Online intro to elabFTW

July 14th, 2020
Dominik Brilhaus
Housekeeping

- This seminar is being recorded!

- Discussions after the talk
  - Use “raise hand” to discuss live
  - Use the question panel and ask me or the general audience

- Links to slides and recordings will be shared after the seminar via
  - ELN mailing list and
  - HHU Rocketchat ([https://rocketchat.hhu.de/channel/elb_eln](https://rocketchat.hhu.de/channel/elb_eln))

- Please fill out the survey
The organizers

- Nina Knipprath, Bert Zulauf
  - https://www.fdm.hhu.de

- Stefanie Weidtkamp-Peters
  - https://www.cai.hhu.de
  - https://www.sfb1208.hhu.de

- Hajira Jabeen, Dominik Brilhaus
  - https://www.ceplas.eu
FAIR principles of data stewardship

Findable
Accessible
Interoperable
Reusable

The research data cycle

Planning

Collecting (meta)data

Processing & Analyzing

Publishing & Sharing

Archiving

Re-using

Research Data
Research data management tools

https://www.fdm.hhu.de/fdm-tools.html
Register at https://elabftw.hhu.de/register.php
Register at
https://elabftw.hhu.de/register.php
Getting started with elabFTW

- Register at https://elabftw.hhu.de/register.php
- Login at https://elabftw.hhu.de/
Getting started with elabFTW

- Register at
  https://elabftw.hhu.de/register.php

- Login at
  https://elabftw.hhu.de/

- ZIM ticket system: elabftw@hhu.de
  - Starting a new team
  - Account and admin support
ELN resources @ HHU

- ELN softwares: elabFTW, Labfolder

- Tutorials
  - https://mediathek.hhu.de/playlist/410

- NRW ELN Wiki
  - https://wiki.hhu.de/display/ELB

- Rocketchat channel
  - https://rocketchat.hhu.de/channel/elb_eln
Introduction to *elabFTW*

- Nicolas Carpi
  - Deltablot ([www.deltablot.com](http://www.deltablot.com), [www.elabftw.net](http://www.elabftw.net))

- Alexander Minges
  - [www.biochemplant.hhu.de](http://www.biochemplant.hhu.de) (Prof. G. Groth)

- Iuliia Novoselova
  - [www.medicalphysics.hhu.de](http://www.medicalphysics.hhu.de) (Prof. C. Monzel)

- Jan Meyer
  - [www.neurobiologie.hhu.de](http://www.neurobiologie.hhu.de) (Prof. C. Rose)
The Free and Open Source Electronic Lab Notebook
Summary

- Why use an electronic lab notebook?
- Why use an open source solution?
- Why use eLabFTW?
- Why use Deltablot hosting?
Why use an ELN?

Problem:

Need to store metadata of experiments (what, when, where, who, why, how)
Why use an ELN?

**Problem:**
Need to store metadata of experiments (what, when, where, who, why, how)

**Solution:**
Why use an ELN?

**Problem:**
Need to store metadata of experiments (what, when, where, who, why, how)

**Solution:**

**Limitations:**
- Can be lost or burned
- No backups
- Often empty
- Not readable by others easily
- Can’t search for something
26 August
Testing cell death
20x cells

77% 5% CO2

37% no CO2

CO2 by TRIN

250 no CO2

Arterial pH after next day

Expected 6.2-7.0, then add 3 in incubator 0.1N. I'm not going to add any more.

40°C in cell culture (Leg) (Leg)

Kills cells after a few hours

Not 1-2 hrs, 1-2 3-5 hours

CO2 tunes media, more things a bit but RT really not so bad for cells

Conclusion: I put in media (Leg)(Leg)

10 cells not getting into Petri dish in culture, I think they are stuck there?
Now you want to use an ELN

Problem:
Which one?

“Should we use the free solutions out there?”
“But if it’s free, it means we are the product, right?”
“Those privacy policies mention too many times the word “marketing” to my taste”
Now you want to use an ELN

Problem:
Which one?

“But should I give all my research results to a foreign company on which I have no control?”
“What happens if that company gets bought by a Chinese consortium?”
“What happens to my data if that company closes”
Now you want to use a free and open source ELN

Problem:

Which one?

Well, eLabFTW of course! It’s the most popular one and the most flexible, modern and fast ELN out there!* ;)
eLabFTW

- Developed since 2012
- Free as in beer
- Free as in speech
- 350+ stars on GitHub
- Vibrant users community contributing to the software
- Modern
- Has great features
- Secure
- Popular all over the world
eLabFTW: key features

Web based

No client to install

Responsive design (works with all screen sizes)
eLabFTW: key features

Open source

Access to the source code is immediate

Users contributions are welcome

A good read: The closed source sustainability crisis
eLabFTW: key features

- Trusted timestamping (RFC 3161)
- API access
- SAML authentication
- Templates
- Database for products/protocols
- Export in ZIP, PDF, CSV, JSON
- Molecule editor
- Todolist
- Tex rendering
- Very customizable
- Translated in 17 languages
eLabFTW: community driven development
eLabFTW: key features
For research centers/universities

• Host it on your network
• Centralize your results on one server
  • No data gets lost if a laptop of a postdoc is stolen
  • Several teams can be hosted on the same instance
eLabFTW: quality software

- Test suite (unit, acceptance, static analysis)
- Respects code standards
- Best practices followed
- Modern tooling used
eLabFTW: secure software

- Tight and secure configuration at different levels
- Vulnerability scans
- Signed releases
- Perfect score on Mozilla’s Observatory
eLabFTW: secure software

SSL Report: demo.elabftw.net
Host: demo.elabftw.net
Scan ID #: 10877555 (unlisted)
Start Time: May 22, 2019 1:38 AM
Duration: 4 seconds
Score: 110/100
Tests Passed: 11/11

Security Report Summary
Site: https://demo.elabftw.net/login.php
IP Address: 2001:bc8:31d5:100::1
Headers:
- Strict-Transport-Security
- X-Frame-Options
- X-XSS-Protection
- X-Content-Type-Options
- Content-Security-Policy
- Referrer-Policy
- Feature-Policy
<table>
<thead>
<tr>
<th>Scan Summary</th>
<th>Scan Summary</th>
<th>Scan Summary</th>
<th>Scan Summary</th>
<th>Scan Summary</th>
<th>Scan Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host:</strong> nj-apiplatform.com</td>
<td><strong>Host:</strong> <a href="http://www.ncbi.nlm.nih.gov">www.ncbi.nlm.nih.gov</a></td>
<td><strong>Host:</strong> <a href="http://www.ncbi.nlm.nih.gov">www.ncbi.nlm.nih.gov</a></td>
<td><strong>Host:</strong> app.chematic.com</td>
<td><strong>Host:</strong> <a href="http://www.absnews.com">www.absnews.com</a></td>
<td><strong>Host:</strong> elabftw.80</td>
</tr>
<tr>
<td><strong>Scan ID #:</strong> 18682490</td>
<td><strong>Scan ID #:</strong> 1005246</td>
<td><strong>Scan ID #:</strong> 1005246</td>
<td><strong>Scan ID #:</strong> 18682505</td>
<td><strong>Scan ID #:</strong> 18682505</td>
<td><strong>Scan ID #:</strong> 18682505</td>
</tr>
<tr>
<td><strong>Start Time:</strong> May 22, 2019 12:04 PM</td>
<td><strong>Start Time:</strong> May 22, 2019 12:01 PM</td>
<td><strong>Start Time:</strong> May 22, 2019 12:01 PM</td>
<td><strong>Start Time:</strong> May 22, 2019 12:13 PM</td>
<td><strong>Start Time:</strong> May 22, 2019 12:08 PM</td>
<td><strong>Start Time:</strong> May 22, 2019 12:19 PM</td>
</tr>
<tr>
<td><strong>Duration:</strong> 1 seconds</td>
<td><strong>Duration:</strong> 2 seconds</td>
<td><strong>Duration:</strong> 2 seconds</td>
<td><strong>Duration:</strong> 19 seconds</td>
<td><strong>Duration:</strong> 2 seconds</td>
<td><strong>Duration:</strong> 3 seconds</td>
</tr>
<tr>
<td><strong>Score:</strong> 28/300</td>
<td><strong>Score:</strong> 15/100</td>
<td><strong>Score:</strong> 15/100</td>
<td><strong>Score:</strong> 0/100</td>
<td><strong>Score:</strong> 0/100</td>
<td><strong>Score:</strong> 75/100</td>
</tr>
<tr>
<td><strong>Tests Passed:</strong> 6/11</td>
<td><strong>Tests Passed:</strong> 5/11</td>
<td><strong>Tests Passed:</strong> 5/11</td>
<td><strong>Tests Passed:</strong> 5/11</td>
<td><strong>Tests Passed:</strong> 5/11</td>
<td><strong>Tests Passed:</strong> 10/11</td>
</tr>
</tbody>
</table>
| **Result:** F | **Result:** D | **Result:** F | **Result:** C+ | **Result:** B | **Result:** B | **Result:** C-

eLabFTW: secure software

... not like others...
eLabFTW: supported software

Free support on GitHub
PRO support available from Deltablot
Hosting available from Deltablot

https://www.deltablot.com
contact@deltablot.email
Hosting a web service can be tricky if you don’t have the right knowledge.

HSTS, SSH, TLS, CSP, Docker, Nginx, etc…

Don’t worry about all of that, and use Deltablot’s hosting!

- PRO support included
- Daily backups
- Secure CentOS server (when I say secure I mean paranoid config)
- Free updates on new releases

Get in touch:
contact@deltablot.email
eLabFTW Use Case

Institute of Biochemical Plant Physiology
Introduction

Objectives

- Replace hand-written lab notebooks
  - Searchable
- Central repository
  - Protocols
  - Manuals
  - Lab inventory
- Harmonisation of entries by using templates
Introduction

Current environment

• Self-hosted instance (set up 2015)
  – Historical reasons
• 24 users (total since start of instance)
• > 300 experiments (approx. 75% timestamped)
• > 300 database items
Organisation

“Why aren‘t there any categories?“
Using Tags

- Powerful and flexible – if used correctly
- All users should stick to a agreed-upon style (e.g. all lowercase, CamelCase, etc.)
- Use auto-completion to avoid fragmentation and duplicate tags!
- Use the admin panel to manage tags!
Admin panel

Manage tags of the team

From here you can edit or delete the tags for your team. Click the tag to edit it. Then click the deduplicate button to merge similar tags.

- 2xGST
- 2xGST-AtETR1(1-157)_QTY
- 2YT
- 2YT medium
- Acetonfallung
- activity
Organisation

Experiment status

Admin panel

Add a New Status

Name | Color
---|---

Allow

| Timestamp

SAVE

Edit an Existing Status

Name | Color
---|---
In progress | Blue
Success | Green
Needs to be redone | Gray
Failure | Red

Save | Delete
Organisation

Database items

- From a programmer’s point of view identical to experiments
- Categories (aka „item types“) available
- Additional types via admin panel
- Items may be bookable via calendar (e.g. machines, rooms)
Organisation

Database items

- From a programmer’s point of view identical to experiments
- Categories (aka “item types“) available
- Additional types via admin panel
- Items may be bookable via calendar
Use internal links

- Link to database items related to your experiment
Organisation

Use internal links

- Link to other experiments or database items from within the text
- Enter „#“ to bring up auto-completion
- Start typing to bring up a list of possible results
Time stamps
What are time stamps?

- Proof of defined status at a specific point in time
- Signed by time stamping authority (TSA) e.g. DFN
- Verification of data integrity by cryptographic hash
Time stamps

How to time stamp?

- Choose an experiment status that allows time stamping (e.g. „Success“)
- Click the calendar button in the experiment view
Time stamps

Remember:

• Time stamping will irrevocably lock the experiment!
• Duplication is still possible
• Comments are allowed
Time stamps

Technical background

- PDF of experiment is sent to the TSA
- Attached files are **not** time-stamped
  - Major shortcoming of current implementation
  - Difficult to solve (file size!)
- PDF and generated token can be downloaded for verification
Concluding Remarks

State of adoption

• Used on a daily basis
• Stable and up to the task of replacing our analog notebooks
• Highlights:
  - Full text search
  - Easy download of complete entries as printer-friendly PDFs
  - Protocol exchange (lab inventory)
Concluding Remarks

Things to be improved

• Direct import from proprietary formats (e.g. MS Office)
• Support for experiment categories
• More complex privilege handling (possible with „Groups“ in 3.x)
• Time stamping should include attachments
• Simple signature functionality (see Sneak Preview)
Sneak preview
Signatures

2020-03-26 13:06:24 | Alexander Minges signed and approved revision 1 (current revision is 4).

2020-03-26 13:16:44 | Alexander Minges signed and approved revision 2 (current revision is 4).

2020-07-14 11:02:23 | Alexander Minges signed and approved the current revision.
Thank you for your kind attention!
You have a chance to set up your account in the way you prefer – some options
You belong to the Lab Monzel team. Members: 11 – Experiments: 138 (0 timestamped) – Items: 72

<table>
<thead>
<tr>
<th>NAME</th>
<th>PHONE</th>
<th>MOBILE</th>
<th>WEBSITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornelia Monzel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nina Bartels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mohammad Reza Safari</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amirarsalan Asharion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daniel Kucka</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valeska Rathe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anne Paul</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christina Siepe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Empty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luisa Coen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iuliia Novoselova</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

e-mails are stored under each name
Each group member can enter ➔ we write there ReadMe files & Important general remarks
You can mark your progress after you finish experiment

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Status</th>
<th>Date</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid Mixture</td>
<td>SUCCESS</td>
<td>2020.02.07</td>
<td>Valeska Rathe</td>
</tr>
<tr>
<td>Lipid Monolayer</td>
<td>SUCCESS</td>
<td>2020.02.06</td>
<td>Valeska Rathe</td>
</tr>
<tr>
<td>Vesicle and Measuring chamber preparation</td>
<td>FAIL</td>
<td>2020.02.05</td>
<td>Valeska Rathe</td>
</tr>
<tr>
<td>IN-001-Zeta Potential and Size of &quot;Synomag 50 nm&quot;</td>
<td>RUNNING</td>
<td>2020.02.05</td>
<td>Iuliia Novoselova</td>
</tr>
<tr>
<td>DK00009 Single Molecule Tracking</td>
<td>RUNNING</td>
<td>2020.01.30</td>
<td>Daniel Kuckla</td>
</tr>
<tr>
<td>CellRox</td>
<td>FAIL</td>
<td>2020.01.29</td>
<td>Valeska Rathe</td>
</tr>
</tbody>
</table>
EVERYTHING you input – stays! You cannot delete experiment you have already created.

<table>
<thead>
<tr>
<th>Database</th>
<th>Filter by type</th>
<th>Order by</th>
<th>Sort</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>empty</td>
<td>BIO:CHEMISTRY</td>
<td>2020.01.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>empty</td>
<td>BIO:CHEMISTRY</td>
<td>2019.12.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>empty</td>
<td>BIO:CHEMISTRY</td>
<td>2019.12.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Live) Cell Dyes / Marker</td>
<td>CELL CULTURE</td>
<td>2019.12.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purification kits</td>
<td>BIO:CHEMISTRY</td>
<td>2019.12.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass Beads</td>
<td>BIO:CHEMISTRY</td>
<td>2019.12.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Fixation Reagent (Formaldehyde)</td>
<td>CELL CULTURE</td>
<td>2019.08.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>syringe filters</td>
<td>LAB:GENERAL</td>
<td>2019.08.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Database we create libraries of stuff we have and its location

<table>
<thead>
<tr>
<th>Description</th>
<th>Supplier</th>
<th>Partnumber</th>
<th>Ammount</th>
<th>Location/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenstube Cover</td>
<td>ThorLabs</td>
<td>SC1124</td>
<td>1</td>
<td>26.42.02.34 right table</td>
</tr>
<tr>
<td>f = 400mm Lens A Coating</td>
<td>ThorLabs</td>
<td>AC508-400-A-ML</td>
<td>1</td>
<td>26.42.02.34 right table</td>
</tr>
<tr>
<td>60mm Cage System Removable Lensholder</td>
<td>ThorLabs</td>
<td>LCP90F</td>
<td>2</td>
<td>26.42.02.34 right table</td>
</tr>
<tr>
<td>30mm Cage System 90° Kinematic Mirror Holder</td>
<td>ThorLabs</td>
<td>KCB1C/M</td>
<td>2</td>
<td>26.42.02.34 right table</td>
</tr>
<tr>
<td>40mm Cage System 90° Kinematic Mirror Holder</td>
<td>ThorLabs</td>
<td>KCB2C/M</td>
<td>2</td>
<td>26.42.02.34 right table</td>
</tr>
<tr>
<td>Beam Blocker CW Only 10W</td>
<td>ThorLabs</td>
<td>LB1/M</td>
<td>4</td>
<td>26.42.02.34 Not Installed</td>
</tr>
<tr>
<td>150mm Post</td>
<td>ThorLabs</td>
<td>PH150/M</td>
<td>2</td>
<td>26.42.02.34 powermeter</td>
</tr>
<tr>
<td>1° Dielectric Broadband Mirror</td>
<td>ThorLabs</td>
<td>BB1-E02-10</td>
<td>1(10)</td>
<td>26.42.02.34 Not Installed</td>
</tr>
</tbody>
</table>

Optics & Microscopy Optomechanics IX73
Search

Search in
Experiments

With the tag
Flow Cytometry
#1516
#1531
#1608

And visibility is:
Select visibility

Search only in experiments owned by:
Yourself

Where date is between

And title contains

And body contains

And status is:
Select status

And rating is:
Select number of stars

Space means and

Tip: you can use '%' as wildcard

LAUNCH SEARCH
Create items to book or to inform others about:

→ Holidays, Work Trips, Experimental Setups, Repair Page, etc.
### Olympus IX73 & IX83 - Microscope Booking

<table>
<thead>
<tr>
<th>Time</th>
<th>MON 9/16</th>
<th>TUE 9/17</th>
<th>WED 9/18</th>
<th>THU 9/19</th>
<th>FRI 9/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>6am</td>
<td>6:00-10:00</td>
<td>6:00-10:00</td>
<td>6:00-10:00</td>
<td>6:00-10:00</td>
<td>6:00-10:00</td>
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<tr>
<td>7am</td>
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<tr>
<td>8am</td>
<td>8:00-4:00</td>
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<td>11:30-3:00</td>
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</tr>
<tr>
<td>9am</td>
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<td>11am</td>
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<td>5pm</td>
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<td>7pm</td>
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<tr>
<td>8pm</td>
<td></td>
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</tr>
</tbody>
</table>

- **6:00-10:00** Long-term measurement Corinna (Nina Bartels)
- **8:00-4:00** MNP clustering observation (Nina Bartels)
- **11:30-3:00** Test entry (Team Empty)
- **1:00-4:00** CellRox IX73 60x (Valeska Rathe)

---

**Group Planner**

[Image of a group planner with scheduled tasks for Olympus IX73 & IX83 microscope booking from Sep 16 to Sep 22, 2019.]
Experiment #1

**Goal:**
Measuring the surface charge (Zeta potential) and hydrodynamic size of the MNPs (DLS)

**Procedure:**
In this set of measurements, we want to figure out the concentration effect on the quality and reliability of our measured data. Then we decided to prepare a library of different concentrations as below:

<table>
<thead>
<tr>
<th>Concentration</th>
<th>mg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>0.25</td>
</tr>
<tr>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>0.75</td>
</tr>
<tr>
<td>5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

To calculate concentration, the following formula was applied: \( C_1 V_1 = C_2 V_2 \),
where \( C_1 \) and \( V_1 \) are initial (stock) concentration and volume and \( C_2 \) and \( V_2 \) are final concentration and volume.

Then we performed an ultrasound bath for 10 min (sample pretreatment), which imposes a positive effect on the possible particle aggregation breaking.

We need to switch on the zeta seizer setup at least 30 min before starting the experiment. It is recommended to be sure that setup is warmed-up and it is valid for all laser-based instruments to prevent changes in the measurement.

The setup's initial settings could be found in the following tables.

Usually, for the first measurement, we set the equilibrium temperature time for 300 s, and after that, for the further measurements, we change it to 10 s.

**Results:**
- DLS scattering angle = 173°

**Table:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Record</th>
<th>Data type</th>
<th>Wait time, °C</th>
<th># measurements</th>
<th>#subruns</th>
<th>cuvette</th>
<th>Data (av. #subruns)</th>
<th>st. dev. (dist. error)</th>
<th>dispersant concentration (solution), mg/ml</th>
<th>mobility (μcm/Vs) ± st. dev</th>
<th>Notes</th>
</tr>
</thead>
</table>
Your Creativity to make your Experiment be easily read:

→ Use different Fonts/Sizes/Tables/Colors

Tags to mark project/sample/method/etc

Links in the text
Surely, attach files (figures, plots, etc.) you created and insert them into the text body.

All changes you make are tracked and can be seen by other group members.

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