

RDM in practice – Electronic lab notebooks

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RPTU Summer School

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Content

- Intro to elabFTW as one example for electronic lab notebooks
- Pros & Cons of elabFTW
- Shaping your lab documentation towards FAIR

Check-in

elabFTW @ RPTU: <https://elab.rptu.de/>

⚠️ this is the RPTU elabFTW instance → Changes cannot be deleted.

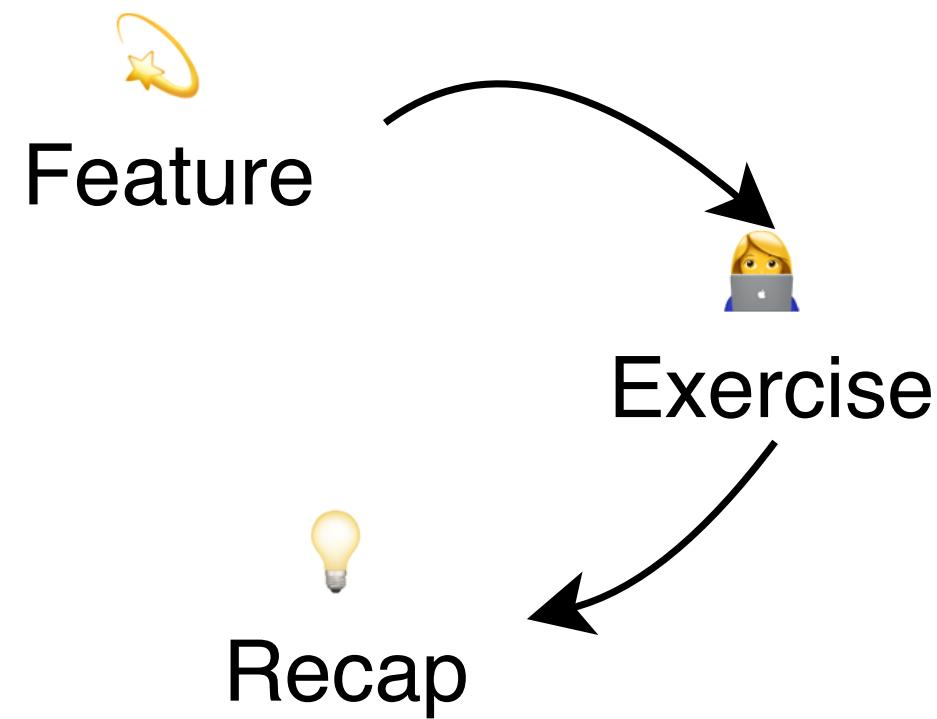
Demo elabFTW: <https://demo.elabftw.net/>

⚠️ this is a public demo → All changes are public

🚀 For today: <https://clerk.cs.uni-kl.de/>

💡 this instance will be deleted after the summer school

Hands-on Circle



Experiments panel

- Create an experiment
- View / edit mode

The screenshot shows the 'Experiments' page of the eLabFTW web application. At the top, there is a navigation bar with links for 'eLabFTW', 'EXPERIMENTS' (which is highlighted in blue), 'DATABASE', 'TEAM', 'SEARCH', and 'DOCUMENTATION'. On the far right of the header, there are icons for search, notifications, help, and user profile, along with a 'Create' button and a notification badge with the number '1'.

The main content area is titled 'Experiments' and contains a table with the following data:

Experiment ID	Name	Status	Last Update
②	My new experiment	RUNNING	2023-07-18
1	2023-03-02_plant-growth	NEED TO BE REDONE	2023-04-12
2	2023-04-11_illumina-libraries	NEED TO BE REDONE	2023-04-12
3	2023-04-01_rna-extraction	NEED TO BE REDONE	2023-04-12
4	2023-03-10_abt-treatment	NEED TO BE REDONE	2023-04-12

At the bottom of the page, there are social media sharing icons (Twitter, LinkedIn, Facebook) and links for 'PRIVACY POLICY' and 'TERMS OF SERVICE'. On the far right, there is a note: 'Powered by eLabFTW 4.7.0' and 'Page generated in 0.03271 seconds'.



Exercise

Create an experiment **Baking pancakes**

1. Ingredients

- Flour
- Eggs
- Milk

2. Procedure

- Mix ingredients
- Fry in pan
- Serve with maple syrup

3.





Recap

- keine Metadaten
- Freitext
- JSON hilfreich
- Daten nicht verlinkt

Categorize

- Tags
- Database
- Link items

Tags

The screenshot shows the 'eLabFTW' software interface. At the top, there is a navigation bar with links: 'eLabFTW', 'EXPERIMENTS' (which is underlined), 'DATABASE', 'TEAM', 'SEARCH', and 'DOCUMENTATION'. To the right of the navigation bar are icons for search, notifications, help, and user profile. Below the navigation bar, the title 'Experiments > Editing an entry' is displayed, along with a 'Create' button. The main form contains fields for 'Started on' (set to '07/18/2023'), 'Title' ('Sugar extraction from plant leaves'), 'Status' ('Running'), and 'Tags' ('Extraction Plants sugar'). There is also a placeholder 'Add a tag'. On the right side of the form, there is a rating star icon.

The screenshot shows the 'eLabFTW' software interface displaying a list of experiments. The title 'Experiments' is at the top, with a 'Create' button. Below the title, there is a button labeled 'Expand all - Select all'. The list of experiments includes one item: 'Sugar extraction from plant leaves' (status: RUNNING). This item has a checkbox, a pencil icon, and a trash bin icon. It also shows the date '2023-07-18' and a '+' button. The experiment title is also listed under the 'Tags' section. At the bottom of the list, there are buttons for 'Filters' and 'Sort'.

Database

The screenshot shows the eLabFTW Database interface. At the top, there is a navigation bar with links for EXPERIMENTS, DATABASE (which is highlighted in blue), TEAM, SEARCH, and DOCUMENTATION. To the right of the navigation are search, filter, and user icons. Below the navigation is a title bar with "Database" and a "Create" button. Underneath is a toolbar with "Expand all - Select all", filter dropdowns for "Ingredients", "Filter owner", "Filter visibility", "Tags", and a "Go" button. There are also "Filters" and "Sort" buttons. The main content area displays a list of database entries under the heading "INGREDIENTS". Each entry includes a checkbox, a pencil icon, the ingredient name, and a timestamp. The entries are:

- Milk (2023-07-18)
- Eggs (2023-07-18)
- Flour (2023-07-18)

At the bottom of the page, there are social media sharing icons, privacy policy and terms of service links, and a note indicating the page was generated in 0.02758 seconds.

The screenshot shows the Admin panel with a header "Admin panel". Below the header is a navigation bar with links for TEAM, GROUPS, USERS, STATUS, TYPES OF ITEMS (which is highlighted in blue), EXPORT, and TAG MANAGER. The main content area is titled "Database Items Types". A descriptive text states: "This menu allows you to define categories for entries in the Database. A database item type is similar to an experiment template but for database entries." A "Create" button is located in the top right corner of this section. Below this is a list item: "Ingredients" with a pencil icon.

Linking items

LINKED ITEMS

🔗 INGREDIENTS - Eggs	+ ↻ 🔍 🗑
🔗 INGREDIENTS - Flour	+ ↻ 🔍 🗑
🔗 INGREDIENTS - Milk	+ ↻ 🔍 🗑

🔍 Ingredients ▾ from the database Add

Database > Viewing an entry Create

Started on 2023-07-18

Ingredients Eggs

Category INGREDIENTS

Visibility All the teams I am part of

Can write All the teams I am part of

Last modified on 2023-07-18 17:08:58
Unique eLabID: 20230718-71611bfef69a54bd08040bf1f0baa333db3d0f70

RELATED EXPERIMENTS

🔗 Baking pancakes +

≡ Show linked experiments



Exercise

Categorize your experiment items

- Use tags → "baking recipes"
- Create database entries → "ingredients"
- link items



Recap

- 2x selbes Item
- Capitalization
- using items in an experiment
- different approaches of linking / resuing items (from database)
- which metadata to add where
- "different ways to do it"
- CV / ontologies
- PIDs



Exercise

Start another experiment **Baking a chocolate cake**

1. Grocery list
 - Flour, Sugar, Eggs, Butter, Milk, Chocolate
2. Steps
 1. Mix ingredients
 1. type of mixer
 2. speed
 3. type of beater
 2. Prepare cake pan
 1. type of cake pan
 2. butter cake pan
 3. Bake
 1. temperature
 2. top heat / circulating air
 3. Cooling phase





Recap



Provide structure: Create templates

The screenshot shows the eLabFTW web application. At the top, there's a navigation bar with links for 'EXPERIMENTS', 'DATABASE', 'TEAM', 'SEARCH', and 'DOCUMENTATION'. On the right side of the header, there are icons for search, notifications, help, and user profile. Below the header, the main content area is titled 'Experiments' with a sub-section 'Baking recipes'. A sidebar on the right contains buttons for 'Create', 'Manage templates', and 'Import from file'. At the bottom of the sidebar, the date '2022-07-10' is displayed.

This screenshot shows the 'User Control Panel' of eLabFTW. The top navigation bar includes 'GENERAL', 'ACCOUNT', 'TEMPLATES' (which is currently selected), 'API KEYS', and 'NOTIFICATIONS'. The main section is titled 'Experiments Templates' and shows a single entry: 'Baking recipes'. Below this entry are fields for 'Title' (set to 'Baking recipes') and 'Tags' (containing 'recipe'). There are also sections for 'Visibility' (set to 'All the teams I am part of') and 'Can write' (set to 'Only me and admins'). Below these settings is a rich text editor toolbar with various formatting options like File, Edit, View, Insert, Format, Tools, Table, Paragraph, and various styling icons. Underneath the toolbar, there are two sections: 'Ingredients' and 'Steps', both of which are currently empty.



Exercise

Create an experiment template for **baking recipes**



Recap

- user-friendly ++
- but a lot of free-text
- templating helps towards reusable structure

Add data to your experiment

▼ ATTACH A FILE



▼ ATTACHED FILE



...

 [pancakes-cc0.jpg](#) 298.64 Kib - 2023-07-19 11:51:54
 Click to add a comment



Recap

Share & Collaborate

Visibility and write access

Experiments > Viewing an entry Create

Edit | Run Schedule Share | Download

Started on 2023-07-18
Baking pancakes

Status RUNNING

Visibility + All the teams I am part of

Can write + Only me and admins

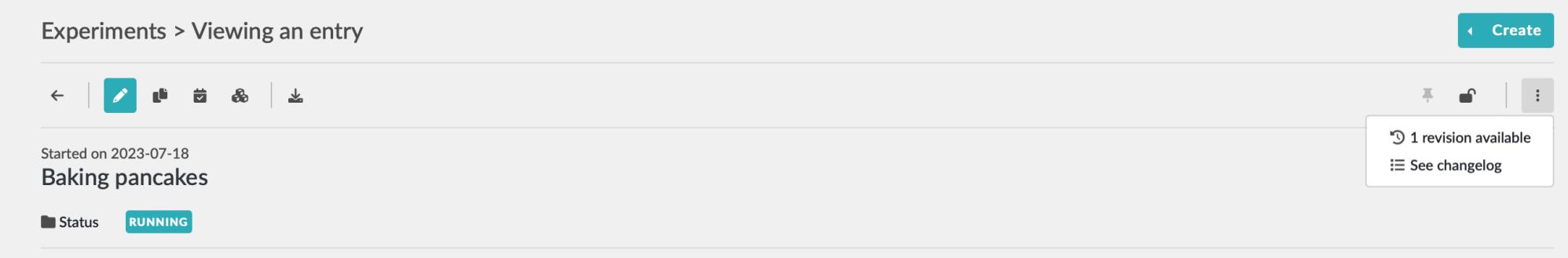
Version history

Experiments > Viewing an entry Create

Started on 2023-07-18
Baking pancakes

Status RUNNING

1 revision available See changelog



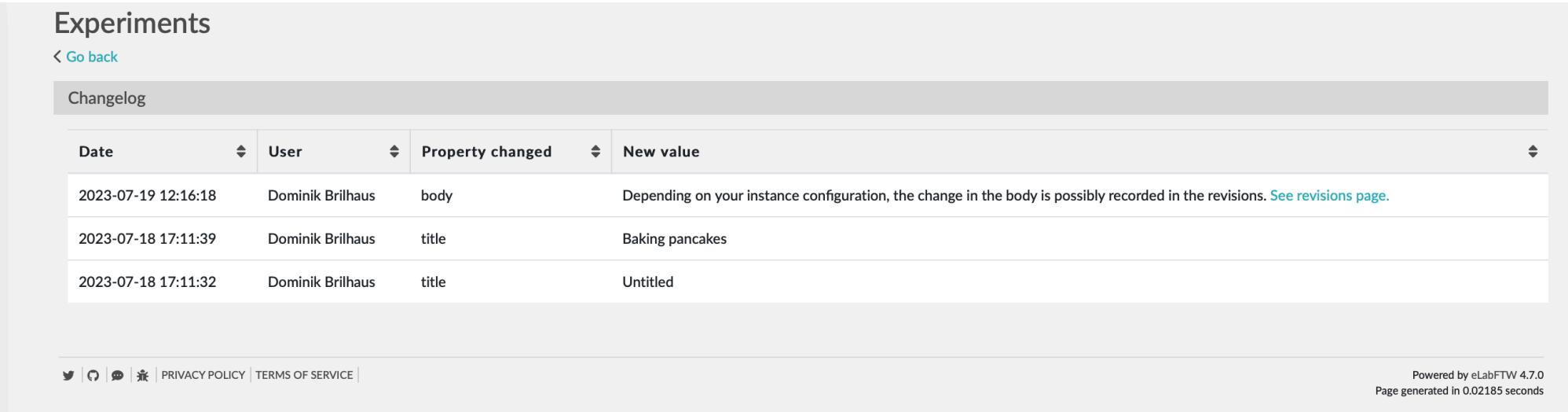
Experiments

[Go back](#)

Changelog

Date	User	Property changed	New value
2023-07-19 12:16:18	Dominik Brilhaus	body	Depending on your instance configuration, the change in the body is possibly recorded in the revisions. See revisions page.
2023-07-18 17:11:39	Dominik Brilhaus	title	Baking pancakes
2023-07-18 17:11:32	Dominik Brilhaus	title	Untitled

[Twitter](#) | [GitHub](#) | [Discord](#) | [Star](#) | [Privacy Policy](#) | [Terms of Service](#) | Powered by eLabFTW 4.7.0
Page generated in 0.02185 seconds



Restore revision

Revisions

This server is configured to store 4 revisions per entry maximum.

[◀ Go back](#)

44 seconds ago by Dominik Brilhaus [Restore](#)

1. Ingredients

- Flour
- Eggs
- Milk

2. Procedure

- Mix ingredients
- Fry in pan
- Serve with maple syrup

3. ...

Export experiments

Experiments > Viewing an entry ◀ Create

Started on 2023-07-18
Baking pancakes

Status: **RUNNING**

Visibility: All the teams

Can write: Only me and others

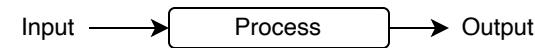
Download PDF File
PDF Long term storage PDF
ZIP Archive
ZIP Long term storage ZIP
ELN Archive
CSV File
QR Code



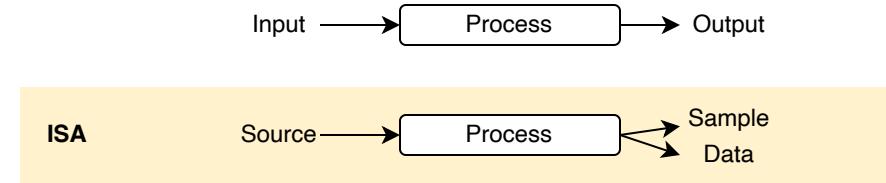
Recap

Towards FAIR elabFTW

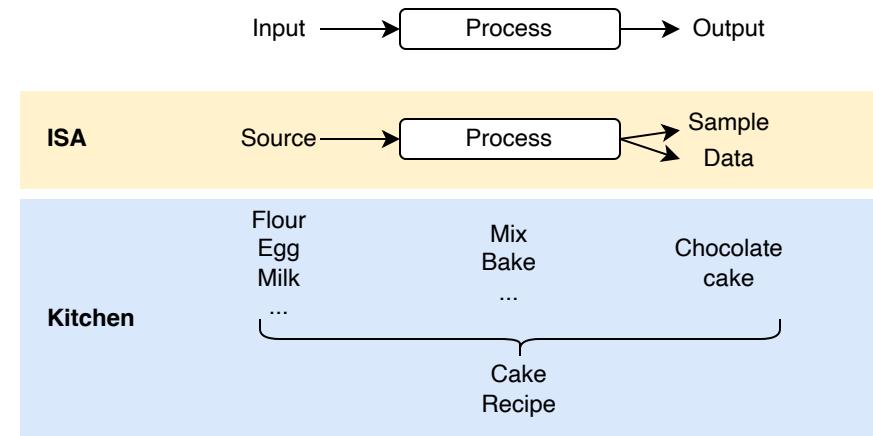
Cut protocols into pieces (processes)



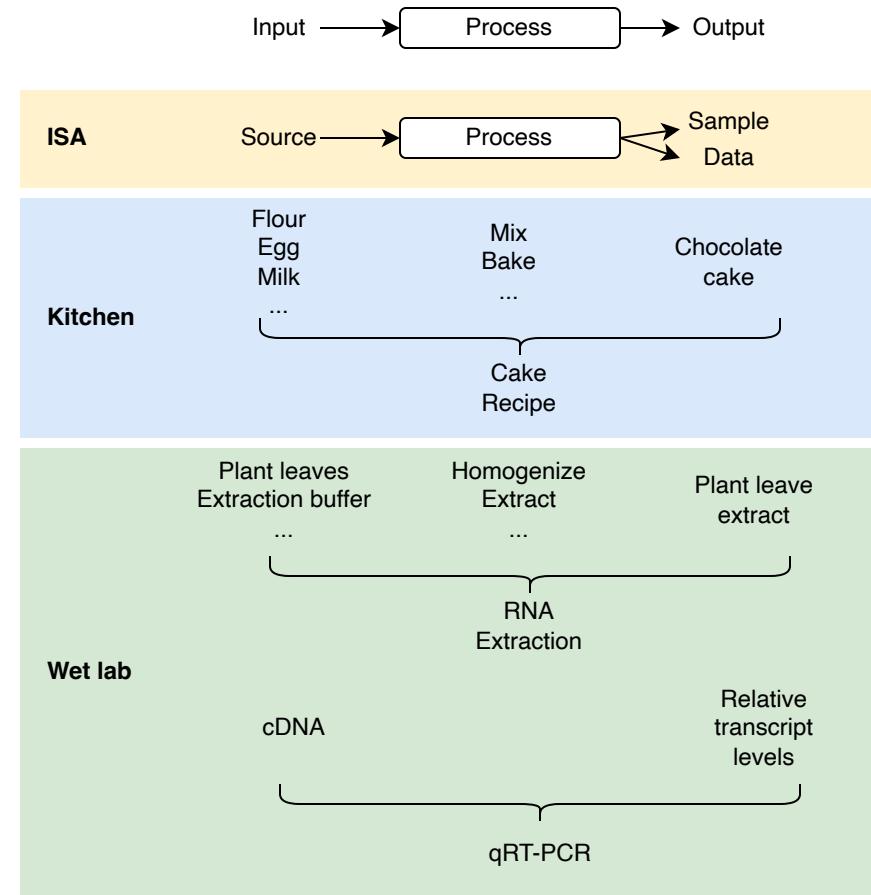
Define inputs and outputs



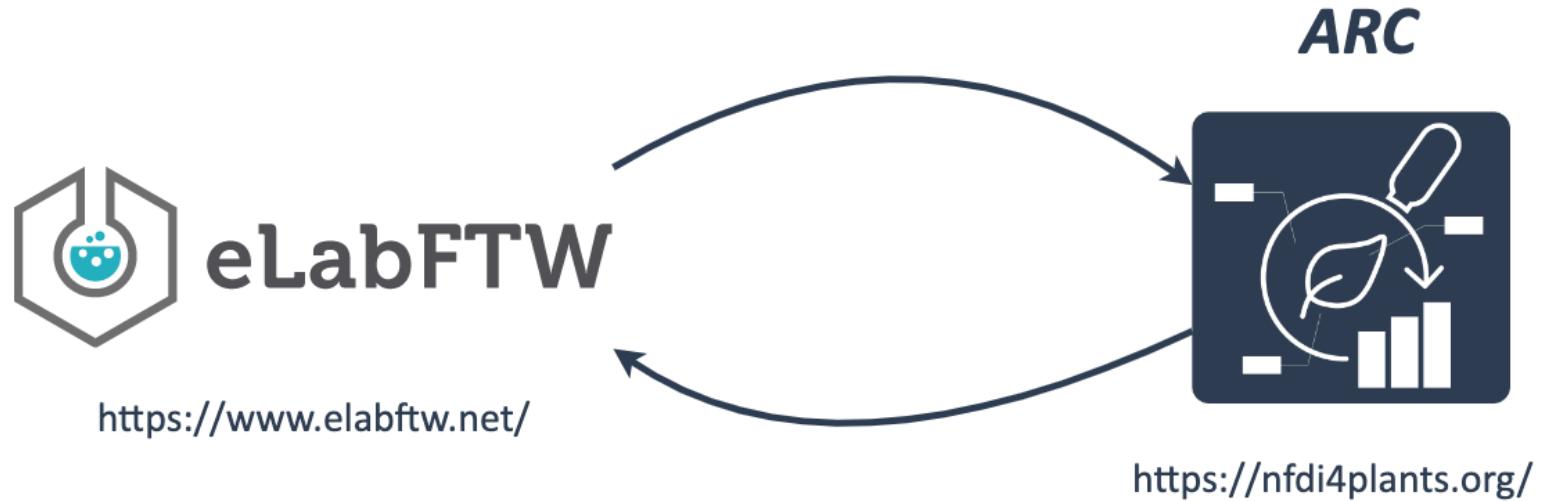
Cut protocols into pieces



Cut protocols into pieces



Bridging eLabFTW and ARC



Example Scenario

1. You use **ARCs** to

- organize and store your (raw) data locally
- share and communicate data with collaboration partners
- annotate and prepare your data for publication

2. You use **elabFTW** to

- document your daily lab work "on the fly"
- organize lab routines with colleagues

Goals

1. Benefit from "both worlds" (ARC and elabFTW)
 - iteratively work on protocols
 - be able to associate metadata to the raw data
2. Align elabFTW structure and ARCs

Schematize: JSON templates

▼ JSON EDITOR

+ | ↕ | ↘ | ⌂ | ☰

Display main text ⓘ

You are currently editing the metadata attached to this entry.

Code ▾

```
1 "elabftw": {
2   "extra_fields_groups": [
3     {
4       "id": 1,
5       "name": "INVESTIGATION"
6     },
7     {
8       "id": 2,
9       "name": "INVESTIGATION PUBLICATIONS"
10    },
11    {
12      "id": 3,
13      "name": "INVESTIGATION CONTACTS"
14    }
15  ],
16},
17 "extra_fields": {
18   "Investigation Title": {
19     "type": "text",
20     "value": "",
21     "group_id": "1",
22     "blank_value_on_duplicate": true
23 }
```

Ln: 1 Col: 1

▼ INVESTIGATION

Investigation Title
Investigation Identifier
Investigation Description
Investigation Submission Date
Investigation Public Release Date

▼ INVESTIGATION PUBLICATIONS

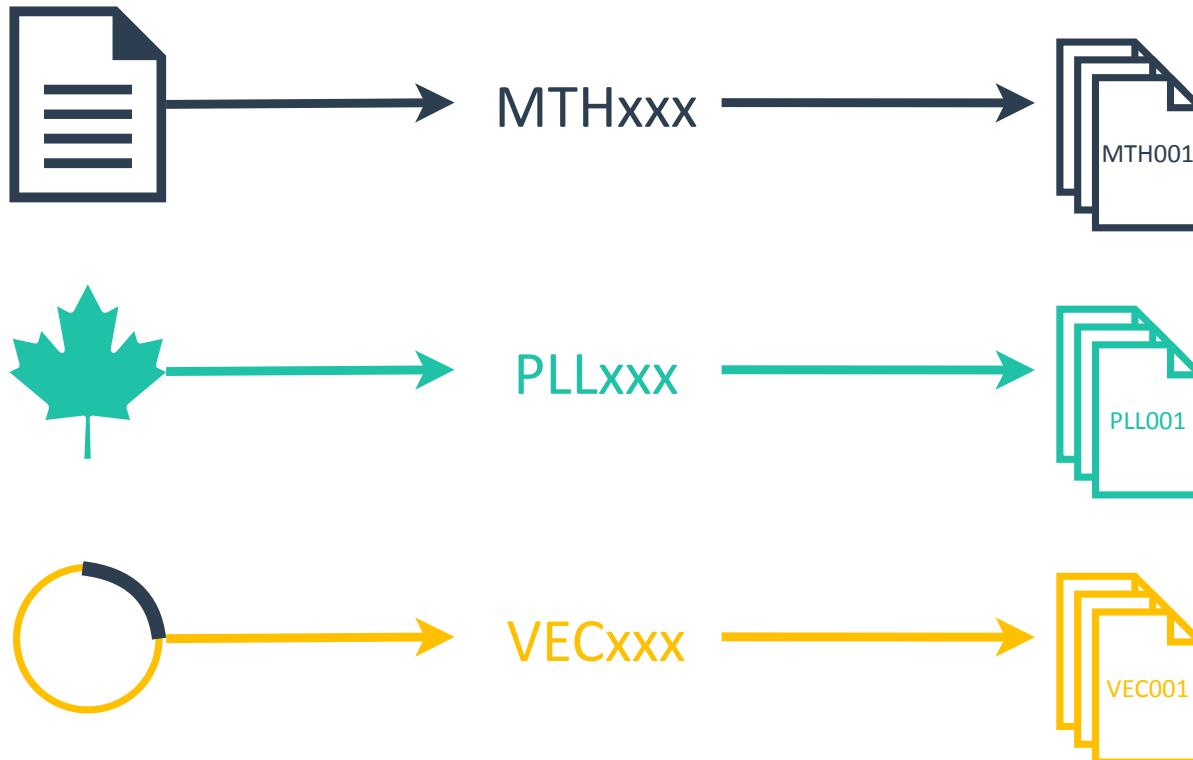
Investigation Publication DOI
Investigation Publication Title
Investigation Publication PubMed ID
Investigation Publication Author List

▼ INVESTIGATION CONTACTS

Investigation Person Email
Investigation Person Phone

Catalog your lab

1. Which items want to be shared and cataloged?
2. catalog: Name / ID items
3. Create item database



Local ARCs - Project overview

- >  inv001-talinum-cam
- >  inv002-arabidopsis-heat
- >  inv003-welwitschia-clock

Local ARCs - Project overview

▼	inv001-talinum-cam
>	assays
	isa.investigation.xlsx
>	runs
>	studies
>	workflows
▼	inv002-arabidopsis-heat
>	assays
	isa.investigation.xlsx
>	runs
>	studies
>	workflows
▼	inv003-welwitschia-clock
>	assays
	isa.investigation.xlsx
>	runs
>	studies
>	workflows

Local ARCs - Protocols

✓	inv001-talinum-cam
✓	assays
>	sty01-asy01-acidity
>	sty02-asy01-acidity
>	sty02-asy02-starch-content
>	sty02-asy04-pepc-activity
>	sty03-asy01-plant-pictures
>	sty03-asy02-acidity
>	sty03-asy03-starch-content
>	sty03-asy04-chlorophyll-content
>	sty03-asy05-pepc-activity
✓	sty03-asy06-rnaseq
>	dataset
✗	isa.assay.xlsx
✓	protocols
	2023-03-10_aba-treatment.md
	2023-04-01_rna-extraction.md
	2023-04-11_illumina-libraries.md
	README.md
✗	isa.investigation.xlsx
>	runs
✓	studies
>	sty01-aba-pre-experiment
>	sty02-aba-full
✓	sty03-aba-timeseries
✗	isa.study.xlsx
✓	protocols
	2023-03-02_plant-growth.md
	README.md
>	resources
>	workflows

DataHUB

<https://git.nfdi4plants.org>

Example ARC DataHUB - project overview

The screenshot shows the GitLab interface for the group "elab-demo-arcs". The left sidebar contains navigation links: Group information, Issues (0), Merge requests (0), CI/CD, Packages and registries, and Settings. The main area displays the group details, including the name "elab-demo-arcs", Group ID: 570, and three projects listed under "Subgroups and projects": "inv001-talinum-cam" (2 minutes ago), "inv003-welwitschia-clock" (32 minutes ago), and "inv002-arabidopsis-heat" (32 minutes ago). A "New subgroup" and "New project" button are also present.

Project	Created
inv001-talinum-cam	2 minutes ago
inv003-welwitschia-clock	32 minutes ago
inv002-arabidopsis-heat	32 minutes ago

Example ARC DataHUB - ARC overview

The screenshot shows a GitLab project page for 'inv001-talinum-cam'. The left sidebar contains navigation links: Project information, Repository, Issues (0), Merge requests (0), CI/CD, Security & Compliance, Deployments, Packages and registries, Infrastructure, Monitor, Analytics, Wiki, Snippets, and Settings. The main content area displays the project details: elab-demo-arcs > inv001-talinum-cam. The project card shows 'inv001-talinum-cam' (Project ID: 374), 2 Commits, 1 Branch, 0 Tags, and 379 KB Project Storage. A commit titled 'add protocols' by Dominik Brilhaus was authored 3 minutes ago. Below the commit, there are buttons for Auto DevOps enabled, Add README, Add LICENSE, Add CHANGELOG, Add CONTRIBUTING, Add Kubernetes cluster, and Configure Integrations. A file tree table lists the following files and their last commits:

Name	Last commit	Last update
.arc	initialize ARC structure	19 hours ago
assays	add protocols	3 minutes ago
runs	initialize ARC structure	19 hours ago
studies	add protocols	3 minutes ago
workflows	initialize ARC structure	19 hours ago
.gitattributes	add protocols	3 minutes ago
isa.investigation.xlsx	initialize ARC structure	19 hours ago

Example ARC DataHUB - assay protocols

The screenshot shows a GitLab project interface for the repository `inv001-talinum-cam`. The sidebar on the left contains various project management links: Project information, Repository, Issues (0), Merge requests (0), CI/CD, Security & Compliance, Deployments, Packages and registries, Infrastructure, Monitor, Analytics, Wiki, Snippets, and Settings.

The main content area displays a commit titled "add protocols" by Dominik Brilhaus, authored 3 minutes ago. The commit hash is `b566d71c`. Below the commit, there is a file tree navigation bar with dropdowns for "main" and "assays / sty03-asy06-rnaseq / protocols". To the right of the navigation are History, Find file, Web IDE, and Clone buttons.

A detailed commit history table follows:

Name	Last commit	Last update
..		
.gitkeep	initialize ARC structure	19 hours ago
2023-03-10_aba-treatment.md	add protocols	3 minutes ago
2023-04-01_rna-extraction.md	add protocols	3 minutes ago
2023-04-11_illumina-libraries.md	add protocols	3 minutes ago

Example ARC DataHUB - protocol detail

The screenshot shows a GitLab interface for a project named 'inv001-talinum-cam'. The left sidebar contains navigation links for Project information, Repository, Issues (0), Merge requests (0), CI/CD, Security & Compliance, Deployments, Packages and registries, Infrastructure, Monitor, Analytics, Wiki, Snippets, and Settings. The main content area displays a commit message 'add protocols' by Dominik Brilhaus, dated 3 minutes ago. The commit hash is b566d71c. Below the commit message, the file path is shown as 'main / inv001-talinum-cam / studies / sty03-aba-timeseries / protocols / 2023-03-02_plant-growth.md'. The file itself is titled 'Plant Material and Growth Conditions' and contains the following text:

Plant Material and Growth Conditions

Plant Material and Growth Conditions

- Talinum triangulare, 28-d-old plants
- Soil: Miracle-Gro Potting Mix (Miracle-Gro)
- Pots: "Short-One" treepots, 1.6 l (Stuewe and Sons)
- Chamber: Environmental Growth Chambers
- Settings:
 - 12 h light (30°C, 37% relative humidity)/12 h dark (22°C) cycles
 - Photon flux density at leaf level was 425 mmol m⁻² s⁻¹

elabFTW - Overview

elabFTW data is mainly
divided in two main panels

Experiments

Database

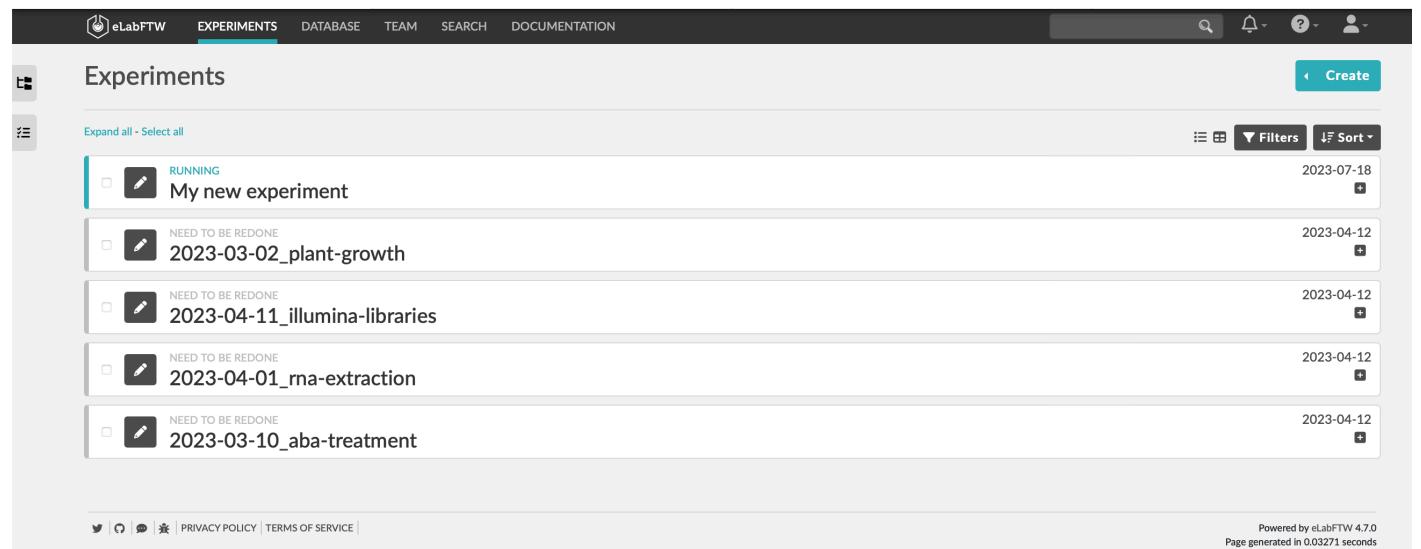
The screenshot shows the elabFTW web application. At the top, there is a navigation bar with links for eLabFTW, EXPERIMENTS (which is highlighted with a red box), DATABASE, TEAM, SEARCH, and DOCUMENTATION. To the right of the navigation are search, notification, help, and user profile icons. Below the navigation is a section titled "Experiments" with several filter options: Filter status, Filter owner, Filter visibility, a dropdown set to 99, Tags, and a "Go" button. A "Create" button is located on the far right. Underneath these filters is a table header with "Expand all - Select all" and a "Sort" button. The table lists four experiments:

2023-03-02_plant-growth	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEED TO BE REDONE	2023-04-12
2023-04-11_illumina-libraries	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEED TO BE REDONE	2023-04-12
2023-04-01_rna-extraction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEED TO BE REDONE	2023-04-12
2023-03-10_abtreatment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEED TO BE REDONE	2023-04-12

At the bottom of the page, there are social media sharing icons (Twitter, LinkedIn, GitHub, etc.), links to ADMIN PANEL and USER PANEL, and footer text indicating the page is powered by eLabFTW 4.5.10, has a privacy policy, and was generated in 0.02589 seconds.

Experiment Panel

The Experiment panel is the default "working area" for protocols of daily lab work



The screenshot shows the eLabFTW interface with the 'EXPERIMENTS' tab selected. The main area displays a list of experiments:

State	Name	Date
RUNNING	My new experiment	2023-07-18
NEED TO BE REDONE	2023-03-02_plant-growth	2023-04-12
NEED TO BE REDONE	2023-04-11_illumina-libraries	2023-04-12
NEED TO BE REDONE	2023-04-01_rna-extraction	2023-04-12
NEED TO BE REDONE	2023-03-10_abtreatment	2023-04-12

At the bottom, there are links for 'PRIVACY POLICY' and 'TERMS OF SERVICE'.

Database Panel

The Database panel is elabFTW's place to categorize contents

The screenshot shows the eLabFTW Database panel. At the top, there is a navigation bar with links for eLabFTW, EXPERIMENTS, DATABASE (which is highlighted in blue), TEAM, SEARCH, and DOCUMENTATION. To the right of the navigation bar are search, filter, and user icons. Below the navigation bar, the title "Database" is displayed. A message bar indicates "10 items imported successfully." Below the message bar are several filter and search options: "Filter by type", "Filter owner", "Filter visibility", a dropdown set to "99", "Tags", and a "Go" button. To the right of these filters is a "Create" button. Underneath the filters, there is a link "Expand all - Select all". On the far right, there is a "Sort" button. The main content area displays a list of 10 imported items, each with a small icon, a name, and a timestamp (all dated 2023-04-12). The names of the items include "inv001-talimum-cam" repeated multiple times, along with other entries like "sty03-asy06-rnaseq", "sty03-asy05-pepc-activity", "sty03-asy04-chlorophyll-content", "sty03-asy03-starch-content", "sty03-asy02-acidity", "sty03-asy01-plant-pictures", "sty02-asy04-pepc-activity", "sty02-asy02-starch-content", "sty02-asy01-acidity", "sty01-asy01-acidity", "sty03-aba-timeseries", "sty02-aba-full", "sty01-aba-pre-experiment", "inv003-welwitschia-clock", "inv002-arabidopsis-heat", and "inv001-talimum-cam".

Item Name	Type	Date
sty03-asy06-rnaseq	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-asy05-pepc-activity	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-asy04-chlorophyll-content	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-asy03-starch-content	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-asy02-acidity	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-asy01-plant-pictures	ASSAY	2023-04-12
inv001-talimum-cam		
sty02-asy04-pepc-activity	ASSAY	2023-04-12
inv001-talimum-cam		
sty02-asy02-starch-content	ASSAY	2023-04-12
inv001-talimum-cam		
sty02-asy01-acidity	ASSAY	2023-04-12
inv001-talimum-cam		
sty01-asy01-acidity	ASSAY	2023-04-12
inv001-talimum-cam		
sty03-aba-timeseries	STUDY	2023-04-12
inv001-talimum-cam		
sty02-aba-full	STUDY	2023-04-12
inv001-talimum-cam		
sty01-aba-pre-experiment	STUDY	2023-04-12
inv001-talimum-cam		
inv003-welwitschia-clock	INVESTIGATION	2023-04-12
inv003-welwitschia-clock		
inv002-arabidopsis-heat	INVESTIGATION	2023-04-12
inv002-arabidopsis-heat		
inv001-talimum-cam	INVESTIGATION	2023-04-12
inv001-talimum-cam		

The screenshot shows the eLabFTW Admin panel with the 'TYPES OF ITEMS' tab selected. The main section is titled 'Database Items Types' and is configured for 'Investigation'. It includes fields for 'Name' (with a color picker), 'Visibility' (radio buttons for 'All the teams I am part of' or 'All the teams I am part of'), and 'Can write' (radio buttons for 'All the teams I am part of' or 'All the teams I am part of'). Below these are rich text editor tools and a JSON Editor section with 'SAVE' and 'DELETE' buttons. A 'Sort items types' sidebar lists 'Investigation', 'Study', and 'Assay'.

Database item types

Item types can be defined in the Admin Panel

Preparing database lists for elabFTW import

💡 elabFTW offers batch-import from csv.

- elabFTW offers to import data from a csv file as described here:
<https://doc.elabftw.net/user-guide.html#importing-from-a-csv-file>
- These can be imported as any type of database item or experiment
- elabFTW-specific columns
 - title : will be the displayed name of the individual item
 - tags : (separated by |) will be used as tags

Database import



Database

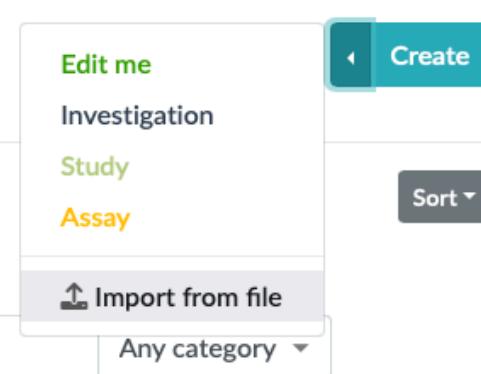
Filter by type ▾ Filter owner ▾ Filter visibility ▾ 99 Tags Go

Expand all - Select all - Clear selection - Invert selection

With selected:

Change item type ▾ Change visibility ▾ Export ▾ Add a tag Add a link

Link to an experiment Any author ▾ LOCK DELETE



Database import example - Investigations

db_investigations.csv

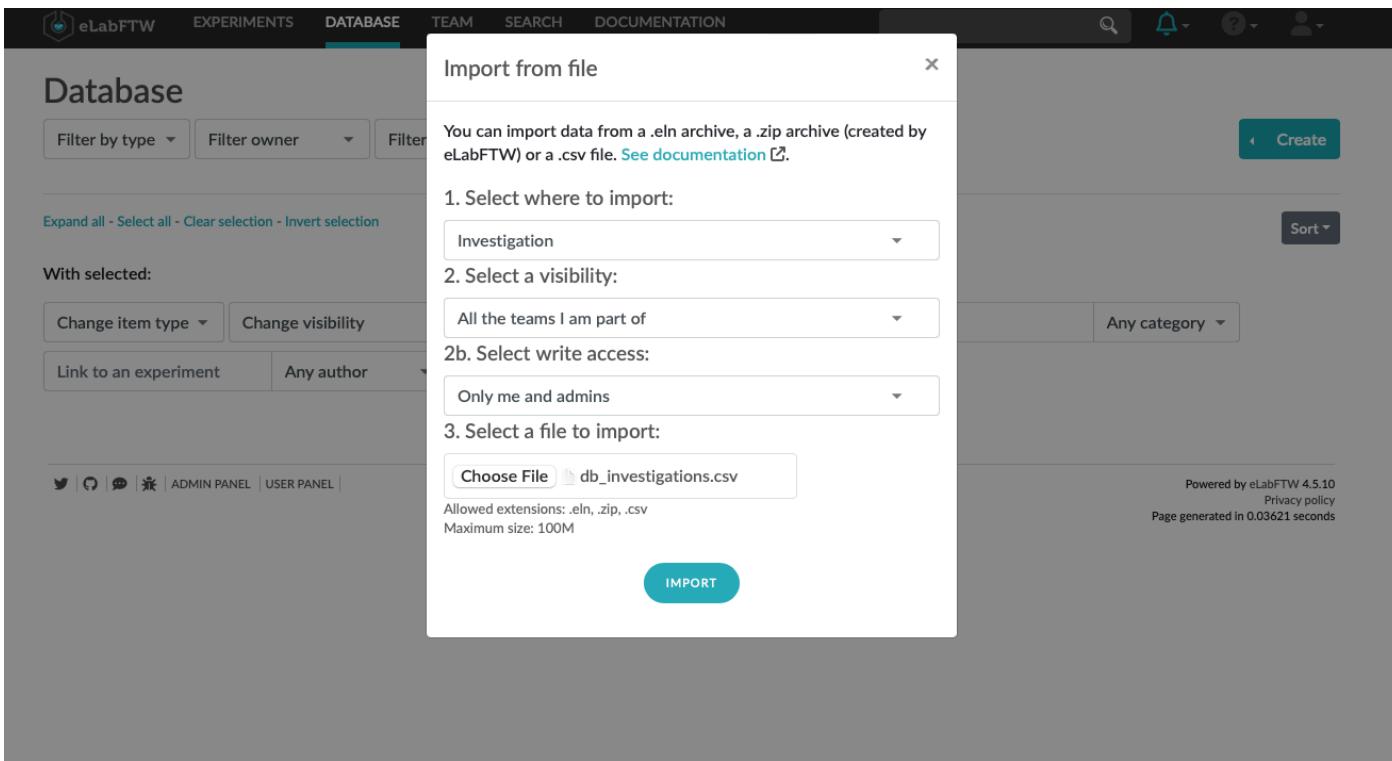
title	tags	Investigation Identifier	Investigation Person Last Name	Investigation Person First Name	Investigation F Email
inv001-talinum-cam	inv001-talinum-cam	inv001-talinum-cam	Beetroot	Jasmine	jasmine.beetroots@uni.org
inv002-arabidopsis-	inv002-arabidopsis-	inv002-arabidopsis-	Sage	Oliver	oliver.sage@arcs.uni.org

Database import example - Studies

`exp_inv001-talinum-cam_studies.csv`

title	tags	Study Identifier	Study Title	Study Description
sty01-aba-pre-experiment	inv001-talinum-cam	sty01-aba-pre-experiment	Pre-experiment to test ABA treatment	ABA treatment
sty02-aba-full	inv001-talinum-cam	sty02-aba-full	Large scale experiment with ABA	ABA treatment

Database import



Database import

The screenshot shows the eLabFTW database interface. At the top, there is a navigation bar with links for EXPERIMENTS, DATABASE (which is highlighted in blue), TEAM, SEARCH, and DOCUMENTATION. To the right of the navigation bar are search, notification, help, and user profile icons. Below the navigation bar, the page title is "Database". A success message box displays "3 items imported successfully." with a close button. Below the message are several filter and search controls: "Filter by type", "Filter owner", "Filter visibility", a dropdown set to "99", "Tags", and a "Go" button. To the right of these controls is a "Create" button. The main content area lists three imported items in a table:

	inv003-welwitschia-clock	<input type="checkbox"/> INVESTIGATION		2023-04-12
	inv003-welwitschia-clock	<input type="checkbox"/> INVESTIGATION		2023-04-12
	inv002-arabidopsis-heat	<input type="checkbox"/> INVESTIGATION		2023-04-12
	inv002-arabidopsis-heat	<input type="checkbox"/> INVESTIGATION		2023-04-12
	inv001-talinum-cam	<input type="checkbox"/> INVESTIGATION		2023-04-12
	inv001-talinum-cam	<input type="checkbox"/> INVESTIGATION		2023-04-12

Below the table are buttons for "Expand all - Select all" and "Sort ▾". At the bottom of the page, there are social media links (Twitter, GitHub, Facebook, Nextcloud) and navigation links for "ADMIN PANEL" and "USER PANEL". On the right side, there is a footer with the text "Powered by eLabFTW 4.5.10", "Privacy policy", and "Page generated in 0.02692 seconds".

Database Panel

The screenshot shows the eLabFTW Database panel. At the top, there is a navigation bar with links for EXPERIMENTS, DATABASE (which is highlighted in blue), TEAM, SEARCH, and DOCUMENTATION. To the right of the navigation bar are search, filter, and user account icons. Below the navigation bar, a message box indicates "10 items imported successfully." The main area is titled "Database" and contains a list of 10 imported items, each with a small icon, a name, and a timestamp (2023-04-12). The items are grouped under the heading "inv001-talinum-cam".

Item Name	Type	Date
sty03-asy06-rnaseq	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-asy05-pepc-activity	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-asy04-chlorophyll-content	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-asy03-starch-content	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-asy02-acidity	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-asy01-plant-pictures	ASSAY	2023-04-12
inv001-talinum-cam		
sty02-asy04-pepc-activity	ASSAY	2023-04-12
inv001-talinum-cam		
sty02-asy02-starch-content	ASSAY	2023-04-12
inv001-talinum-cam		
sty02-asy01-acidity	ASSAY	2023-04-12
inv001-talinum-cam		
sty01-asy01-acidity	ASSAY	2023-04-12
inv001-talinum-cam		
sty03-aba-timeseries	STUDY	2023-04-12
inv001-talinum-cam		
sty02-aba-full	STUDY	2023-04-12
inv001-talinum-cam		
sty01-aba-pre-experiment	STUDY	2023-04-12
inv001-talinum-cam		
inv003-welwitschia-clock	INVESTIGATION	2023-04-12
inv003-welwitschia-clock		
inv002-arabidopsis-heat	INVESTIGATION	2023-04-12
inv002-arabidopsis-heat		
inv001-talinum-cam	INVESTIGATION	2023-04-12
inv001-talinum-cam		

Linking / grouping items

 Two mechanisms

1. Tags
 - i. user-friendly, easy way to group items
2. Linking
 - i. Database items
 - ii. Experiment items

Linking items

In edit mode

The screenshot shows a document editing interface with the following sections:

- Title:** 2023-03-02_plant-growth
- Tags:** Add a tag
- Plant Material and Growth Conditions:**
 - Talinum triangulare, 28-d-old plants
 - Soil: Miracle-Gro Potting Mix (Miracle-Gro)
 - Pots: "Short-One" treepots, 1.6 l (Stuewe and Sons)
 - Chamber: Environmental Growth Chambers
 - Settings:
 - 12 h light (30°C, 37% relative humidity)/12 h dark (22°C) cycles
 - Photon flux density at leaf level: 425 mmol m⁻² s⁻¹
- Steps:** Add a step
- Linked experiments:** Add a link to an experiment by Any author
- Linked items:** Add a link from the database to Assay, ASSAY - sty03-asy06-rnaseq, or INVESTIGATION - inv001-talinum-cam.

Buttons at the bottom include SAVE, SAVE AND GO BACK, and links to All the teams I am part of and Only me and dunnis.

Linked items

The screenshot shows the eLabFTW interface. At the top, there's a navigation bar with links for EXPERIMENTS, DATABASE, TEAM, SEARCH, and DOCUMENTATION. On the right side of the header are search, notification, help, and user profile icons. Below the header, the main content area has a title "Experiments" and a "Back to listing" link. There are several action icons: a pencil, a clipboard, a lock, a checkmark, a gear, and a download arrow. The experiment details shown are:

- Status:** Need to be redone
- Started:** 2023-04-12
- Title:** 2023-03-02_plant-growth
- Plant Material and Growth Conditions:**
 - Talinum triangulare, 28-d-old plants
 - Soil: Miracle-Gro Potting Mix (Miracle-Gro)
 - Pots: "Short-One" treepots, 1.6 l (Stuewe and Sons)
 - Chamber: Environmental Growth Chambers
 - Settings:
 - 12 h light (30°C, 37% relative humidity)/12 h dark (22°C) cycles
 - Photon flux density at leaf level: 425 mmol m⁻² s⁻¹

On the right side of the experiment card, there are visibility and permissions settings: "Visibility" (EDIT), "Can write" (EDIT), and "Only me and admins". Below the experiment card, there's a section titled "Linked items" with two entries:

- ASSAY - sty03-asy06-rnaseq
- INVESTIGATION - inv001-talinum-cam

elabFTW – Conclusion

Good

- Documenting daily lab routine
- Lab methods & protocols
- Lab inventory (biologicals, chemicals, instruments)
- Local sharing & collaboration
- Backup (locally)

Intermediate

- Version control
- Track changes / contributions
- Use of IDs
- External sharing

Limited

- Data storage
- Analyses
- Structured metadata
- PIDs

Demo

 The following slides are attached to prep a demo

Creating the ARC structure locally (demo)

settings

```
gitlab_base_url=https://git.nfdi4plants.org/elab-demo-arcs/  
arc_dir_local=~/gitlab_dataplant/elab-demo-arcs
```

create a first arc

💡 This is a line-by-line example to initiate and share an ARC with a few studies and assays

```
arc_name=inv001-talinum-cam

mkdir -p "$arc_dir_local"/"$arc_name"
cd "$arc_dir_local"/"$arc_name"

arc init
arc investigation create -i "$arc_name"

arc study add -s sty01-aba-pre-experiment
arc assay add -s sty01-aba-pre-experiment -a sty01-asy01-acidity

arc study add -s sty02-aba-full
arc assay add -s sty02-aba-full -a sty02-asy01-acidity
arc assay add -s sty02-aba-full -a sty02-asy02-starch-content
arc assay add -s sty02-aba-full -a sty02-asy04-pepc-activity

arc study add -s sty03-aba-timeseries
arc assay add -s sty03-aba-timeseries -a sty03-asy01-plant-pictures
arc assay add -s sty03-aba-timeseries -a sty03-asy02-acidity
arc assay add -s sty03-aba-timeseries -a sty03-asy03-starch-content
arc assay add -s sty03-aba-timeseries -a sty03-asy04-chlorophyll-content
arc assay add -s sty03-aba-timeseries -a sty03-asy05-pepc-activity
arc assay add -s sty03-aba-timeseries -a sty03-asy06-rnaseq

arc sync -f -r "$gitlab_base_url""$arc_name" -m "initialize ARC structure"
```

create and push more arcs (for loop)

```
for arc_name in inv002-arabidopsis-heat inv003-welwitschia-clock; do
echo $arc_name
mkdir -p "$arc_dir_local"/"$arc_name"
cd "$arc_dir_local"/"$arc_name"
arc init
arc investigation create -i "$arc_name"
arc sync -f -r "$gitlab_base_url""$arc_name" -m "initialize ARC structure $arc_name"
done
```