Transition to an electronic lab notebook
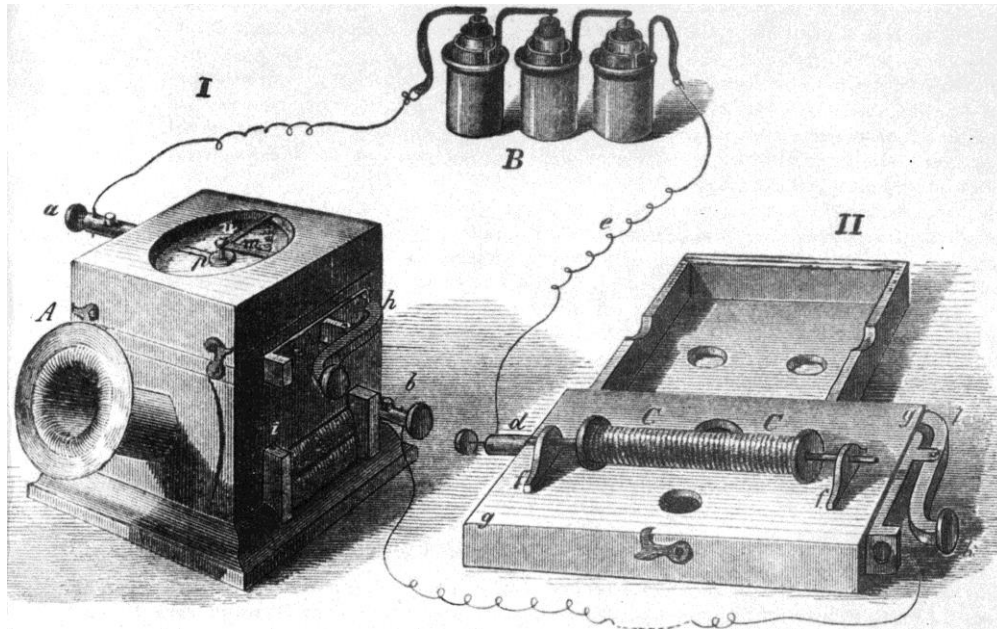## experience report

Lukas Hellmann
mol. Geneticist & Bioinformatician
Nucleic Acids Core Facility

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

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TECHNICAL ADVANCEMENT

19th century

21st century

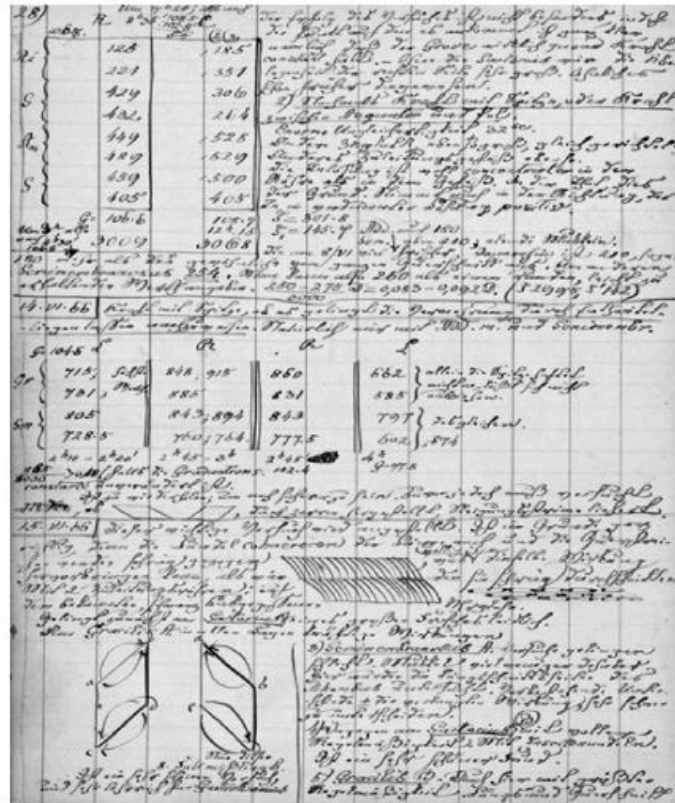

S.P. Thompson, P. Reis: Reis' telephone,
licence: Public Domain

RaBiTeC: Picture of OnePlus 7 (modified),
licence: CC BY-SA 4.0

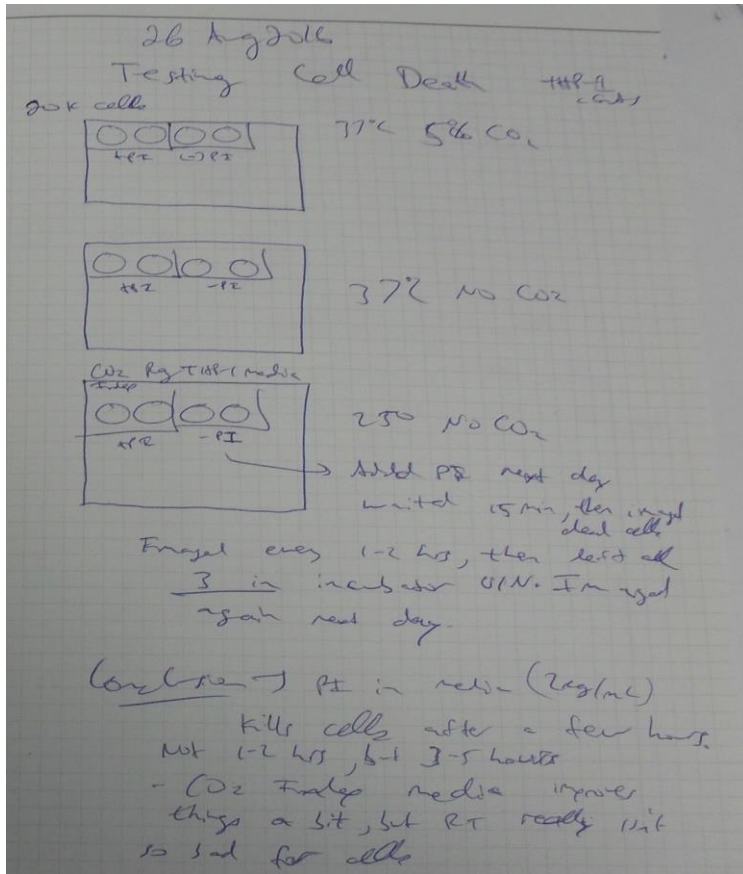Nucleic
Acids

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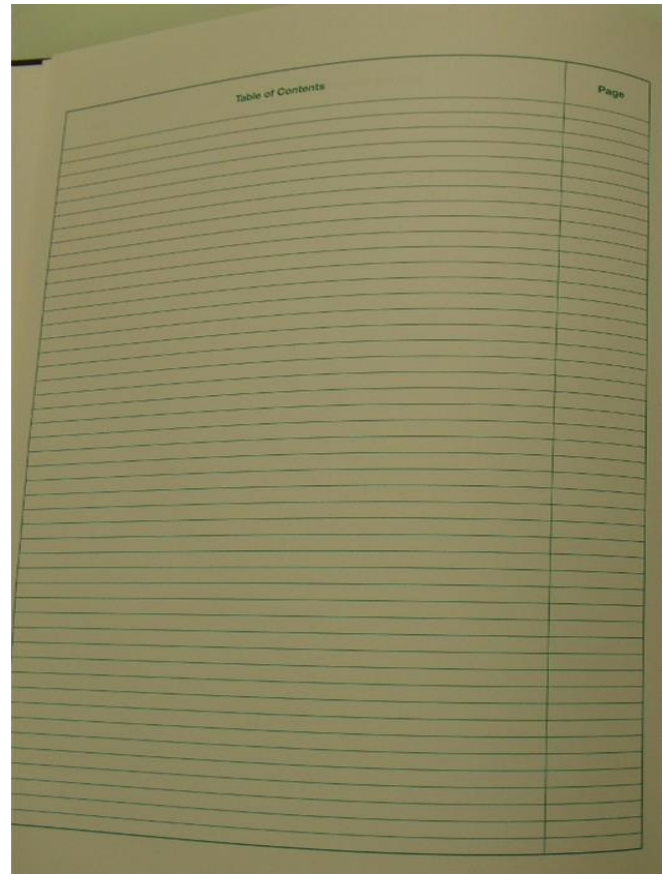# TECHNICAL ADVANCEMENT ?

19th century

21st century

DISADVANTAGES OF PAPER LAB BOOKS

Hard to read

No Index

No Search

REASONS FOR AN ELECTRONIC LAB NOTEBOOK

- Seamless transition during staff turnover
- Simplifies team collaboration
- Streamlines protocol and data sharing
- "Bird's-eye view" of lab-wide activities
- Mandated by many funding agencies
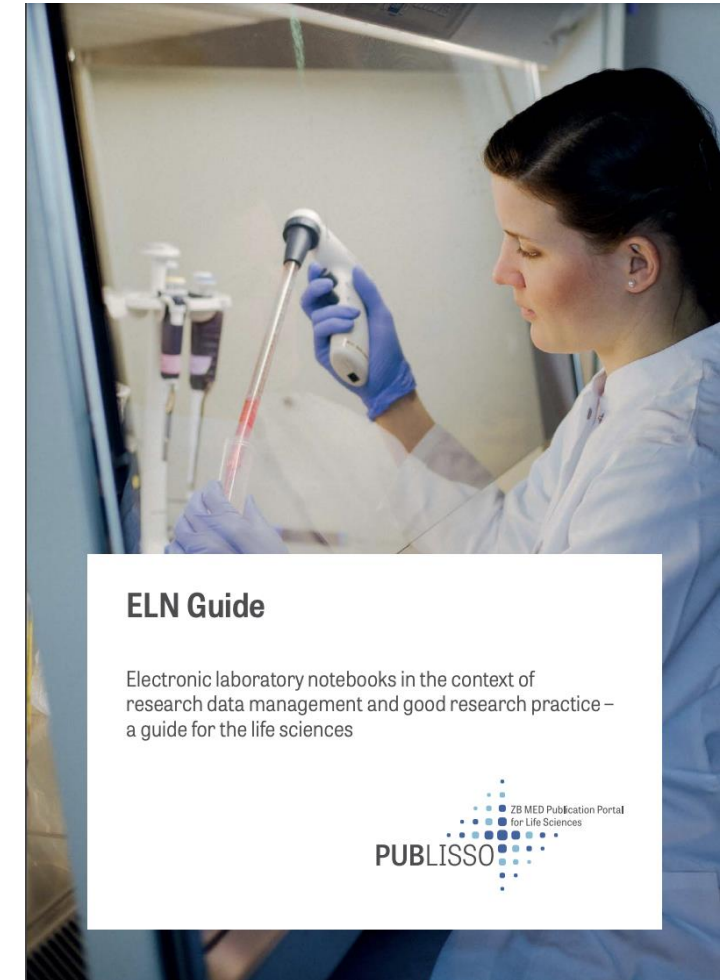- Integrated automatic backup feature
- Version Control

NA Nucleic Acids

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SELECTING THE IDEAL ELN

- Analyse the current situation
- Assess your institution's needs
- Define selection criteria
- Select one or more ELN(s)
- Test the ELN(s)
- Select an ELN
- License the ELN
- Introduce the ELN in research groups
- Monitor the application

modified from Adam & Lindstädt 2021 and Vandendorpe et al. n.d. by ZB MED 2023

ELN Guide

Electronic laboratory notebooks in the context of research data management and good research practice – a guide for the life sciences

ZB MED Publication Portal for Life Sciences
PUBLISSO

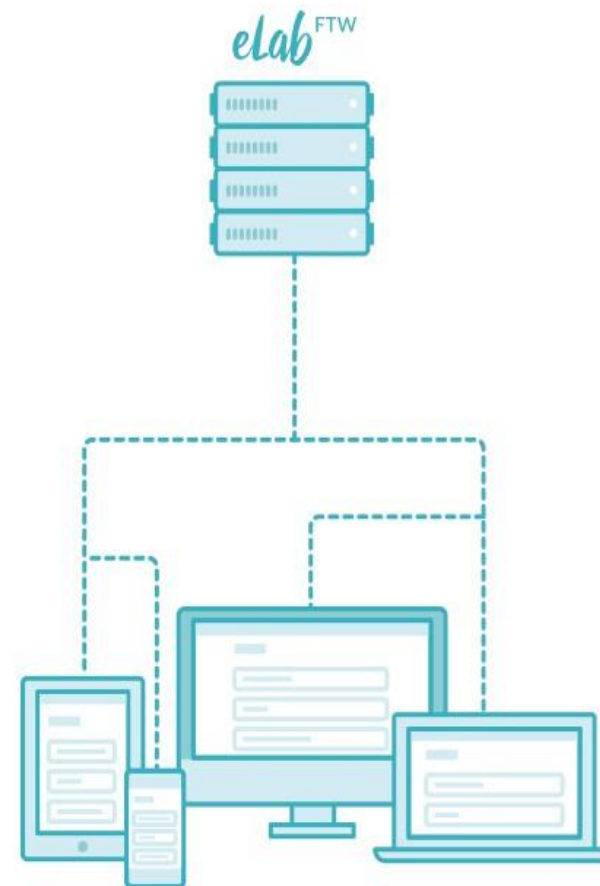ELN Guide
DOI: https://doi.org/10.4126/frl01-006425772

Nucleic Acids

KEY FEATURES

- generic ELN
- on-premise and web-based solutions
- no client installation required
- REST API
- compatible with all operating systems
- responsive design for all screen sizes
- Free, open-source software with an active community and developers

IMPLEMENTATION

technical

- VM hosted at local data center

    4 CPUs, 8GB RAM, 2x40GB storage

- Backups secured at two separate physical sites

- File size capped at 100 MB, no overarching limit

user training

- initial introduction

- regular workshops

source: David Lohner (modified)
https://flickr.com/photos/davidlohner/32808143587/
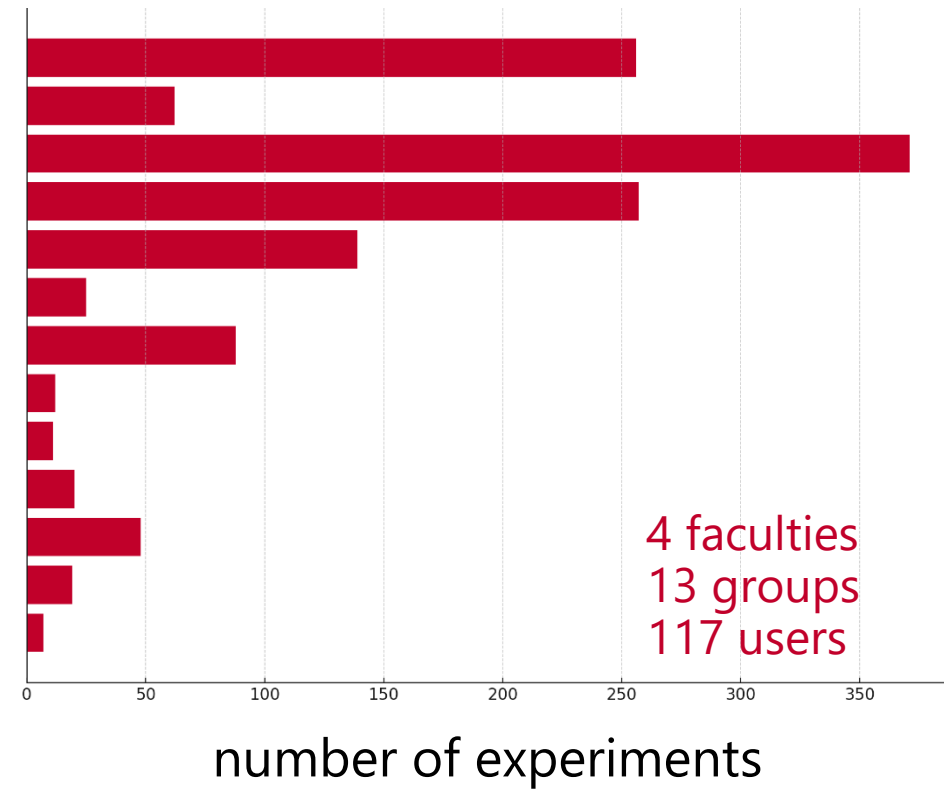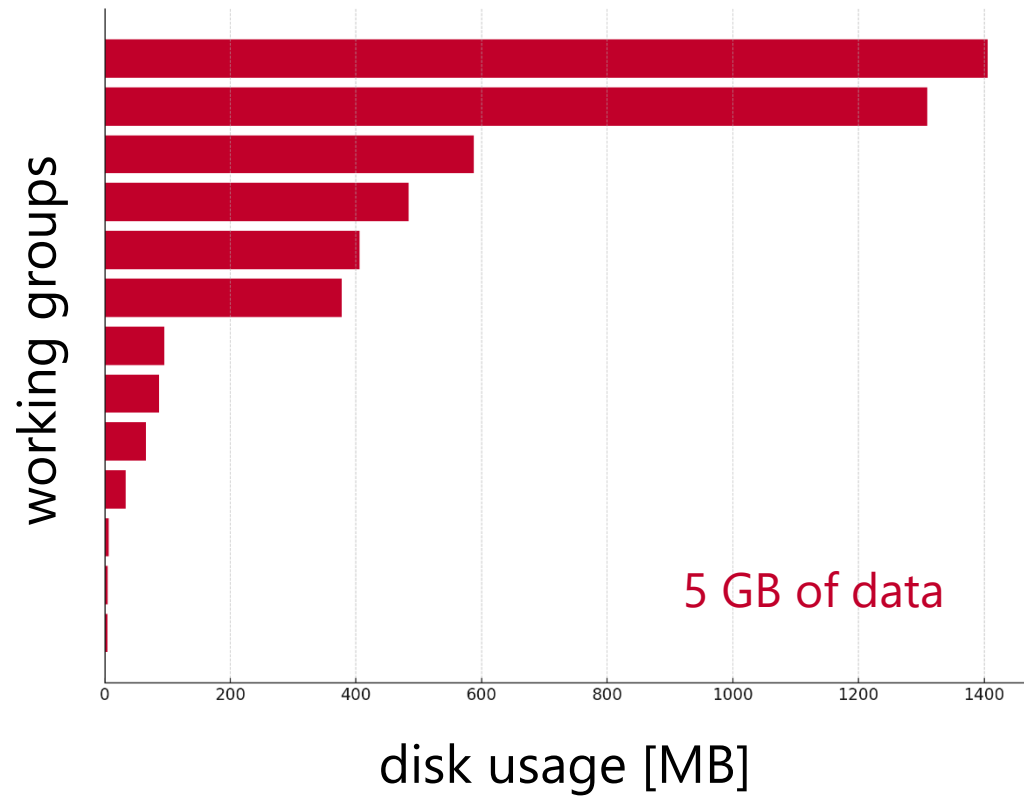
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ENHANCING USER-FRIENDLY EXPERIENCE

- Tablets in the lab
- Speech-to-Text
- Optical Character Recognition (OCR)
- Direct Links to Data Files & Results
- Provenance with Auto Date/Time Stamps
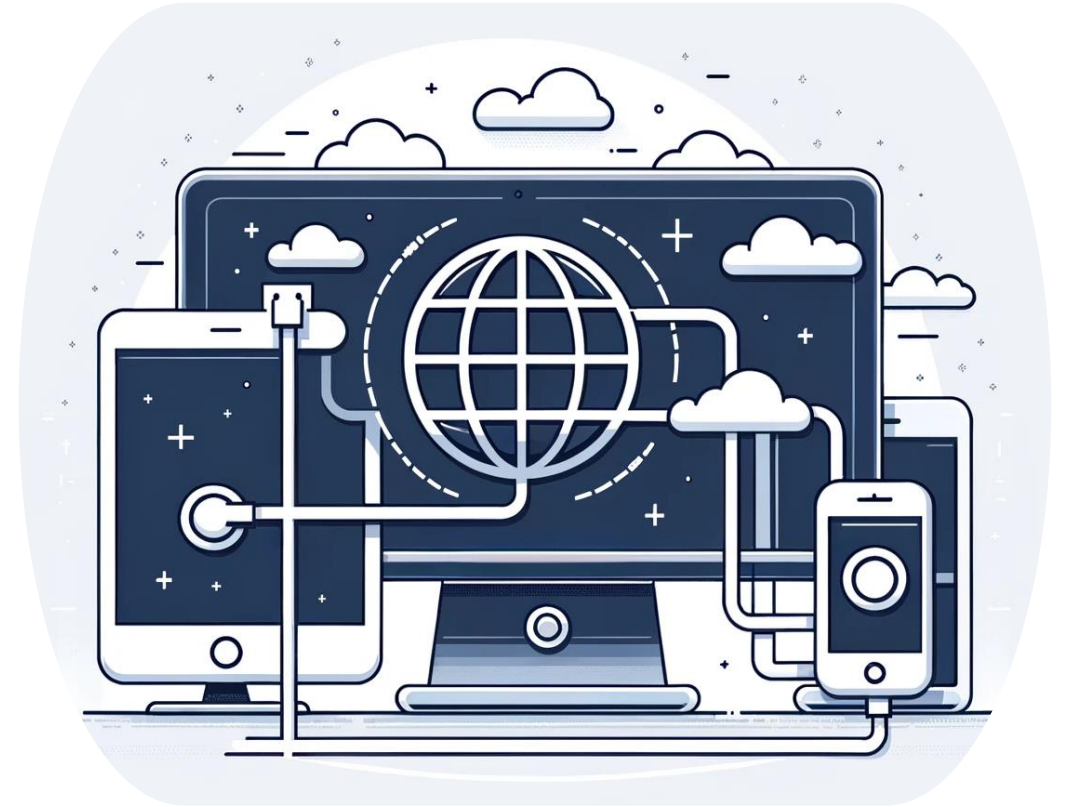
generated with DALL·E (OpenAI)

TECHNICAL DETAILS

working groups

disk usage [MB]

5 GB of data

number of experiments

4 faculties
13 groups
117 users

after 7 months

ADVANTAGES

- User-friendly, intuitive interface
- Accessible anywhere (conference, home office)
- Aided supervision of students
- Enhanced transparency with lab activity tracking
- Higher efficiency with template use
- Documentation with timestamps

generated with DALL·E (OpenAI)

NA
Nucleic
Acids

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DISADVANTAGES

- Initial setup demands significant investment

- Full group participation critical for efficiency

- Implementation often requires top-down directives

- PIs' adoption not reflective of potential benefits

source: Jan Vasek (modified)
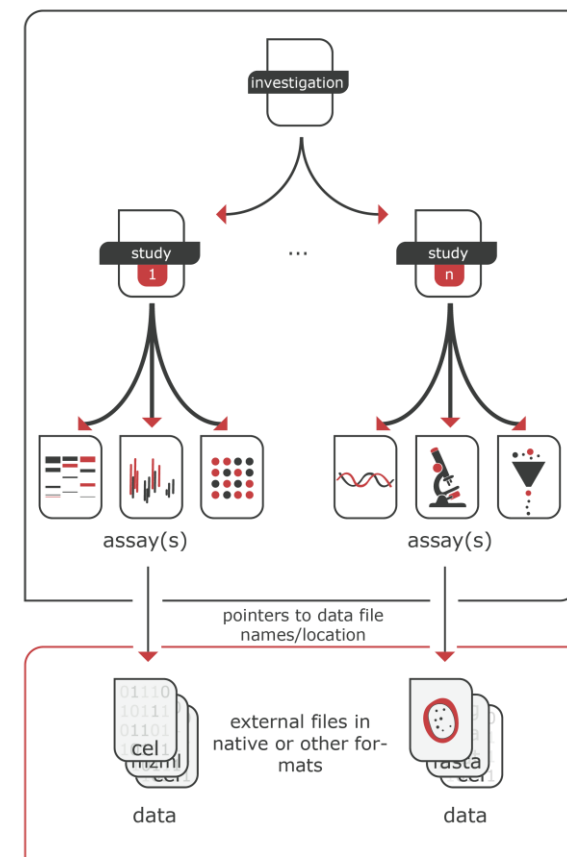https://unsplash.com/de/@jeshoots

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MISSING FEATURES

- Lacks overarching project categorization

- Limited collaborative functionality
  in spreadsheets & databases

- Problems with linking to raw data, e.g. group folder

Responsive developer with prompt issue resolution
on GitHub

► Features might get implemented

ISA Model & Serialization
Specifications (modified). https://isa-tools.org/format/specification.html

LESSONS LEARNED

- ongoing maintenance and user support

- Unresolved issue: privacy and security for healthcare data

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ENHANCE RESEARCH REPRODUCIBILITY

RDM in (Bio-)Medicine:
Electronic Lab Notebooks

**15.11.2023
10 a.m.**   **online workshop**

eLabFTW @ JGU

Access with ZDV-Account credentials

Registering a new group:
bio-it@uni-mainz.de