example¹

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This article discusses the use of L^AT_EX as a tool for the preparation of scientific presentations. L^AT_EX is widely used in computer and mathematics communities partly because it is well known for generating beautiful mathematical equations. The use in biological sciences so far seems not widespread. However, as biological sciences become more and more interdisciplinary, the use of L^AT_EX is likely to increase. The power of L^AT_EX lies not only in generating beautiful mathematical equations, it has some other qualities central to an efficient scientific/professional presentation and publishing:

1. L^AT_EX is most useful for typesetting large and complex documents. In this environment, the process of producing various components, such as table of contents, index, and cross-referencing, etc., becomes fully structured, consistent and error-free.
2. The *format* of a document is separated from the *content*. This enables the writer to concentrate on the *content* and let the computer take care of the appearance (*format*) of a document.
3. The document is well backed up because several copies are automatically maintained. In particular, the source file is in plain text format, which makes it efficient and safe for long-term storage.
4. Using this system also enables an efficient handling of literature citation and listing. This not only saves user's time but also avoids unnecessary mistakes in manually entering and editing the literature.
5. Using L^AT_EX, it is easy to move some major pieces of information (such as graphics and illustrations) among different presentations (such as slide shows, posters, and articles and reports).

There are numerous online materials on how to use L^AT_EX for document preparations. From these and many other materials, one can find the advantages and disadvantages of using L^AT_EX. I use both L^AT_EX and MS Word for writing technical documents. For any serious writing involving literature citations, I would make the first draft in L^AT_EX. After that, the document may be translated into MS Word format using program 12r (freely

¹ Created: January 27, 2009 / Last modified: April 13, 2009
Available at <http://www.infoclearinghouse.com/tiki-index.php?page=LATEX>

available on the internet).

A researcher usually presents his/her work in different formats, such as slide shows, conference posters, or full articles/reports. My experience is that using L^AT_EX it is very easy to move things across different presentations, especially if the document contains tables and graphics generated using special commands in L^AT_EX. The purpose of this short article is to show this point using a simple example. This example, including two graphs and one table, is adapted from a presentation X. Dong gave to the 2006 annual meeting of NCCC31 in Eureka Springs, Arkansas (slide show) and a poster presentation to the 2008 joint conference of IGC (International Grassland Congress) and IRC (International Rangeland Congress) in Huhhot, China.

I wrote this article primarily for myself because similar procedures may be used repeatedly in the future and a good documentation will minimize the time that I will spend producing a different presentation. Also, this article may be useful for those who have a minimum experience with L^AT_EX and are working hard to make good-looking presentation or to convert one type of presentation to another.

I will emphasize that once one has the code to produce a graph or table, it is quite easy to adapt it into a format suitable for slide show, poster, or regular article/report. Besides, there are many excellent online articles one can consult for the basics of L^AT_EX graphics. So, in the following, I will briefly discuss the key features of three different presentations (see Appendices 4.1-4.4) but will not provide a complete explanation to the L^AT_EX code (see Appendices 4.5-4.7) that produces Table 1 and Figures 1-2 (the emphasized table heading and figure captions can be generated using command `\em (text to be emphasized)`). One should be able to understand the complete code if he/she has minimum experience using the `PSTricks` macro(s) in combination with L^AT_EX. It is much easier to work on the L^AT_EX code if one has a nice text editor (such as `WinEdt`) with a built-in mechanism for highlighting computer code in colors. I will discuss key points involved in moving material from one type of presentation to another and assume that a recent version of L^AT_EX (such as `MikTeX 2.5`) is installed on one's personal computer so that different forms of the following example can be reproduced.

1 Slide shows

Incidentally, this example was in the form of slide show when it was first created. So, I will start with this form of presentation first. The computer template was created by James R. Hopgood (see Appendix 4.1). The original slide has a blue background. But I changed it into white color, which I personally feel like better (but we will try a different background color later in this article). Each slide is clearly marked by `\begin{slide}{...}\end{slide}`. The code in between is responsible for the content

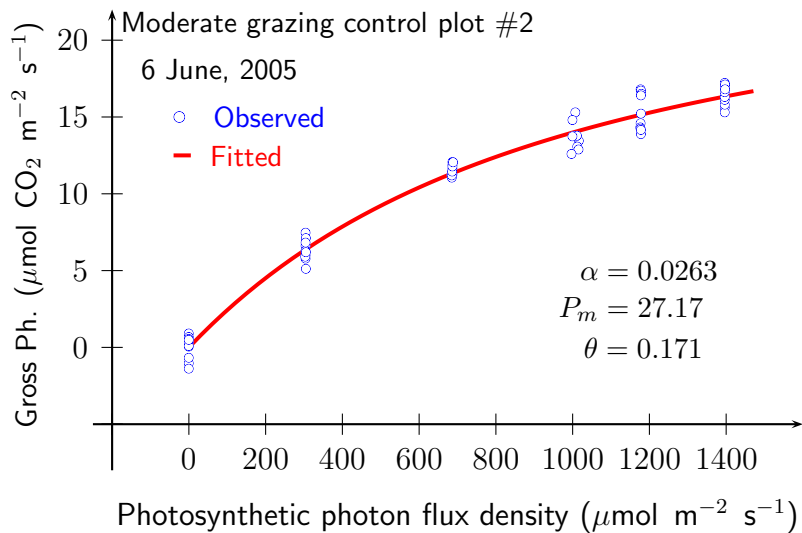


Figure 1: A photosynthesis-light curve for grassland canopy as measured in 2005.

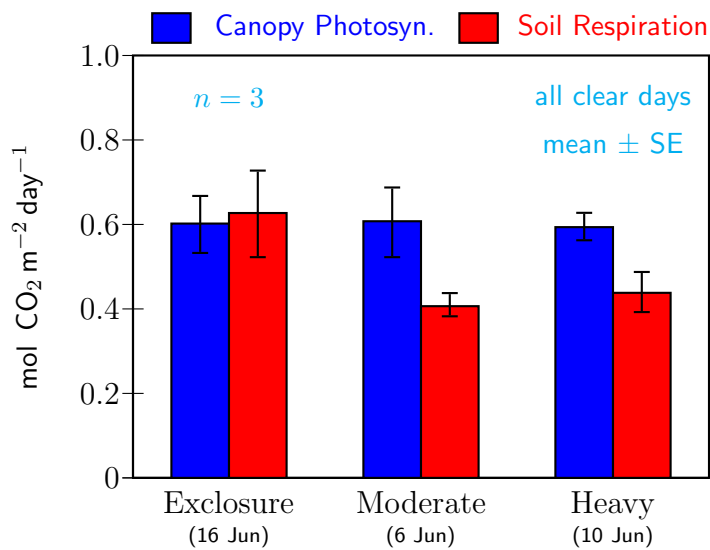


Figure 2: Daily photosynthesis & soil respiration as measured in 2005.

Table 1: Daily net ecosystem CO_2 exchange of grasslands ($mol\ CO_2\ m^{-2}\ day^{-1}$). I added notes by using \ddagger and \dagger , but later deleted the text of the notes to simplify this paper.

Treatment	2004 (2nd year of drought)	2005 (drought removed)
Average rainfall \ddagger	0.33a \dagger	0.08a
Natural rainfall	0.22ab	0.08a
Drought	0.14b	0.05a

of the slides and is listed separately (Appendices 4.5-4.7). To make slide 1 using L^AT_EX², a data file (`mc2_606.dat`) has to reside in the current directory. It includes two columns of data in `mc2_606.dat` describing the fitted values of photosynthesis vs. PPF_D (photosynthetic active photon flux density), which is shown as red line in Figure 1. The data listing in Appendix 4.4 is to generate the blue dots in Figure 1³:

```
1 0.0263
31 0.7954
61 1.5287
91 2.2283
121 2.8959
151 3.5334
181 4.1425
211 4.7248
241 5.2817
271 5.8148
301 6.3252
331 6.8142
361 7.2831
391 7.7329
421 8.1646
451 8.5792
481 8.9776
511 9.3606
541 9.7291
571 10.0838
601 10.4253
631 10.7545
661 11.0717
691 11.3778
721 11.6731
751 11.9582
781 12.2337
811 12.4999
841 12.7573
871 13.0063
901 13.2472
931 13.4805
961 13.7065
991 13.9255
1021 14.1378
1051 14.3437
```

²To generate a document, one may need to run L^AT_EX four times in this order: L^AT_EX-BIB_TE_X-L^AT_EX-L^AT_EX to obtain a dvi file, then translate this dvi to a ps, and the ps to a pdf. This just involves a few mouse clicks when using WinEdt, a text editor designed primarily for L^AT_EX.

³The data is listed in full to ensure that Figure 1 can be reproduced.

```

1081 14.5434
1111 14.7373
1141 14.9256
1171 15.1084
1201 15.2861
1231 15.4588
1261 15.6268
1291 15.7902
1321 15.9491
1351 16.1038
1381 16.2545
1411 16.4012
1441 16.5442
1471 16.6835

```

There are no headings in `mc2_606.dat` (only plain data separated by a space for each row). Further, it is good to comment out the `caption` line from within the “code block for producing Figure 1” (in Appendix 4.5), so the slide (for Figure 1) will look better. The `caption` line in Appendix 4.5 is:

```

\vspace {0.46in}\caption{A photosynthesis-light curve for grassland
canopy as measured in 2005.}

```

To produce Figure 2, we need to have a file `bar05.csv` saved in the current folder (in `csv` format). The following are the contents of this file:

```

Exclosure Moderate Heavy
0.602064 0.607562 0.59362
0.627033 0.406497 0.438104.

```

The headings of the file `bar05.csv` are used in labeling horizontal axes of Figure 2. Same as it is for Figure 1, the `caption` line from within the “code block for producing Figure 2” (in Appendix 4.6), as well as the line `\vspace {0.46in}` immediately preceding it, will need to be commented out before one runs the code in Appendix 4.1.

Table 1 is self-contained without support from any external file. The `pdf` slide show can be viewed in a PC with Adobe Reader installed. One can view the slide show by using `View\Full screen mode` within Adobe reader. The up/down arrow keys can be used to navigate within the slide show. Note that the user can freely define new commands that may be used later to simplify and speed up the entering of some complex formulae of phrases.

As an example, let’s see what Figure 1 would look like in the slide format if one follows the above mentioned steps (for producing Figure 1 in the slide format), plus one

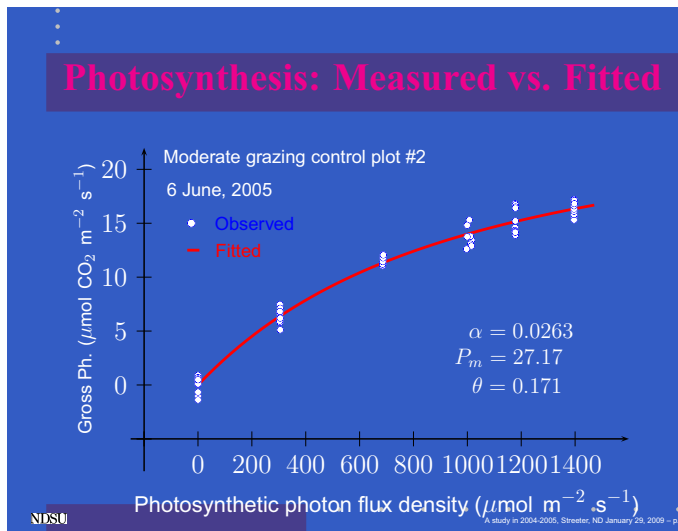


Figure 3: The appearance of Figure 1 following a conversion to the slide format.

additional change⁴ to Appendix 4.1:

Change the `documentclass` line to

```
\documentclass[pdf,slideColor,contemporain,colorBG,accumulate,total]{prosper}
```

so that the background changes from plain white to the “contemporain” style (See Figure 3).

2 Articles

It is straightforward to convert the slide show into ordinary article format and print it on the A4 paper. This is shown in Appendix 4.2. First the `preamble` needs to be changed into the `article` format (but we still need to maintain those macros related to `PSTricks` and drawings). Second, for each slide, we simply remove the `\begin{slide}{}... \end{slide}` pair. Note also that we choose to use the *fancy header* functionality, which is optional.

3 Conference posters

As seen in Appendices 4.3 and 4.4, the original authors of the poster template made some good hints and suggestions for new users. I will not repeat those valuable points here. For tables, the code can be used directly and enclosed by a `\begin{textblock}... \end{textblock}` pair, with appropriate definition of the width and location of the `textblock`. For graphs, I tried the following two ways to produce the poster form for the current presentation

⁴In this slide, I let the NDSU logo to display by uncommenting the logo line in Appendix 4.1.

example: (1) from individual graphs printed in article format and (2) from individual slides.

3.1 From individual graphs in article format

- Produce the graphs (all graphs together) in an article style pdf, using a template similar to the one in Appendix 4.2 but without *fancy heading* and page numbers (use `\thispagestyle{empty}` on each page). The full code to produce this pdf is shown in Appendix 4.8.
- Assume the user has installed a color postscript “printer” (not a real printer) on his/her computer (it is free). Now try to *print* (using `Print to file`) an eps file for each page individually, giving a unique name for each page. Here, in this example, we gave names of `nt_aaa.eps` and `nt_fff.eps` for Figure 1 and 2, respectively.
- I assume the user has `GSView` installed in his/her computer (it is free). Use `GSView` to open the all of the .eps graphs one by one and by locating the computer mouse to the lower-left (x_1, y_1) and upper-right (x_2, y_2) corners of each of the graphs, one can determine the *coordinates* of the graph. Now, within the `\begin{textblock}... \end{textblock}` pair, one can import a graph named `nt_aaa.eps` by

```
\begin{center}
  \includegraphics[bb=64 436 457 738,scale=1]{nt_aaa.eps}
\end{center}
```

assuming $x_1 = 64, y_1 = 436, x_2 = 457, y_2 = 738$. This will reduce extra white space on the graph page.

- Now make sure that only .eps graphs are used in the current file (for poster), and one can use the `LATEX-dvip2ps-ps2pdf` command series to generate the pdf (we cannot use `PDFLATEX` if our graphs are in .eps format)
- After several tries, a satisfactory pdf poster similar to Figure 4 can be produced (see Appendix 4.3 for L^AT_EX code).

Note that to match the size of the A0 poster, I have changed the `\framebox` parameter for Table 1 to 10.6in (the value used in the article format is 5.6in).

3.2 From individual slides

- Produce a single slide file as a pdf for each of the interested graphs that was originally made in slide series. The procedure is similar to that for producing Figure 3, except that the white background is to be used, as is done in Appendix 4.1.

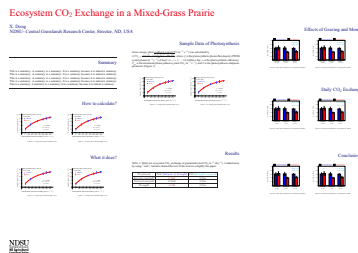


Figure 4: *The appearance of the sample poster as generated using two .eps graphs made in article format.*

- Within the `textblock` environment of the poster template as in Appendix 4.3, change the `\includegraphics` command to something like

```
\begin{center}
  \includegraphics[height=5in,width=6in]{nt1.pdf}
\end{center}
```

to include pdf slide `nt1.pdf` (corresponding to Figure 1). The slide corresponding to Figure 2 is named `nt6.pdf`.

- Make sure that no `.eps` file is used (but `.jpg` graphs are OK). Run L^AT_EX through PDFLATEX and a pdf poster similar to Figure 5 can be generated (see Appendix 4.4 for the list of code).

However, up to now, I don't know how to remove the annoying edge marks on the four corners of the pictures created using slide show format (Figure 5). If anyone knows how to do this, please let me know.

Bullet text, pictures and graphs generated from within another software are also frequently used in scientific presentation. These topics are not covered here, but it is rather straightforward to incorporate them into one's L^AT_EX presentation. For bullet text, use them in L^AT_EX's usual way but make sure to enclose them within appropriate `\begin{...}\end{...}` pair, depending on the type of presentation one is going to produce. For pictures and graphs generated from within a different software, just use `\includegraphics` command, but usually the user is expected to spend a little time trying out different parameters before a satisfactory result is obtained.

As a conclusion, this short article contains some useful tips for making different presentations using material of two sample figures and one table. The complete L^AT_EX code for reproducing the figures and the table in various forms is provided, with the possibility of producing different figures/tables after some modifications. In particular, it is shown how to use the postscript code *directly* to produce both the article and slide versions of the presentation. Further more, different methods of producing the poster version is elaborated with a complete instruction. As such, the procedures documented here for making various forms of scientific presentation are potentially useful for those who just start using L^AT_EX for scientific writing.

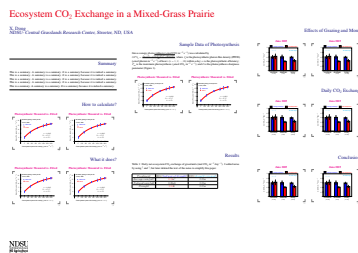


Figure 5: *The appearance of the sample poster as generated using two pdf slides.*

Finally, let's briefly comment on the L^AT_EX literature. Although there are a few important books available on L^AT_EX and L^AT_EX graphics, it is easy to get information online, thanks to many generous authors who share their knowledge and experience with others through the internet. The only L^AT_EX book that I use often is the one by Lamport (1994).

4 Appendix

4.1 A template for slide show

This template is due to James R. Hopgood at Department of Engineering, University of Cambridge (<http://amath.colorado.edu/documentation/LaTeX/prosper/7/>)⁵. I made some minor modifications to suite my needs.

```
\documentclass[pdf,slideColor,colorBG,accumulate,total]{prosper}
\usepackage{amsmath,amsfonts,amsbsy,pstricks,pst-node,pst-text,pst-3d}
\usepackage{pstricks-add,pst-plot,pst-bar}
\usepackage{graphicx}

\newcommand{\slidetextsize}{\footnotesize}
\newcommand{\captionstyle}[1]{\scriptsize \textbf{#1}}

% I changed the bullet background from blue to white in this slide series.
\myitem{1}{\includegraphics[width=.4cm]{red-bullet-on-white}}
\myitem{2}{\includegraphics[width=.4cm]{green-bullet-on-white}}
\myitem{3}{\includegraphics[width=.4cm]{yellow-bullet-on-white}}

% The following three commands are not used in the current slide series.
% They are potentially useful for producing two-column slides.
\newlength{\MiniPageLeft}
\newlength{\MiniPageRight}
\newlength{\ThisFigureWidth}

\title{\magenta Ecosystem CO2 Exchange in a Mixed-Grass Prairie}
\subtitle{\magenta Effects of Cattle Grazing and Drought}
```

⁵This template was downloaded from web site of the Department of Applied Mathematics, University of Colorado at Boulder.

```

\author{X. Dong1}
\institution{1North
Dakota State University, Central Grasslands
Research Extension Center, Streeter, ND 58483, USA}

\slideCaption{A study in 2004-2005, Streeter, ND \today}

% Uncomment the following command if your own logo file is stored
% in the current directory, or in the LaTeX's local directory.
%\Logo(-0.8,-1.06){\includegraphics[scale=0.16]{nds}}

% To produce my slide show, the file "nds.eps" was stored in the
% local directory,
% so that it can be used repeatedly to produce other slide shows.

% My new commands:
%=====Begin of X. Dong's new commands=====
\newcommand{\ie}{\emph{i.e.}}
\newcommand{\Cph}{Canopy photosynthesis}
\newcommand{\cph}{canopy photosynthesis}
\newcommand{\sres}{soil respiration}
\newcommand{\Sres}{Soil respiration}
\newcommand{\arout}{automatic rain-out-shelters}
\newcommand{\resU}{ $\mu\text{mol CO}_2\text{ m}^{-2}\text{ s}^{-1}$ }
\newcommand{\fluxU}{ $\text{mol CO}_2\text{ m}^{-2}\text{ day}^{-1}$ }
\newcommand{\parU}{ $\mu\text{mol photon m}^{-2}\text{ s}^{-1}$ }
%=====end of new commands=====

\begin{document}
\maketitle % based on information provided in the preamble

%slide 1
% =====
\begin{slide}{\magenta Photosynthesis: Measured vs. Fitted}
  [Insert here the code block for reproducing Figure 1]
\end{slide}

%=====
% Slide 2
\begin{slide}{\magenta Daily CO2 Exchange: June 2005}
\begin{center}
  [Insert here the code block for reproducing Figure 2]
\end{center}

```

```

\end{center}
\end{slide}

% slide 3
%=====
\begin{slide}{\magenta Effect of Simulated Drought}
  [Insert the code block for reproducing Table 1]
\end{slide}

\end{document}

```

4.2 A template for article

```

\documentclass[a4paper,12pt]{article}
\usepackage{color}
\usepackage{hyperref}
%\usepackage{subfig} % not used here in this example.
\usepackage{natbib}
\usepackage{graphicx}
\usepackage[top=1.5in,bottom=1in,left=1in,right=1in]{geometry}

\usepackage{amsmath, amsfonts, amsbsy, pstricks, pst-node, pst-text, pst-3d}
\usepackage{pstricks-add,pst-plot,pst-bar}

\usepackage{fancyhdr}
\pagestyle{fancy}
\fancyhead{}
\lhead{\LaTeX\, and scientific presentation}
\rhead{X. Dong}
\cfoot{\thepage}
\voffset=0.2in

% My new commands:
%=====Begin of X. Dong's new commands=====
\newcommand{\ie}{\emph{i.e.}}
\newcommand{\Cph}{Canopy photosynthesis}
\newcommand{\cph}{canopy photosynthesis}
\newcommand{\sres}{soil respiration}
\newcommand{\Sres}{Soil respiration}
\newcommand{\arout}{automatic rain-out-shelters}
\newcommand{\resU}{\$\mu\$mol CO2 m-2 s-1}
\newcommand{\fluxU}{mol CO2 m-2 day-1}
\newcommand{\parU}{\$\mu\$mol photon m-2 s-1}
%=====end of new commands=====

```

```

\begin{document}

\begin{center}
\Large{\textbf{\LaTeX \},for efficient scientific presentation- an illustration
using a simple example }}
\end{center}
\bigskip

\bigskip

\begin{center}
\textsl{Xuejun Dong}\\
\texttt{North Dakota State University}\\
\texttt{Central Grasslands Research Extension Center}\\
\texttt{Streeter, ND 58483}
\end{center}

\begin{center}
\today
\end{center}

\LaTeX \},is widely used in computer and mathematics communities partly because...

[Insert here the code block for reproducing Figure 1]

[Insert here the code block for reproducing Figure 2]

[Insert here the code block for reproducing Table 1]

\end{document}

```

4.3 A template for A0 poster based on graphs in the article format

This template (and the next one) was written by Graeme based on Norman's original microensing poster (see <http://www.astro.gla.ac.uk/users/norman/docs/posters/>). Before the reader runs this template, he/she first needs to run the code in Appendix 4.8 and use the instruction in Section 3.1 to produce graphs `nt_aaa.eps` and `nt_fff.eps`.

```

\documentclass[a0]{a0poster}
% You might find the 'draft' option to a0 poster useful if you have
% lots of graphics, because they can take some time to process and
% display. (\documentclass[a0,draft]{a0poster})

```

```

\pagestyle{empty}
\setcounter{secnumdepth}{0}

% The textpos package is necessary to position textblocks at arbitrary
% places on the page.
\usepackage[absolute]{textpos}

% Graphics to include graphics. Times is nice on posters, but you
% might want to switch it off and go for CMR fonts.
\usepackage{wrapfig,times}

% These colours are tried and tested for titles and headers. Don't
% over use color!
\usepackage{color}
\definecolor{DarkBlue}{rgb}{0.1,0.1,0.5}
\definecolor{Red}{rgb}{0.9,0.0,0.1}

\usepackage{amsmath, amsfonts, amsbsy, pstricks, pst-node, pst-text, pst-3d}
\usepackage{pstricks-add,pst-plot,pst-bar}
\usepackage{graphicx}

% see documentation for a0poster class for the size options here
\let\Textsize\normalsize
\def\Head#1{\noindent\hbox to \hsize{\hfil{\LARGE\color{DarkBlue} #1}}\bigskip}
\def\LHead#1{\noindent{\LARGE\color{DarkBlue} #1}\bigskip}
\def\Subhead#1{\noindent{\large\color{DarkBlue} #1}\bigskip}
\def\Title#1{\noindent{\VeryHuge\color{Red} #1}}

% Set up the grid
%
% Note that [40mm,40mm] is the margin round the edge of the page --
% it is not the grid size. That is always defined as
% PAGE_WIDTH/HGRID and PAGE_HEIGHT/VGRID. In this case we use
% 23 x 12. This gives us three columns of width 7 boxes, with a gap of
% width 1 in between them. 12 vertical boxes is a good number to work
% with.
%
% Note however that textblocks can be positioned fractionally as well,
% so really any convenient grid size can be used.
%
\TPGrid[40mm,40mm]{23}{12}      % 3 cols of width 7, plus 2 gaps width 1

\parindent=0pt
\parskip=0.5\baselineskip

```

```

% My new commands:
%=====Begin of X. Dong's new commands=====
\newcommand{\ie}{\emph{i.e.}}
\newcommand{\Cph}{Canopy photosynthesis}
\newcommand{\cph}{canopy photosynthesis}
\newcommand{\sres}{soil respiration}
\newcommand{\Sres}{Soil respiration}
\newcommand{\arout}{automatic rain-out-shelters}
\newcommand{\resU}{\$ \mu$mol CO$_2$ m$^{-2}$ s$^{-1}$}
\newcommand{\fluxU}{mol CO$_2$ m$^{-2}$ day$^{-1}$}
\newcommand{\parU}{\$ \mu$mol photon m$^{-2}$ s$^{-1}$}
%=====end of new commands=====

\begin{document}

% Understanding textblocks is the key to being able to do a poster in
% LaTeX. In
%
%   \begin{textblock}{wid}(x,y)
%   ...
%   \end{textblock}
%
% the first argument gives the block width in units of the grid
% cells specified above in \TPGrid; the second gives the (x,y)
% position on the grid, with the y axis pointing down.

% You will have to do a lot of previewing to get everything in the
% right place.

% This gives good title positioning for a portrait poster.
% Watch out for hyphenation in titles - LaTeX will do it
% but it looks awful.
\begin{textblock}{23}(0,0)
\Title{Ecosystem CO$_2$ Exchange in a Mixed-Grass Prairie}
\end{textblock}

\begin{textblock}{13}(0,0.8)
\LHead{X. Dong
\hfil \break
\textsl{NDSU- Central Grasslands Research Center, Streeter, ND,
USA\}}
\end{textblock}

% Uni logo in the top right corner. A&A in the bottom left. Gives a
% good visual balance, but you may want to change this depending upon

```

```
% the graphics that are in your poster.

% The following textblock generates the logo used in X. Dong's poster.
% You can uncomment these lines if your own
% logos are stored in the current directory, or in the
% local directory for LaTeX (now they are commented out temporarily).

%\begin{textblock}{2}(0,11.5)
%\resizebox{1.2\TPHorizModule}{!}{\includegraphics{NDAES.eps}}
%\end{textblock}

\begin{textblock}{7}(0,2.5)
\hrule\medskip

\Head{Summary}

\slshape

This is a summary. A summary is a summary. It is a summary because
it is indeed a summary. This is a summary. A summary is a summary.
It is a summary because it is indeed a summary. This is a summary.
A summary is a summary. It is a summary because it is indeed a summary.
This is a summary. A summary is a summary. It is a summary because it
is indeed a summary. This is a summary. A summary is a summary. It is
a summary because it is indeed a summary.
\bigskip
\hrule
\end{textblock}

\begin{textblock}{7}(0,4.6)

\Head{How to calculate?}
\begin{center}
\includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
\hspace*{0.1in}
\includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
\end{center}

\end{textblock}

\begin{textblock}{7}(0,7.3)
\Head{What it does?}

\begin{center}
```

```

\includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
  \hspace*{0.1in}
\includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
\end{center}

\end{textblock}

\begin{textblock}{7}(8,1.6)

  \Head{Sample Data of Photosynthesis}

  Gross \cph \,(\resU) was calculated by \
  $GPh_i = \frac{J_i \alpha + P_m - \sqrt{(\alpha J_i + P_m)^2 - 4 \theta \alpha J_i P_m}}{2 \theta}$, where $J_i$ is the photosynthetic
  photon flux density (PPFD) (\parU) of hour $i$ ($i=1,2,\dots,24$)
  within a day; $\alpha$ is the photosynthetic efficiency; $P_m$ is
  the maximum photosynthesis (\resU); and $\theta$ is the
  photosynthesis sharpness parameter (Figure 1).
  \bigskip

\begin{center}
  \includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
    \hspace*{0.1in}
  \includegraphics[bb=64 436 457 738,scale=1.1]{nt_aaa.eps}
\end{center}

\end{textblock}

\begin{textblock}{7}(8,7.1)

  \Head{Results}

  [Insert here the code block for reproducing Table 1]

\end{textblock}

\begin{textblock}{7}(16,0.9)

\Head{Effects of Grazing and Month}
\begin{center}
  \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
  \hspace*{0.36in}

```

```

    \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
\end{center}

\end{textblock}

\begin{textblock}{7}(16,3.9)

    \Head{Daily CO2 Exchange}

\begin{center}
    \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
    \hspace*{0.36in}
    \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
\end{center}

\end{textblock}

\begin{textblock}{7}(16,7.2)
\Head{Conclusions}
\begin{center}
    \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
    \hspace*{0.36in}
    \includegraphics[bb=111 440 446 726,scale=1.1]{nt_fff.eps}
\end{center}

\end{textblock}

\end{document}

```

4.4 A template for A0 poster based on pdf slides

```

\documentclass[a0]{a0poster}
% You might find the 'draft' option to a0 poster useful if you have
% lots of graphics, because they can take some time to process and
% display. (\documentclass[a0,draft]{a0poster})

\pagestyle{empty}
\setcounter{secnumdepth}{0}

% The textpos package is necessary to position textblocks at arbitrary
% places on the page.
\usepackage[absolute]{textpos}

% Graphics to include graphics. Times is nice on posters, but you

```

```

% might want to switch it off and go for CMR fonts.
\usepackage{wrapfig,times}

% These colours are tried and tested for titles and headers. Don't
% over use color!
\usepackage{color}
\definecolor{DarkBlue}{rgb}{0.1,0.1,0.5}
\definecolor{Red}{rgb}{0.9,0.0,0.1}

\usepackage{amsmath, amsfonts, amsbsy, pstricks, pst-node, pst-text, pst-3d}
\usepackage{pstricks-add,pst-plot,pst-bar}
\usepackage{graphicx}

% see documentation for a0poster class for the size options here
\let\Textsize\normalsize
\def\Head#1{\noindent\hbox to \hsize{\hfil{\LARGE\color{DarkBlue} #1}}\bigskip}
\def\LHead#1{\noindent{\LARGE\color{DarkBlue} #1}\bigskip}
\def\Subhead#1{\noindent{\large\color{DarkBlue} #1}\bigskip}
\def\Title#1{\noindent{\VeryHuge\color{Red} #1}}

% Set up the grid
%
% Note that [40mm,40mm] is the margin round the edge of the page --
% it is not the grid size. That is always defined as
% PAGE_WIDTH/HGRID and PAGE_HEIGHT/VGRID. In this case we use
% 23 x 12. This gives us three columns of width 7 boxes, with a gap of
% width 1 in between them. 12 vertical boxes is a good number to work
% with.
%
% Note however that texblocks can be positioned fractionally as well,
% so really any convenient grid size can be used.
%
\TPGrid[40mm,40mm]{23}{12}      % 3 cols of width 7, plus 2 gaps width 1

\parindent=0pt
\parskip=0.5\baselineskip

% My new commands:
%=====Begin of X. Dong's new commands=====
\newcommand{\ie}{\emph{i.e.}}
\newcommand{\Cph}{Canopy photosynthesis}
\newcommand{\cph}{canopy photosynthesis}
\newcommand{\sres}{soil respiration}
\newcommand{\Sres}{Soil respiration}
\newcommand{\arout}{automatic rain-out-shelters}

```

```

\newcommand{\resU}{\mu$mol CO$_2$ m$^{-2}$ s$^{-1}$}
\newcommand{\fluxU}{mol CO$_2$ m$^{-2}$ day$^{-1}$}
\newcommand{\parU}{\mu$mol photon m$^{-2}$ s$^{-1}$}
%=====end of new commands=====

\begin{document}

% Understanding textblocks is the key to being able to do a poster in
% LaTeX. In
%
%   \begin{textblock}{wid}(x,y)
%   ...
%   \end{textblock}
%
% the first argument gives the block width in units of the grid
% cells specified above in \TPGrid; the second gives the (x,y)
% position on the grid, with the y axis pointing down.

% You will have to do a lot of previewing to get everything in the
% right place.

% This gives good title positioning for a portrait poster.
% Watch out for hyphenation in titles - LaTeX will do it
% but it looks awful.
\begin{textblock}{23}(0,0)
\Title{Ecosystem CO$_2$ Exchange in a Mixed-Grass Prairie}
\end{textblock}

\begin{textblock}{13}(0,0.8)
\LHead{X. Dong
\hfil \break
\textsl{NDSU- Central Grasslands Research Center, Streeter, ND,
USA\}}
\end{textblock}

% Uni logo in the top right corner. A&A in the bottom left. Gives a
% good visual balance, but you may want to change this depending upon
% the graphics that are in your poster.

% The following textblock generates the logo used in X. Dong's poster.
% You can uncomment these lines if your own
% logos are stored in the current directory, or in the
% local directory for LaTeX (now they are commented out temporarily).

%\begin{textblock}{2}(0,11.5)

```

```

%\resizebox{1.2\TPHorizModule}{!}{\includegraphics{NDAES.jpg}}
%\end{textblock}

\begin{textblock}{7}(0,2.5)
\hrule\medskip

\Head{Summary}

\slshape

This is a summary. A summary is a summary. It is a summary because
it is indeed a summary. This is a summary. A summary is a summary.
It is a summary because it is indeed a summary. This is a summary.
A summary is a summary. It is a summary because it is indeed a summary.
This is a summary. A summary is a summary. It is a summary because it
is indeed a summary. This is a summary. A summary is a summary. It is
a summary because it is indeed a summary.
\bigskip
\hrule
\end{textblock}

\begin{textblock}{7}(0,4.6)

\Head{How to calculate?}
\begin{center}
  \includegraphics[height=5in,width=6in]{nt1.pdf}
  \hspace*{0.5in}
  \includegraphics[height=5in,width=6in]{nt1.pdf} \\
%   Decomposition \hspace{4in} Reconstruction
\end{center}

\end{textblock}

\begin{textblock}{7}(0,7.3)
\Head{What it does?}
\begin{center}
  \includegraphics[height=5in,width=6in]{nt1.pdf}
  \hspace*{0.5in}
  \includegraphics[height=5in,width=6in]{nt1.pdf} \\
%   Decomposition \hspace{4in} Reconstruction
\end{center}

```

```
\end{textblock}
```

```
\begin{textblock}{7}(8,1.6)
```

```
\Head{Sample Data of Photosynthesis}
```

```
Gross \cph \,(\resU) was calculated by \\  


$$G_{Ph_i} = \frac{J_i \alpha + P_m - \sqrt{(\alpha J_i + P_m)^2 - 4 \alpha J_i P_m}}{2 \alpha}$$
, where  $J_i$  is the photosynthetic  

  photon flux density (PPFD) (\parU) of hour  $i$  ( $i=1,2,\dots,24$ )  

  within a day;  $\alpha$  is the photosynthetic efficiency;  $P_m$  is  

  the maximum photosynthesis (\resU); and  $\theta$  is the  

  photosynthesis sharpness parameter (Figure 1).
```

```
\bigskip
```

```
\begin{center}
```

```
\includegraphics[height=5in,width=6in]{nt1.pdf}
```

```
\hspace*{0.5in}
```

```
\includegraphics[height=5in,width=6in]{nt1.pdf} \\  

%
```

```
Decomposition \hspace{4in} Reconstruction
```

```
\end{center}
```

```
\end{textblock}
```

```
\begin{textblock}{7}(8,7.1)
```

```
\Head{Results}
```

```
[Insert here the code block for reproducing Table 1]
```

```
\end{textblock}
```

```
\begin{textblock}{7}(16,0.9)
```

```
\Head{Effects of Grazing and Month}
```

```
\begin{center}
```

```
\includegraphics[height=5in,width=6in]{nt6.pdf}
```

```
\hspace*{0.5in}
```

```
\includegraphics[height=5in,width=6in]{nt6.pdf} \\  

%
```

```
Decomposition \hspace{4in} Reconstruction
```

```
\end{center}
```

```

\end{textblock}

\begin{textblock}{7}(16,3.9)

  \Head{Daily CO2 Exchange}

\begin{center}
  \includegraphics[height=5in,width=6in]{nt6.pdf}
  \hspace*{0.5in}
  \includegraphics[height=5in,width=6in]{nt6.pdf} \\
%   Decomposition \hspace{4in} Reconstruction
\end{center}

\end{textblock}

\begin{textblock}{7}(16,7.2)
\Head{Conclusions}
\begin{center}
  \includegraphics[height=5in,width=6in]{nt6.pdf}
  \hspace*{0.5in}
  \includegraphics[height=5in,width=6in]{nt6.pdf} \\
%   Decomposition \hspace{4in} Reconstruction
\end{center}

\end{textblock}

\end{document}

```

4.5 Code block for reproducing Figure 1

```

\begin{center}
\begin{figure}
\psset{xunit=0.002in, yunit=0.08in}
\begin{pspicture}[](-380,-8)(1600,22)
  \psaxes[0x=-200,0y=-5,Dx=200,Dy=5,tickstyle=bottom]{->}
  (-200,-5)(-250,-8)(1600,22)
  \rput(-420,8){\rotateleft{\small\sffamily Gross Ph.
    ($\mu\text{mol } \text{CO}_2$, m-2s-1, s-1)}}
  \rput(80,18){\small\sffamily 6 June, 2005}
  \rput(360,21){\small\sffamily Moderate grazing control plot \#2}
  \psdot[dotscale=1.2,dotstyle=o,linicolor=blue](-25,15)
  \psline[linicolor=red,linewidth=1.5pt](-40,12.5)(5,12.5)
  \rput(210,15){\small\sffamily \blue{Observed}}
  \rput(150,12.5){\small\sffamily \red{Fitted}}
  \rput(1200,5){\small\sffamily $\alpha=0.0263$}
\end{pspicture}
\end{figure}
\end{center}

```

```

\rrput(1153,2.5){\small\sffamily $P_m=27.17$}
\rrput(1185,0){\small\sffamily $\theta=0.171$}
\rrput(700,-11){\textsf{Photosynthetic photon flux density
  ($\mu\text{mol } \text{m}^{-2}\text{s}^{-1}$)}}}
\fileplot[linewidth=1.5pt,linestyle=solid,linecolor=red]
  {mc2_606.dat}
\listplot[plotstyle=dots,dotscale=1,dotstyle=o,linecolor=blue]
  {%.but use "linecolor"
1396 15.610 1396 15.310 1396 15.810 1396 16.110 1396
16.310 1396 16.610 1396 16.910 1396 17.210 1397 17.110
1397 16.810 1177 16.810 1178 16.710 1179 16.510 1178
16.410 1178 15.210 1177 14.600 1176 14.330 1177 14.230
1178 13.890 1178 14.160 1016 13.440 1012 13.070 1015
12.890 1008 13.720 1007 13.790 1011 13.790 1007 15.310
997 12.600 999 13.740 999 14.810 687 11.260 687 11.630 687 12.070
687 11.880 684 11.220 685 11.060 685 11.200 686 11.440 687 11.780
688 12.050 305 5.113 304 7.470 305 7.120 304 6.620 304 5.790 304
6.280 304 5.990 303 5.910 304 6.820 305 6.190 0 0.900 0 0.050 0
-1.040 0 0.680 0 0.330 0 -0.670 0 -1.390 0 0.100 0 0.560
0 0.480}
\end{pspicture}
\vspace {0.46in}\caption{A photosynthesis-light curve for grassland
  canopy as measured in 2005.}
\end{figure}
\end{center}

```

4.6 Code block for reproducing Figure 2

```

\begin{center}
\begin{figure}
\psset{xunit=1in,yunit=2.2in}%
\begin{pspicture}(-1,-0.2)(3,1.1)%
  \psaxes[axesstyle=frame,0x=0,Dx=1,Dy=0.2,labels=y,%
    ticks=y](0,0)(3,1)%
  \readpsbardata{\data}{bar05.csv}%
  \psbarchart[barstyle={blue,red}]{\data}%
  \psline[arrows=|-|](0.35,0.53)(0.35,0.67)
  \psline[arrows=|-|](0.65,0.52)(0.65,0.73)
  \psline[arrows=|-|](1.65,0.38)(1.65,0.44)
  \psline[arrows=|-|](1.35,0.52)(1.35,0.69)
  \psline[arrows=|-|](2.65,0.39)(2.65,0.49)
  \psline[arrows=|-|](2.35,0.56)(2.35,0.63)
  \rrput(-0.55,0.5){\rotateleft{\small\sffamily mol\,
CO$_2$ \text{m}^{-2}\text{s}^{-1}$}}}
\psframe[fillstyle=solid,fillcolor=blue](0.1,1.03)(0.3,1.1)

```

```

\put(1,1.065){\small\sffamily \blue{Canopy Photosyn.}}
\psframe[fillstyle=solid,fillcolor=red](1.7,1.03)(1.9,1.1)
\put(2.5,1.065){\small\sffamily \red{Soil Respiration}}
\put(0.5,-0.14){\scriptsize\sffamily (16 Jun)}
\put(1.5,-0.14){\scriptsize\sffamily (6 Jun)}
\put(2.5,-0.14){\scriptsize\sffamily (10 Jun)}
\put(2.5,0.9){\small\sffamily \cyan{all clear days}}
\put(0.5,0.9){\small\sffamily \cyan{$n=3$}}
\put(2.5,0.79){\small\sffamily \cyan{mean $\pm$ SE}}
\end{pspicture}
\vspace {0.12in}
\caption{Daily photosynthesis \& soil respiration as measured in 2005.}
\end{figure}
\end{center}

```

4.7 Code block for reproducing Table 1

```

\begin{table}
\caption{Daily net ecosystem CO2 exchange of grasslands
(\fluxU). We can add notes by using  $\ddag$  and  $\dag$ .
But I deleted the text of the notes for simplicity.}
\bigskip \framebox[5.6in]{\begin{tabular}{c || c | c}
$Treatment$ & $ 2004 \, , ( \color{blue}2nd \, , year \, , of \, , drought ) $ & $ 2005 \, ,
( \color{cyan}drought \, , removed ) $ \\
\hline
$Average \, , rainfall \, \ddag$ & $ \color{red}0.33 \, a \, \dag$ & $0.08a$ \\
\hline
$Natural \, , rainfall$ & $0.22ab$ & $0.08a$ \\
\hline
$Drought$ & $ \color{red}0.14 \, b$ & $0.05a$ \\
\end{tabular}}
\end{table}

```

4.8 A template to produce a pdf graph using the article format

```

\documentclass[a4paper,12pt]{article}
\usepackage{amsmath, amsfonts, amsbsy, pstricks, pst-node, pst-text, pst-3d}
\usepackage{pstricks-add,pst-plot,pst-bar}
\usepackage{graphicx}

\begin{document}

\thispagestyle{empty}
[Insert here the code block for reproducing Figure 1]

```

```
\newpage
\thispagestyle{empty}

[Insert here the code block for reproducing Figure 2]

\end{document}
```

References

Lamport, L.: 1994, *L^AT_EX: A Document Preparation System. User's Guide and Reference Manual*, Addison-Wesley Publication Company, Inc., Reading, MA.