Willkommen
Welcome
Bienvenue

Empa
Materials Science and Technology

OpenBIS Pilot Lab 206

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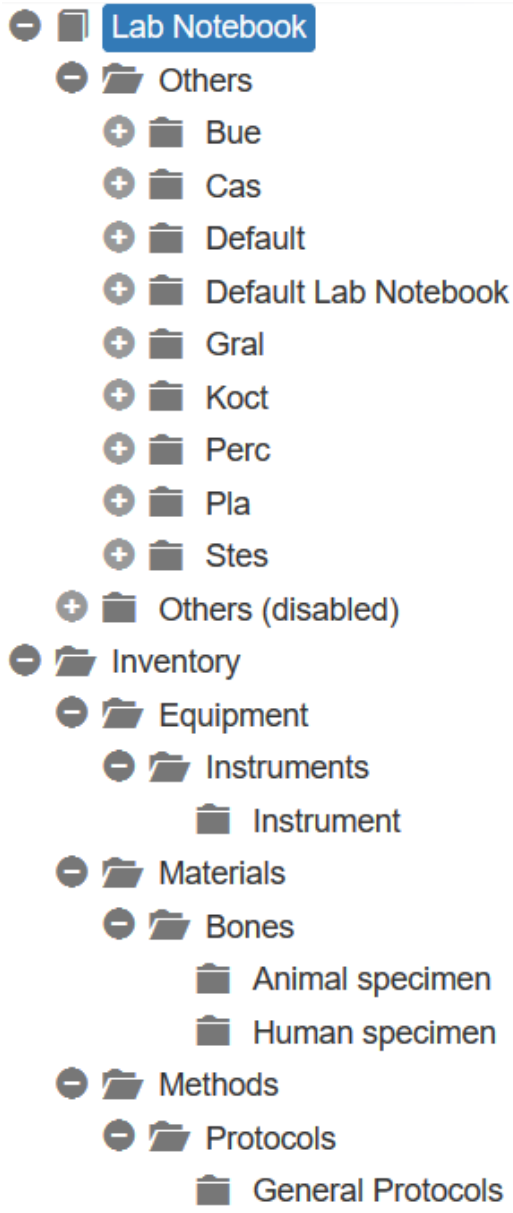
Overview

- 7 active users
- Databases
  - Materials
  - Instruments
  - Protocols
- Organized by users
- Projects are created by the group head and shared with the respective Postdocs/students
- Main activities
  - ELN
  - Data repository
  - Script subversion
  - Sharing information



Materials database

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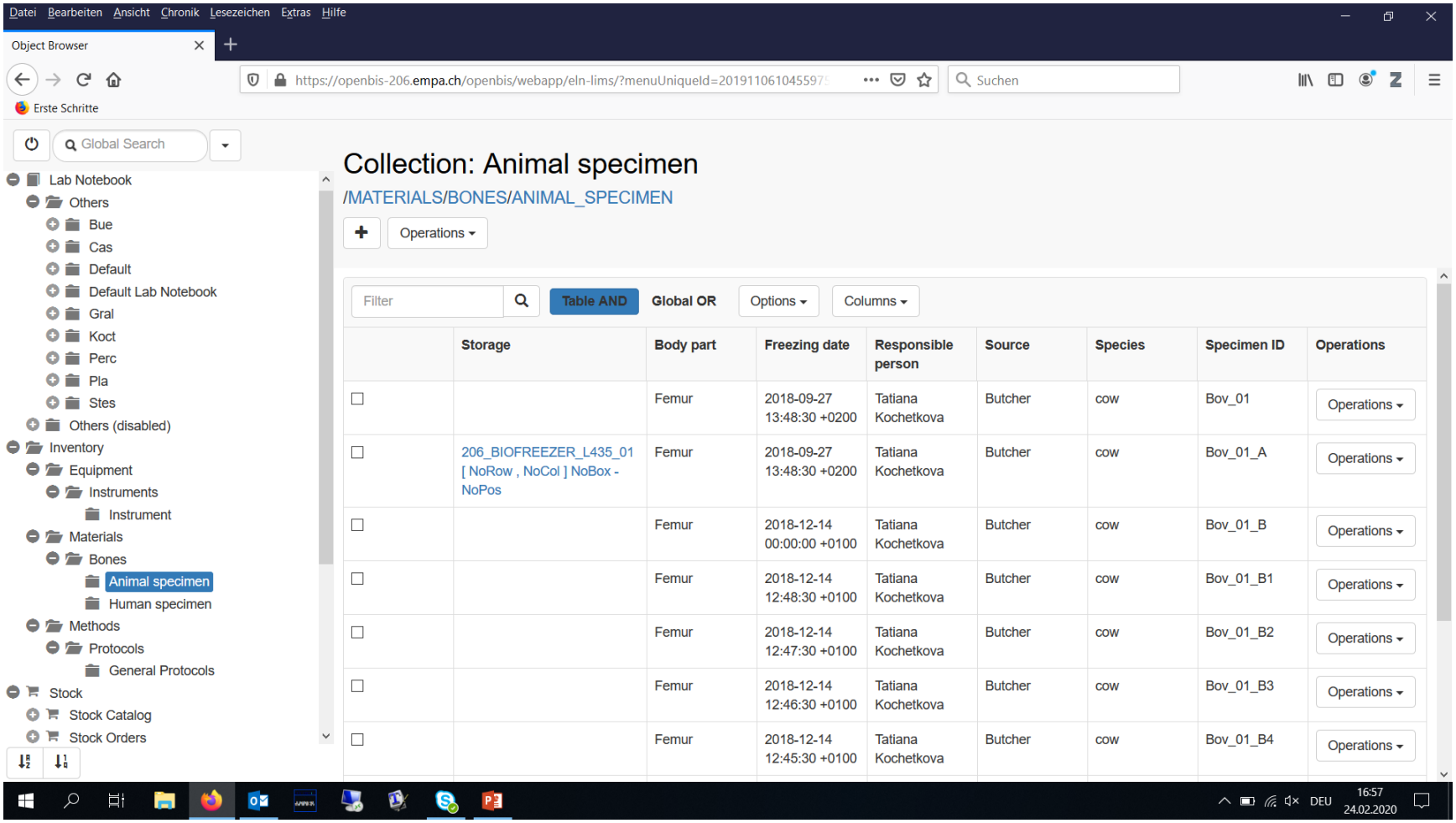

Instrument database

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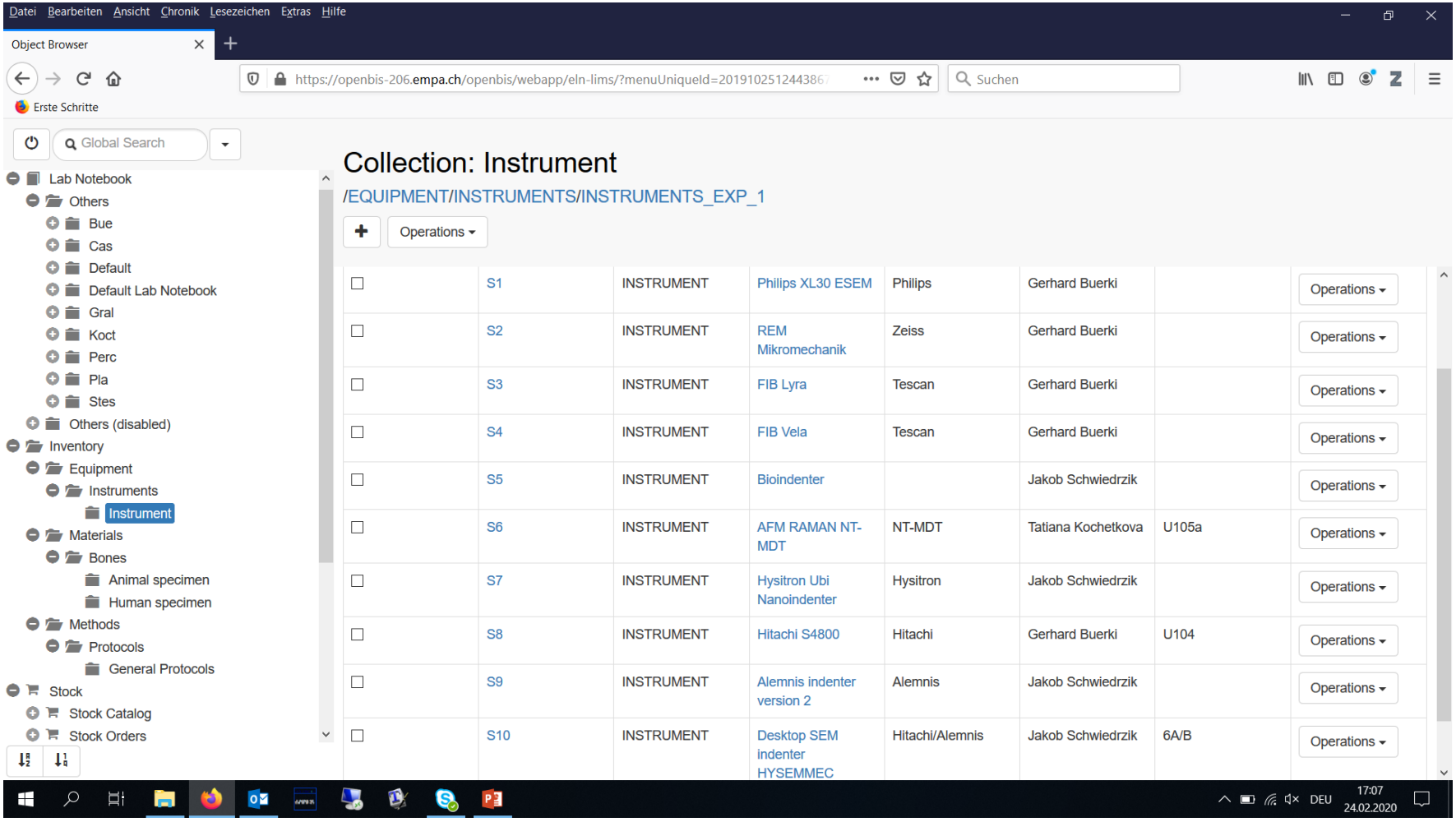

Protocol database

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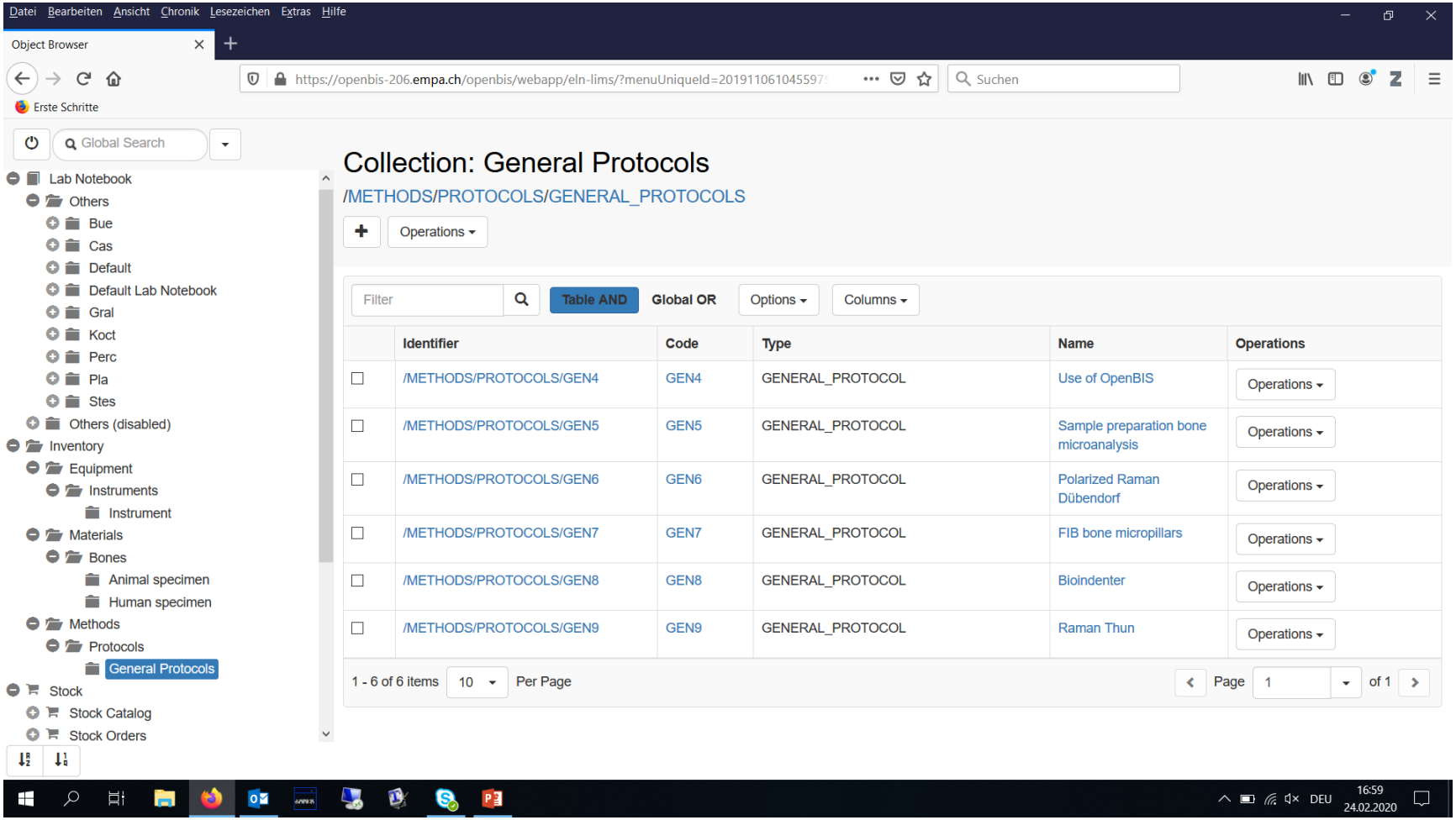

Example protocol

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Object: Polarized Raman Dübendorf

/METHODS/PROTOCOLS/GENERAL_PROTOCOLS/GEN6

General info

Name:
Polarized Raman Dübendorf

Children

Filter | AND | OR | Options | Columns

Identifier	Code	Type	Name	Modification Date
/KOCT/FEMHALS/EXP1	EXP1	EXPERIMENTAL_STEP	Raman Pol Bovine 16012019	2020-01-24 11:16:58
/KOCT/FEMHALS/EXP1_1	EXP1_1	EXPERIMENTAL_STEP	Raman Pol Bovine 03062019	2020-01-06 08:48:23
/KOCT/FEMHALS/EXP2	EXP2	EXPERIMENTAL_STEP	Raman Pol MTLT 27032019	2020-01-24 11:18:19

1 - 3 of 3 items | 10 | Per Page | Page 1 of 1

Example protocol

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For what:
Non-destructive qualitative analysis of material composition and molecular anisotropy.

Materials:
Confocal Raman microscope (alpha300R, WITec, Ulm, Germany) equipped with a piezo-scanner

Objectives: 10x (0.25 NA), 50x (0.80 NA), 100x

Time requirement:
~ integration time * number of spectra

For average polarized spectra acquisition at one spot: 7 min for 180°, 15 min for 370° with 10° polarization step.

Procedure:
Software (Project FIVE):

Scanning table – 700g; CCD#2. For table positioning – positioning tab, for spectra acquisition – oscilloscope tab.

Polarizer motors controller: STSv1.0 (or latest running version), Ray line (785 nm), set position to 0 + check motors position visually.

Calibration:

Calibration on Si reference with 100x objective at chosen grating (300gr/mm works well). Raman spectra calibration parameters:

PRS Si calibration

laser power	40 mW
Integration time	0.1 s
Grating	150 g/mm | 300 g/mm
Center λ	969 | 1500

Example protocol

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Measurements:

Samples are mounted to the sample chamber (max 4 at once, better to have the same sample height). Before any spectra acquisition on each sample – overview image with 10x objective is done (Image stitching → sample positioning, geometry → center at current position, X=Y~5000). Then change the objective and take another smaller overview of the ROI (listen position → once, X=Y~500). For spectra aquisition: switch off the light & optical microscope, oscilloscope → start, find Z with the best Raman spectra. Then enter sample name (ex. *B8-ost1_785nm_50xSD_30mW_PoloutAll),* set accumulation to 1. For single spectra aquisition use the WITec soft, for multiple polarized spectra – use the Labview soft (STSv1.0), enter the sample name there and manually check polarizer motor position before collecting the new set of spectra.

Typical Polarized Raman parameters for spectra acquisition on bone are shown below:

PRS on bone setup parameters

Laser λ	785
Laser power	30 mW
Objective	50x 0.80 NA
Integration time	30 s
Grid	300 gr/mm
Center λ	1500
Polarizer angles range	0 – 180 / 0 - 370
Polarizer angle step	10

Data manipulation (CCR):

Highlight spectra in the list → drag → CCR+Smooth → OK → values: 4 & 9

Example protocol

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Data extraction:

Export file → Use data obj name → no number before, spectral units: rel 1/cm

References

References:

Mandair, G. S., & Morris, M. D. (2015). Contributions of Raman spectroscopy to the understanding of bone strength. *BoneKEy Reports*, *4*(August 2014), 1–8. https://doi.org/10.1038/bonekey.2014.115

Identification Info

Type:
GENERAL_PROTOCOL

Collection:
/METHODS/PROTOCOLS/GENERAL_PROTOCOLS

Code:
GEN6

Registrator:
sjj

Registration Date:
2019-11-06 10:51:57

ELN and project structure example

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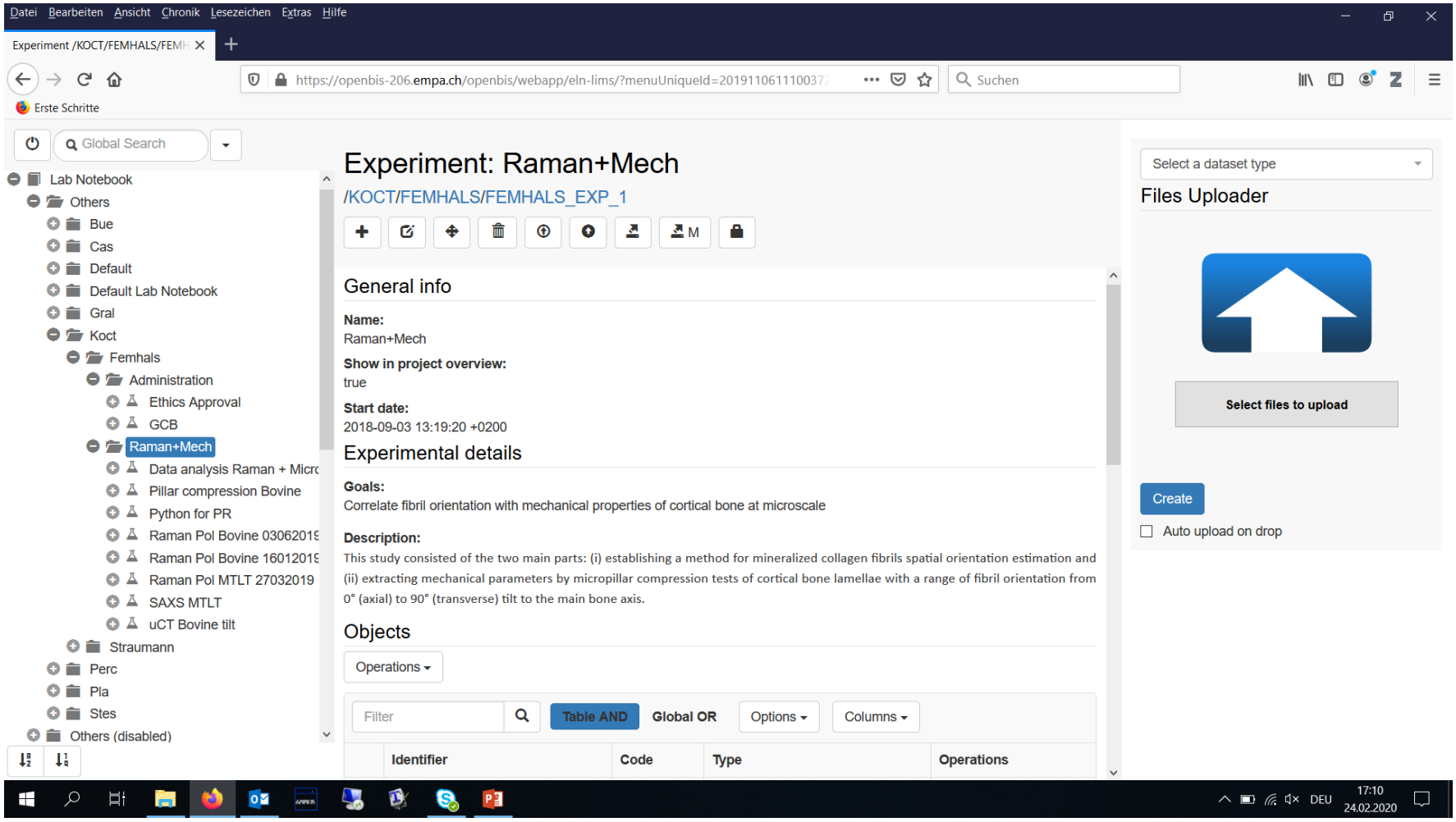

Summary

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- ELN is currently actively used by 7 users
- Since most instruments are connected to PCs with internet access, the ELN can be used on site
- Using the general experimental step templates is feasible
- Later on, we plan to develop specific templates for certain types of measurements
- Chosen structure:
  - User based
  - Projects created by group head/project responsible and shared with collaborators
  - Admin information is stored as first experiment in every project
  - Experimental campaigns are grouped into logical subprojects
- Combination of ELN with data repository and material/instrument database allows to keep track of projects and is especially attractive for archiving