

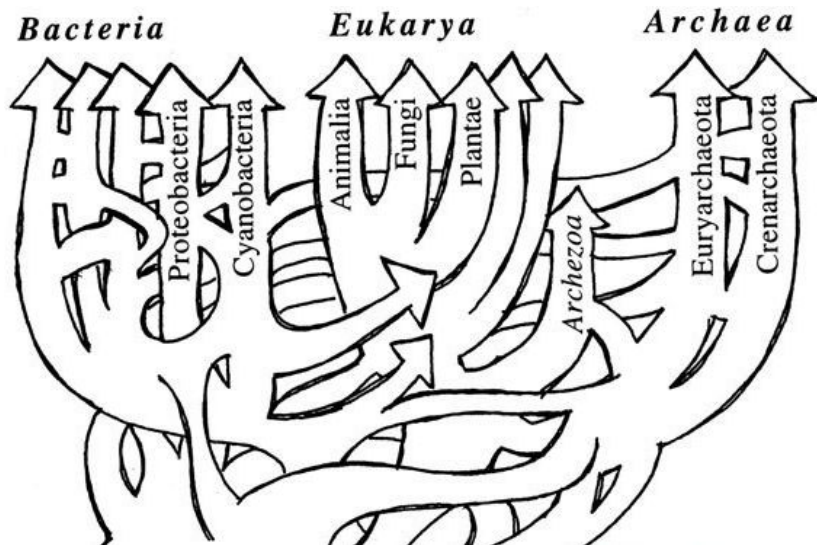
# Digital Lab Journalling with Git

Katrin Leinweber

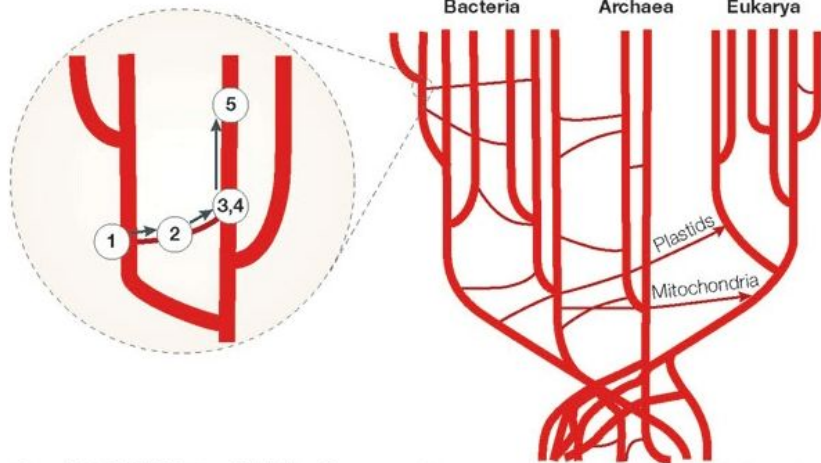
2015-Apr-13

Slides of this presentation with recorded audio  
here

# Tree of Life



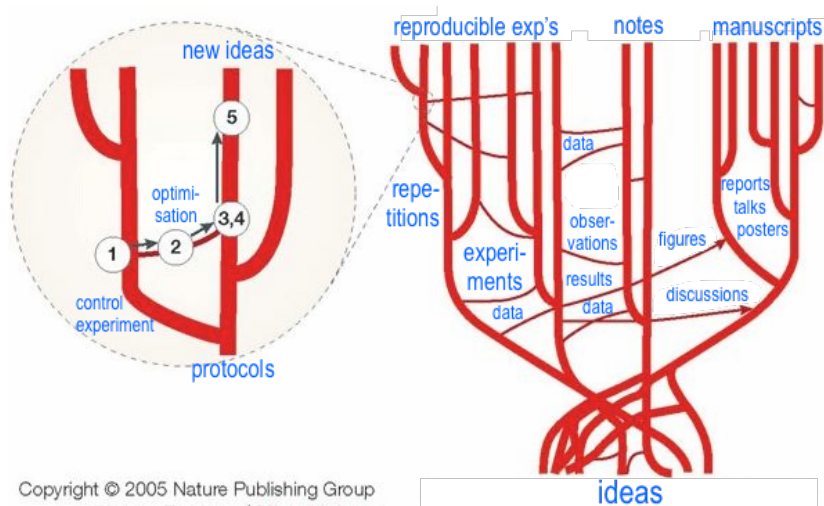
# Tree of Life



Copyright © 2005 Nature Publishing Group  
**Nature Reviews | Microbiology**

Common ancestral community of primitive cells

# Tree of Projects



Copyright © 2005 Nature Publishing Group  
modified **Nature Reviews | Microbiology**

# Git tracks digital evolution of files

- ▶ highlights exactly what changed, line by line
- ▶ makes you comment file changes

proof-read



Katrin Leinweber

158fc2f

12

12

13

- Identification of *\*A. minutissimum\** capsules (asterisks) by subsequent observation of cell clusters by both bright-field and scanning electron microscopy of xenic biofilm (scale bars: 5  $\mu$ m).

13

+ Identification of *\*A. minutissimum\** capsules (asterisks) by successive observation of cell clusters by first bright-field and then scanning electron microscopy of xenic biofilm (scale bars: 5  $\mu$ m).

14

14

Git is your file watchdog.



# Good against: too many files

	old manuscript versions	29. Mrz. 2015 15:38
106 KB	141218b KL - AchMi SEM - finally ready for PeerJ.odt	18. Dez. 2014
4.727 KB	141218b PJ - AchMi SEM - review.pdf	18. Dez. 2014
29 KB	150216 AchMi SEM rebuttal.docx	18. Feb. 2015
169 KB	150216 KL - AchMi SEM - changes requested by PJ.odt	16. Feb. 2015
202 KB	150216 KL - AchMi SEM - changes requested by PJ.pdf	16. Feb. 2015
104 KB	150216 KL - AchMi SEM - clean requested by PJ.odt	26. Mrz. 2015
4.684 KB	150218 PJ - AchMi SEM - review.pdf	18. Feb. 2015
9.905 KB	150318 KL - AchMi SEM - peerj858-proof.pdf	19. Mrz. 2015
104 KB	150318 KL - AchMi SEM - proofing.odt	18. Mrz. 2015
9.963 KB	150319 PK - AchMi SEM - peerj858-proof.pdf	20. Mrz. 2015
9.912 KB	150320 KL - AchMi SEM - peerj858-proof.pdf	26. Mrz. 2015
104 KB	150326 KL - AchMi SEM - proofed.odt	26. Mrz. 2015
18 KB	AchMi sizes.ods	9. Sep. 2014 1
1.201 KB	Katrina's AchMi SEM Manuskript nicht übernommene Korrekturen beantwortet.pdf	23. Okt. 2014














Good for: tidy project folders, but...

Include in library ▾ Share with ▾ Slide show Burn New folder





	Size	Name	Date	Type
140225 - AchMi biotest				
140330 - 18m summary				
140808 - AchMi SEM				
fig_attachment				
fig_attachment - FigShare				
fig_attachment_old				
fig_ax-fibrils				
fig_capsule-material				
fig_CLEM				
fig_compare				
fig_CV Chl				
fig_EDX				
fig_induced-apical-EPS				
fig_legends				

# Good for: ... version history still accessible

## Unsynced changes

	remove meta-info 2 days ago by Katrin Leinweber
	proof-read 16 days ago by Katrin Leinweber
	fixed judgemental "outlier" designati... 26 days ago by Katrin Leinweber
	reverted SF2 scale bar variant 1 month ago by Katrin Leinweber
	Peter's corrections & scale bar varian... 1 month ago by Katrin Leinweber
	moved incubation times to legends 1 month ago by Katrin Leinweber
	150213 PJ requests coherent label siz... 1 month ago by Katrin Leinweber
	renamed 1 month ago by Katrin Leinweber
	initial commit: as in 150211 PJ AchMi... 1 month ago by Katrin Leinweber
	 Added .gitattributes 1 month ago by Katrin Leinweber

## proof-read

	Katrin Leinweber		 
12	12		
13		- Identification of *A. minutissimum* capsules (asterisks) by subsequent observation of cell clusters by both bright-field and scanning electron microscopy of xenic biofilm (scale bars: 5 µm).	
	13	+ Identification of *A. minutissimum* capsules (asterisks) by successive observation of cell clusters by first bright-field and then scanning electron microscopy of xenic biofilm (scale bars: 5 µm).	
14	14		
15	15	**A:** Bright-field micrograph of crystal violet (CV) stained, 31 days old culture. Encapsulated cells (asterisks) are strongly stained, while weak staining indicates few extracellular polymeric substances (EPS) on the frustule surfaces. **B:** Scanning electron micrograph of the the same cell cluster. Encapsulated cells (asterisks) are surrounded by an opaque material. Frustule pores are visible on cells that did not possess a capsule in the hydrated biofilm. Note also the unequal distribution of bacteria ...(line truncated)...	
16	16		
...	...	@@ -30,7 +30,7 @@ Comparison of microstructures on *A. minutissimum* cell surfaces in a xenic biof	
30	30		
31	31		
32	32		
33		- Scanning electron micrographs of terminal parts of *A. minutissimum* cells at potentially different encapsulation stages of xenic biofilms (scale bars: 1 µm).	
	33	+ Scanning electron micrographs of terminal parts of *A. minutissimum* cells at potentially different encapsulation stages within xenic biofilms (scale bars: 1 µm).	
34	34		

# Version control with Git

## Technical



















- ▶ works best for line- or paragraph-based files
- ▶ built for source code, but also useful for texts and simple images
- ▶ less useful for complex or large file types
- ▶ not a substitute for full backups

## Cultural

- ▶ helps build self-explanatory & verifiable project documentation (for your future self, colleagues, students, reviewers. . . )
- ▶ enables less painful collaboration on same set of files
- ▶ conflicts only if same lines in same file get changed
- ▶ for text files: better than syncing tools

# Basic Git vocabulary: repository/repo

- ▶ project folder watched by Git
- ▶ is still a normal folder: add, edit & delete files normally
- ▶ database of file versions in hidden subfolder

	.git	5. Okt. 2014 13:42	File folder
	32 KB .RData	13. Mrz. 2015 15:00	RDATA File
	5 KB Figure 7 attachment.pdf	13. Mrz. 2015 14:26	Adobe Acrobat Document
	1 KB Figure 7 basic stats.csv	13. Mrz. 2015 14:26	OpenOffice.org 1.1 Tabelle
	1 KB fig_attachment.Rproj	13. Mrz. 2015 14:00	R Project
	655 KB Figure_7_attachment_documentation.html	17. Feb. 2015 09:42	Firefox HTML Document
	15 KB Figure_7_attachment_documentation.docx	17. Feb. 2015 09:42	Microsoft Word-Dokument
	155 KB Figure_7_attachment_documentation.pdf	17. Feb. 2015 09:24	Adobe Acrobat Document
	4 KB Figure 7 attachment documentation.Rmd	17. Feb. 2015 08:45	RMD File
	9 KB Figure 7 attachment.eps	9. Feb. 2015 17:13	IrfanView EPS File
	1 KB 141005a_fig_attachment - basic stats - 11d.csv	8. Feb. 2015 17:20	OpenOffice.org 1.1 Tabelle
	1 KB 141005a_fig_attachment - basic stats - 20d.csv	8. Feb. 2015 17:20	OpenOffice.org 1.1 Tabelle
	1 KB 141005a_fig_attachment - basic stats - 31d.csv	8. Feb. 2015 17:20	OpenOffice.org 1.1 Tabelle
	1 KB 141005a_fig_attachment - basic stats.csv	8. Feb. 2015 17:20	OpenOffice.org 1.1 Tabelle
	74 KB Figure 7 attachment 31d.png	6. Feb. 2015 15:25	IrfanView PNG File
	84 KB Figure 7 attachment.png	6. Feb. 2015 15:25	IrfanView PNG File
	66 KB Figure 7 attachment 11d.png	6. Feb. 2015 15:25	IrfanView PNG File
	72 KB Figure 7 attachment 20d.png	6. Feb. 2015 15:25	IrfanView PNG File

# Basic Git vocabulary: committing



- ▶ saving a logical set of file changes in Git, together with meaningful comment
- ▶ changes can be within single file, or across different ones
- ▶ **commit history**: self-explanatory & verifiable documentation

## Basic Git vocabulary: .gitignore



- ▶ file that contains a repo's rules for ignoring files
- ▶ No preview of highlighted changes? Large file?  
Auto-generated? Rather ignore those!



# Basic Git vocabulary: .gitignore in GitHub for Windows

 Sync | 

proof-read

 Katrin Leinweber  158fc2f

▼ F0-legends.md

...	...	@@ -10,7 +10,7 @@ Micrograph and is a merge of the chlor
10	10	
11	11	
12	12	
13		- Identification of <i>A. minutissimum</i> capsules (asterisks) by subsequent observation of cell clusters by both bright-field and scanning electron microscopy of xenic biofilm (scale bars: 5 $\mu$ m).
	13	+ Identification of <i>A. minutissimum</i> capsules (asterisks) by successive observation of cell clusters by first bright-field and then scanning electron microscopy of xenic biofilm (scale bars: 5 $\mu$ m).

Repository settings...

Open in Explorer

Open in Git Shell

View on GitHub

Undo most recent commit

Options...

About GitHub for Windows...

# Vocabulary summary

## repository/repo

- ▶ project folder watched by Git, plus hidden database of file versions

## committing

- ▶ composing logical set of file changes and meaningful commit message

## .gitignore

- ▶ a repo's ignore rules for non-essential files & file types



# How to start using Git?

1. download client from [windows.github.com](https://windows.github.com) (any other from [git-scm.com/downloads/guis](https://git-scm.com/downloads/guis)) & install
2. start with small sub-project (protocol optimisation, diagram in R, report, etc.)
3. **besides working on the files themselves:** commit logically connected changes often
4. **recommended:** start writing texts in Markdown<sup>1</sup> format
5. **optional (for collaboration etc.):** create account with Git hosting service like GitLab or GitHub

---

<sup>1</sup>Possible in Word with Writage add-in

# Thanks to & Further Reading

## Writing with Git

- ▶ “Markdown Basics” and “Mastering Markdown” by GitHub
- ▶ “Scientific Markdown” by Jens Erat
- ▶ “Paper Now” by PeerJ

## Git in Science

- ▶ “Git/GitHub: a Primer for Researchers” by Carly Strasser
- ▶ “We Need a Github of Science” by Marcio von Muhlen
- ▶ “Git for Scientists” by Molly Gibson

## Git concepts & tech

- ▶ “Learn Version Control with Git” by Fournova
- ▶ “10 Years of Git: An Interview with Git Creator Linus Torvalds” by Jennifer Cloer

Thanks for your attention! Questions?

