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Ways to Collaborate – Multigroup Instance

How to integrate two sister laboratories with a joint infrastructure

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Particles-Biology Interactions (403)

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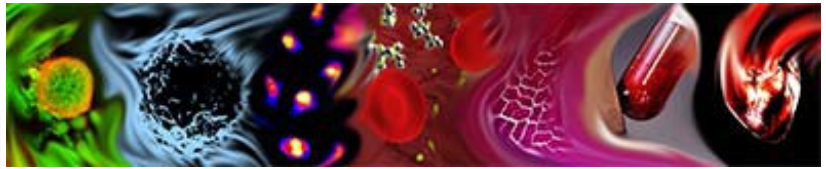
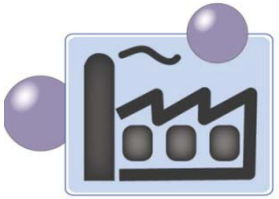
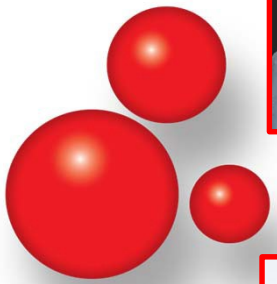
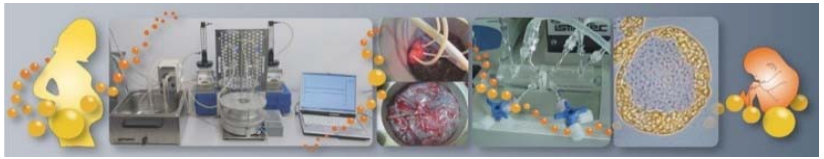
We pioneer innovative particle-based solutions for personalized healthcare applications to meet the growing needs of our society.
We seek to characterize, understand and steer the interactions of particulate materials with biomolecules, human cells and barrier tissues.



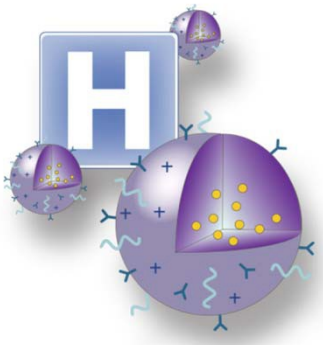




Rational design of functionalized nanomaterials for precision health solutions



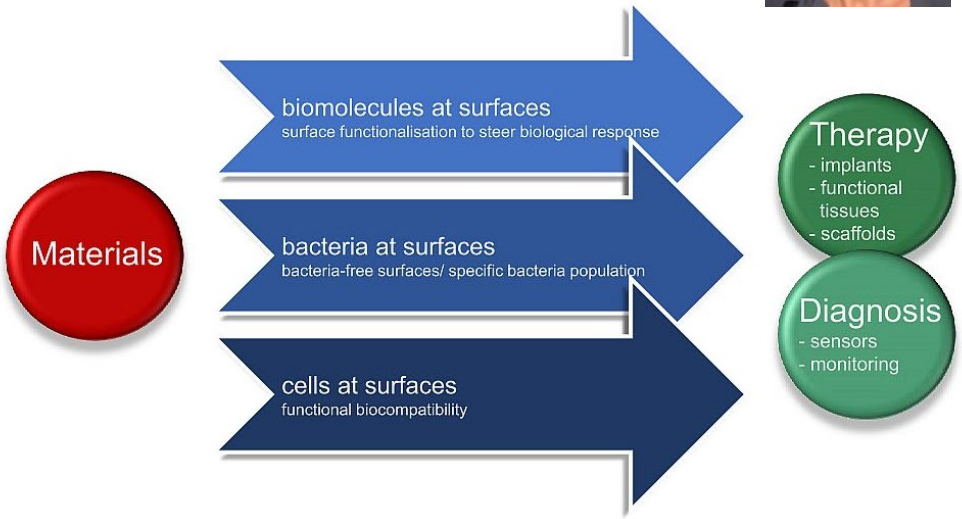
Understanding nanomaterial transport and effects at biological barriers



Multigroup Instance

- 403 was the first laboratory, which went through the setup process
- 403 and 404 are sister laboratories using many joint labs, instruments, stocks and procedures
- Still each lab has also their own special labs, instruments, stocks and procedures
- The initial discussion highlighted that single group instances for each lab means double work (instruments and procedures) and unsynchronized stocks
- Therefore Caterina proposed to use a multigroup instance for 403 & 404

Biointerfaces (404)



Multigroup Instance

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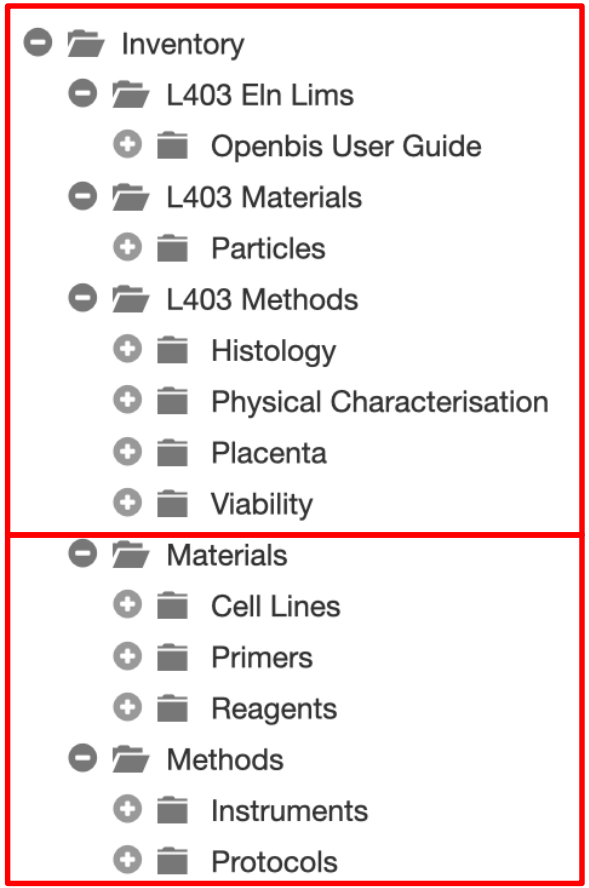
Multigroup Instance allows:

- Common inventories for
  - Materials
  - Methods
- Lab specific inventories for
  - Materials
  - Methods
- Easy setup of projects for
  - Individual users
  - Collaboration within the lab
  - Collaboration between labs of the multi group instance
- Common administration of the multigroup instance



Collaboration Scenarios

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- **Single Group Instance**
  - Lab uses mainly its own instruments
  - Lab has mainly its own inventory and stocks
  - Each member of the lab has access to the single group instance
  - Collaboration within the lab and single group instances easy
  - Collaboration with other labs – person receives account in single group instance
  - Outside person only sees and works in spaces and projects with granted access rights
  - Instance manager can adopted single group instance fully to the needs and requirements of the lab

- **Multi Group Instance**
  - Labs use many joined instruments
  - Labs have many joined inventories and stocks
  - Each member of the labs has access to the spaces and projects of their lab and joined inventories
  - Collaboration within and between each lab of the multi group instance easy
  - Collaboration with other labs – person receives account in multi group instance
  - Outside person sees and works in spaces and projects with granted access rights
  - One instance manager for all the labs of the multi group instance
  - Adoption of the multi group instance has to consider the needs of all involved labs

Stepwise Integration of New Persons

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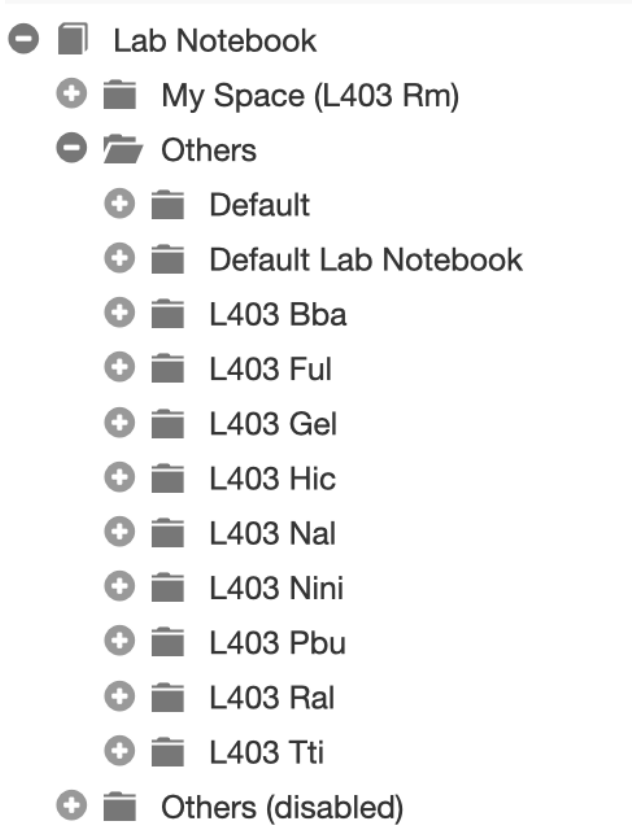
- No big bang!
- Stepwise integration of new persons
- Initial users receive training during the setup phase of the instance
- Initial users start filling the inventories
- Initial users start specifying adopted protocols and experimental steps according to their individual needs and specialization
- Any new users receives introduction to the basic functionalities of openBIS
- Further familiarization with the already existing inventories, protocols and experimental steps
- Test project to learn the main functionality of openBIS and specific instance
- New users may specify additional adopted protocols and experimental steps according to their specific needs



Visualization - Inventory

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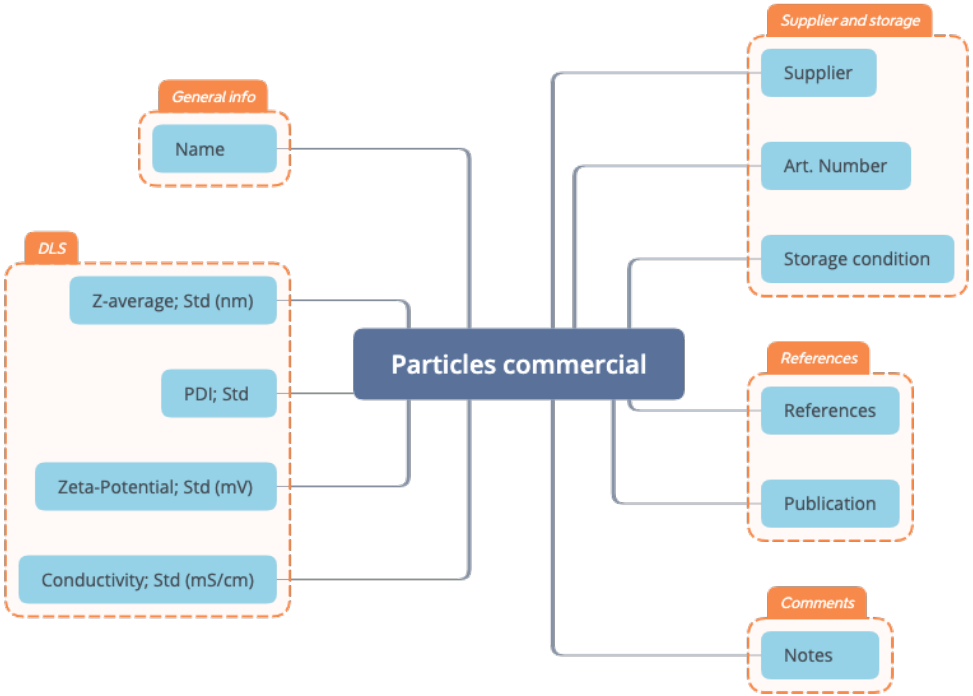

metadata - ontology

Identification Info

Type:
COMMERCIAL_PARTICLE

Collection:
/L403_MATERIALS/PARTICLES/COMMERCIAL_PARTICLE_2

Code (*):
CPAR5

General info

Name:
Name

Parents

Children

Supplier and storage

Supplier:

Art. Number:

Storage conditions:

DLS

Z-average, std (nm):
DLS: Z-average diameter and standard deviation

PDI, std:
DLS: Polydispersity index and standard deviation

Zeta-Potential; StD (mV):
DLS Zeta-Potential and standard deviation

Conductivity; StD (mS/cm):
DLS Conductivity and standard deviation

References

References:

Format | Schriftart | Grösse

Useful refences

Visualization – Experimental Step

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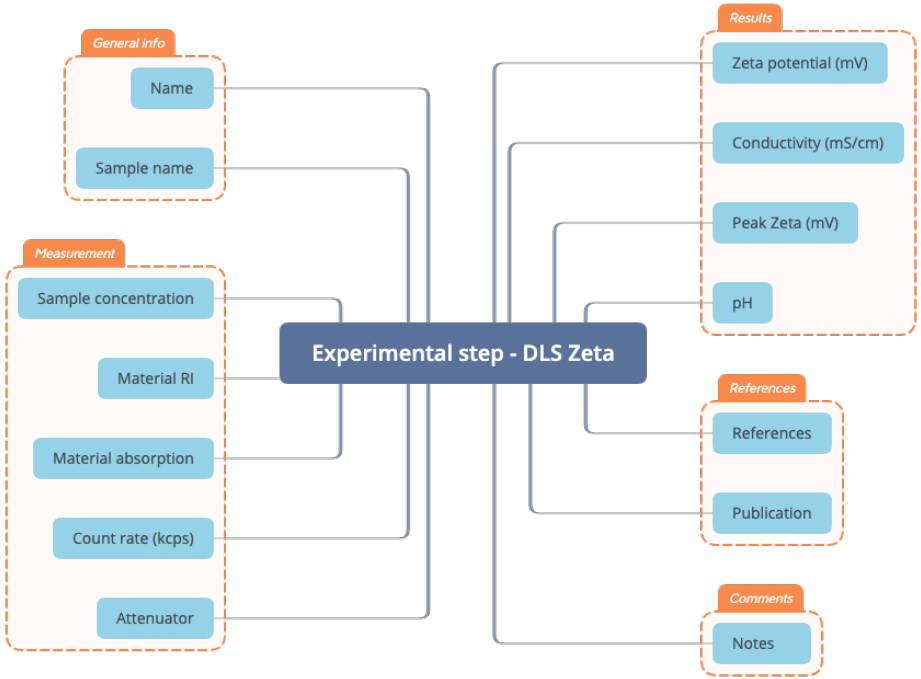
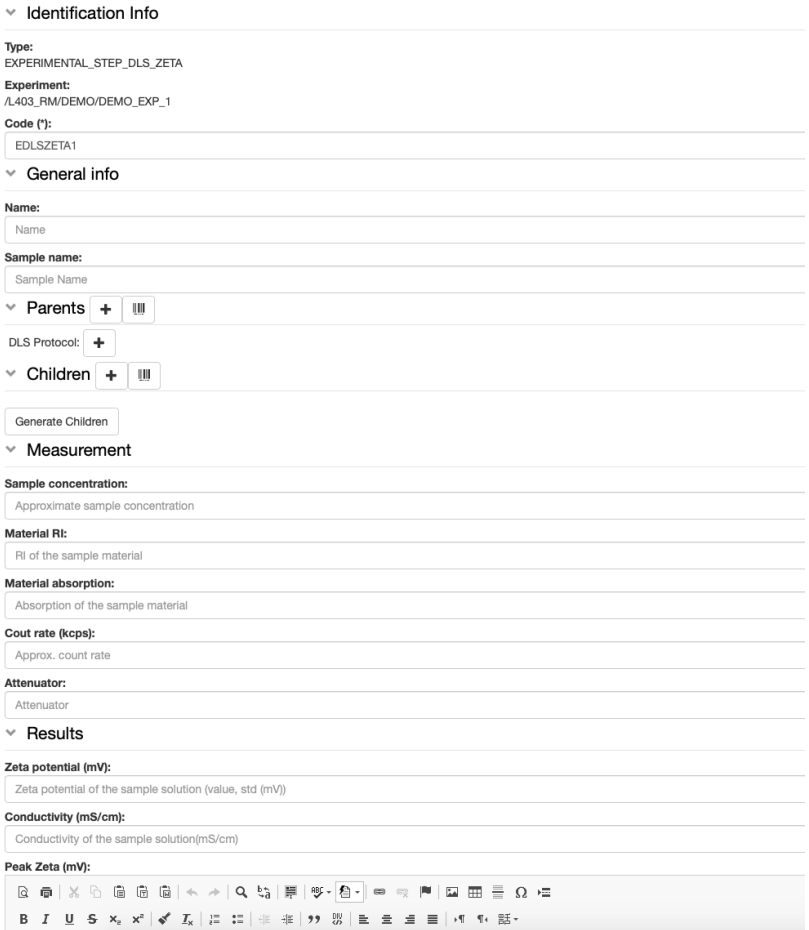
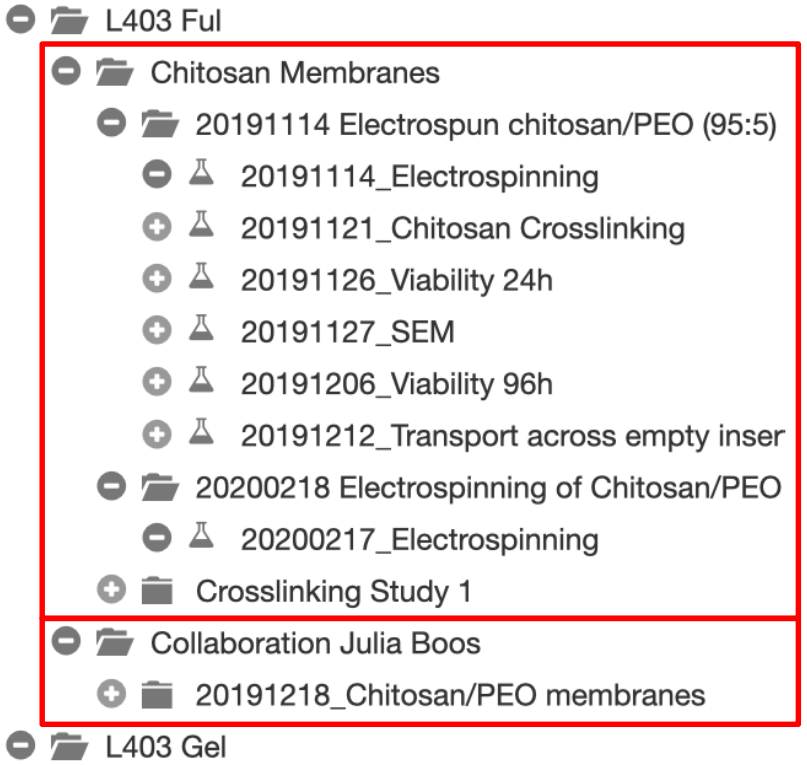


metadata - ontology



Running Projects

- Each person in an instance has its own space for their different projects
- Each person is free to generate their own project (folders)
- Recommendation one or a few projects should comprise one publication (easy upload to repositories)
- Each person can handle access rights to their own space
- Rules in our lab
  - Each group leader has access to all the spaces of the group members
  - Each member in a collaboration has access to the specific project (folder)
  - In collaboration project is in the space of the project leader
  - They have the overall responsibility over the collaboration projects and all its data and metadata

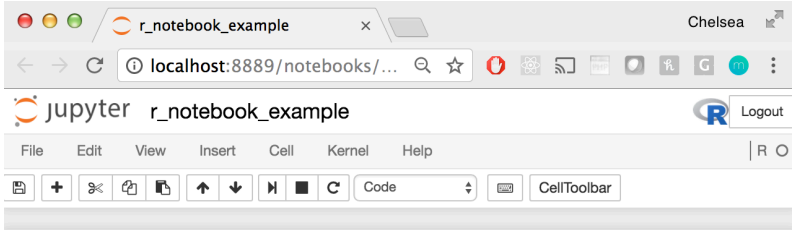


Next Steps - Barcodes

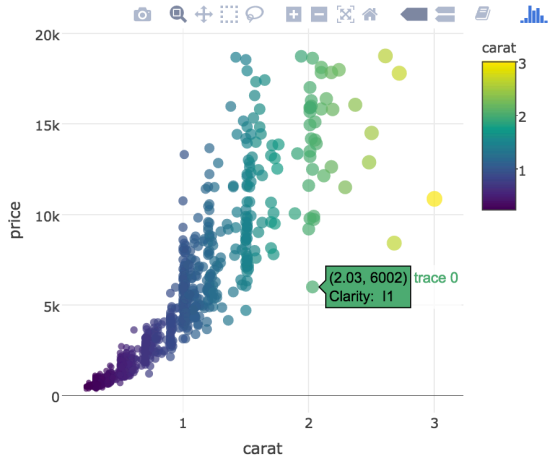
- Challenge
  - Huge inventory of different chemicals, antibodies, cell-lines, media, commercial nanoparticles etc.
  - Growing stock of own synthesized nanoparticles
  - Different labs with various cabinets, refrigerators, freezers, -80˚C freezers and liq. N_2 dewar
  - It is often hard to find something and keep track of the different stocks
- Solution
  - openBIS allows to specify the location of an item up to the shelf, box and location in the box
  - Barcodes and barcode scanners allow to identify each item unambiguously
- Current status
  - Barcode functionality newly integrated into openBIS -> additional functionalities might be needed
  - Develop the operating procedures in the two labs
  - Incorporate the different inventories into openBIS
  - Convince each member of the lab to keep things in order!

Next Steps

- Challenge
  - Data analysis is done in excel with cumbersome worksheets, various in-transparent formulas and many referenced cells
  - Data analysis is done using click-software
  - Even the person providing the data analysis has often problems to reproduce the data analysis after some time
- Solution
  - Describe the data analysis step by step in code (R, python, julia etc.)
  - Comment the data analysis path using markdown
  - Access to jupyter od rstudio notebooks in openBIS
- Current status
  - Preparation of courses (courses & self-study) to learn R and Rmarkdown
  - Provide regular courses for R & build-up R user group




```
In [5]: library(plotly)
        set.seed(100)
        d <- diamonds[sample(nrow(diamonds), 1000), ]
        plot_ly(d, type = 'scatter', mode = 'markers',
                x = ~carat, y = ~price,
                color = ~carat, size = ~carat,
                text = ~paste("Clarity: ", clarity))
```



Conclusion

- openBIS is a very versatile and complete system
- It can be adopted to any needs and any requirements of any lab
- During the pilot we have improved the setup process considerably
- We have found very professional partners with SIS-ETHZ
- There is a long term commitment of ETHZ and SIS-ETHZ for openBIS
  - Support
  - Further development (including our needs)
- The success of each instance depends strongly on commitment of the instance manager
- It needs sometimes encouragement of the lab and group leaders towards all lab and group members