

# Grad Student Time–Saving Tools

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Tool	Description	Reference
<b>Misc Tools</b>		
Unix	<code>cd -, alias net 'netscape &amp;', wc file, grep xx file gzip file, find /home/username -name filename, rm -r</code>	<a href="http://cfa-www.harvard.edu/cf/UserGuide.html">cfa-www.harvard.edu/cf/UserGuide.html</a> man pages
Tar	Reads and writes data tapes, or directories of info into a single file. <code>tar cvf /dev/rmt/4cbn night4, tar xvf file.tar</code>	<a href="http://www.gnu.org/manual/tar/html_mono/tar.html">www.gnu.org/manual/tar/html_mono/tar.html</a> <a href="http://cfa-www.harvard.edu/cf/ref/devices.html">cfa-www.harvard.edu/cf/ref/devices.html</a>
Sed	Stream Editor: handy for replacing strings in a text file: <code>sed s/"&amp;"/" / datatable.tex &gt; data</code>	<a href="http://www.gnu.org/manual/sed/html_mono/sed.html">www.gnu.org/manual/sed/html_mono/sed.html</a>
Awk	Great for writing quick hack programs, and parsing text output. <code>cat data   awk '{ x=\$1^2*sin(\$2); if (x&gt;\$3) print x, \$4; }'</code>	<a href="http://www.gnu.org/manual/gawk/html_mono/gawk.html">www.gnu.org/manual/gawk/html_mono/gawk.html</a>
Starbase Tables	Allows ASCII database manipulation; great for bookkeeping. <code>&lt; data.db row 'ra &lt; 12:30:15 &amp;&amp; filter=="R"'   statstable</code>	<a href="http://cfa-www.harvard.edu/~john/starbase/starbase.html">cfa-www.harvard.edu/~john/starbase/starbase.html</a>
<b>Scripting</b>	Powerful languages that can use software packages, manipulate files, and do calculations all in one. Scripting is a fast alternative to writing C or Fortran, and allows easy alterations when data processing. Other alternatives such as tcl/tk, guile, javascript, etc abound.	
Shell	Shell scripts are like a series of UNIX commands, with logic statements, loop, variables, and good string manipulation. The limited math capabilities can be supplemented by awk.	<a href="http://www.uwsg.iu.edu/usail/concepts/shell-scripting.html">www.uwsg.iu.edu/usail/concepts/shell-scripting.html</a> man sh, man csh
Perl	Programming and shell scripting in one, with C–like syntax. Good math capabilities. PerlDL allows fast array calculations ala IDL. Free.	<a href="http://www.perl.org">www.perl.org</a> <a href="http://pdl.perl.org">pdl.perl.org</a>
Python	Python is object–oriented (if you want) and has exceptionally clean and easy–to–read syntax. NumPY module allows fast array calculations ala IDL. Free.	<a href="http://www.python.org">www.python.org</a> <a href="http://numpy.sourceforge.net">numpy.sourceforge.net</a>
IDL	A powerful programming language, with Fortran–like syntax. IDL is rather versatile and great for visualizing data. It has great online help. Very expensive.	<a href="http://www.rsinc.com/idl/index.cfm">www.rsinc.com/idl/index.cfm</a> <a href="http://idlastro.gsfc.nasa.gov/homepage.html">idlastro.gsfc.nasa.gov/homepage.html</a>
<b>Plotting</b>		
Pgplot	Very capable 2–D plotting library. Callable from Fortran, C, and most all scripting languages.	<a href="http://www.astro.caltech.edu/~tjp/pgplot/">www.astro.caltech.edu/~tjp/pgplot/</a>
SuperMongo	Basic but effective plotting program, it can read ASCII columns and does most math functions.	<a href="http://www.astro.princeton.edu/~rhl/sm/">www.astro.princeton.edu/~rhl/sm/</a>
<b>Astro–Online</b>		
ADS	The NASA Astrophysical Data System. Access catalogs, abstracts, full–text articles, catalogs, and data archives through your web browser. Never go to the library again!	<a href="http://adswww.harvard.edu/">adswww.harvard.edu/</a>
Astro–ph	Un–refereed pre–print server. Check it out for current work in astronomy.	<a href="http://xxx.lanl.gov/archive/astro-ph">xxx.lanl.gov/archive/astro-ph</a>
Misc Tools	Convert coordinates, dates, energy units and search for bibliographic references.	<a href="http://heasarc.gsfc.nasa.gov/docs/corp/tools.html">heasarc.gsfc.nasa.gov/docs/corp/tools.html</a>
DSS	Digitized Sky Survey. Enter an RA and Dec, and retrieve that piece of sky. Great for optical finding charts. The images have astrometric solutions.	<a href="http://archive.stsci.edu/cgi-bin/dss_form">archive.stsci.edu/cgi-bin/dss_form</a>

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VizieR	Provides access to the most complete library of published astronomical catalogues and data tables available on line, organized in a self-documented database. Query tools allow the user to select relevant data tables and to extract and format records matching given criteria.	<a href="http://vizier.u-strasbg.fr">vizier.u-strasbg.fr</a>
<b>LaTeX</b>		
emulate.apj	Include the line "\usepackage{emulateapj5}" in your latex file header, and your document will come out in ApJ journal format. Must use psfig or epsfig for figure placement.	<a href="http://hea-www.harvard.edu/~alexey/emulateapj/">hea-www.harvard.edu/~alexey/emulateapj/</a>
BibTeX	Never write a bibliographic entry again! Use ADS (see below) to get the BibTeX database entries and then simply use \citep{} and \citet{} like usual in your papers.	<a href="http://www.ecst.csuchico.edu/~jacobsd/bib/formats/bibtex.html">www.ecst.csuchico.edu/~jacobsd/bib/formats/bibtex.html</a>
<b>Presentation</b>		
XV	Allows one to display a wide range of image formats, crop and scale the image, and save it in a wide range of formats (ps, jpg, gif, etc.)	<a href="http://cfa-www.harvard.edu/cf/ref/xv.html">cfa-www.harvard.edu/cf/ref/xv.html</a>
IslandDraw	Directly edit postscript files. Very easy to use. (edit .cshrc and type 'island')	<a href="http://www.islandssoft.com">www.islandssoft.com</a>
Framemaker	Allows one to combine and text, images, math, and basic graphics. Relatively easy to use and great for posters.	<a href="http://www.adobe.com/products/tips/framemaker.html">www.adobe.com/products/tips/framemaker.html</a>
StarOffice	Read and edit those pesky Word, PowerPoint, and Excel files your friends send you. Very powerful and user-friendly – but quite bloated. Freely available for download for Solaris, Windows, and Linux.	<a href="http://www.sun.com/products/staroffice/">www.sun.com/products/staroffice/</a>
<b>Calculations</b>		
Skycalc	Give it a date and location, skycalc provides sun & moon rise & set times, moon phase, LMST, parallactic angle, an hourmass table, etc.	<a href="http://www.cfht.hawaii.edu/~tmca/almanac.html">www.cfht.hawaii.edu/~tmca/almanac.html</a>
Xephem	Similar calculations as Skycalc but with a GUI. Can also generate sky charts.	<a href="http://www.clearskyinstitute.com/xephem/">www.clearskyinstitute.com/xephem/</a>
SLALIB	Library to perform astrometric calculations that is callable from C or Fortran. Many other useful astronomy software packages are available at the Starlink web site.	<a href="http://star-www.rl.ac.uk">star-www.rl.ac.uk</a>
WCSTools	WCSTools is a package of programs and a library of utility subroutines for setting and using coordinate systems in the headers of FITS files. Also displays and edit FITS headers.	<a href="http://tdc-www.harvard.edu/software/wcstools.html">tdc-www.harvard.edu/software/wcstools.html</a>
Netlib	Netlib is a collection of mathematical software, papers, and databases. The code (mainly in Fortran) is extremely robust. (LAPACK for matrix calcs, QUADPACK for integration, MINPACK for optimization and non-linear least-squares, Cephes for special functions, etc...)	<a href="http://www.netlib.org">www.netlib.org</a>
Numerical Recipes	Good place to start when working on almost any numerical task. The references will point you to more robust and detailed descriptions and/or code. Code is minimalistic.	<a href="http://www.nr.com">www.nr.com</a>
Mathematica	Extremely powerful symbolic and numerical computations. Steep learning curve. Never do algebra or calculus again!	<a href="http://www.wolfram.com">www.wolfram.com</a>