

Electronic laboratory notekeeping at the Göttingen Campus

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Electronic laboratory notekeeping

What is an ELN?

Paper laboratory notebook

October 15 1998

Digest:

2 µl p116 MET25	2.5 µl pGEN6.2MA Eno24/AA
4.5 µl UNIVERSAL B	4.5 µl UNIVERSAL B
22.5 µl H ₂ O	22.5 µl H ₂ O
0.5 µl BstHI	0.5 µl BstHI
0.5 µl EcoRI	0.5 µl EcoRI

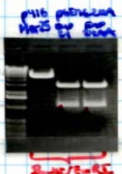
→ D CIP

Ligs:

6 µl p116 MET25
2 µl Eno24/AA / H ₂ O
17 µl H ₂ O
3 µl T4-LIG B
0.5 µl T4-LIGASE

AND TRANSFORM AFTER 4h OF LIGATION

Digest TEMPLATE-DNA FOR MAKING RNA:



Electronic laboratory notebook (ELN)

Close Save as Template Delete Sign

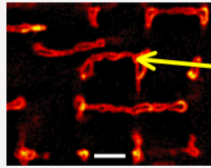
Home / AG Lehnart Demo / Experiments / Experiment 1 based on Template AG Lehnart STED Microscopy Image Acquisition

Name: Experiment 1 based on Template AG Lehnart STED Tags: di-8-ANEPPS, STED, Microscopy, Fluorescence SD381

Microscopy Image Acquisition

Publication

Wagner et al. 2012



Dye

di-8-ANEPPS

Excitation in nm

490

laser

pulsed diode laser (Pico TA 490, Toptica, Munich, Germany)

Challenges

Introduction of an ELN in academic research environments

- No routine workflows (basic research)
- Dynamic working structures (heterogeneous methodology)
- High dynamics of interdisciplinary team composition
- Data management/access policies rarely defined

Experimental documentation

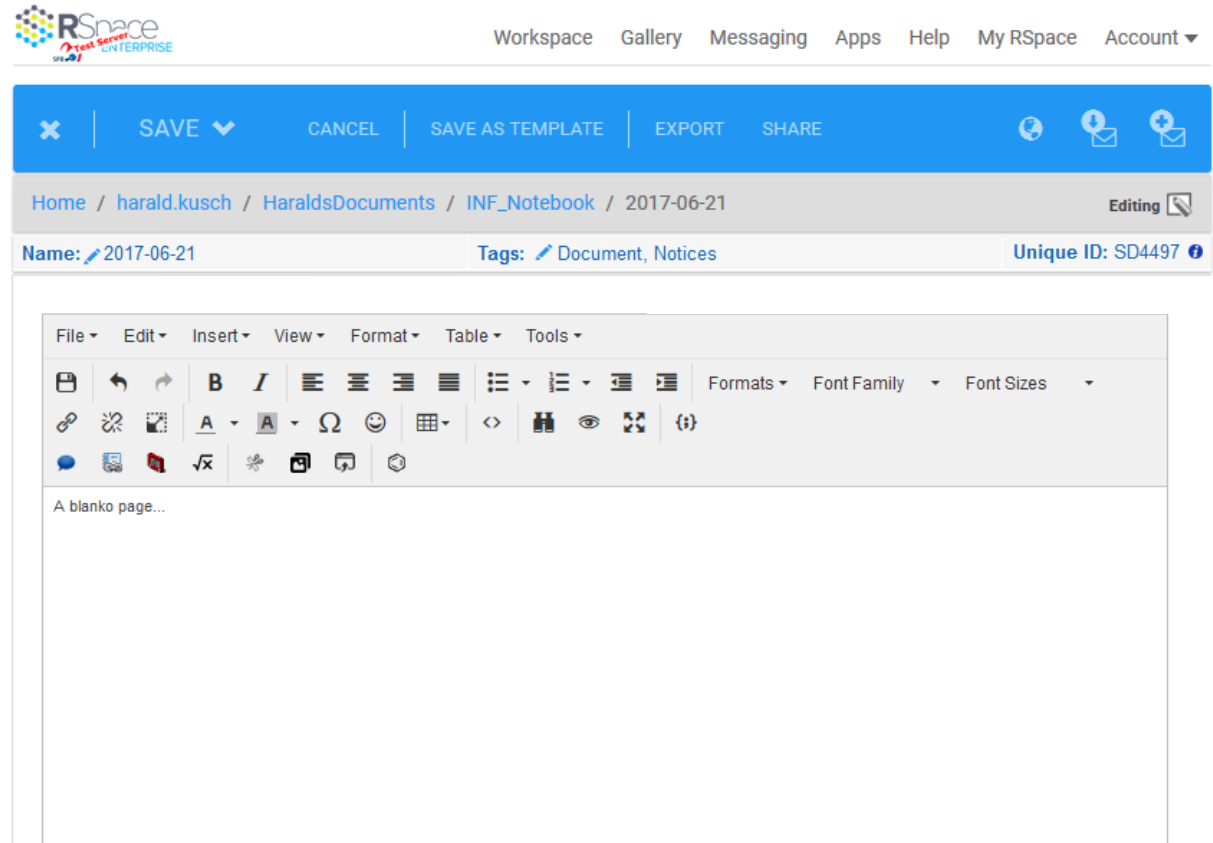
Heterogeneous aims

- Daily lab/field work
- Authority reporting
- Research group internal management
- Research Consortium internal management
- FAIR/Open Science approaches

ELN

Unstructured documentation

- New methods
- Room for “creativity”



The screenshot displays the RSpace software interface. At the top left is the RSpace logo with the tagline "Next Server ENTERPRISE". The top navigation bar includes "Workspace", "Gallery", "Messaging", "Apps", "Help", "My RSpace", and "Account". Below this is a blue action bar with buttons for "SAVE", "CANCEL", "SAVE AS TEMPLATE", "EXPORT", and "SHARE". The breadcrumb path is "Home / harald.kusch / HaraldsDocuments / INF_Notebook / 2017-06-21". The document title is "Name: 2017-06-21" and it has tags "Document, Notices" and a "Unique ID: SD4497". The main editing area features a rich text editor with a menu bar (File, Edit, Insert, View, Format, Table, Tools) and a toolbar with various icons for text formatting, alignment, and insertion. The content area is currently blank, displaying "A blanko page...".

ELN

Structured documentation

- Centralized protocols
- Learning tool
- Quickly shared
- Metadata recording facilitated

Name: Western blot Tags: Unique ID: SD5059

Field ▾
17/01/2017

Samples

Sample cells 1
Sample cells 2
Sample cells 3

Block solution

250 ml, 25 ml 10 X TBS, 12.5 g milk powder

Block solution date

17/01/2017

Primary antibody

GST 1mg/ml, Roth 3998.1

Link to research data platform

<https://fbf1002.med.uni-goettingen.de/production/>

Primary antibody dilution

1:1000

Primary antibody incubation time in min ▾

60 min
 90 min
 overnight
 other

Primary antibody incubation temperature

RT

Secondary antibody

IRDye 800 CW Donkey anti-Rabbit IgG

Secondary antibody supplier

P/N 926-32213, LI-COR INC.

Secondary antibody dilution

1:5000

ELN: cross-linking

Institutional filestore connectivity

- Cross-linking of primary research data
- Enables remote access to lab data
- Exports contain selected primary data and automatic lists of cross-linked data

Owner: Harald Kusch Calculation Table Example Page: 3

Network files

File System Id	File System URL	Path
1	smb://filer4.be-mrz.med.uni-goettingen.de/Gruppenaufwerk_ML_Prak/Projekte/SFB1002/ELN_Filestore	eCAT-Schulung/ImportExcel.xlsx

Export date: 2018-02-27 Exported by: Harald Kusch

File details:
Name: ImportExcel.xlsx
Full path: eCAT-Schulung/ImportExcel.xlsx
Stored on a File System:
Name: Mltest
URL: smb://filer4.be-mrz.med.uni-goettingen.de/Gruppenaufwerk_ML_Prak/Projekte/SFB1002/ELN_Filestore

Download

OK

This entry shows the ca
RIPA buffer
<http://www.abcam.com/protocols/buffer-and-stock-s>
ImportExcel.xlsx

RIPA buffer contains the ionic detergent sodium deoxycholate as an active extracts. A RIPA buffer gives low background but can denature kinases. It immunoprecipitations and pull-down assays.

50 mM Tris HCl, p
150 mM NaCl
1% NP-40
0.5% sodium deo
0.1% SDS

Filestore: Test

- FirstFolder
- ImportExcel.xlsx
- Journal.pone.0025290.pdf
- Microscopy.PNG
- PCR-Wiki.png
- SecondFolder
- Test
- TestImportRSpace.docx
- Thumbs.db
- westernblot.jpg

File Explorer: eCAT-Sch...
Name
FirstFolder
SecondFolder
Test
ImportExcel.xlsx
Journal.pone.0025290.pdf
Microscopy.PNG
PCR-Wiki.png
TestImportRSpace.docx
Thumbs.db
westernblot.jpg

Order by: Select None

Insert

) must be protected from light.

	D	E	F	G	H
1		I RIPA Buffer			
150		ml NaCl stock solution			
50		ml Tris HCl stock solution			

ELN: cross-linking local RDM web services

- e.g.:
- menoci.io
 - Omero
 - Jupyter
 - Gitlab
 - ...

The screenshot shows the OMERO web interface. On the left is a file explorer showing a directory structure under 'Harald Kusch'. The main area displays a microscopy image of cells. On the right, the 'Image Details' panel shows the following information:

- Image ID: 156
- Owner: Harald Kusch
- Image Name: IEM_SIRT2_PTG_WT_779-0723_1_400_1_16000_2.tif
- Acquisition Date: 2019-07-05 14:02:00
- Import Date: 2021-10-06 16:29:03
- Dimensions (XY): 2048 x 2048
- Pixels Type: uint8
- Pixels Size (XYZ) (µm): 0.00 x 0.00 x -
- Z-sections/Timepoints: 1 x 1
- Channels: 2048 HSC
- ROI Count: 0

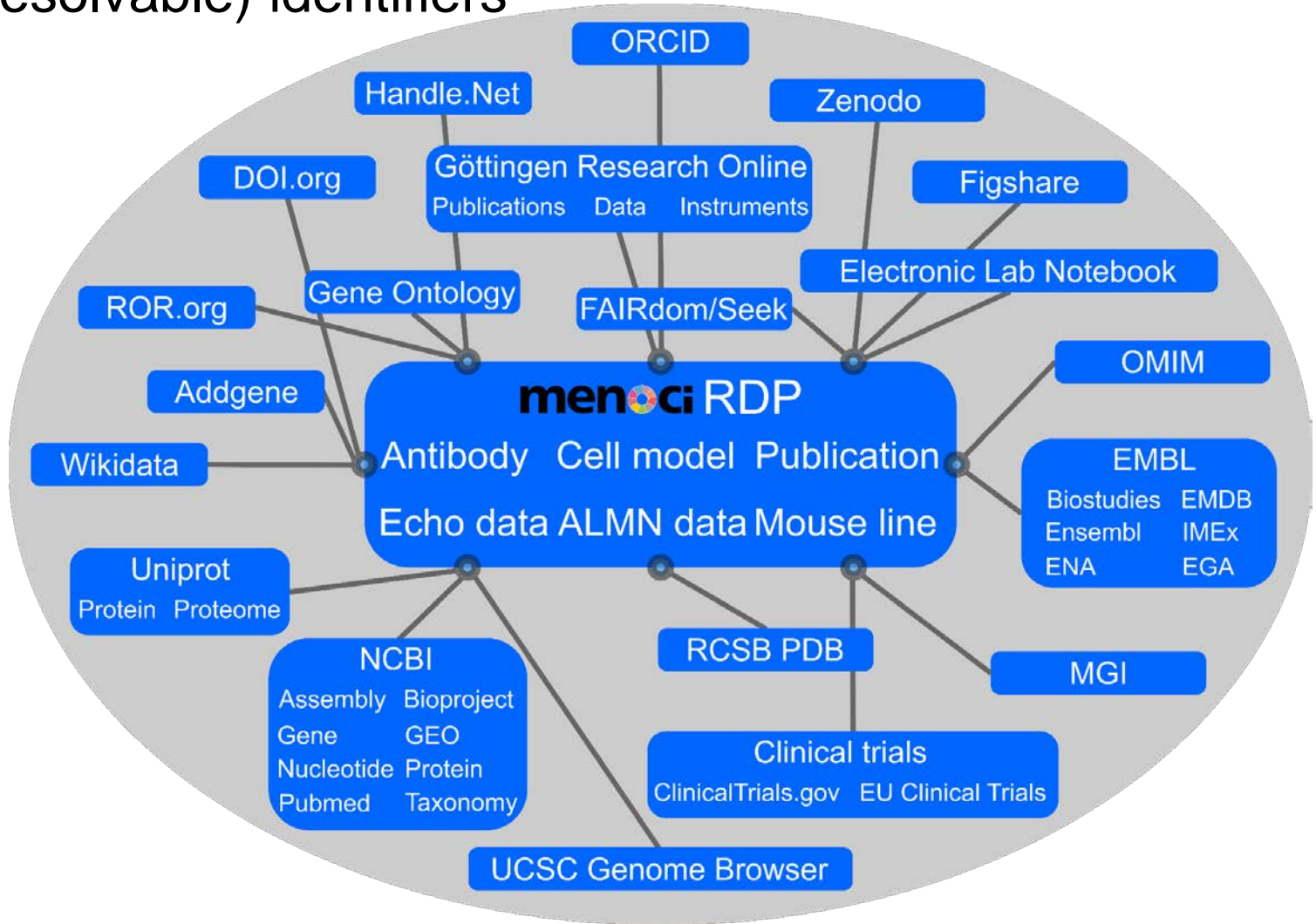
The screenshot shows the 'Antibody Catalogue' web interface. It includes a search bar and a table of 'New primary antibodies'.

AG	PID	Antigen Symbol	Antibody Registry	Name	Clonality	Antigen	Quality	Company	Catalog no.
primary-0856		TFAM	AB_10717737	TFAM MaxPab rabbit polyclonal antibody (D01)	polyclonal	TFAM (NP_003192.1, 1 a.a. ~ 246 a.a) full-length human protein.	-	Abnova	H00007019-D01
primary-0855		BrdU	AB_305426	Anti-BrdU antibody [BU1/75 (ICR1)] - Proliferation Marker	monoclonal	The details of the immunogen for this antibody are not available.	-	Abcam	ab6326

ELN: cross-linking “Knowledge Graph”

Persistent (resolvable) identifiers

+
Metadata



ELN: data publishing

automatic integration with campus repository

Persistent identification via DOI and ORCID integration

The screenshot displays the RSpace Enterprise interface. On the left, a workspace shows an R script for ETL processing. A modal window titled 'Required Information for Repository Deposit' is open, prompting the user to choose a repository (DATAVERSE eln) and providing instructions for activating 'FIGSHARE' and 'DSpace' apps. The main interface shows the 'Göttingen/eResearch Alliance' header, the user's profile 'eRA > electroniclabnotebook', and a search bar. Below the search bar, a list of results is shown, including a draft entry for 'ETL Script 0.1' by Harald Kusch, dated Nov 17, 2017. The entry includes a citation metadata section with the Dataset Persistent ID doi:10.5072/ITXS37 and the author's name and ORCID.

```
#postscript(family="Times", "multi.ps", width=40)
#pdf(family="Times", "multi.pdf", width=40)

# draw points (offsets 1s for color)
offsets <- c(0.0, 0.3, 0.3, 0.6, 0.6)
linethick <- c(0.5, 0.5, 0.5, 1.5, 1.5)
leg.txt <- c(
  "actual p(novel)",
  "p(novel), method X",
  "p(novel), method X+stdev",
  "p(novel), method X-fac",
  "p(novel), method X-fac+stdev")

#read source file
data_table <- read.table("multi.data",
  col.names=c("vy1", "vy2", "vy3", "vy4", "vy5", "vy6", "vy7"))

#cbind() forms matrices by binding together matrices horizontally,
#the columns are not cbind() vertically on separate
```

Required Information for Repository Deposit

Please choose a repository to submit your export in 'DATAVERSE':

DATAVERSE eln DATAVERSE eln

App 'FIGSHARE' requires activation to be available. Please ask your sysadmin to activate 'FIGSHARE'.

App 'DSpace' requires activation to be available. Please ask your sysadmin to activate 'DSpace'.

Göttingen/eResearch Alliance

eRA > electroniclabnotebook

Contact Share Edit

Search this dataverse... Find Advanced Search Add Data

Filter Results

Author Name: Harald Kusch

1 to 10 of 15 Results

ETL Script 0.1 Draft Unpublish

Nov 17, 2017

Harald Kusch, 2017, "E"

This is the RSpace-Doc

Citation Metadata

Dataset Persistent ID

doi:10.5072/ITXS37

Title

ETL Script 0.1

Author

Harald Kusch (University Medical Center Göttingen) - ORCID: 0000-0002-9895-2469

Contact

Use email button above to contact.

ELN: implementations Göttingen

One ELN fits all?

- Heterogeneous applications (examples, not complete!)
 - Life sciences: RSpace, Labfolder, eLabFTW, Jupyter, Redcap, self developments
 - Chemistry: Rspace, self developments
 - Physics: Confluence, self developments
- A variety of research groups plans/wants to change from paper to digital

ELN: implementations Göttingen

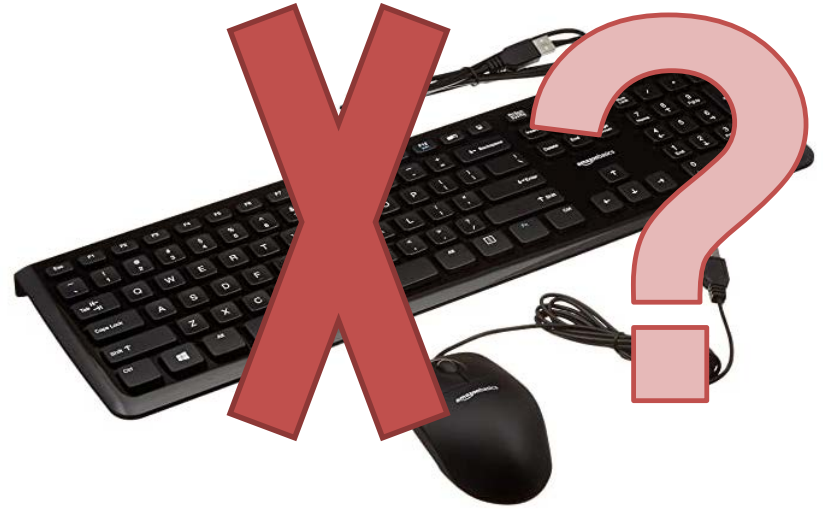
- No or only basic institutional support!
 - License fees or other technical costs often financed via project funding
 - Persons („Admins“) often not officially available
- Open source vs. proprietary
 - Current open source solutions (e.g. eLabFTW) are too rudimentary developed for several user groups
 - Adaptions to current needs require costly (unavailable?) personal resources

ELNs: recent changes = new challenges

- ELNs get „normal“: Scientists more and more work (daily) with ELNs
- When scientist move they want to migrate their ELNs to new locations
- Large consortia: different ELNs need to be integrated
- “Source data”: increasingly life science journals require (meta)datasets for each figure in an article
- Long term archiving: What (exactly) to do with alumni ELN data sets?

ELNs: The (near?) future

- Alternative input methods: Voice recognition
 - Labtwin.com
 - Labvoice.ai
- Interfacing
 - application programming interface (API)
 - Standard development (e.g. REST)
- Offline documentation (synchronization)???



ELNs: The (near?) future – voice commands

1. Design of protocol in browser app

The screenshot shows a web interface for designing a protocol. At the top, there is a breadcrumb trail 'Protocol-15092020_buffer...' with a link icon, a yellow dot, and a 'Generate Report' button. Below this, a vertical timeline lists three steps, each with a trash icon to its right:

- Step 1:** Add 10 ml buffer A
- Step 2:** Add 100 ml buffer B
- Step 3:** Shake for 5 minutes.

At the bottom left, there is a '+ Add Step' button.

2. Application of protocol in mobile app

The screenshot shows a mobile app interface. At the top, a blue speech bubble contains the text '„Avocado ... read protocol“'. Below it, a status bar shows icons for location, mail, and lock, along with signal strength, Wi-Fi, 67% battery, and 17:30. A checkmark icon is followed by the text 'Protocol-15092020_buffermix'. Below this, three steps are listed in separate boxes:

- Step 1:** Add 10 ml buffer A
- Step 2:** Add 100 ml buffer B
- Step 3:** Shake for 5 minutes.

A speaker icon is positioned to the left of the Step 1 box, indicating audio playback.

Summary

- Many benefits by introducing ELN documentation
- Familiarize: Ideal versus real software
- Interfaces to connect heterogeneous applications at a large Campus
- Increasing routine ELN usage evokes new challenges

INF team



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