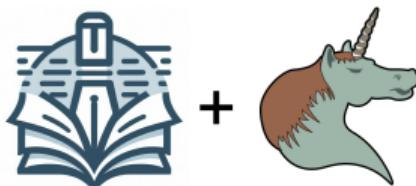


A Science Writing Workflow in Org Mode

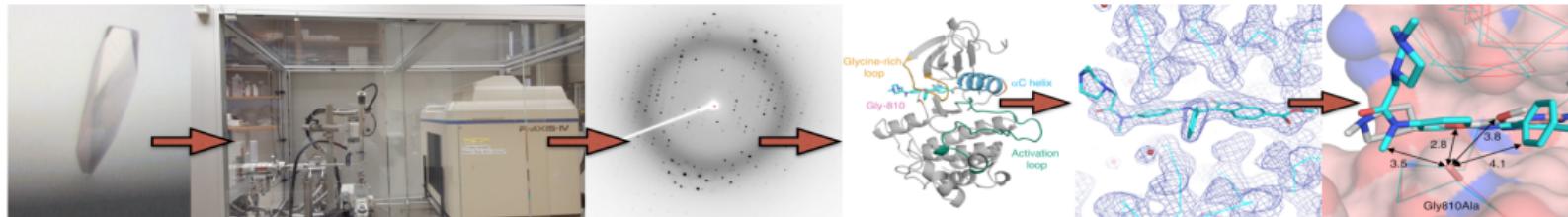
Blaine Mooers, PhD
Department of Biochemistry and Physiology
University of Oklahoma Health Sciences

github.com/MooersLab/DSW24-org-mode-slides

Oklahoma Data Science Workshop:: 2024 November 22, 12:00 A.M. CST



Data + Code + Stats = Story



\$HOME/0573crystalDetection

- |— manu0573.org¹
- |— log0573.org ²
- |— ./abib0573/abib0573.org³

¹MooersLab/manuscriptInOrg

²MooersLab/modular-writing-project-log-bibtex-org-mode

³MooersLab/modular-annotated-bibliography-bibtex-org-mode

Templates at github.com/MooersLab



Writing Project Logs for Open Source Typesetting Programs

Dependent on LaTeX

Independent of LaTeX

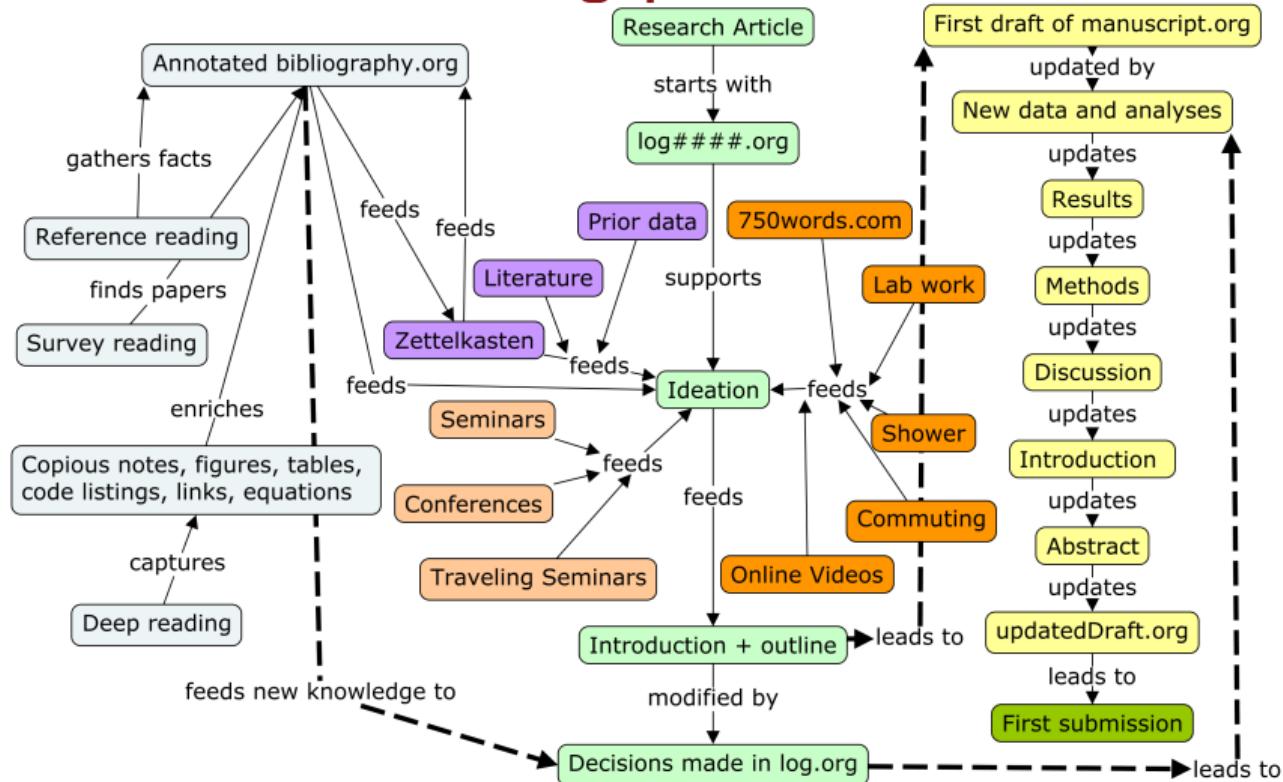
Org-mode

R Markdown

LaTeX

Typst

Writing process



Goals and Outline of Talk

Goals

- (re-)Introduce Org Mode.
- Demystify Emacs some more.
- Describe research article writing workflow.

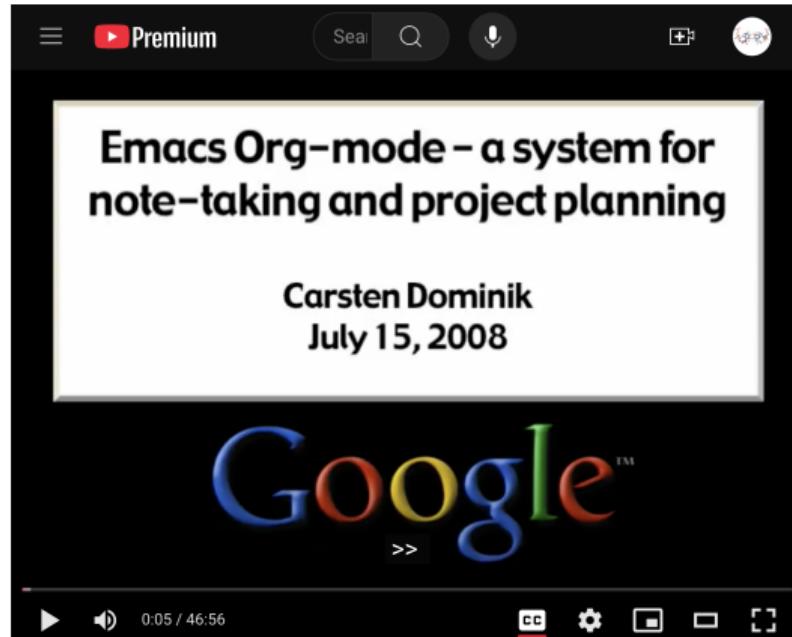
Outline

- Introduce Org Mode.
- Introduce Emacs.
- Walk-through of the writing-project log.

Features of Org Mode

- Simple markup language
- Dynamics tables
- README.org on GitHub
- Access to LaTeX
- Publishing to many formats
- Slide shows
- Polyglot interactive literate programming in parallel sessions
- Personal knowledge management (org-roam)
- Wiki and Web Page building
- Blogging
- Journaling
- Time-logging
- Time management (org-agenda)

Talk about Org Mode by the developer



<https://www.youtube.com/watch?v=oJTwQvgfgMM>

<https://staff.science.uva.nl/c.dominik/#org60c8666>

Installing GNU Emacs

- Installed already?
- Package manager: Homebrew, Macports, Anaconda.
- Binary download ⁴.
- Compile from source⁵.

⁴<https://www.gnu.org/software/emacs/download.html>

⁵<https://github.com/MooersLab/compile-emacs-29>

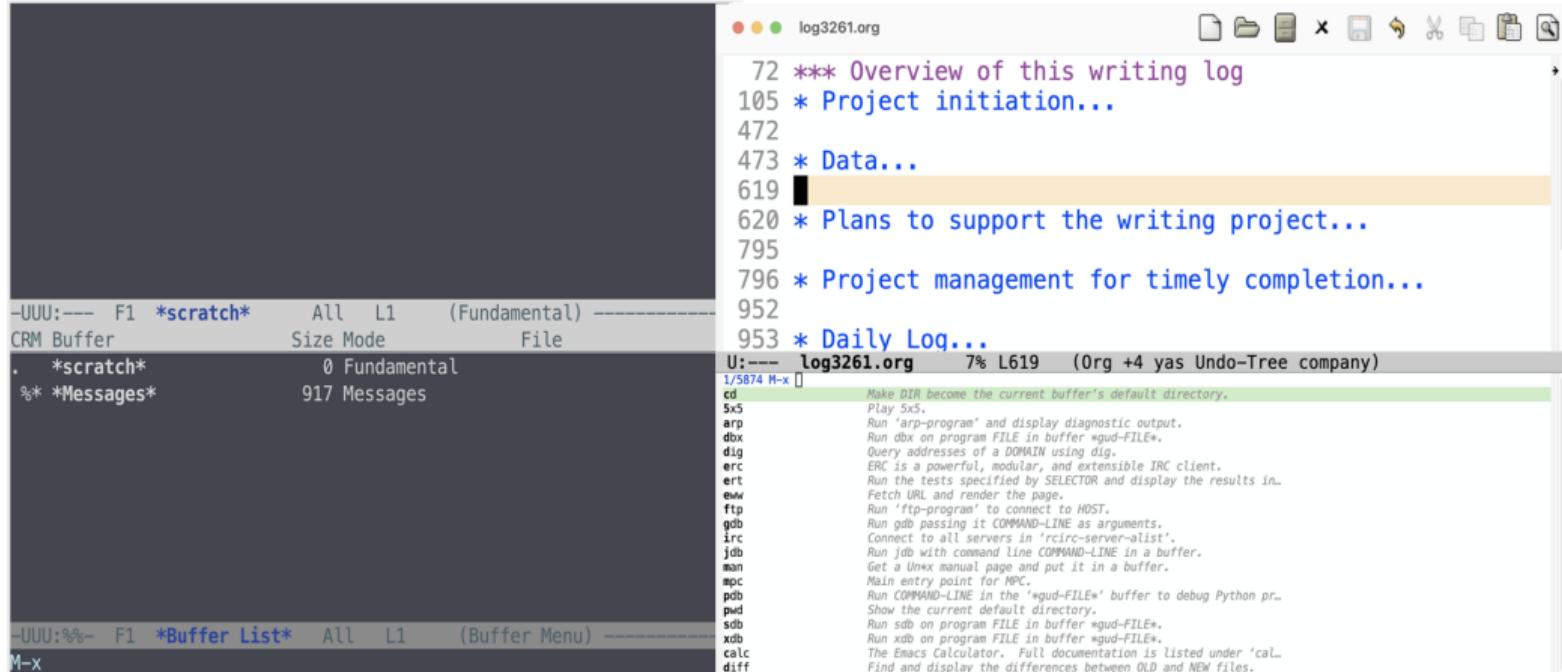
Interview of an Emacs user (not for newbies)



Interview with an Emacs Enthusiast in 2023 [Colorized]

<https://www.youtube.com/watch?v=urcL86UpqZc&t=5s>

Terminal (emacs -nw) vs GUI (emacs)



Left: 2 buffers, 2 modelines, 1 minibuffer; Right: 1 buffer, 1 modeling, 1 minibuffer with vertico.

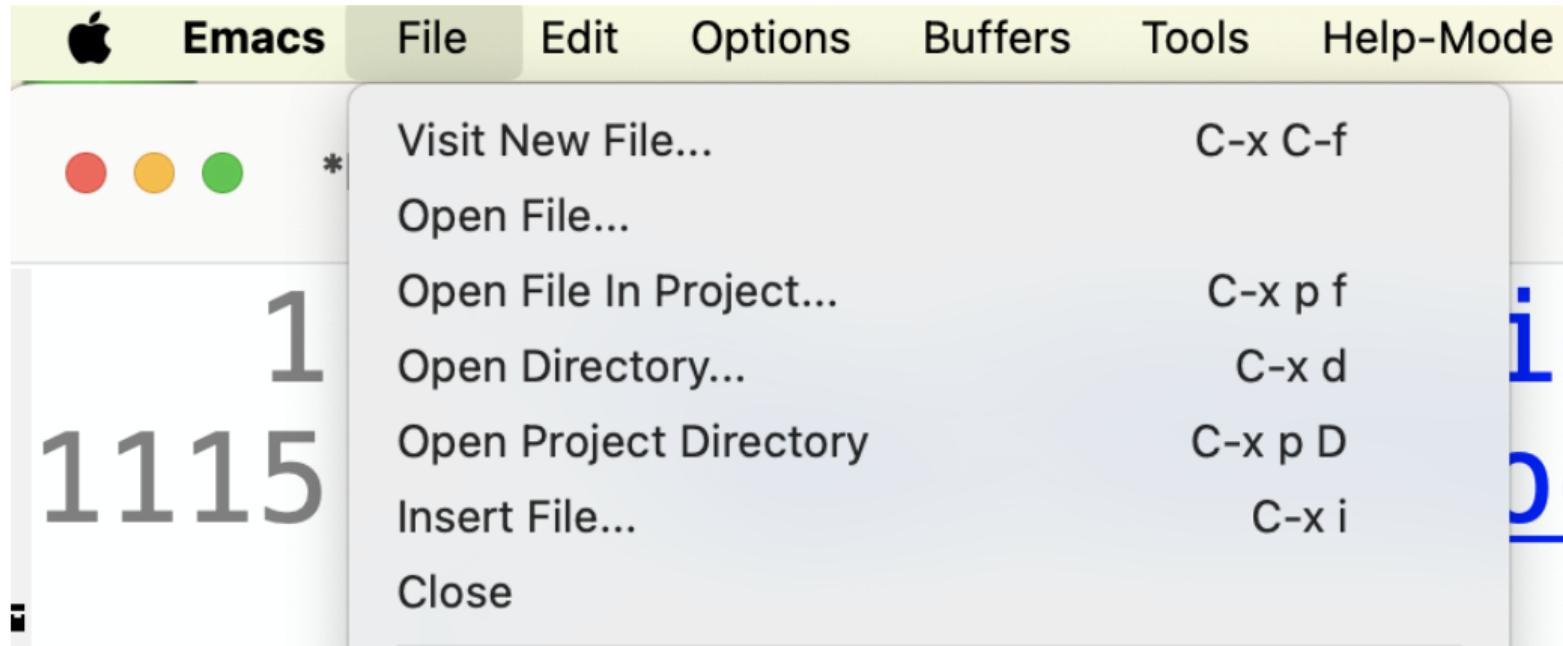
Emacs at top, Schooner in bottom tmux pane

```
1 zsh 2 schooner2
File Edit Options Buffers Tools Minibuf Help
10 Resource.aux      3
11 Resource.log      4 (% 200202 2020202 5858585)
12 Resource.pdf
13 Resource.tex
14 log1019.org
15 main.bbl
16 main.org
Treemacs: Default
1/4741 M-x |
eval-last-sexp (C-x C-e) Evaluate sexp before point; print value in the echo area.
cd Make DIR become the current buffer's default directory.
5x5 Play 5x5.
arp Run 'arp-program' and display diagnostic output.
dbx Run dbx on program FILE in buffer *gud-FILE*.
dig Query addresses of a DOMAIN using dig.
erc ERC is a powerful, modular, and extensible IRC client.
ert Run the tests specified by SELECTOR and display the resu...
eww Fetch URL and render the page.
ftp Run 'ftp-program' to connect to HOST.
gdb Run gdb passing it COMMAND-LINE as arguments.
irc Connect to all servers in 'rcirc-server-alist'.
Your /scratch/bmooers directory is on a storage subsystem
that you share with hundreds of other OSCER users.
It has a total capacity of 49TB,
of which 25TB is already consumed by the hundreds of y'all (51% full),
and 24TB is available for y'all to share.
Files in /scratch/bmooers are available for 2 weeks
and are NEVER EVER BACKED UP.
(base) [bmooers@schooner2 ~]$
```

C-h, C-j, C-k, C-l <https://github.com/laishulu/emacs-tmux-pane>

File pulldown menu

Meta key (M) = Alt key; C, control; S, shift; s, super (left-option); H, hyper (right-option)



Org pulldown menu

Emacs File Edit Options Buffers Tools Table Org Text YASnippet

log0598tsrWritingLog.org

log0598tsrWritingLog.org

60 * Introduction
94 * Project initiation
468 * Data...

Show/Hide

New Heading

Navigate Headings

Edit Structure

Editing

Archive

Hyperlinks

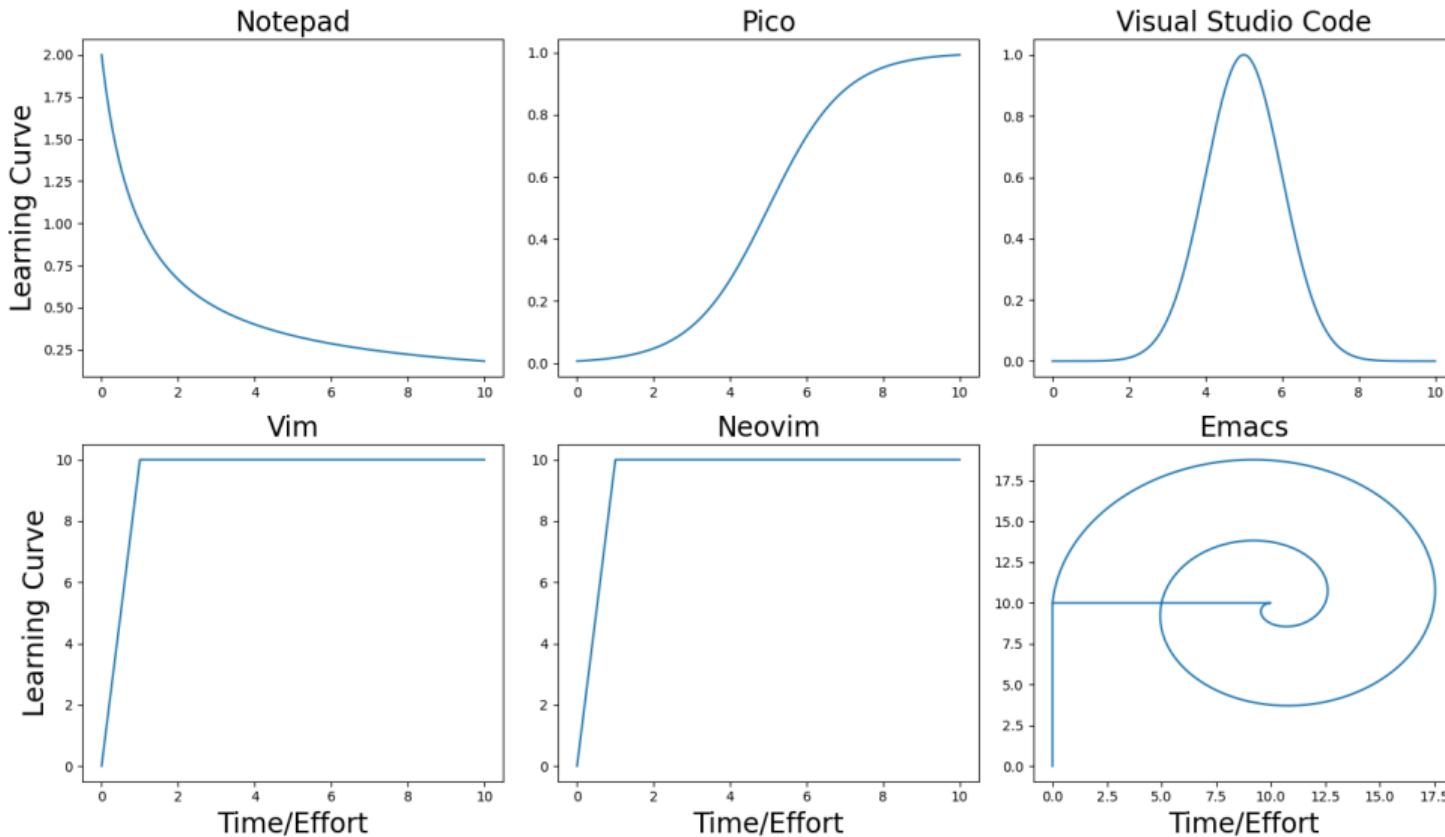
TODO Lists

TAGS and Properties

Basic key-bindings

- C-g ;;undo last command
- C-x C-f ;;find file C-x C-s ;;save file C-x C-w ;;write file
- C-1 ;; close current buffer (and file) C-x 1 close other buffers
- C-x C-b ;; generate list of open buffers
- C-x C-c ;; quit Emacs
- C-x C-e ;; run elisp symbolic expression
- C-h ? ;; help commands C-h b ;; show active key bindings
- C-h R org ;; open the Org-manual; C-h t ;; open tutorial
- M-x some command in the minibuffer

Learning Curves for Text Editors



Open org manual: C-h R org

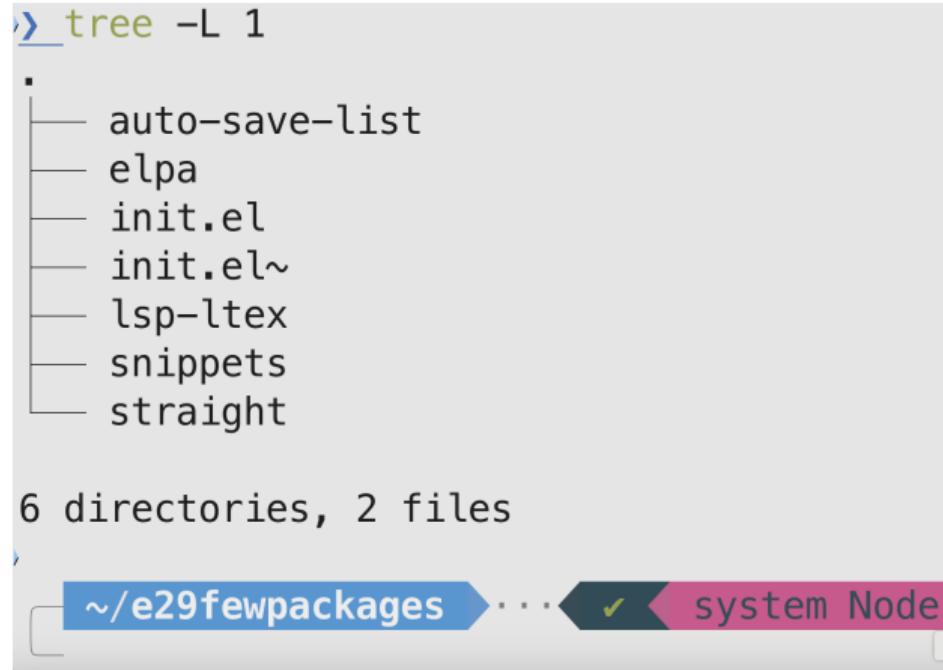
```
● ● ● *info*<2>
Next: Introduction, Up: \(dir\)
1 (org)Top
2
3 The Org Manual
4
5
6 This manual is for Org version 9.8.
7
8 Copyright © 2004–2024 Free Software Foundation, Inc.
9
10 Permission is granted to copy, distribute and/or modify this
11 document under the terms of the GNU Free Documentation License,
12 Version 1.3 or any later version published by the Free Software
13 Foundation; with no Invariant Sections, with the Front-Cover Texts
14 being "A GNU Manual," and with the Back-Cover Texts as in (a)
15 below. A copy of the license is included in the section entitled
16 "GNU Free Documentation License."
17
18 (a) The FSF's Back-Cover Text is: "You have the freedom to copy and
19 modify this GNU manual."
20
21 * Menu:
22
23 * IntroductionGetting started.
24 * Document StructureA tree works like your brain.
25 * Tables Pure magic for quick formatting.
26 * HyperlinksNotes in context.
27 * TODO ItemsEvery tree branch can be a TODO item.
28 * Tags Tagging headlines and matching sets of tags.
U:%- *info*<2> (org) Top Top L2 [(Info yas Undo-Tree +5 company Narrow)]
```

Emacs configuration folder

Traditionally: \$HOME/.emacs.d ;; Not necessary to hide folder.

```
› tree -L 1
.
├── auto-save-list
├── elpa
├── init.el
├── init.el~
├── lsp-ltex
└── snippets
└── straight

6 directories, 2 files
›
```



```
alias efnw='/Applications/Emacs29.4.app/Contents/MacOS/Emacs -nw  
-init-directory /e29fewpackages'
```

Top of init.el file

init.el

```
1 (setq user-emacs-directory "~/e29fewpackages/")
2 ;; Alias e29f='/Applications/Emacs29.4.app/Contents/MacOS/Emacs \
3 ;; --init-directory ~/e29fewpackages --debug-init'
4 (defvar bootstrap-version)
5 (let ((bootstrap-file
6       (expand-file-name
7        "straight/repos/straight.el/bootstrap.el"
8        (or (bound-and-true-p straight-base-dir)
9            user-emacs-directory)))
10      (bootstrap-version 7))
11  (unless (file-exists-p bootstrap-file)
12    (with-current-buffer
13      (url-retrieve-synchronously
14       "https://raw.githubusercontent.com/radian-software/straight.el/develop/install.el"
15       'silent 'inhibit-cookies)
16      (goto-char (point-max))
17      (eval-print-last-sexp)))
18  (load bootstrap-file nil 'nomessage))
19 (straight-use-package 'org)
20 (setq package-enable-at-startup nil)
21 (use-package use-package)
22
23 (message "Finished straight package manager configuration.")
```

Overview of the manuscript.org

```
> main0573.org
 1 #+TITLE: 0573 Crystal detection
 2 #+Author: Blaine Mooers
 3 #+Options: title:nil toc:nil author:nil \n:nil num:nil
 4 #+STARTUP: noindent overview
 5 :PREAMBLE:....
63
64 ** abstract guidance :noexport:
65 #GUIDANCE:
66 I draft the abstract after defining the scope of the paper with the I,
67 I usually rewrite the abstract after the first draft is finished.
68 The abstract is often single-spaced.
69 I enclosed the abstract in the singlespace environment.
70 :END:
71 #+LATEX:\begin{singlespace}
72 #+LATEX:\section*{Abstract}
73 #+LATEX:\end{singlespace}
74
75 ** keyword guidance :noexport:...
86 * Introduction...
111 * Materials and Methods...
121 * Results...
232 * Discussion...
254 * Acknowledgments...

-:-- main0573.org All L65 Git:main [(Org Flymake:Wait[0 0 14] yas Undo-Tree +5 LSP[ltex-ls:64220] company)] file
```

Preamble of the manuscript.org

```
> main0573.org
4 #+STARTUP: noindent overview
5 :PREAMBLE:
6 #+LaTeX_CLASS: article
7 #+LaTeX_CLASS_OPTIONS: [11pt,letterpaper]
8 #+LaTeX_HEADER:\usepackage[letterpaper, total={6.75in, 9in}]{geometry}
9 #+LaTeX_HEADER:\usepackage{booktabs}
10 #+LaTeX_HEADER:\usepackage{graphicx}
11 #+LaTeX_HEADER:\usepackage{xurl} % permit line breaks in urls
12 #+LaTeX_HEADER:\usepackage{hyperref,lineno}
13 #+LaTeX_HEADER:\usepackage{datetime2}
14 #+LaTeX_HEADER:\usepackage{amsmath,amssymb,amsfonts}
15 #+LaTeX_HEADER:\usepackage{breakcites} % allow citation to wrap
16 #+LaTeX_HEADER:\usepackage{lastpage}
17 #+LaTeX_HEADER:\usepackage{fancyhdr}
18 #+LaTeX_HEADER:\pagestyle{fancy}
19 #+LaTeX_HEADER:\fancyhf{} % Clear all header and footer fields
20 #+LaTeX_HEADER:\fancyhead[L]{\today}
21 #+LaTeX_HEADER:\fancyhead[C]{Log for 0573 Crystal detection} % Center
22 #+LaTeX_HEADER:\fancyhead[R]{\thepage\ / \pageref{LastPage}}
23
```

Title page of first-submission manuscript

Generic Manuscript Template

Graduate Student¹, Senior Collaborator², Staff Scientist³, and Blaine Mooers^{*1,2,3}

¹Department of Biochemistry and Molecular Biology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States 73104

²Stephenson Cancer Center, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States 73104

³Laboratory of Biomolecular Structure and Function, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States 73104

2024-10-11

<https://github.com/MooersLab/manuscriptInOrg>

Second page

1 Abstract

2 Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscin
3 vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id,
4 vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus
5 et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla
6 et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer
7 sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Ae-
8 nean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper
9 nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam.
10 Duis eget orci sit amet orci dignissim rutrum.

11

12 **Keywords:** I draft the keywords in the writing document and select the best up to the allowable limit.

13 **Abbreviations:** GUI: graphical user interface, IDE: integrated development environment

BibTex/BibLaTeX

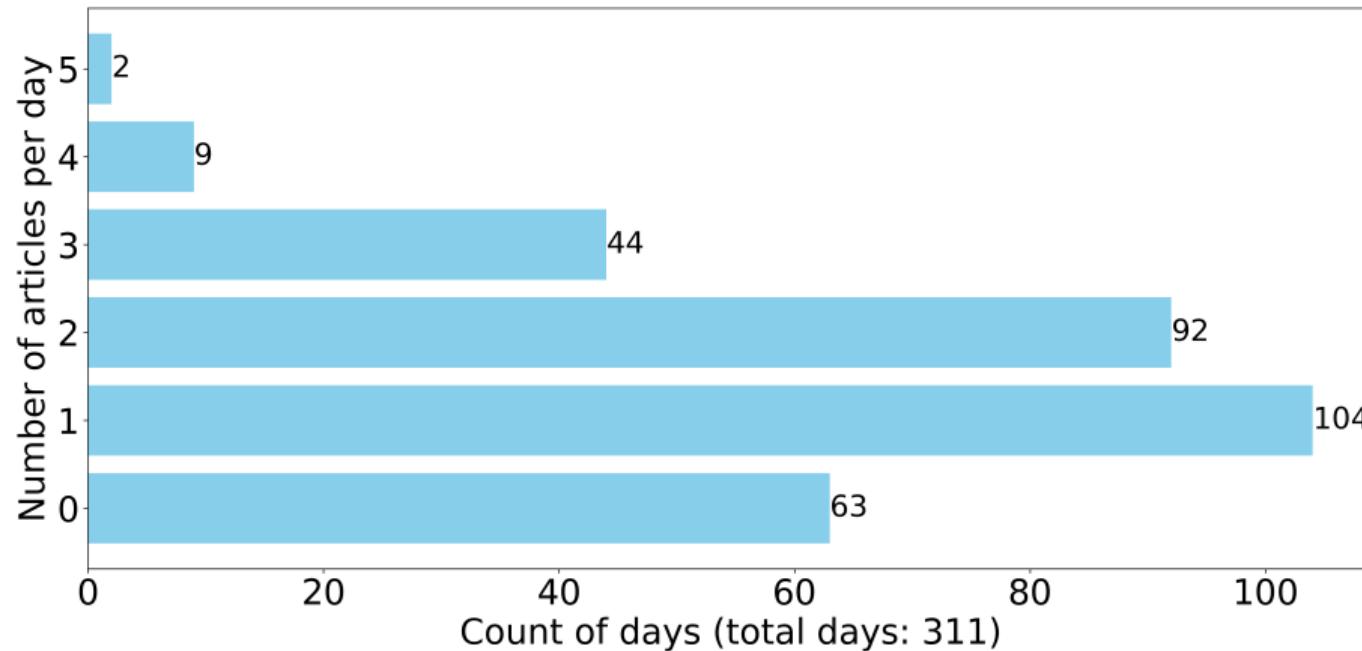
```
@Article{Mooers2020ShortcutsForFasterImageCreationInPyMOL,
  author      = {Mooers, Blaine HM},
  pages       = {268--276},
  title        = {Shortcuts for faster image creation in PyMOL},
  volume       = {29},
  number       = {1},
  annotate     = {The seminal paper on PyMOL shortcuts.},
  date         = {2020},
  file         = {Mooers2020ShortcutsForPyMOL.pdf:PDF},
  journal      = {Protein Science}
}
```

Not this accountability tool!

▲ 1	Date	Project	Accomplishment	Mintues	Words
1044	22 July 2023	0454CCTBXsnips	The real paper for a journal following the	675	633
1045					
1046	23 July 2023	0454CCTBXsnips	I fleshed out the paper to about 60% of t	255	2444
1047	23 July 2023	0466ReproOptimal	This paper was suggest to me by Eddie	510	40
1048	23 July 2023	0481PyMOL4ncRN/	Invited to submit by August 10th for waiv	30	0
1049					
1050	24 July 2023	0481PyMOL4ncRN/	Moved manuscript to overleaf	45	0
1051	24 July 2023	0465scipy2023	Correcting DOIs as requested by publish	120	0
1052	24 July 2023	0038GGTtwinning	Moved manuscript to org-mode. This pa	240	0
1053	24 July 2023	0039T4Ltwinning	Moved manuscript to org-mode.	240	0
1054	24 July 2023	0454CCTBXsnips	Reading	30	0

Boice,R. (1989) Procrastination, busyness and bingeing. *Behaviour Research and Therapy*, 27, 605–611.

Number of articles worked per day in 2024



Worked on 2 or more articles per day 58% of the days when some journal article writing was done.

Motivation behind the writing-project log

Primary purpose: support clear thinking to

- improve project's impact (i.e., do better science).
- accelerate project completion

Secondary purpose: enable work on multiple projects

- ease switching between projects
- feed subconscious background jobs

Side-effects: peace of mind

- reduced Fear of Forgetting (FoF).
- reduced Fear of Losing Momentum (FoLM).

Sword, H. (2016) 'Write every day!': A mantra dismantled. International Journal for Academic Development, 21, 312–322.

Overview of writing-project log in Org Mode

```
1 #+Title: Writing log for this hot paper
2 #+Options: toc:nil author:nil \n:nil
3 #+STARTUP: noindent
4 #+STARTUP: overview
5 :PREAMBLE:...
62
63 * Overview of this writing log :noexport:...
96   * Project initiation...
463
464   * Data...
610
611   * Plans to support the writing project...
786
787   * Project management for timely completion...
943
944   * Daily log...
1087
1088   * Future additions and tangents...
1189
1190   * Workflows, guidelines, checklists, protocols, helpful hints...
1505
1506   * Backmatter...■
```

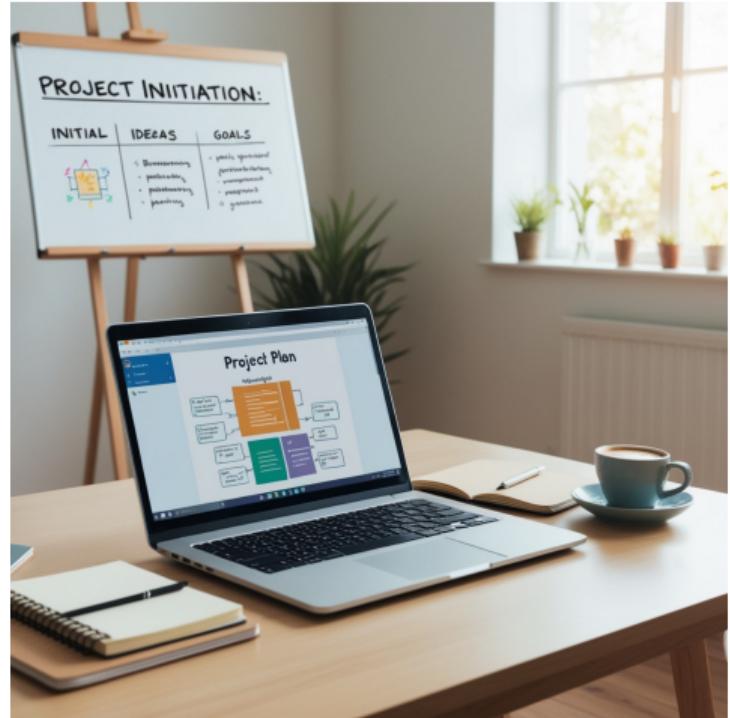
Additional features of the template

- Table of contents
- Images
- Tables
- Equations
- Code blocks
- Index
- List of acronyms
- Glossary
- Mathematical notation
- Literature Cited

These features are also available in the annotated bibliography template.

Four workflows

- Project initiation
- Daily
- Periodic assessment
- Project closeout



Project initiation workflow

```
93 * Project initiation
94 :PROPERTIES:...
97 #+Latex:\index{project initiation}
98 ** Rationale for this article...
116 ** Audience for the paper...
132 ** Potential target journals for submission
133 :PROPERTIES:...
136 #+Latex:\index{target journals}
137 *** Guidance on target journals for submission :noexport:
138 :GUIDANCE:
139 The journal titles are enumerated in descending order of desirability.
140 You have a plan B journal identified at the time of submission so that
141 you can respond swiftly if the plan A journal rejects the paper.
142 :END:
143 *** Response
144 1. Crystals
145 2. Protein Science [Plan B]
146 3. Journal of Structural Biology■
```

Daily workflow

- 831 * **Daily Log**
- 832 ** 2024-07-24...
- 862 ** 2024-08-10...
- 875 ** 2024-09-19 Greenlight from Gilbert...
- 927 ** 2024-10-01
- 928 *** Accomplishments
 - 929 – Pulled several crystal imaging papers.
 - 930 – Noticed connection to pathology.
 - 931 – Started abib0578.■
- 932 ** Next action...
- 960 ** To be done...
- 987 ** Word Count...
- 1025 ** Update Writing Progress Notebook...
- 1048 ** Update Zettelkästen in org-roam...
- 1059 * Future additions and tangents...

Periodic assessment workflow

999 * Project management for timely completion
1000 *** Guidance on plans to support the writing project :noexport:...
1011 ** Checklist for manuscript completion...
1059 ** Timeline with milestones
1060 *** Guidance on Timeline with milestones :noexport:...
1072 *** Timeline with milestones
1073 #+Caption[Milestones]: Timeline with milestones.
1074 | Milestone | Target date | Achievement date |
1075 |-----|-----|-----|
1076 | 2nd draft | 2024/10/26 | 2024/10/27 |
1077 | Typst prototype | 2024/10/28 | 2024/10/28 |
1078 | Typst repo | 2024/10/24 | 2024/10/29 |
1079 | LaTeX repo | 2024/11/02 | 2024/10/29 |
1080 | modular Org-mode repo | 2024/11/03 | 2023/11/02 |
1081 | Rmarkdown prototype | 2024/11/03 | 2024/11/01 |
1082 | Scripts identified 10/28 | 2024/11/05 | |
1083 | Read PDFs and update | 2024/11/21 | |
1084 | Submit | 2024/11/25 | |
1085 ** Assessments of current state
1086 *** Date: 2024-10-28
1087 **** How far is the manuscript from being completed (in percent completion)?
1088 40 percent.
1089 **** List what keeps the manuscript from being submitted today....
1099 **** List what is missing from the manuscript that could improve its impact....
1103 **** What could be removed from the manuscript to streamline it?...

Project closeout workflow

```
1190 * Workflows, guidelines, checklists, protocols, helpful hints
1191 :PROPERTIES:...
1194 #+LaTeX:\index{workflows}
1195 #+LaTeX:\index{guidelines}
1196 #+LaTeX:\index{checklists}
1197 #+LaTeX:\index{protocols}
1198 #+LaTeX:\index{helpful hints}
1199 ** Project initiation workflow...
1213 ** Daily workflow...
1231 ** Periodic review workflow...
1247 ** Project winddown workflow
1248 #+LaTeX:\index{workflows!project winddown}
1249 # #+INCLUDE:~/protocols-org/projectWinddown-workflow-checlist.org
1250 - [ ] Inventory all data made publicly available.
1251 - [ ] Gather all required Zenodo DOIs.
1252 - [ ] Move the extensions of the project to new project(s), if not done already.
1253 - [ ] Advertise paper on social media and in the department.
1254 - [ ] Centralize links to slideshow(s) about the project on lab webpage.
1255 █
```

Conclusions

- Project-specific log file narrows the focus to one project.
- Log harbors thinking about the writing project.
- Log supports project initiation, momentum, and completion.
- Side effects: dampened FoF and FoLM, which reduce barriers to working on multiple projects in one day.

Acknowledgements

Friends and mentors:

- Oklahoma Data Science Workshop
- Berlin and Austin Emacs Meetups
- Vidianos Giannitsis, David Pérez-Suárez, and the UK-RSE M-x research Slack Channel

Support for working in Emacs all day:

- NIH: R01 CA242845, R01 AI088011
- NIH: P30 GM145423, P30 CA225520, P30 AG050911-07S1
- OCAST HR20-002

Other potential logs

Scholarship:

- journal article
- grant application
- conference paper
- book chapter
- book
- talk
- seminar
- poster
- patents

Teaching:

- didactic teaching
- recruitment
- mentoring
 - junior faculty, staff scientists
 - postdoc, technicians
 - graduate student
 - exam committee
 - thesis committee
 - rotation student
 - summer student
 - undergraduate student
 - high school student

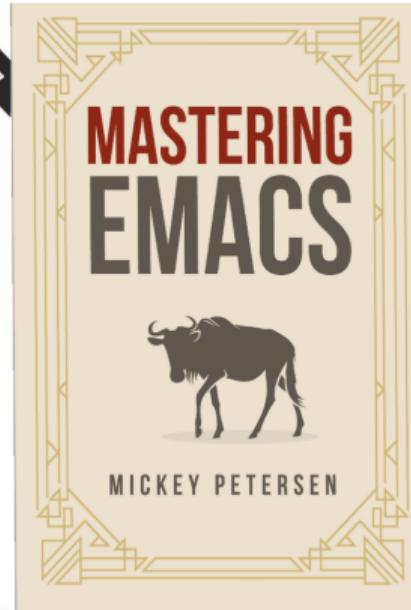
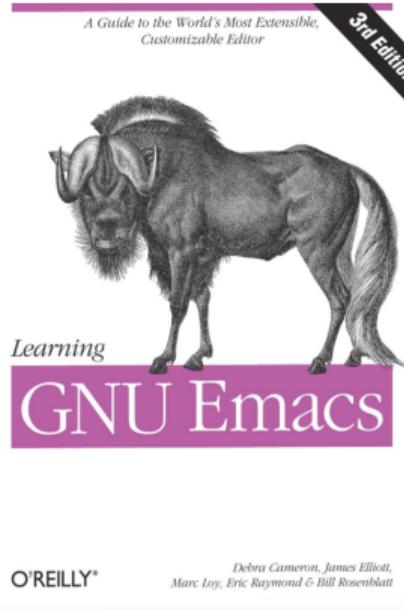
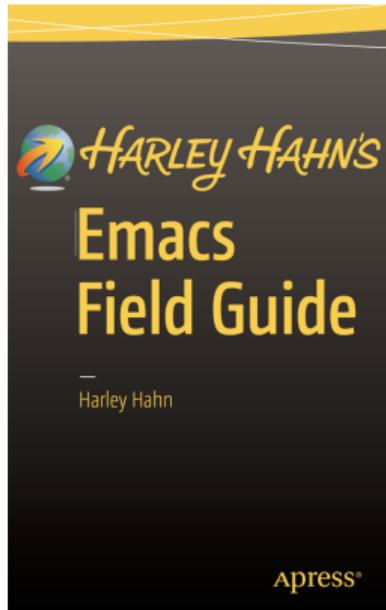
Service:

- manuscript reviewer
- special issue editor
- associate editor
- journal editor
- workshop chair
- meeting organizer
- committee chair
- grant reviewer
- core lab director

Introduction to org-roam-ui



Books about Emacs



GNU Emacs Manual

Seventeenth Edition, Updated for Emacs Version 26.3.

Richard Stallman et al.

Glickstein (1997) Writing GNU Emacs Extensions. O'Reilly.

Web sites (hyperlinks in slides)

- Marcus' tutorials on Emacs
- Org-mode worg link
- Emacs Wiki
- MELPA
- Planet EmacsLife
- Sacha Chua's weekly newsletter
- Awesome Emacs
- GitHub /emacs | , 47.9 K repositories
- Jake Boxerman YT, Columbia U student
- John Kitchin (Org-ref, Scimax) YT
- Gavin Freeborn YT
- Dave Wilson's System Crafters YT
- Protesilous 'Prot' Stravou YT
- Emacsconfs (160 h of on-line content, 2013, 2015, 2019-2023, Dec. 7 and 8 2024)

Packages auto installed by straight

```
> ls straight/build
ace-window           lsp-grammarly          queue
avy                  lsp-latex              request
cfrs                lsp-ltex               s
citar                lsp-mode               seq
citeproc              lsp-treemacs          spinner
company              lsp-ui                 straight
company-box          lv                    string-inflection
compat               marginalia            tablist
consult              markdown-mode         treemacs
dash                 math-preview          treemacs-icons-dired
eldoc                org                  treemacs-persp
exec-path-from-shell parsebib             treemacs-projectile
f                    pdf-tools             undo-tree
frame-local          persp-mode            vertico
grammarly            pfuture              websocket
ht                  popup                yasnippet
hydra                posframe             youtube-sub-extractor
let-alist            projectile
```

emacs -Q ;; Start Emacs without packages.

Demo with new org file

- header section
- headlines
- folding and expanding with tab
- shuffling of items in lists
- shuffling of sentences written OSPL
- table creation
- using LaTeX directly and with keywords
- opening images in adjacent buffers

Elisp function to play YouTube video in MPV

```
install mpv (Homebrew, MacPorts, yum, etc.)
sudo curl -L https://yt-dl.org/downloads/latest/youtube-dl \
-o /usr/local/bin/youtube-dl
sudo chmod a+r /usr/local/bin/youtube-dl

(defun play-youtube-video (url)
  "Play a YouTube video with mpv."
  (interactive "sYouTube URL: ")
  (start-process "mpv" nil "mpv" URL))C-x C-e in scratch buffer
```

Minibuffer:

M-x play-youtube-video
