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2009



Tips, Tricks and Software for Keeping Research Organized

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Why Organization Matters for your PhD

- You will do A LOT OF STUFF in 5-7 years!
- Much of it you'll FORGET
- You will WASTE TIME trying to recreate or reproduce work you've already done if you are disorganized
- Your advisor won't teach you this stuff

- IT'S UP TO YOU! -



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Mistakes We've Made

- Not commenting code
- Not taking notes during meetings
- Not keeping track of papers we've read
 - Messy stacks of paper on our desks
- Not using revision control for code and papers
- Not writing down research ideas

- NOT WRITING DOWN STUFF! -



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Bad Assumptions

- I'm the only person who will ever see this source code
- I'm never going to touch this project again
- I can save time by skimping on the documentation
- I'll remember this
- Organization requires too much time/overhead
 - I DON'T HAVE TIME FOR THIS! -



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Things to Consider

- Do I work alone, or with collaborators?
- Do I work on multiple machines?
- Do I have limited amounts of storage?
- Do I need to keep paper records, or record data off my computer?
- Is my work backed up?

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Staying Organized

1. Ideas

- 2. Literature
- 3. Experiments
- 4. Papers



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1 - Ideas

- Keep notes from meetings with advisor, collaborators and reading groups
- Organize by research project
- Track TODO, IN PROGRESS and DONE items.
 DONE items good for status reports
- Keep open space for random thoughts, and revisit that space later



Paper notes







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Pros and Cons

Pros

- Temporary notes
- Drawings

Cons

- Losing notes
- Hard to find
- Not searchable

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• Not portable



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Electronic notes



- Difficult to find material from months ago
- Difficult to organize ideas
- Nice journal form
- Group members can follow and comment



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Pros and cons

- Easy to track progress on items
- Produced massive documents
- Difficult to share with advisor and peers





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	Paperwork	Register for SAC		1.0
	Paperwork	Turn in conference grant to SAO		notes
	TA 191b	Revise code review checklist	February 15, 2009	
	iMuse	Let users set parameters in world view		Share with group
	TA 191b	Read usability 3		$\partial = \partial =$
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	TA 191b	Make new code review groups	February 15, 2009	Not public



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Department poll

- Do you take notes during meetings with your advisor
 13/13 yes
- Do you take notes of research ideas?
 - 11/13 yes
- Do you take notes of todo items?
 - 11/13 yes
- Do you take note of your progress?
 - 9/13 yes

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In Summary

- Notes are important!
- Find a tool that works for you
- Tools we've used:
 - Blogs: blogspot, WordPress, Internal tools,
 - Websites: University servers, Google Sites,
 - Electronic notes: Google notes, Word docs,
- There are tons of others as well



Try this!

Homework

- Look at your notes and define characteristics about them
 - Positive and negative
- Think about what you wish for
- Use these characteristics when choosing a note format and tool

Important to me

• Easy to find, consult

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- Portable
- Searchability



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Staying Organized

1. Ideas

2. Literature

- 3. Experiments
- 4. Papers



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2 - Literature Searches

- Keep track of title, authors, year and publication of papers read (and to read)
- Keep paper copies, electronic copies, or links to electronic copies

- Especially if you highlighted or wrote notes on them

- Write down a summary of points you've grasped, including any criticisms, questions you have.
 - If you only skimmed the paper, make a note of it.



2 - Literature Searches

How?

- EndNote (Windows, Mac)
- Pybliographer (Linux)
- Bibtex (All platforms, Flat file)
 - Annote or note section for comments
- Zotero (browser plug-in)
- Mendeley (All platforms, web)

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What to look for?

- Make citations and bibliographies for papers
- Takes notes
- Links to PDFs

Try to choose a good system early on (hard to change)



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EndNote X2

Windows, Mac

- + Groups of articles (manual)
- + Smart groups (automatic)
- + Lots of citation styles, manually editable
- + Lots of citations types, manually editable
- + Integrates well with word
- Interface a little slow, not pretty

- \$\$\$

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BCI general	(1)		Girouard	2010	From Brain Signals to Adaptive I	(B+H)CI: The Brain in H	Book Secti		
Brainstorming	(43)		Hirshfield	2010	This is Your Brain on Interfaces:	ACM CHI 2010 Confere	Conference		
Brainstorming - brain	(11)		Girouard	2009	Adapting Pacman: Brain Compu	Wellesley College	Presentation		
Cognitive load	(25)		Hirshfield	2009	Brain Measurement for Usability	Proc. CHI'09	Conference		
Emotions	(23)		Millán	2004	Brain-actuated interaction	Artificial Intelligence	Journal Arti		
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To Read - brainstorming (18) Proceeding of the twenty-sixth annual SIGCHI conterence on Human factors in computing systems, ACM,									
To Read - input	(4)		Research Notes: increasing predictability and accuracy is good for user satisfaction						
Words	(8)		Only accuracy has significant effect on performance						
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Mendeley

All platforms + web

- + Integrates well with web
- + Extracts references from papers
- + Easy sharing among colleagues
- + Great interface
- + Word plugin
- Limited document types
- No current manual type
- No current manual style

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Create Collection	$\overset{\wedge}{\Im}$	•	Abowd, G .	, The Human Experience	2002	Pervasive Computing	Volume:	11	
Trash		•	Abraham, .	. Computer-based systems and organizati	1994	Creativity Researc	Issue:	1	
		•	Achille, L B	Considerations in the Design and Developme	1990		Year:	2004	
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Aarts, E Abascal, J	☆	•	Adams, Ra.	. Brain Computer Interfaces: Psychology	2008		DOI:		0,
Abhari, Abdolreza Abi-Ezzi, S	☆	•	Adanez, M.	. Does quantity generate quality? Testing the fun	2005	Spanish Journal	ArXiv ID: PMID:		9
Abowd, G D Abraham, Thomas	☆	•	Agarawala.	. Keepin' it real: pushing the desktop metaphor	2006		Keywords:	ambient intelligence; artificial intelligence;	•
Achille, L B Ackerman, M S Adamczyk Piotr D	☆	•	Aho, A V; J.	. LR Parsing	1974			contemporary interaction; context awareness; digital environments; distributed multimedia; electronic devices;	
Adams K			Abo AV-K	ΔWK Δ Pattern	1979	*		embedded static platform; information	-



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Bibtex

All platform

- + flat file
- + easy to get from ACM and IEEE
- + easy to use with latex

+ machine processable for creating a webpage with all your bibs

+ can include abstract and personal notes

- Not an interface (there are tools)

```
@article{mrx05,
auTHor = "Mr. X",
Title = {Something Great},
publisher = "nob" # "ody"},
YEAR = 2005
@misc{GHC09,
Author = {Rebbapragada, Umaa and Girouard, Audrey and
Winbladh, Kristina},
Title = {Tips, Tricks and Software for Keeping Research
Organized},
Year = \{2009\}\}
@article{
Author = {Allanson, Jennifer and Fairclough, Stephen H.},
Title = {A research agenda for physiological computing},
Journal = {Interacting with Computers},
Volume = \{16\},\
Pages = \{857 - 878\},\
Keywords = {physiological computing, Biofeedback, brain-
computer interface, BCI, Affective computing},
Year = \{2004\}\}
@misc{ Ravaja04,
Author = {Ravaja, Niklas and Salminen, Mikko and
Holopainen, Jussi and Saari, Timo and Laarni, Jari and
J \mid 228, Aki and rvinen},
Title = {Emotional response patterns and sense of presence
during video games: potential criterion variables for game
design},
Publisher = {ACM},
Year = \{2004\}\}
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Pybliographer

Linux

- + Interface for bibtex
- + Customizable, searchable interface
- + Integrates with Lyx, Kile, OpenOffice
- + open source (free)

- Preserves data entry inconsistencies (author: J. Doe vs. Jane Doe)

- Feature set is basic; not as impressive as EndNote

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Zotero

All platform, Firefox plugin

+ Integrates the actual article with citation

- + Easy to import citations from web
- Write and cite is weak

- slow

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Staying Organized

- 1. Ideas
- 2. Literature

3. Experiments

4. Papers



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• What's at stake?

Sanity – You're redoing an experiment, results have mysteriously changed, and you have no clue why.

- Time You're revisiting an old piece of code, but because you didn't comment much of it, are spending a lot of time trying to understand it.
- **Reputation** You skimped on some error checking, found a bug in your code AFTER you've SUBMITTED the paper, and must withdraw the paper.



- Organize filesystem by project, experiment
- Code should be modular

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- Separate code for pre-processing data, running your method, summarizing results, creating figures, tables
- If things go wrong, only need to run portions that went bad
- Experiments should be **reproducible**
 - Store random seeds, input parameters
 - Know versions of code, libraries used







- Use good programming practices
- Handle errors
- Code unit tests
 - Unix diff is your friend!
- Use an integrated development environment (IDE) which integrates with debuggers, revision control
 - i.e., Eclipse



- Use revision control (CVS, SVN, Hg)
- Allows you to sync between different machines
- If multiple users, ensures no collisions
- Use "tagging" to associate a particular version of an experiment (incl. source code and results) with a paper draft







Tag: ICML_2009_SUBMISSION



How?

- Good filesystem organization
- Revision Control
 - CVS, Subversion (SVN), etc.
- Good software practices
 - Use IDEs like Eclipse
 - Use debuggers

What to look for?

- Web-based tools with visual diffs
 - Good for multiple collaborators
- IDE integration with revision control, debuggers

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4. Papers



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4 – Writing Papers

Keep drafts

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- Use a good LaTeX editor (i.e., Kile, Texshop)
- Use revision control and/or track changes
 - Especially if multiple authors
- Keep track of which version submitted where
 - Multiple revisions submitted to a journal, camera-ready copy
- Start early, writing can help organize your thoughts



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Software for Notes

- OneNote
- Word
- Open office
- Google docs
- Text editor
- Emacs org mode
- Latex with svn
- Blogs
- Google sites
- Journal ideas
- iPhone apps
- Notecards

- Mywebspiration online graph making tool
- Citeulike
- Delicious
- Diigo
- Autodesk light
- iPhone whiteboard to share
- Emails
- Mailing list
- Livescribe pen
- Pages (mac)
- Stickies desktop app



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Software for Literature

- Endnote
- Pybliographer
- Zotero
- Medeley

- PDF annotater
- Skim (mac)
- PDF exchange

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- Envivo 8
- Analyzer
- Atlas ti



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Software for Paper-writing

Editors

- Word
- Open office
- Google docs
- TexShop
- Kile
- Lyx
- Winedit

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Sync

- Svn
- Dropbox





Software for Experiments

- Eclipse
- Subversion
- Mercurial
- CVS

- Script that gets the svn version for each experiment
- Matlab double quotes can run different parts

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• Matlab to publish



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Thanks!

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Kristina Winbladh

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