ELNs – electronic laboratory notebooks + data security of DDR @CXI

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What is ELN?

- It is a tool that helps to streamline laboratory workflows and make data more accessible and organized.

- Digital platform that enables scientists and researchers to record, store, and manage their laboratory experiments, observations, and data electronically

- Replaces traditional paper-based lab. notebook

- Features & advantages:

    - ✓ Electronic templates for experiment entries
    - ✓ Ability to attach digital files (images, graphs, datasets)
    - ✓ Tools for collaboration and sharing data with other researchers
    - ✓ Advanced search functions (helps finding specific data or experiments quickly
    - ✓ Security and backup to protect against data loss or unauthorized access

What is NOT ELN?

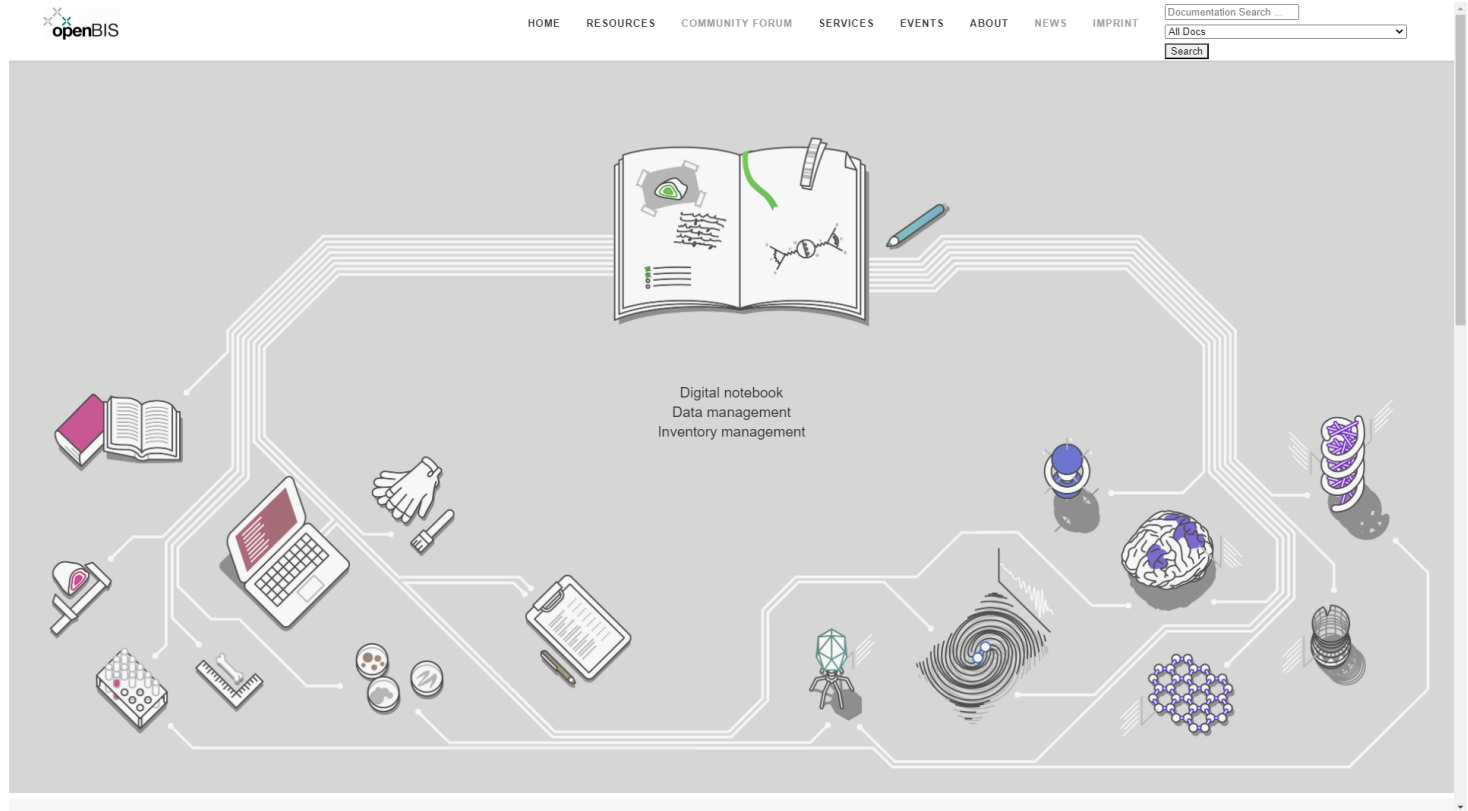## ELN is not instrument (machine) log book – it is separate tool

- **OpenBIS**

- **Kadi4Mat**

- **NOMAD (Oasis)**

OpenBIS

- Developed at ETH Zürich (originally for biologists)

- Secured financing and further support

- Pretty complex system which contains (almost) every necessary function

- JupyterLab integration – useful for Python/R calculations

- https://openbis.ch/

ELN – electronic laboratory notebook(s)

OpenBIS

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OpenBIS

Kadi4Mat

- Developed at Institute for Applied Materials in Karlsruhe, Germany

- Youngest member of the team – still in early development

- Simply extensible, very easy to use

- Missing some important advanced features or functions

- Integrated with CIDS through KadiAI – framework for statistics and ML

- https://kadi.iam-cms.kit.edu/

ELN – electronic laboratory notebook(s)

Kadi4Mat

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NOMAD (Oasis)

- Quickly developed lately but still grant funded

- Focused on material science

- Either central hosted or own instance (Oasis) possible

- JupyterLab integration – useful for Python/R calculations

- https://nomad-lab.eu/

ELN – electronic laboratory notebook(s)

NOMAD (Oasis)

ELN – electronic laboratory notebook(s)

NOMAD (Oasis)

And now some practical demonstration

ELNs comparison

ELN and their features

	ENG/CZE	Own instance needed	MATECH group support	Honours FAIR principles	Maturity (yrs)	Repository integration	Big data linking	Open source	Web UI	University login	Fill your tax return
OpenBIS	YES/NO	YES	YES	YES	10+	Zenodo	YES	YES	YES	YES	NO
Kadi4Mat	YES/NO	YES	YES	YES	1+	Zenodo	NO*	YES	YES	NO*	NO
NOMAD	YES/NO	NO	NO	YES	3+	NOMAD	NO	YES	YES	YES	NO

*in process

DATA STEWARD role and counsell @ CXI

What is role/purpose of Data Steward?

- He/she is your bridge between your research and world of digitized data

- Can help you with issues that reqiure deeper data-related knowledge

- Should be able to communicate and explain data concepts to non-technical researchers (or people in general)

- Data Steward always knows what are we trying to achieve – golas, objectives

OMI (Department of Process Modelling and Artificial Intelligence) **is able to help you with:**

1. Data Management Plan

2. Any Open Science issues

3. Data FAIRification

4. Project documentation

5. ...and of course anything related to ELN

Data security at CXI and in DDR project

- Right now there are no general rules at CXI on data security

- Although within DDR project data sharing will have strict rules with explicit exceptions

- No need to upload data if NDA does not approve

- Systematic approach should be set

FAQs [(1)]

- **How do I log into an ELN?**

- Each ELN has its user management. We plan to implement university login in the chosen ELN.

- **Can I collect other data? E.g.: data for audits, machine tunning/calibration**

- Yes. Everything that you want you can save in the associated record.

- **Is it possible to add own metadata to the measurement (or any other entry to an ELN)?**

- Yes. You are free to write and save anything through ELN. (It is highly recommended to add as much [valid] metadata as possible.)

FAQs (2)

- **What happens if I haven't got any PC connected to instrument?**

- You can use ELN from any device that is connected to the internet.

- **How can I share work on one sample with my group?**

- Linking data of a single sample between researchers is one of the key elements in ELN.

- **Do I have to have some programming skills to use ELN?**

- No. You just need to learn how to work with ELN via user interface.

FAQs (3)

- **Can I use ELN with my smartphone or tablet?**

- **Is it possible to digitize my previous handwritten notes?**

- **I would like to set user interface to different colours. May I?**

- Kadi4Mat for sure, others do not have responsive UI.

- Yes, it is possible to transform handwritten text to digital form (but the result may not be useful)

- Well – we cannot promise, but we'll do our best.

Thanks for your attention

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