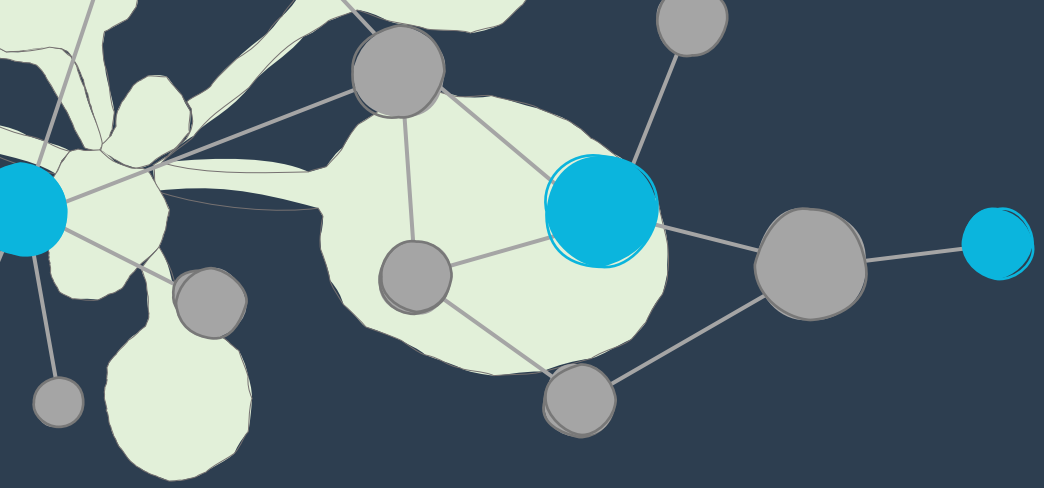
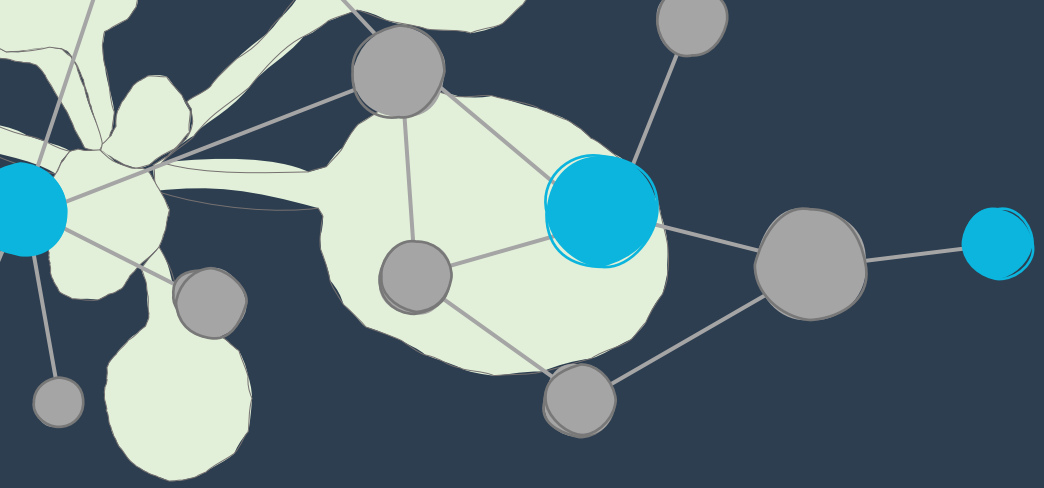
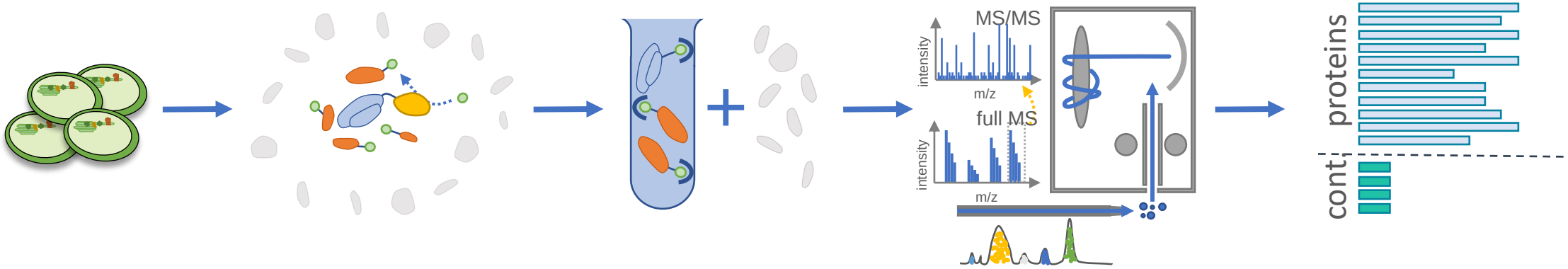


Becoming FAIR: Utilizing ARCs and the PLANTdataHUB for collaborative research in the TRR175



Part two: What is an ARC? A Practical Approach

Motivation: An TurboID experiment



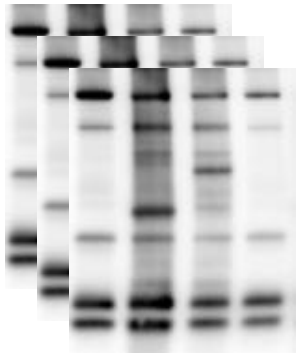
Growth | Biotinylation Assay | Affinity Purif. | MS Measurement | MS Analysis

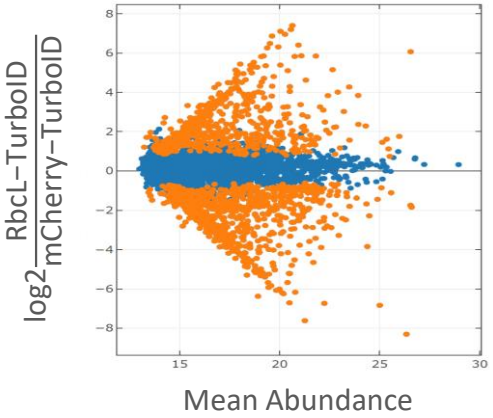
Motivation: An TurboID experiment

Cell type 1,
genetic background 1,
Condition 1
e.g. RbcL-TurboID

...

Cell type n,
genetic background n,
Condition n
e.g. mCherry-TurboID



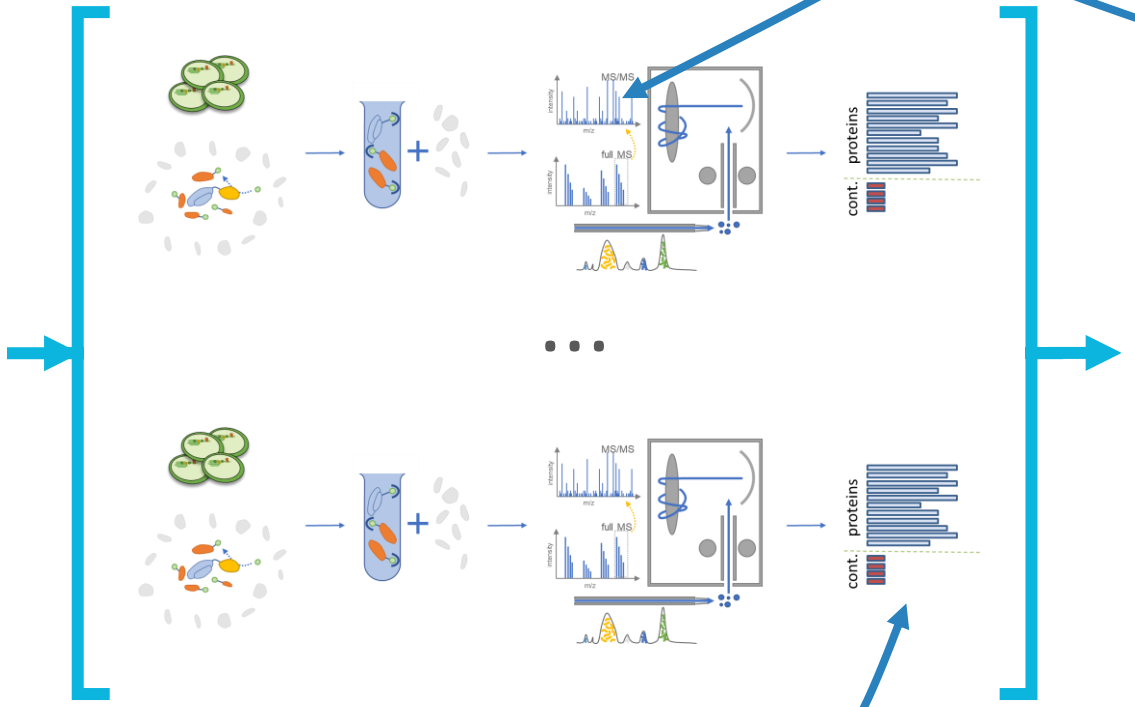


Motivation: An TurboID experiment

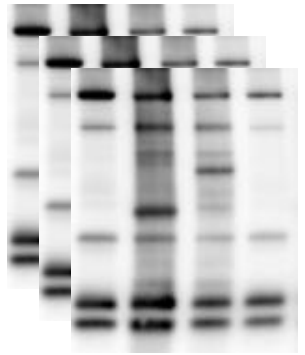
Cell type 1,
genetic background 1,
Condition 1
e.g. RbcL-TurboID

...

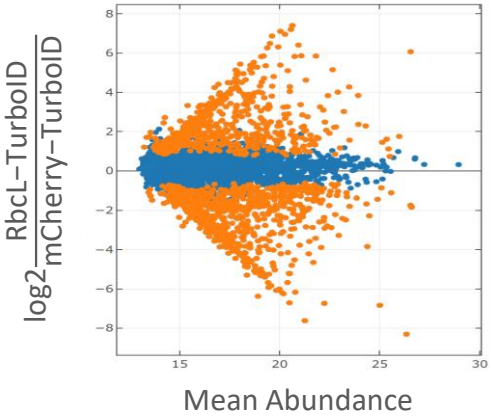
Cell type n,
genetic background n,
Condition n
e.g. mCherry-TurboID



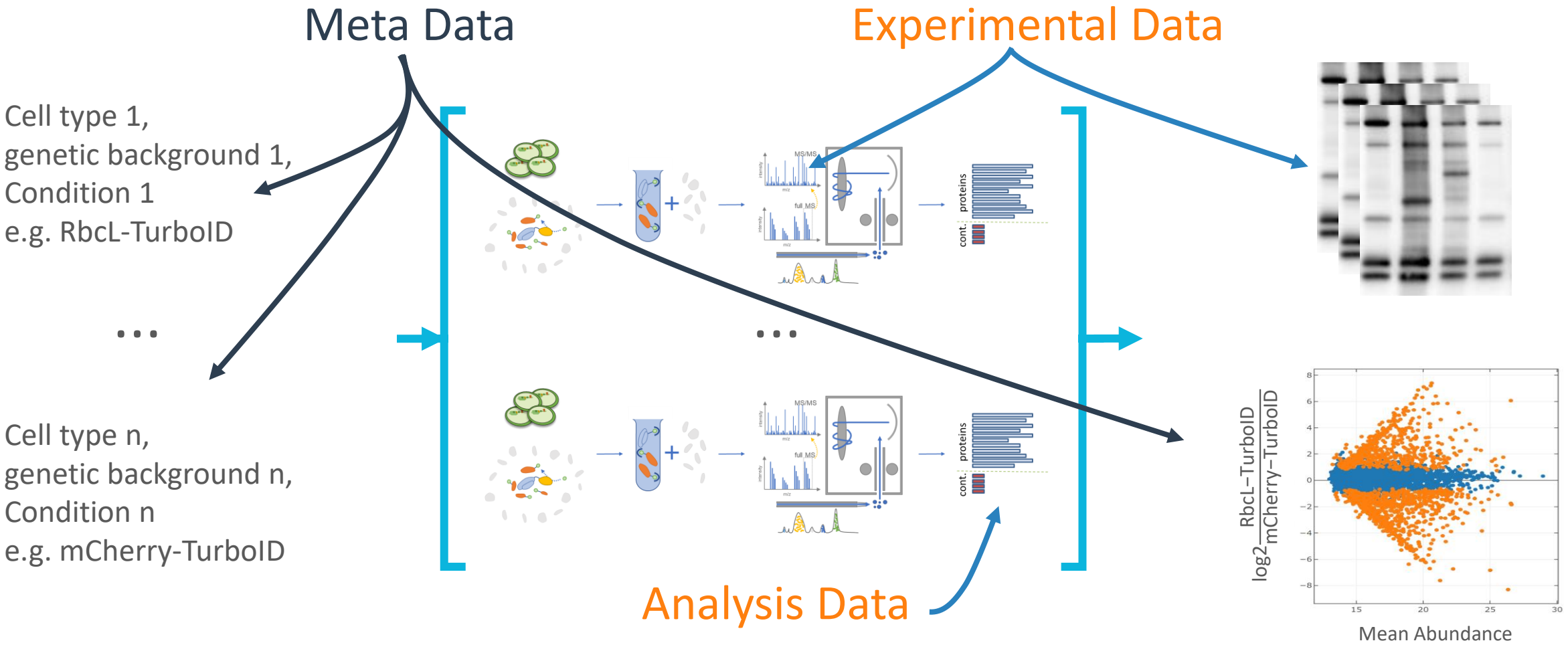
Experimental Data



Analysis Data

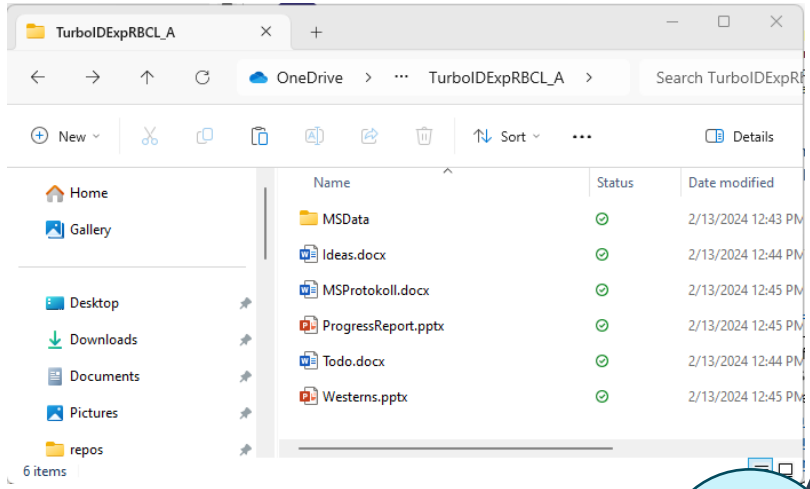


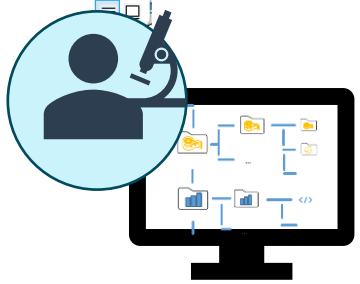
Motivation: An TurboID experiment



Until recently: Individual RDM solutions

Researcher As data management solution:

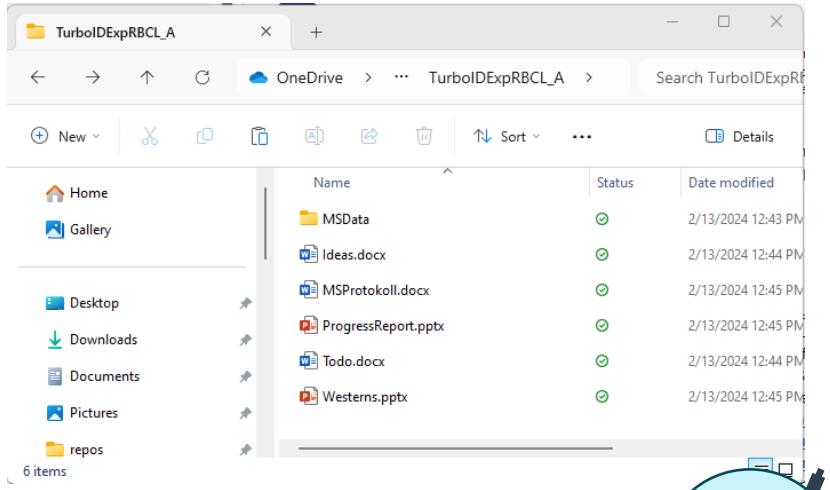


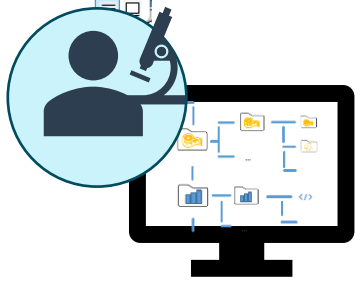


Researcher A

Until recently: Individual RDM solutions

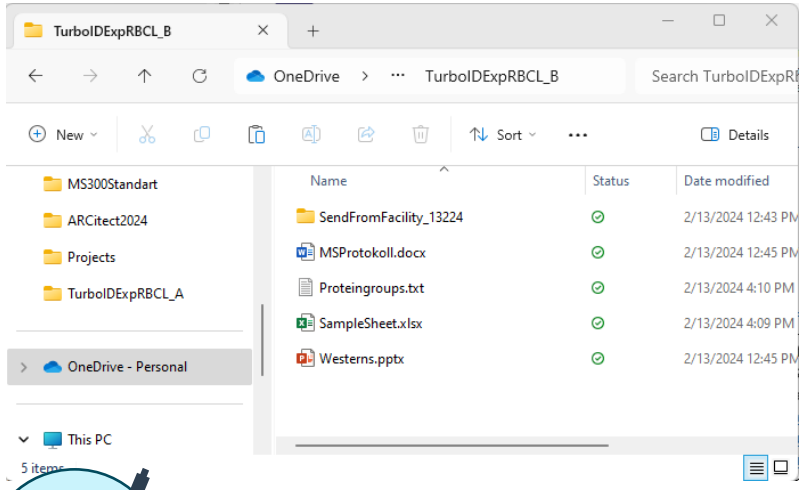
Researcher As data management solution:

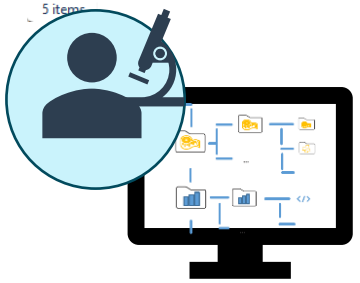




Researcher A

Researcher Bs data management solution:

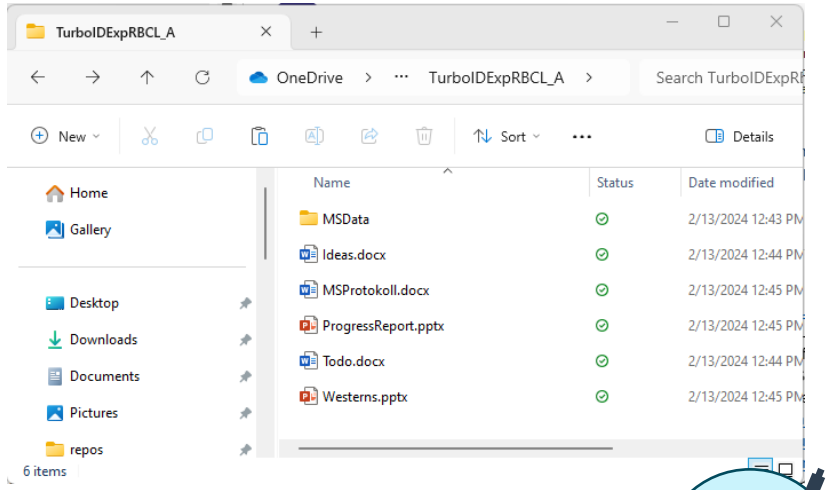


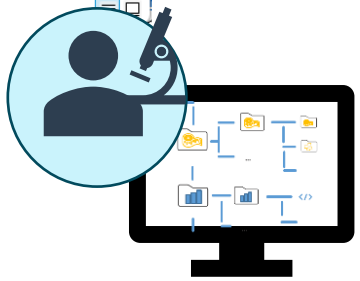


Researcher B

Until recently: Individual RDM solutions

Researcher As data management solution:

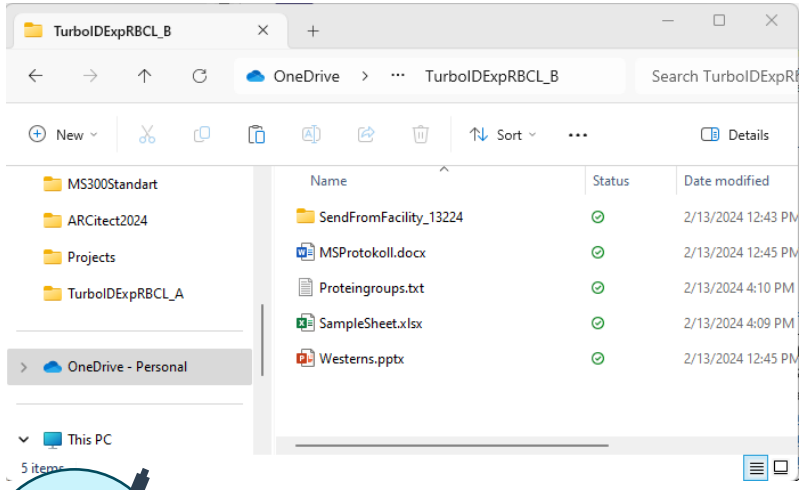


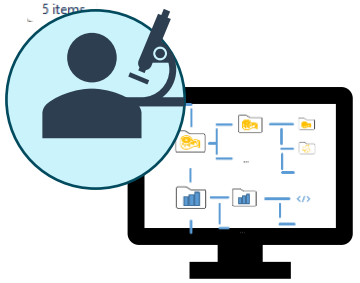


Researcher A

Collaboration

Researcher Bs data management solution:

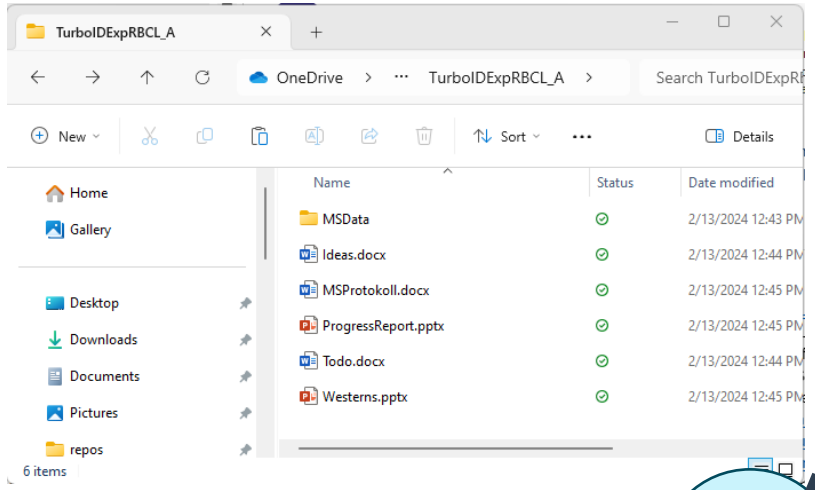




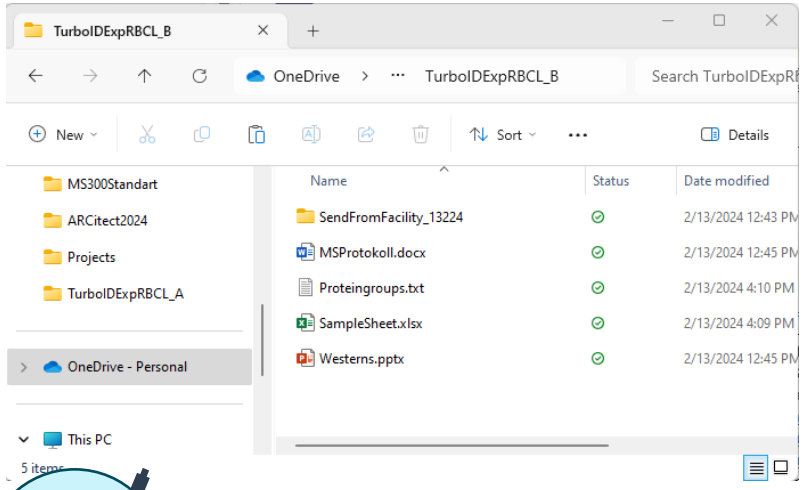
Researcher B

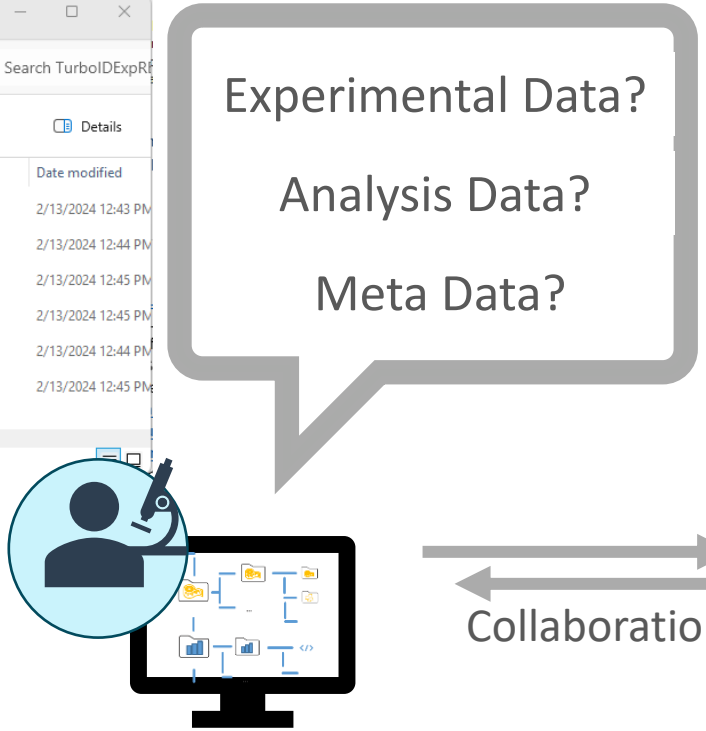
Until recently: Individual RDM solutions

Researcher As data management solution:



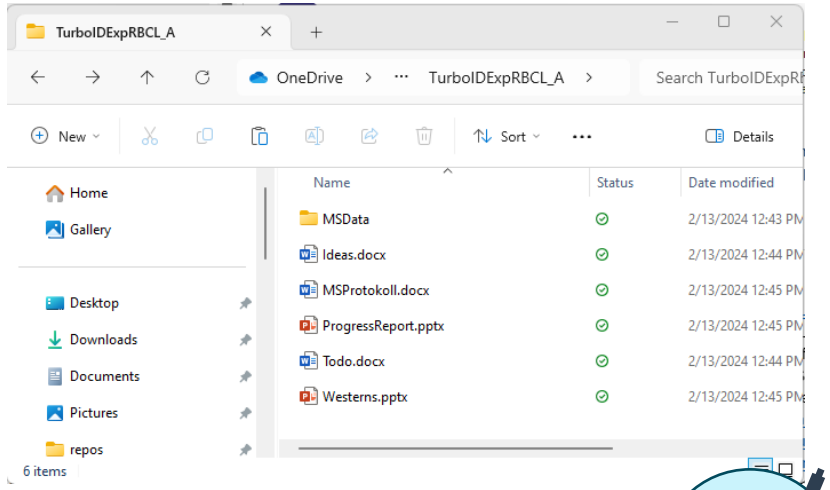
Researcher Bs data management solution:



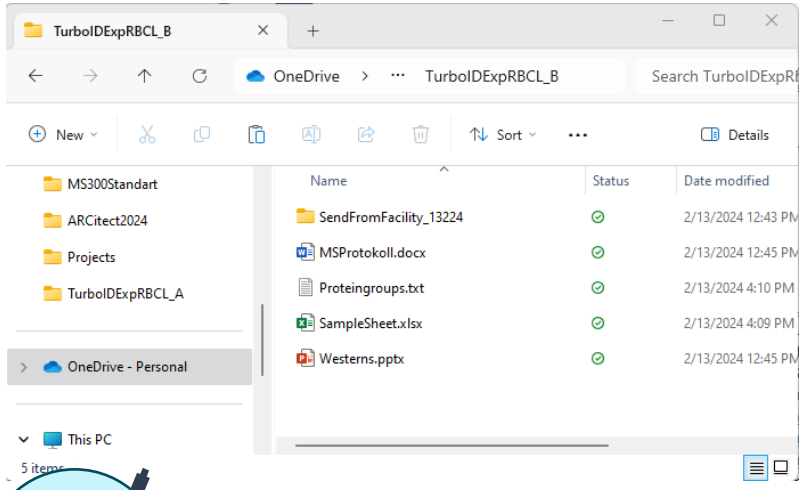


Until recently: Individual RDM solutions

Researcher As data management solution:



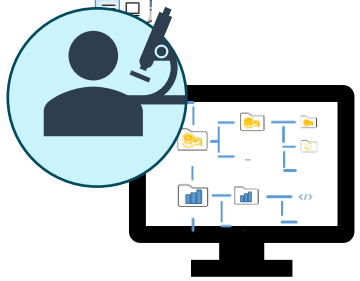
Researcher Bs data management solution:



How do we exchange data?

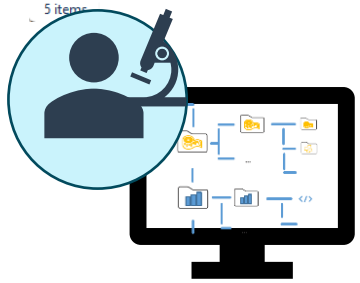
More Metadata?

Any Updates?



Researcher A

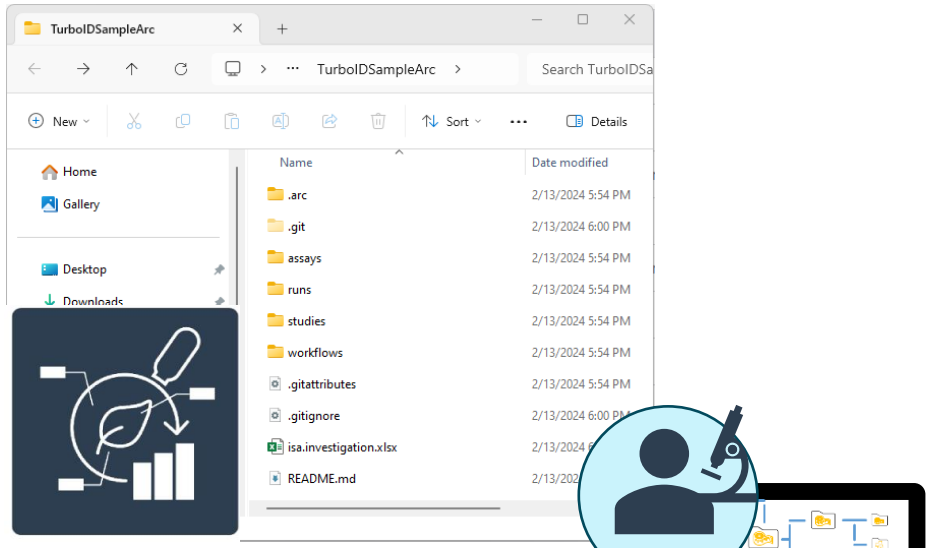
Collaboration

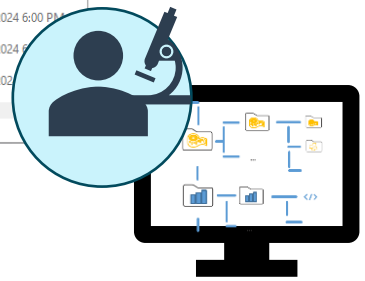


Researcher B

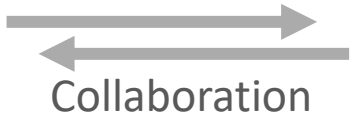
Now: ARCs as a single RDM entry point

Researcher As data management solution:
Annotated Research Context (ARC)

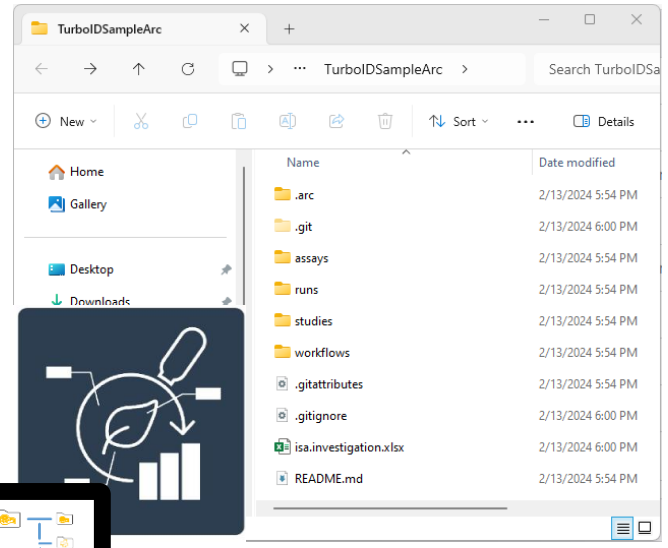


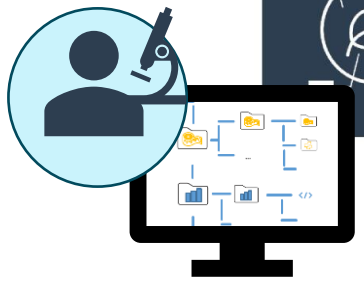


Researcher A



Researcher Bs data management solution:
Annotated Research Context (ARC)

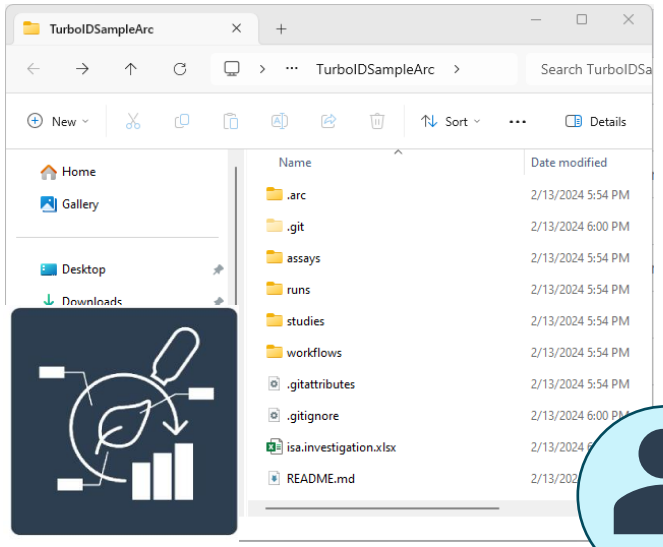


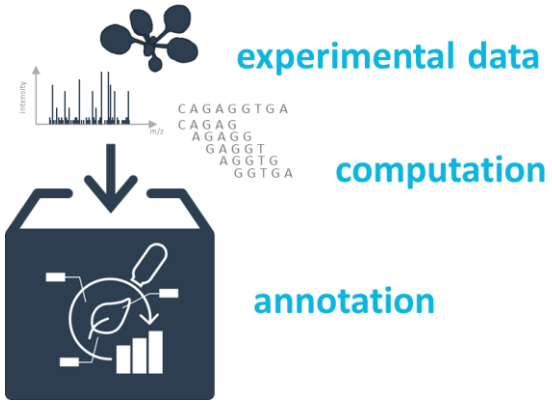


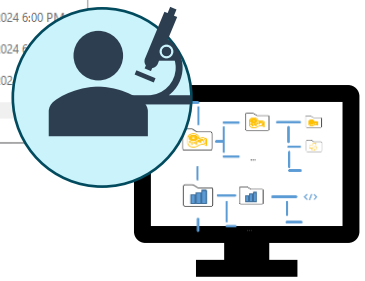
Researcher B

Now: ARCs as a single RDM entry point

Researcher As data management solution:
Annotated Research Context (ARC)

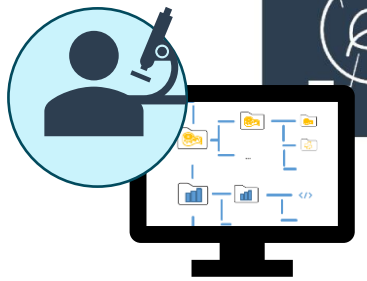






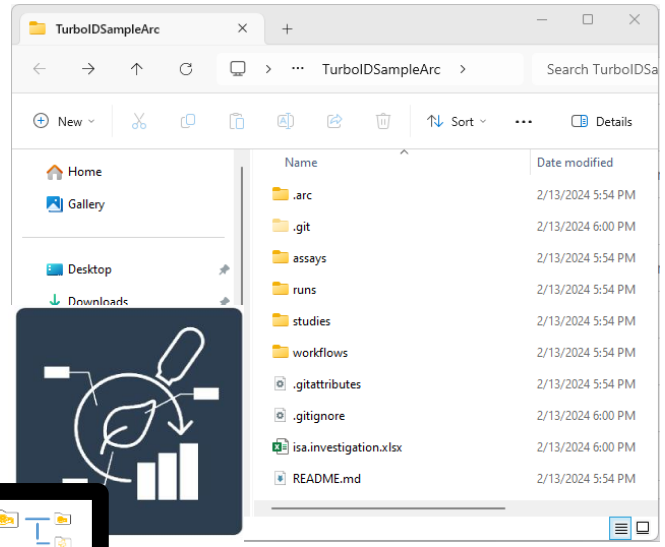
Researcher A

Collaboration



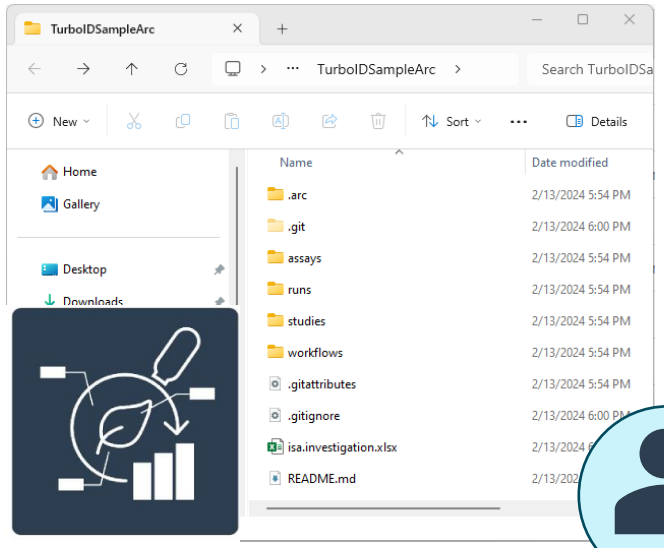
Researcher B

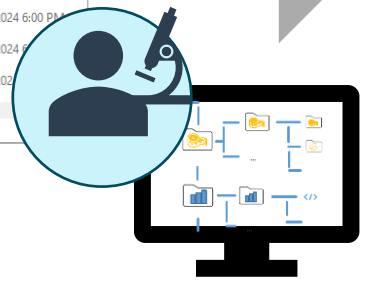
Researcher Bs data management solution:
Annotated Research Context (ARC)



Now: ARCs as a single RDM entry point

Researcher As data management solution:
Annotated Research Context (ARC)

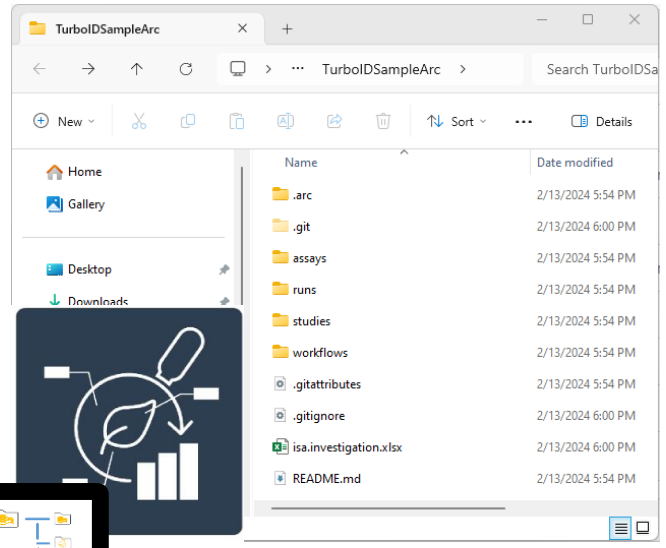


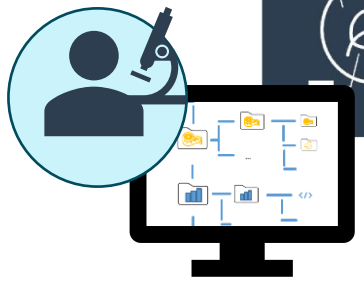


Researcher A

Collaboration

Researcher Bs data management solution:
Annotated Research Context (ARC)

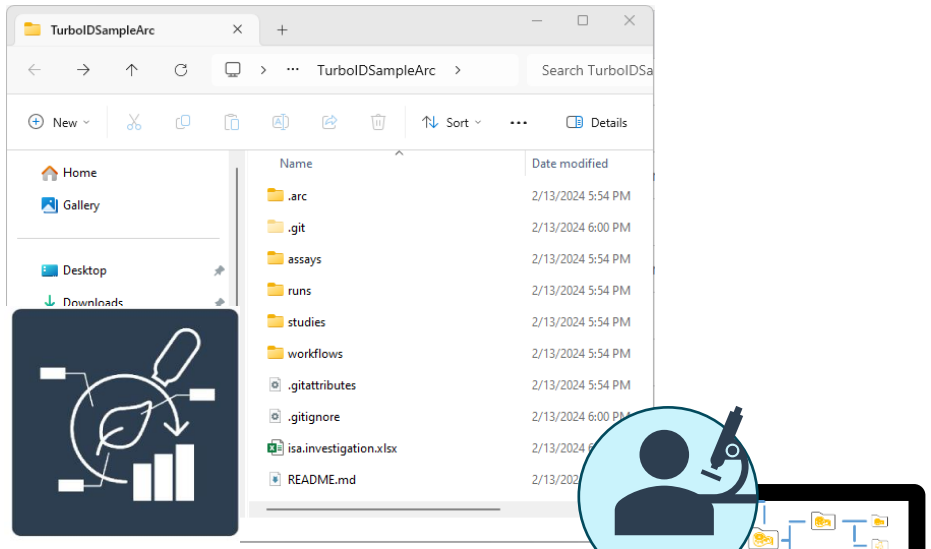


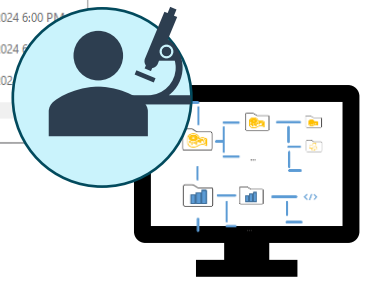


Researcher B

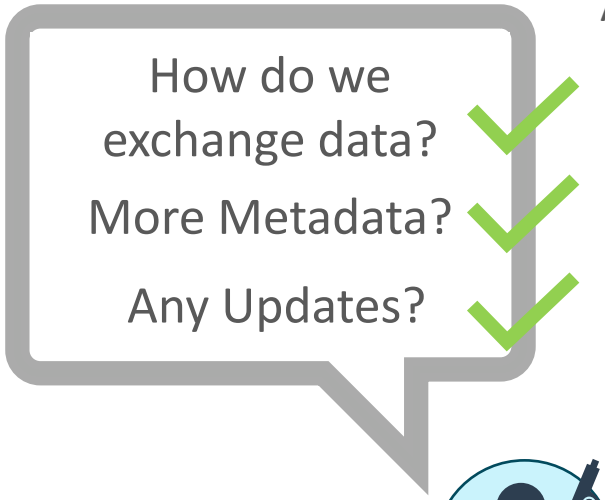
Now: Using the PLANTDataHUB to collaborate

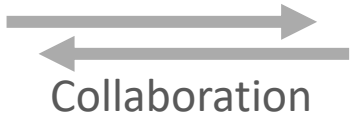
Researcher As data management solution:
Annotated Research Context (ARC)



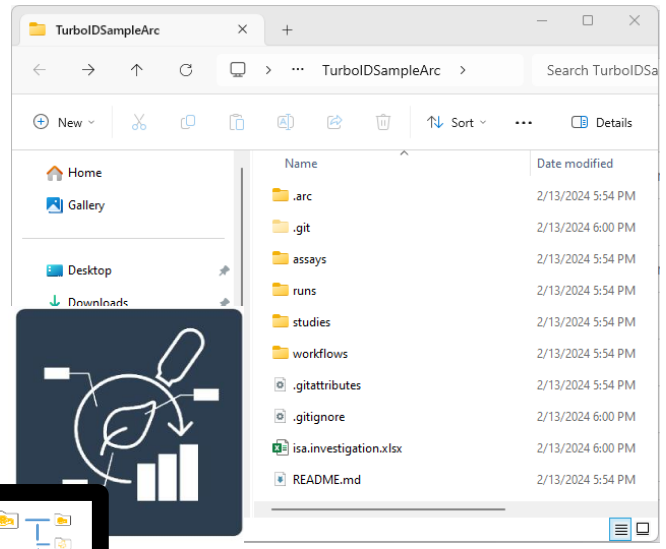


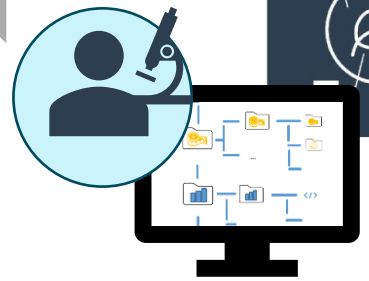
Researcher A





Researcher Bs data management solution:
Annotated Research Context (ARC)



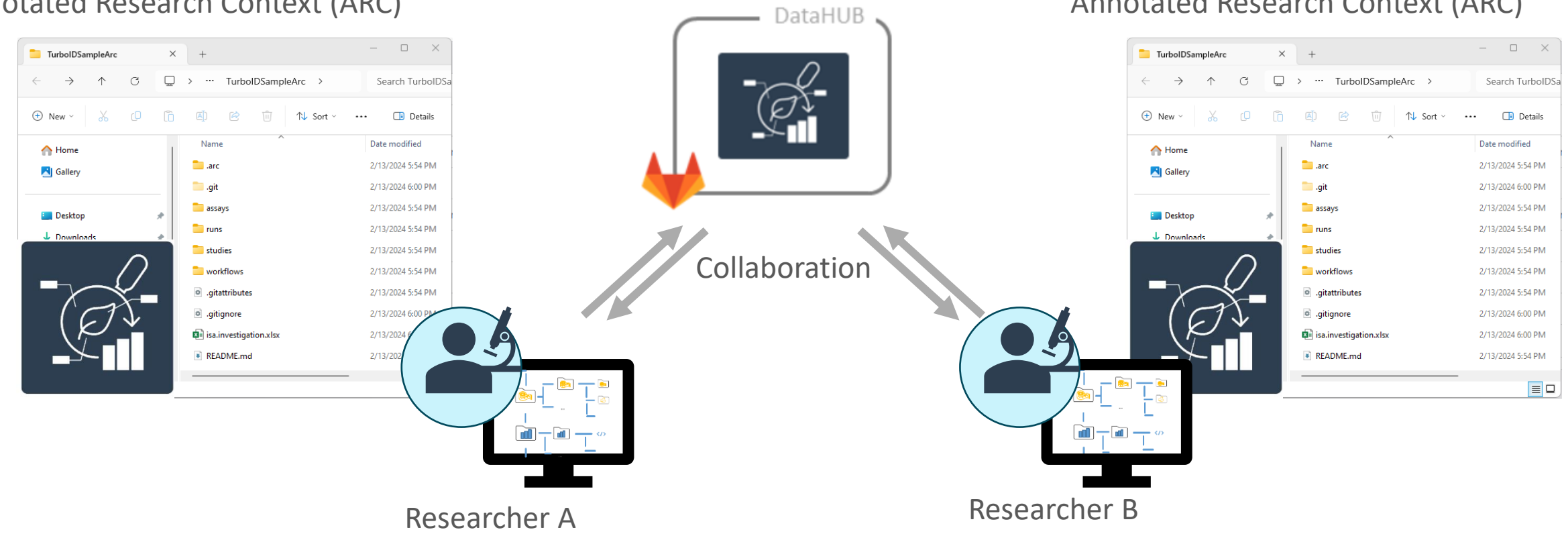


Researcher B

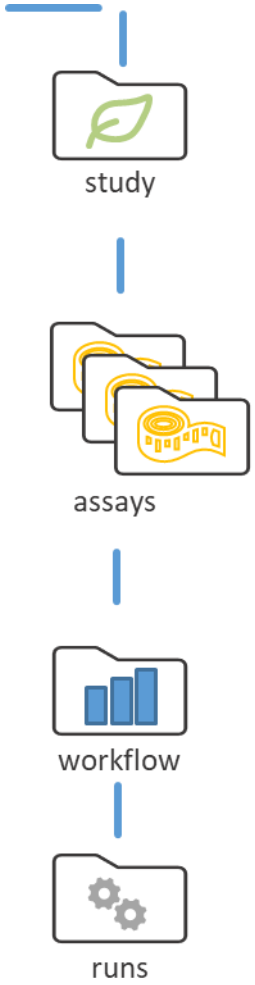
Now: Using the PLANTDataHUB to collaborate

Researcher As data management solution:
Annotated Research Context (ARC)

Researcher Bs data management solution:
Annotated Research Context (ARC)



Agenda of part two



I. Important ARC concepts by example: Structure and Data

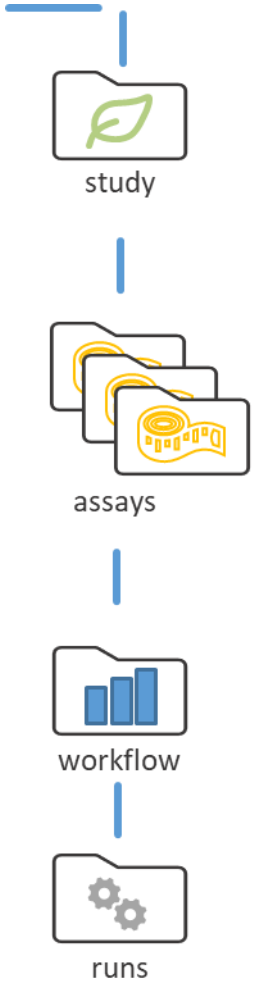
II. Important ARC concepts by example: Meta Data Annotation Principle

III. ARCs for FAIR collaboration using the PLANTDataHUB

ARCitect

IV. Complete Walk-Through using the ARCitect

Agenda of part two



I. Important ARC concepts by example: Structure and Data

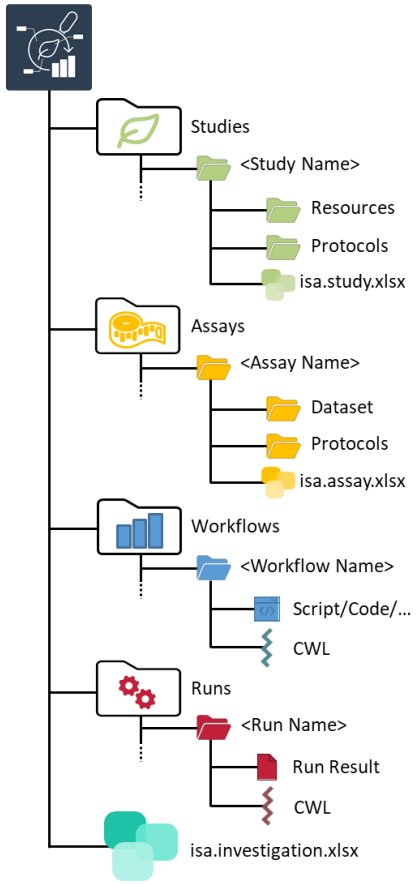
II. Important ARC concepts by example: Meta Data Annotation Principle

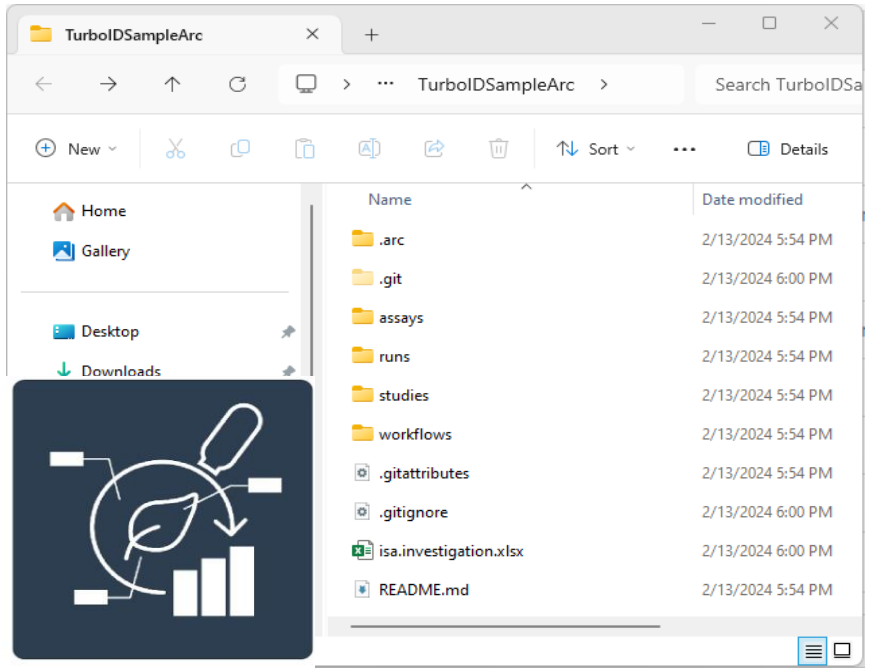
III. ARCs for FAIR collaboration using the PLANTDataHUB

ARCitect

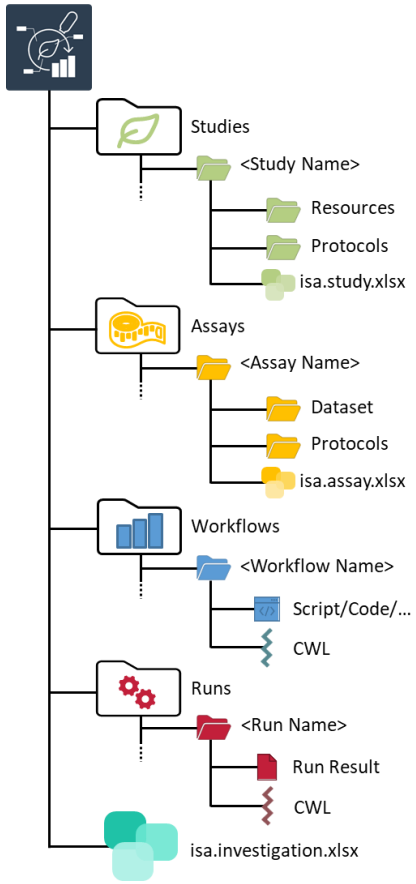
IV. Complete Walk-Through using the ARCitect

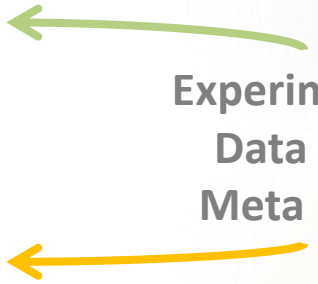
Important ARC Concepts: Structure and Data

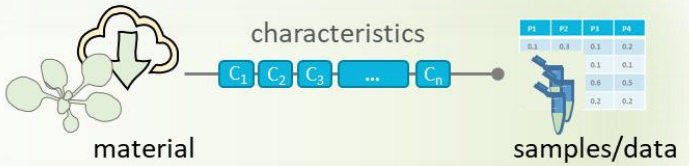


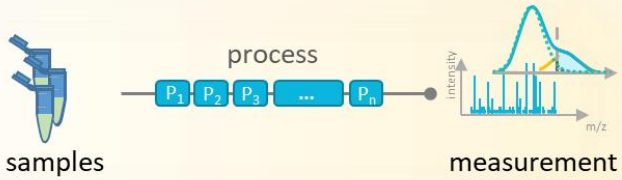


Important ARC Concepts: Structure and Data

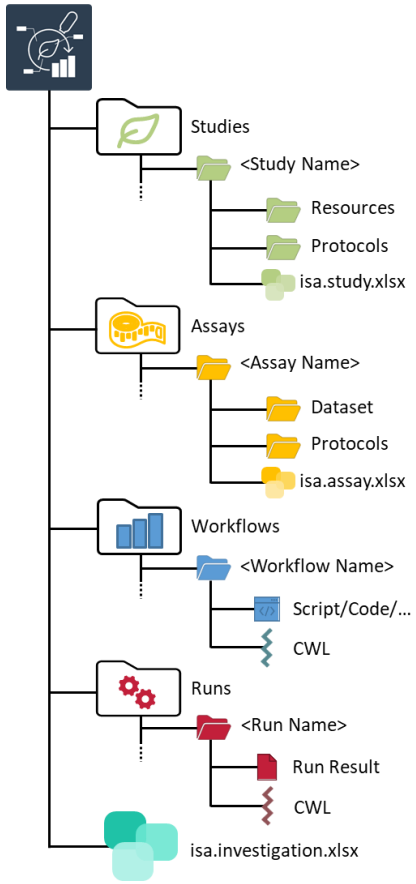


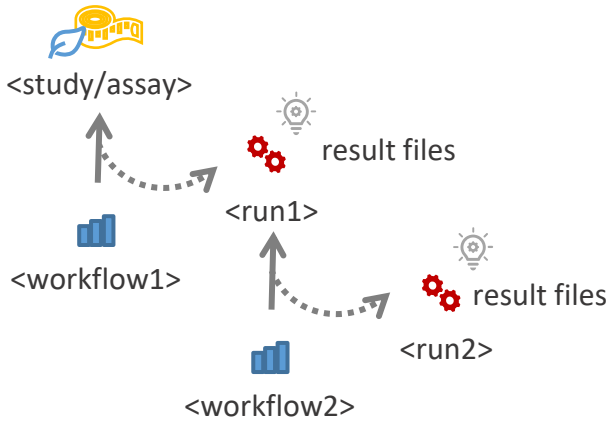




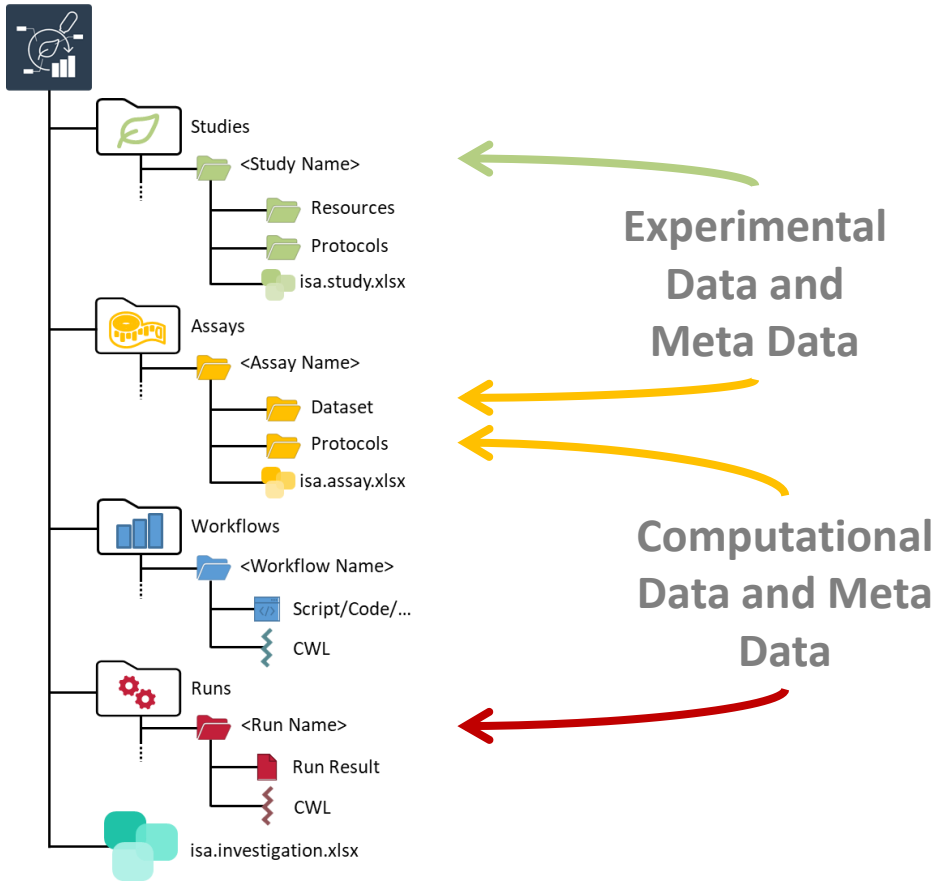


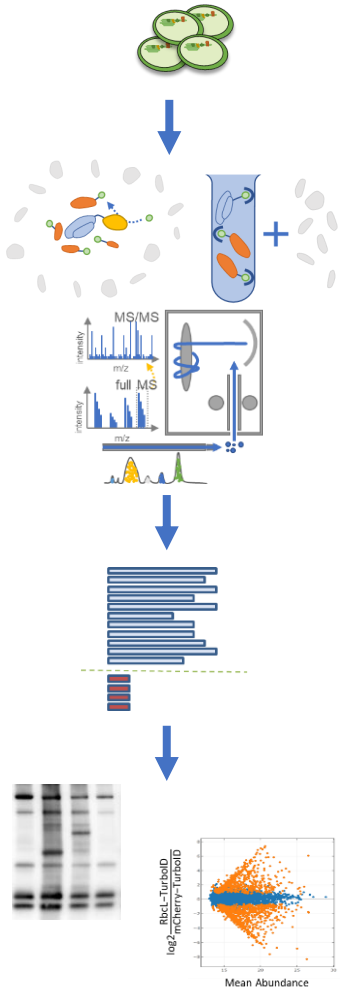
Important ARC Concepts: Structure and Data



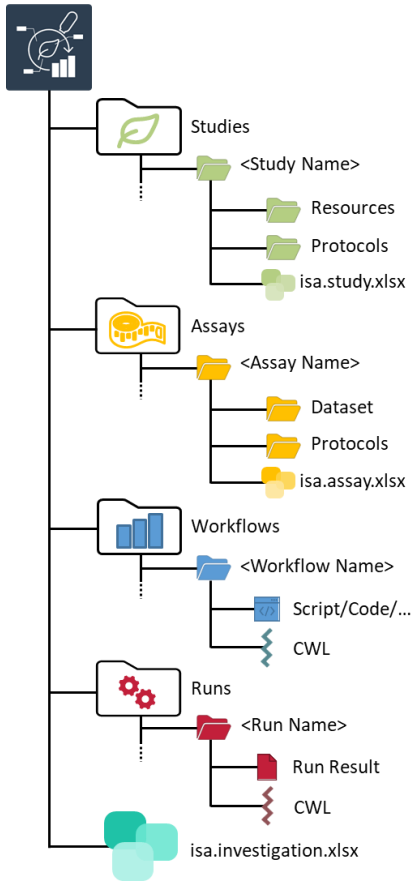


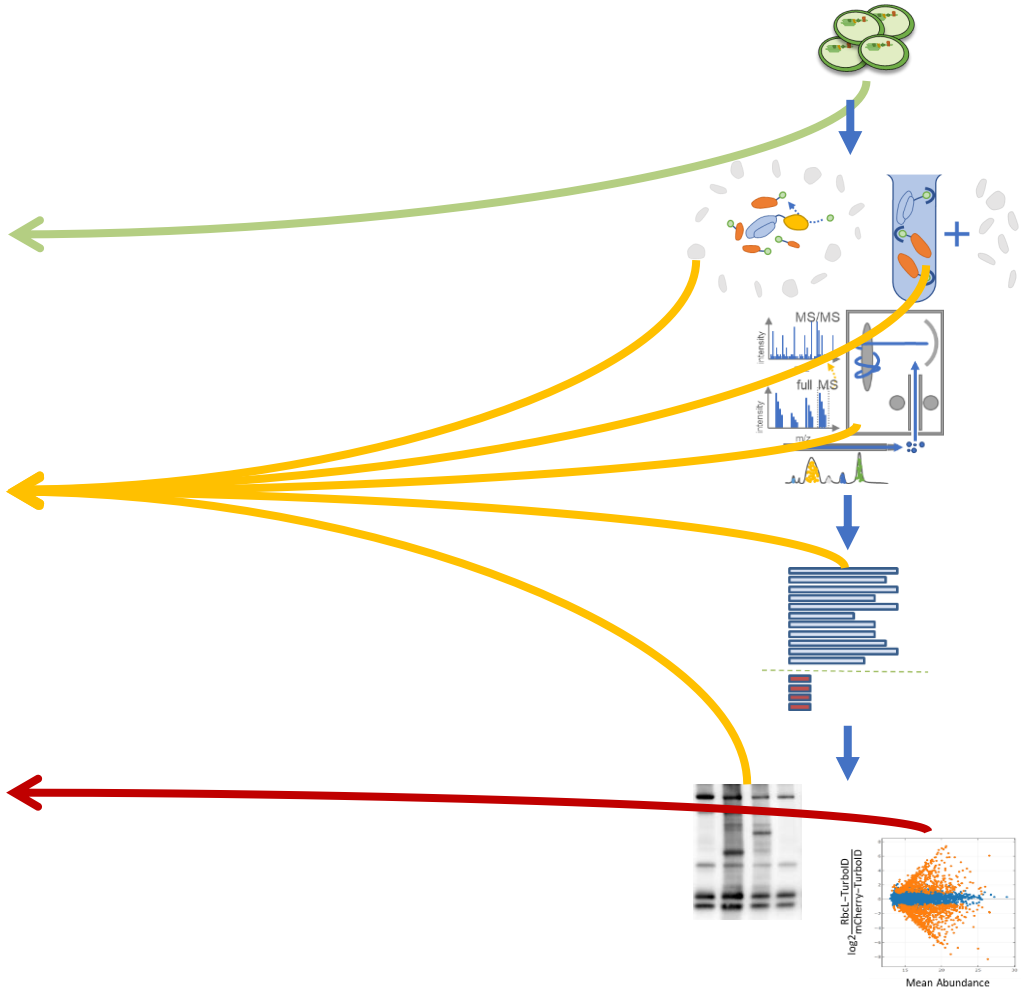
Important ARC Concepts: Structure and Data



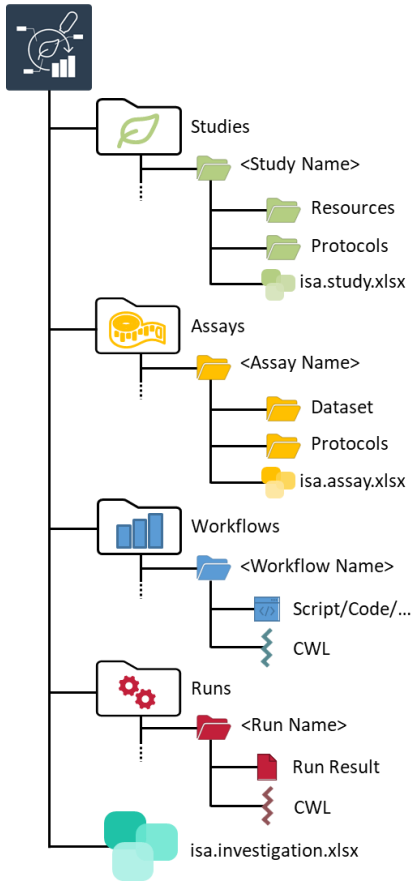


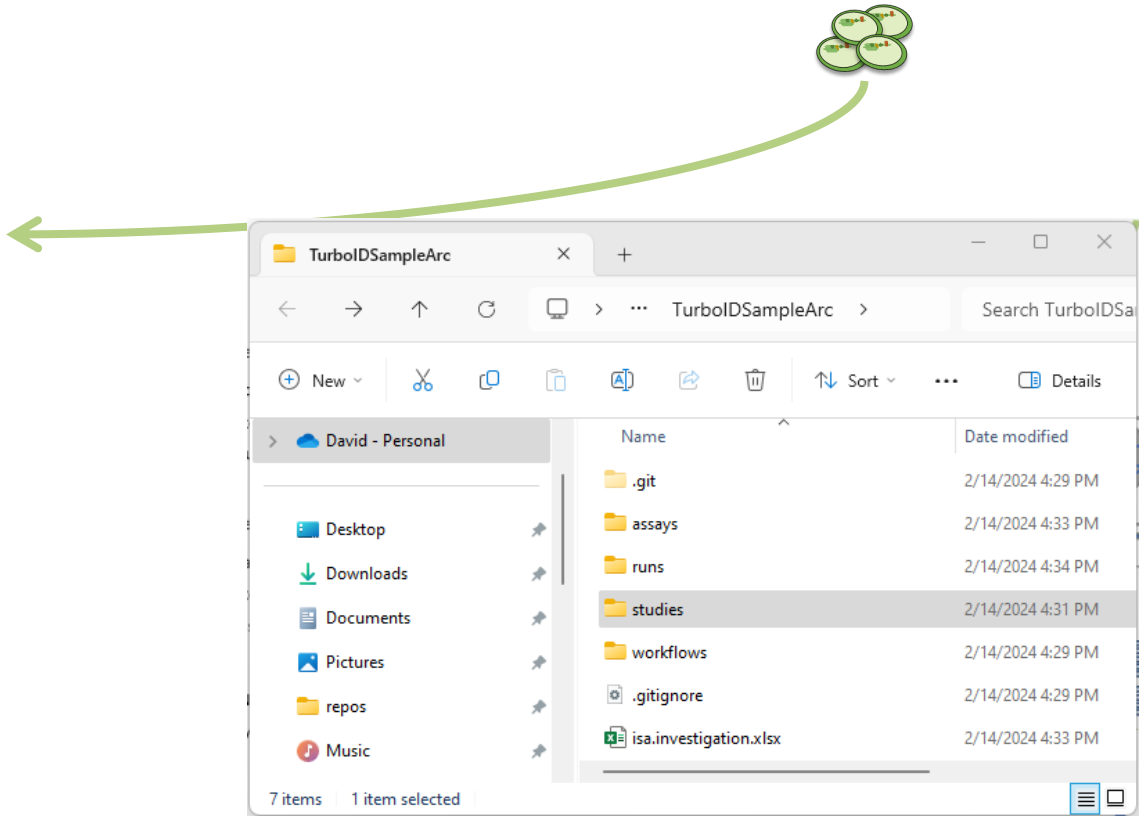
Important ARC Concepts: Structure and Data



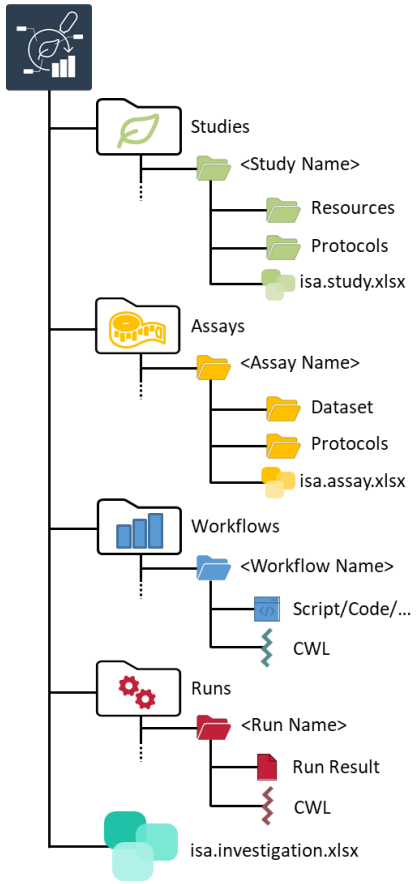


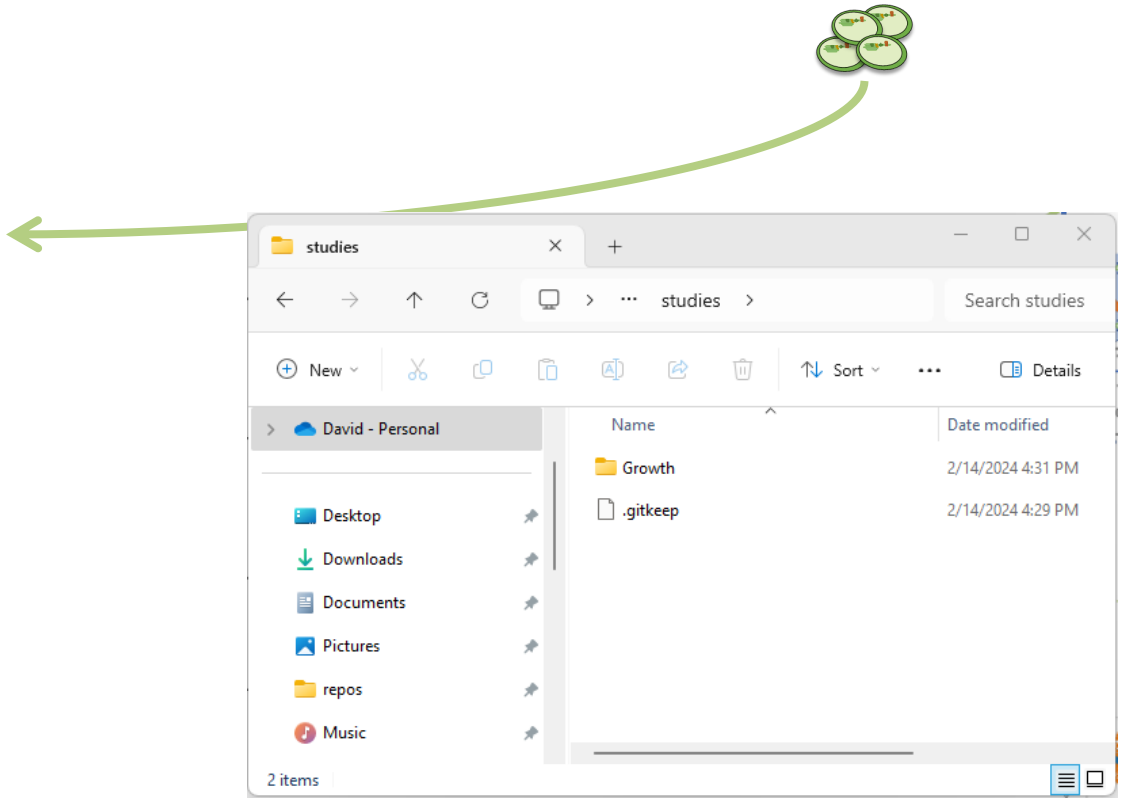
Important ARC Concepts: Structure and Data



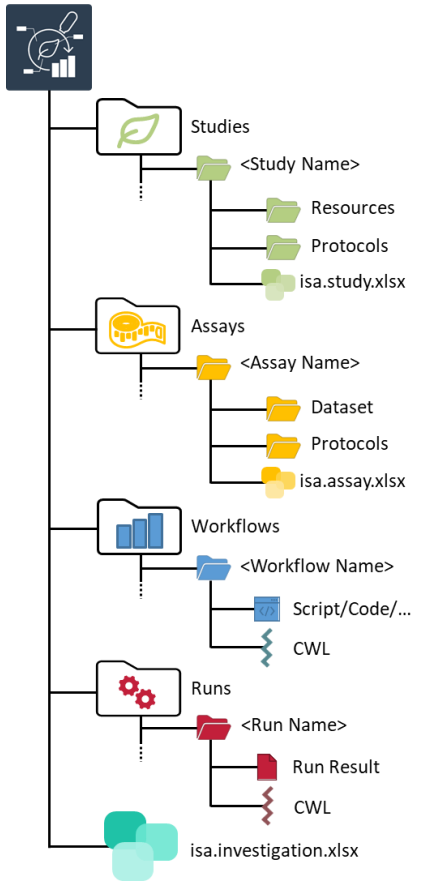


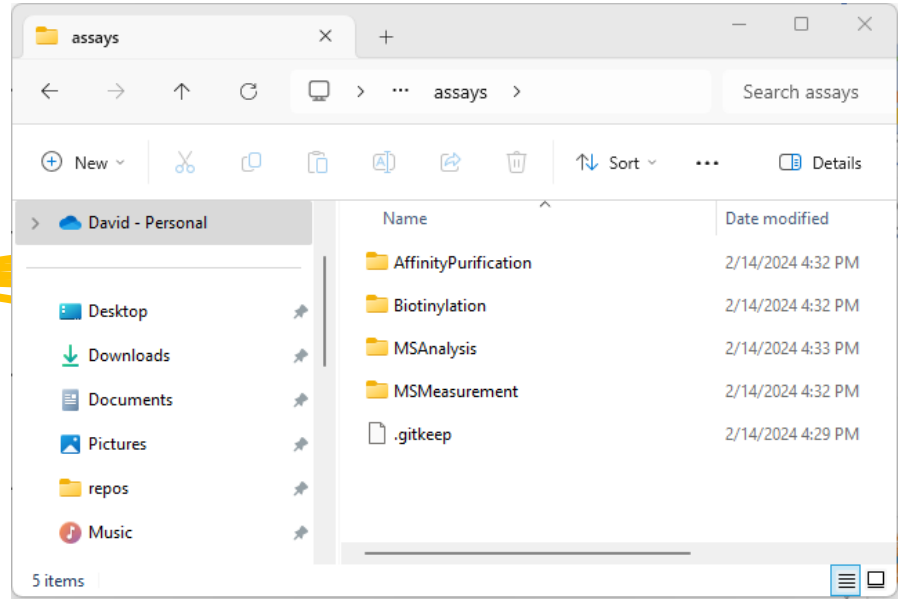
Important ARC Concepts: Structure and Data



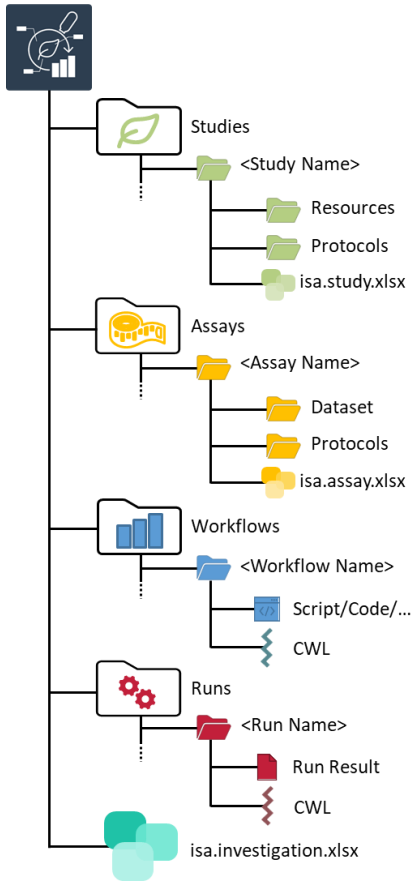


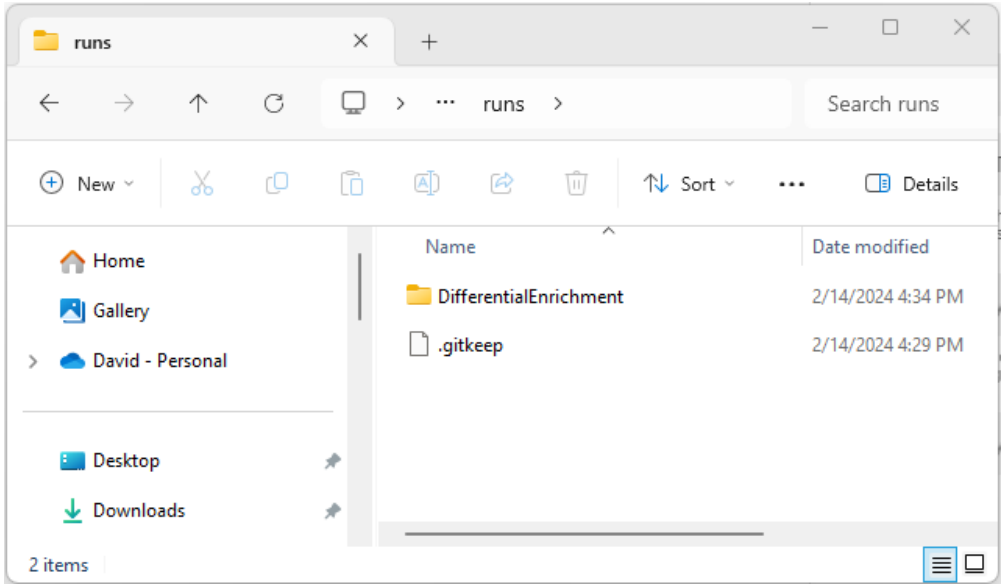
Important ARC Concepts: Structure and Data

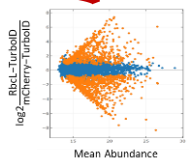




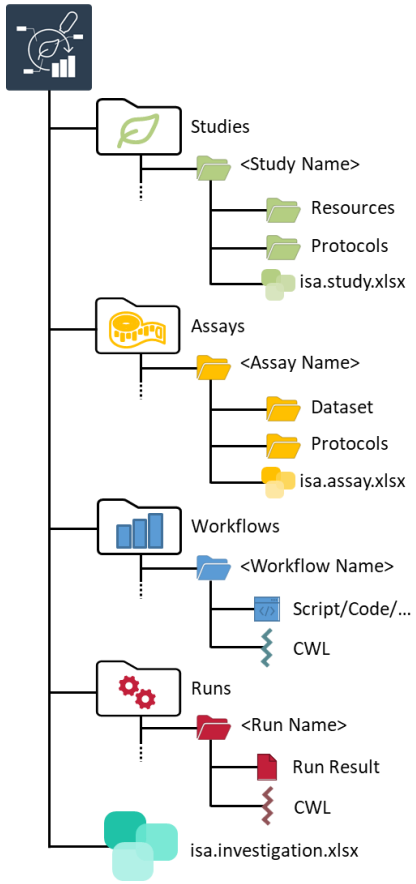
Important ARC Concepts: Structure and Data

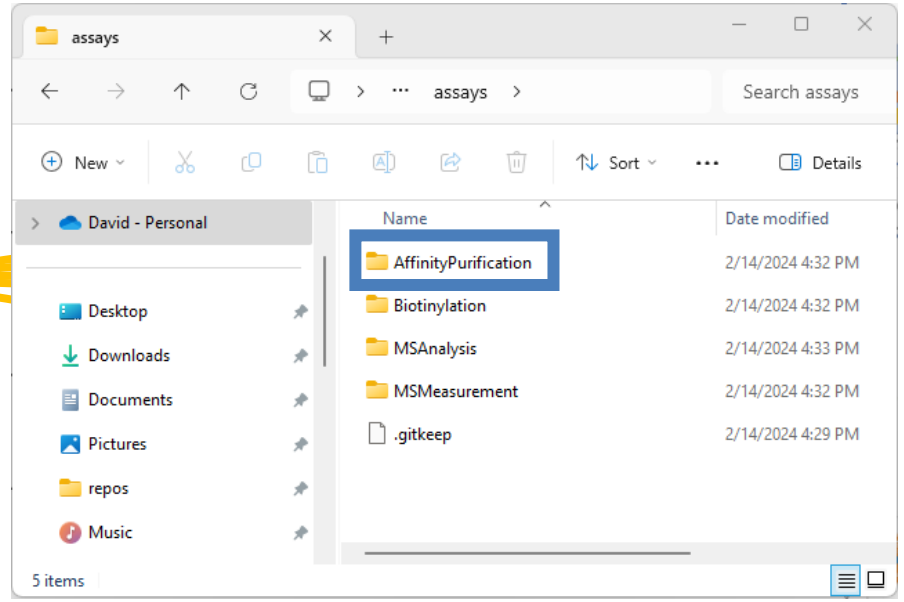




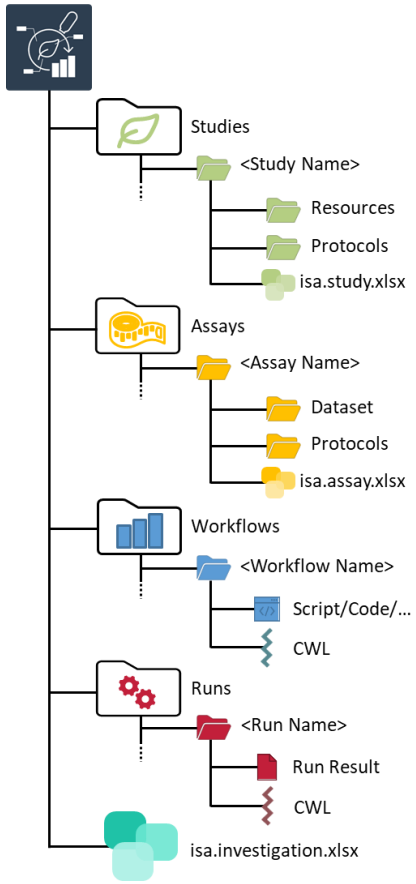


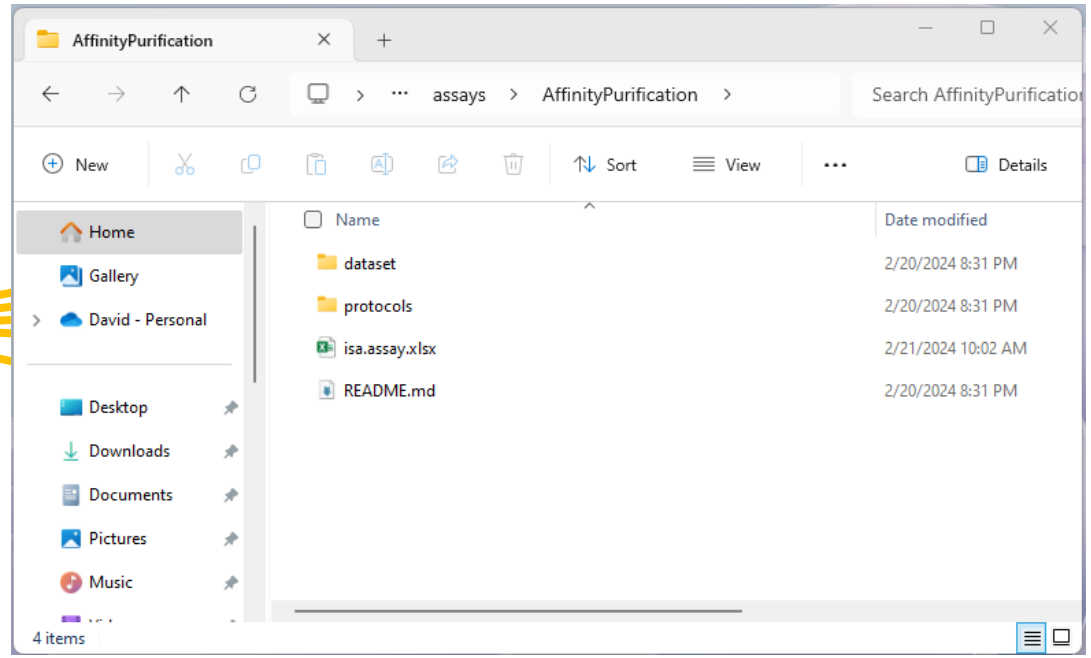
Important ARC Concepts: Structure and Data



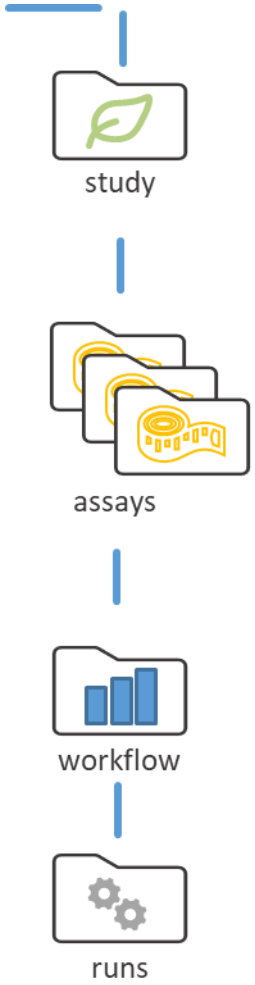


Important ARC Concepts: Structure and Data





Agenda of part two



I. Important ARC concepts by example: Structure

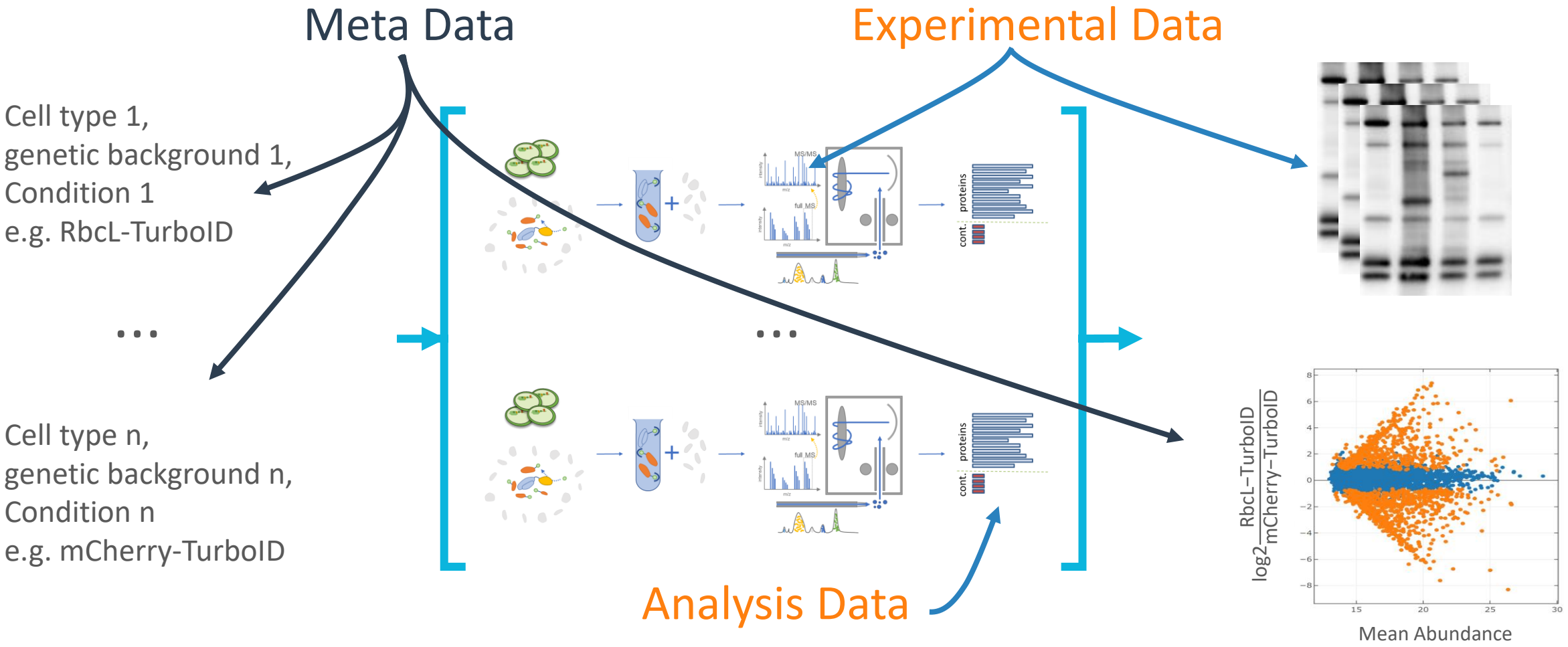
II. Important ARC concepts by example: Meta Data Annotation Principle

III. ARCs for FAIR collaboration using the PLANTDataHUB

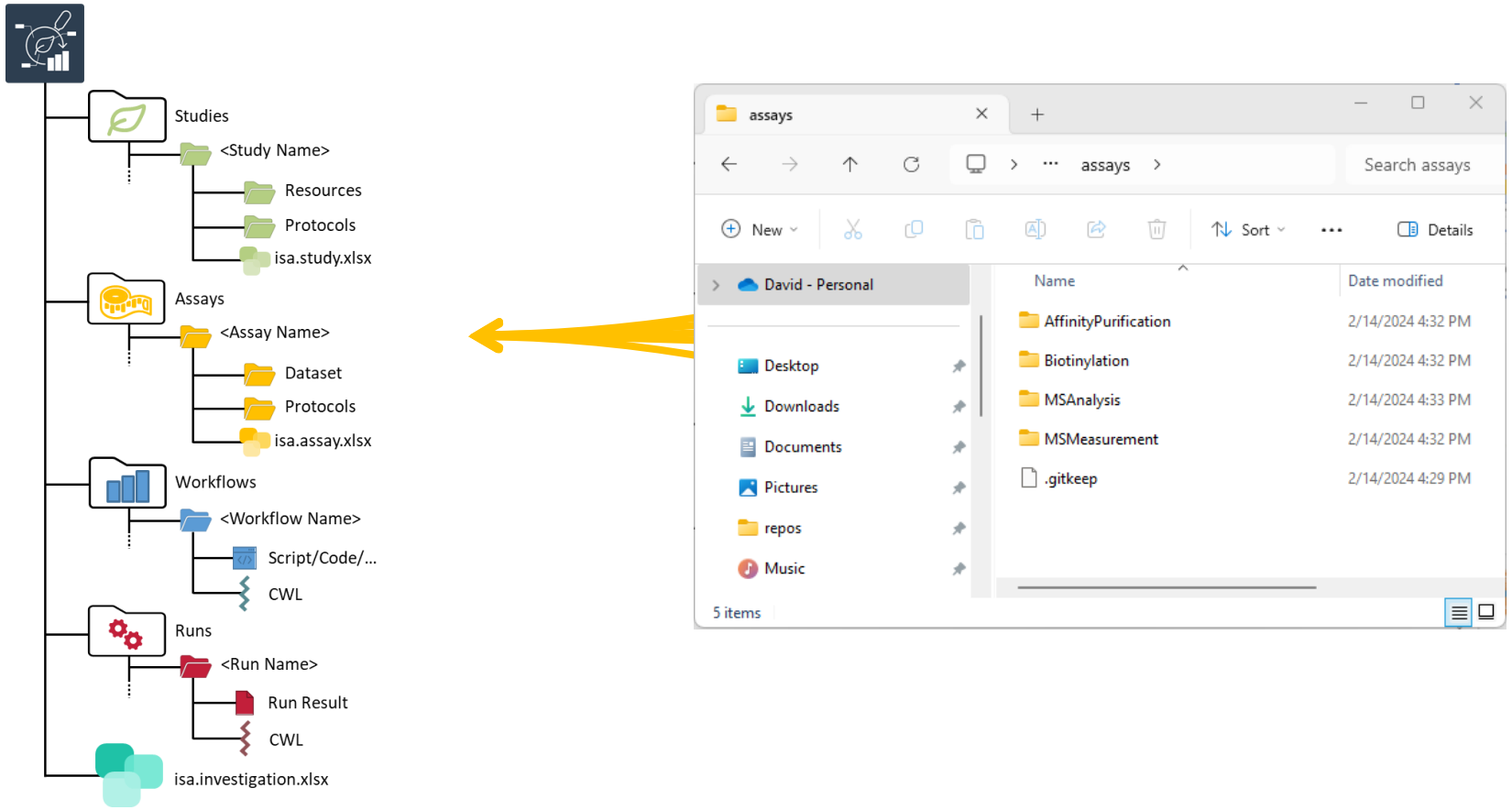
ARCitect

IV. Complete Walk-Through using the ARCitect

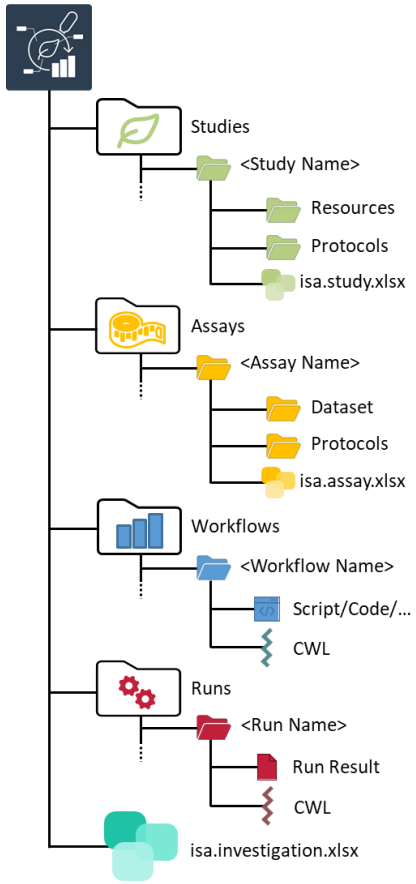
Motivation: An TurboID experiment

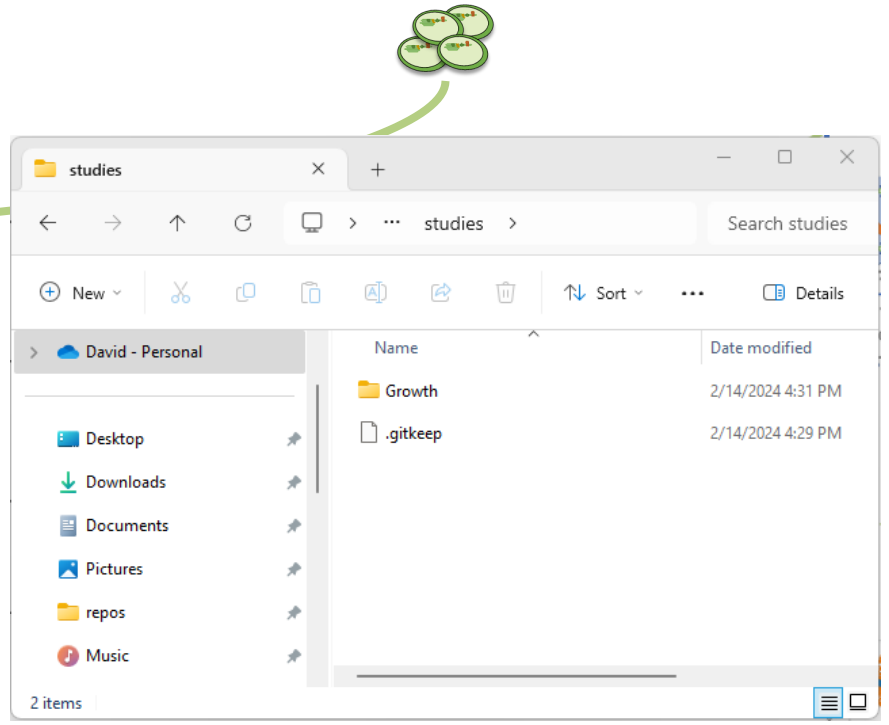


Important ARC Concepts: Meta Data

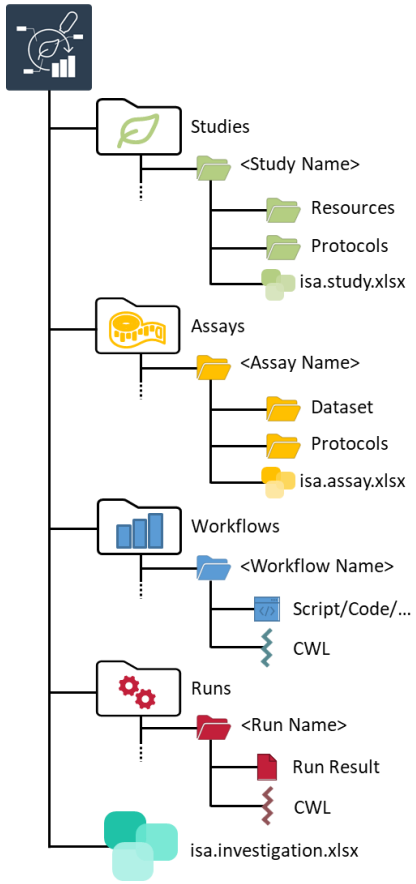


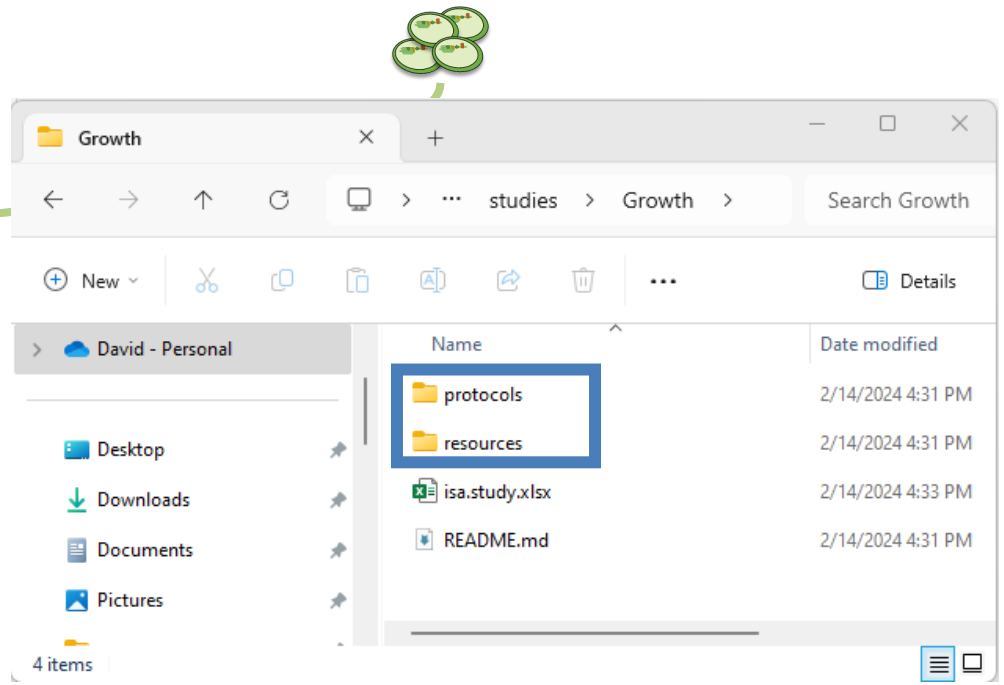
Important ARC Concepts: Meta Data



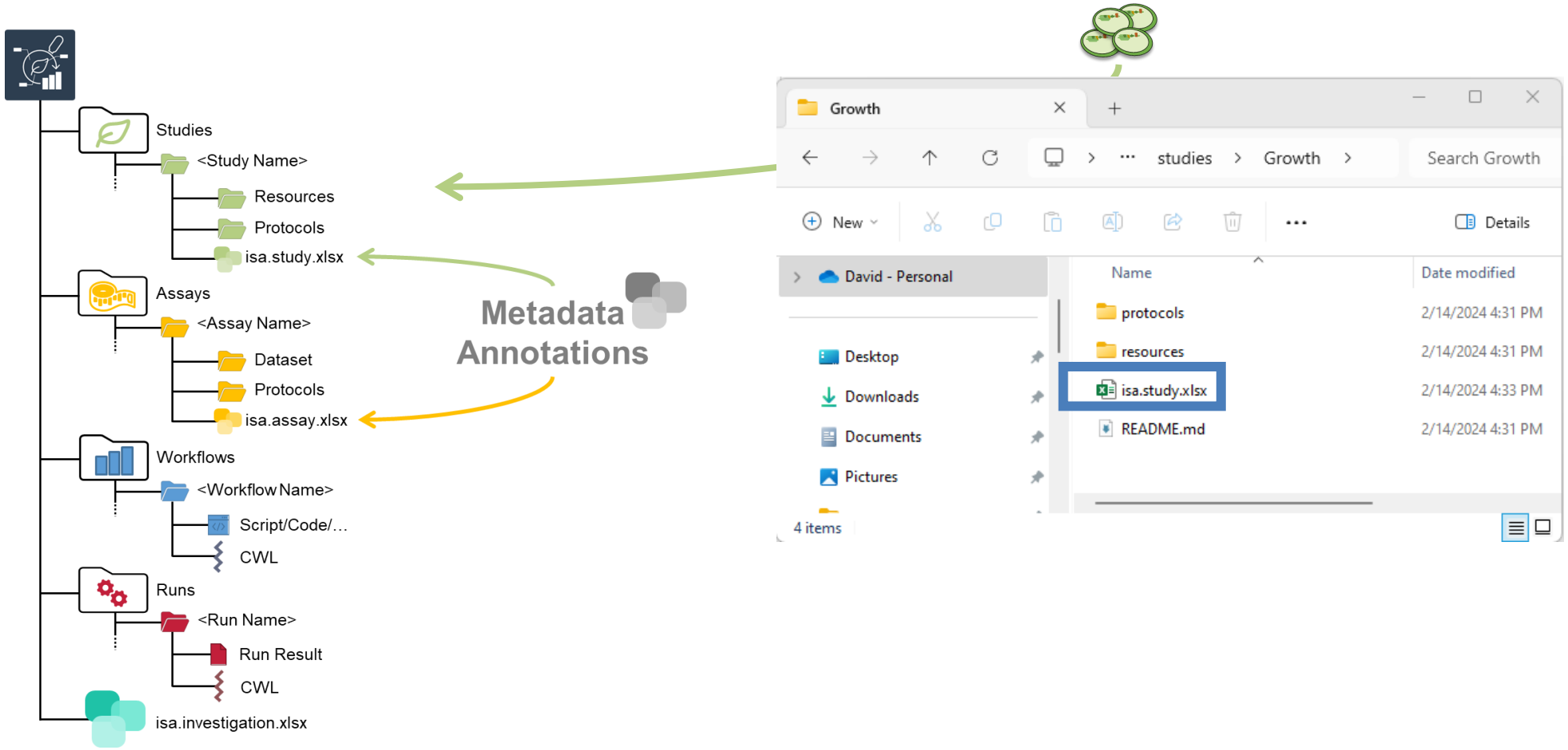


Important ARC Concepts: Meta Data

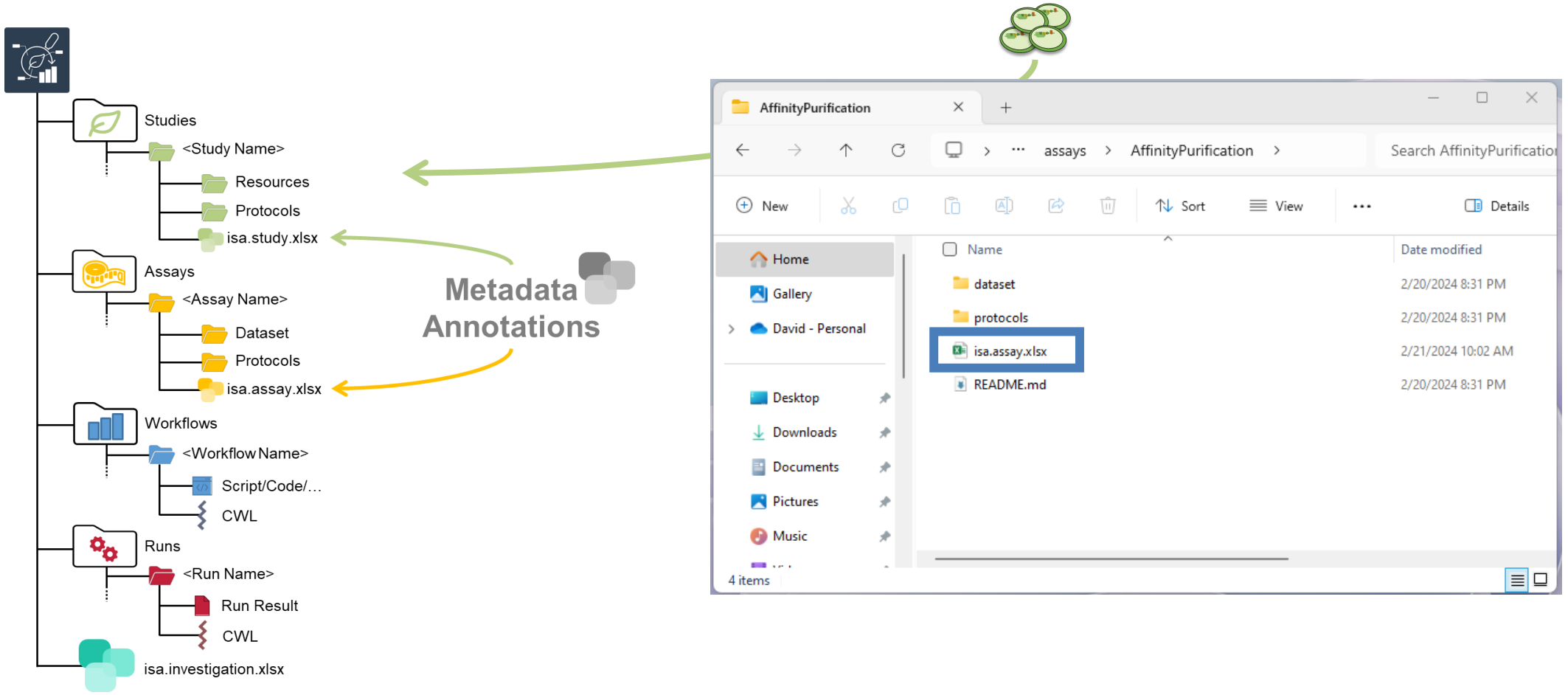




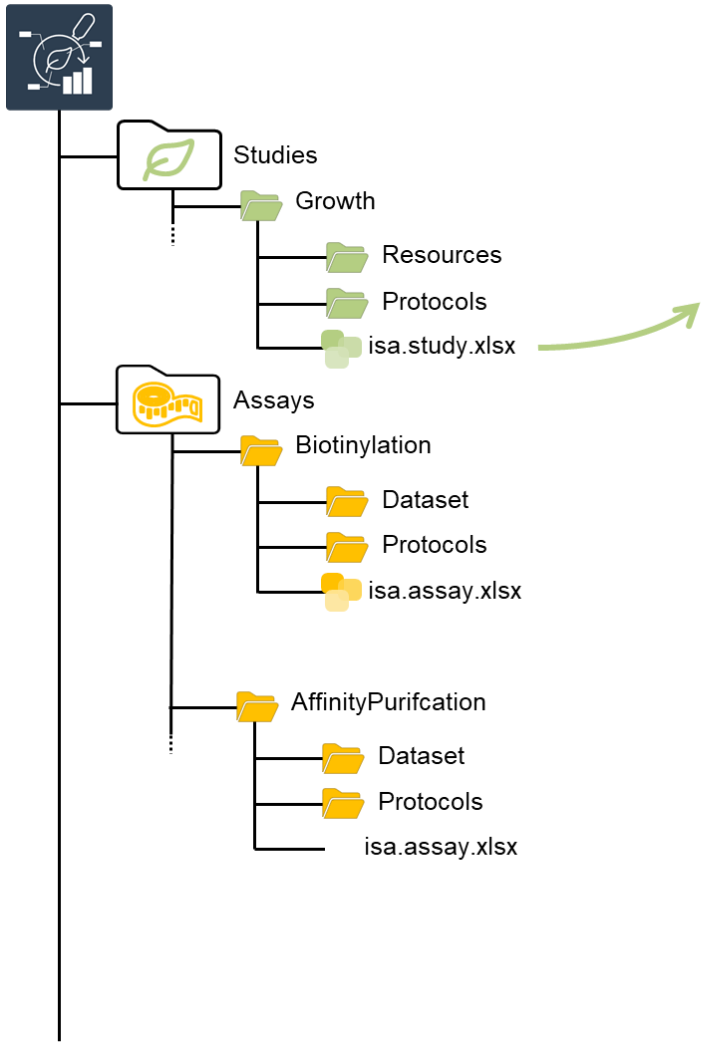
Important ARC Concepts: Meta Data



Important ARC Concepts: Meta Data



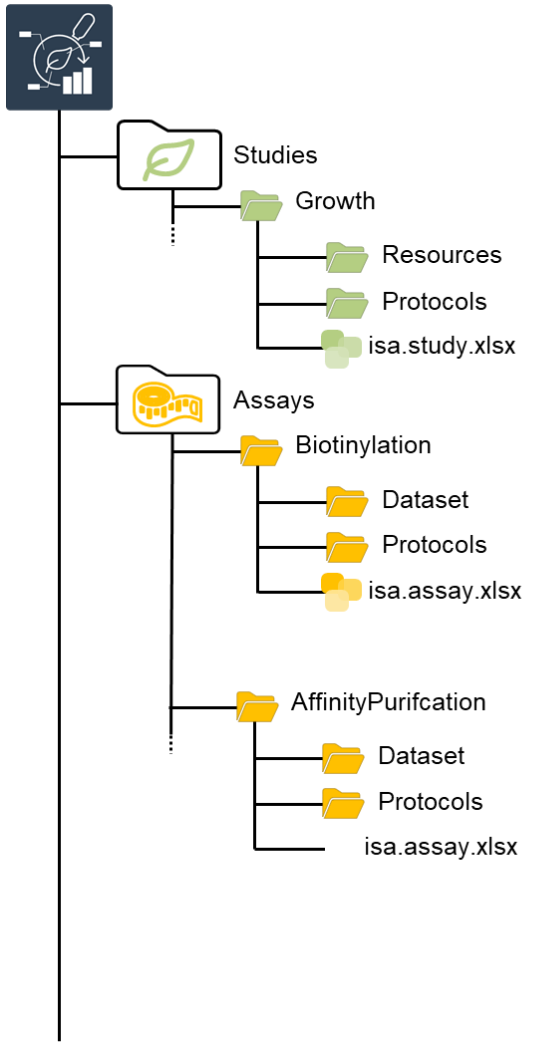
Important ARC Concepts: Meta Data



Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

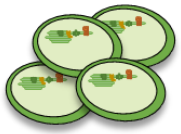
Important ARC Concepts: Meta Data



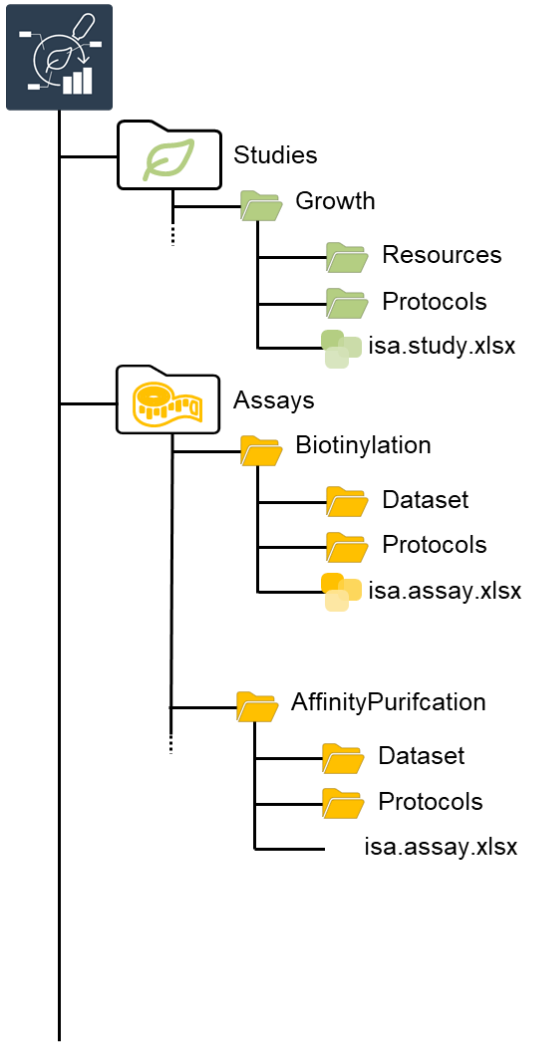
Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

Input → Output



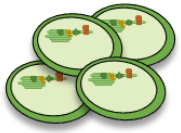
Important ARC Concepts: Meta Data



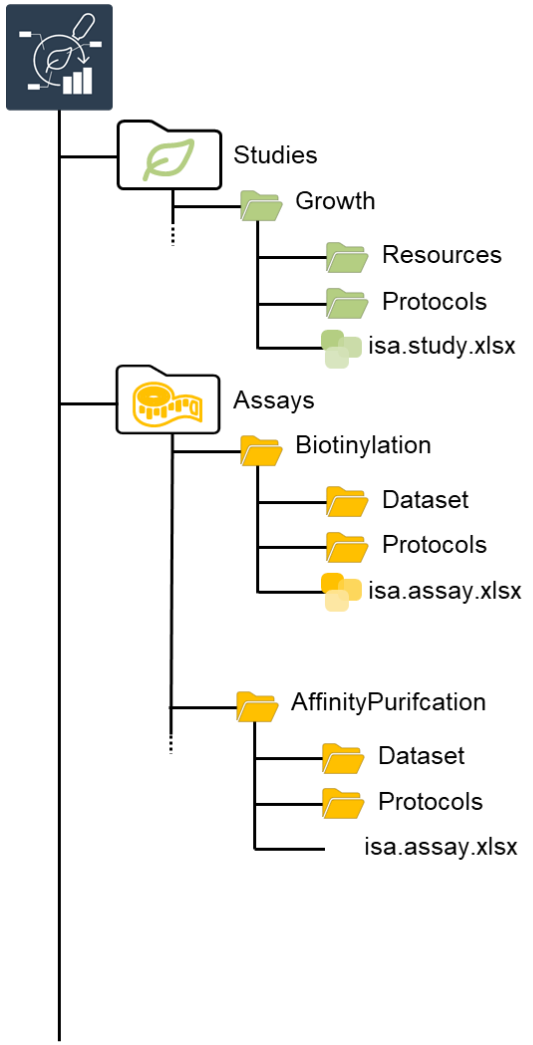
Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

Input → Output



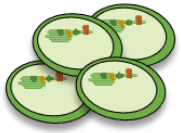
Important ARC Concepts: Meta Data



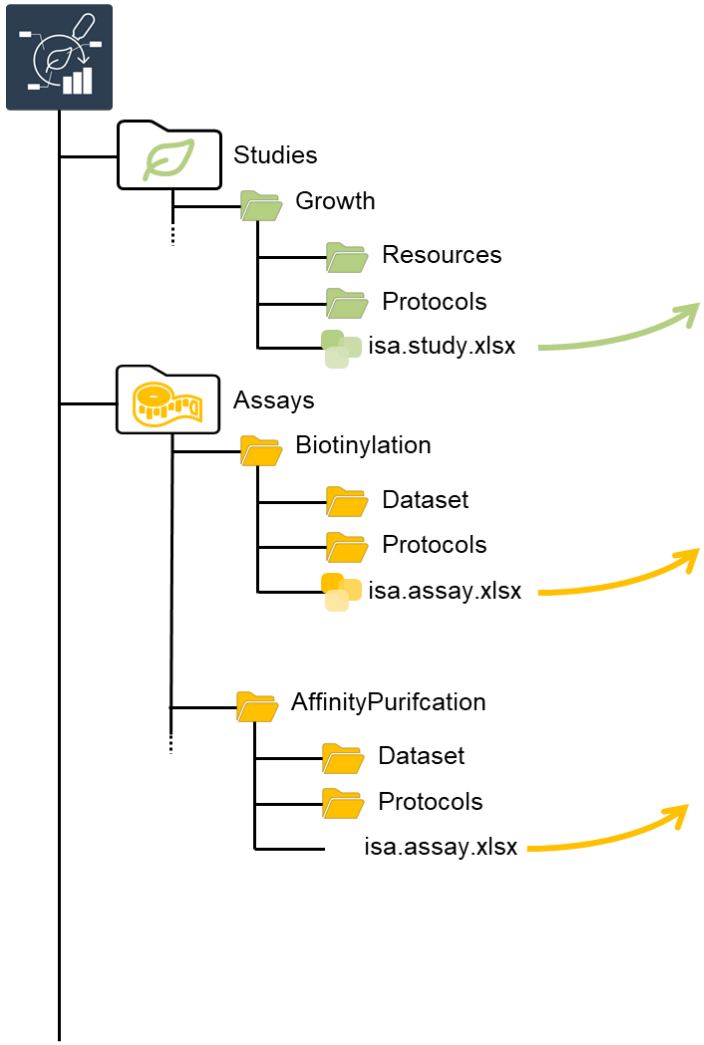
Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

Input → Output

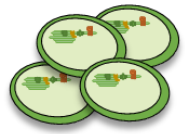


Important ARC Concepts: Meta Data



Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

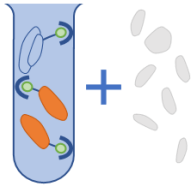


Biotinylation/isa.assay.xlsx

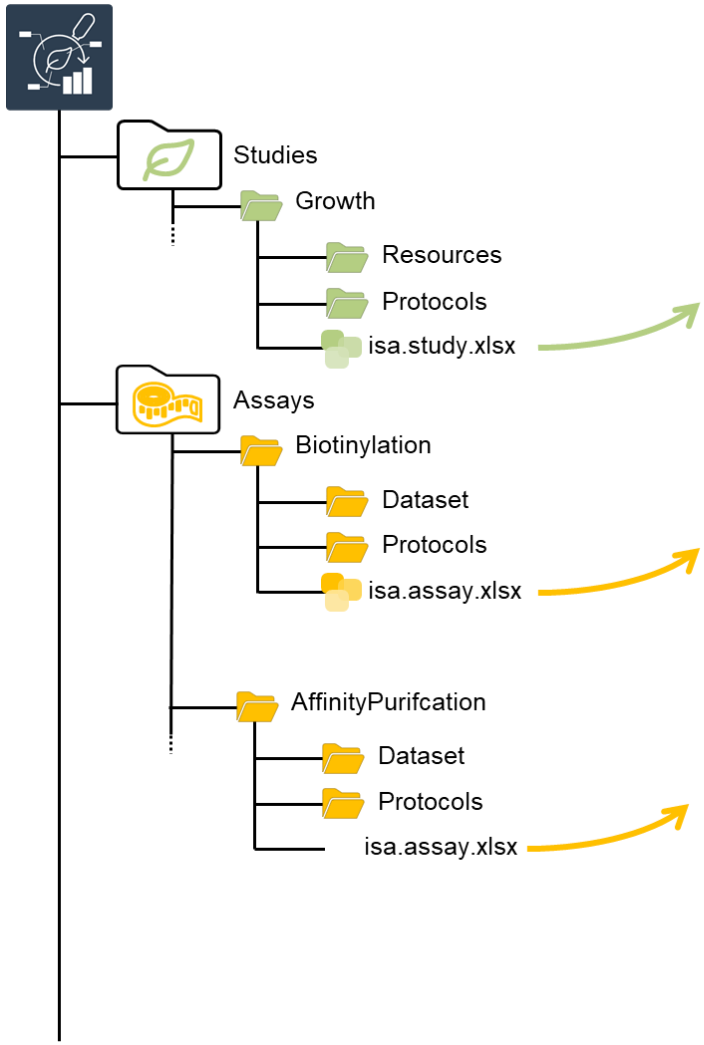
Input [Sample Name]	Parameter [temperature]	Parameter [light intensity exposure]	Parameter [Biotin-phenol]	Output [Sample Name]
RBCL_TurboID_1_preExp	24	60	100	RBCL_TurboID_1_postBio
RBCL_TurboID_2_preExp	24	60	100	RBCL_TurboID_2_postBio
RBCL_TurboID_3_preExp	24	60	100	RBCL_TurboID_3_postBio
FBP_TurboID_1_preExp	24	60	100	FBP_TurboID_1_postBio
FBP_TurboID_2_preExp	24	60	100	FBP_TurboID_2_postBio
FBP_TurboID_3_preExp	24	60	100	FBP_TurboID_3_postBio
Cher4_1_preExp	24	60	100	Cher4_1_postBio
Cher4_2_preExp	24	60	100	Cher4_2_postBio
Cher4_3_preExp	24	60	100	Cher4_3_postBio

AffinityPurifcation/isa.assay.xlsx

Input [Sample Name]	Parameter [affinity column]	Parameter [Buffer]	Parameter [Biotin]	Output [Sample Name]
RBCL_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_1_eluate
RBCL_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_2_eluate
RBCL_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_3_eluate
FBP_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_1_eluate
FBP_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_2_eluate
FBP_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_3_eluate
Cher4_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_1_eluate
Cher4_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_2_eluate
Cher4_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_3_eluate



Important ARC Concepts: Meta Data



Growth/isa.study.xlsx

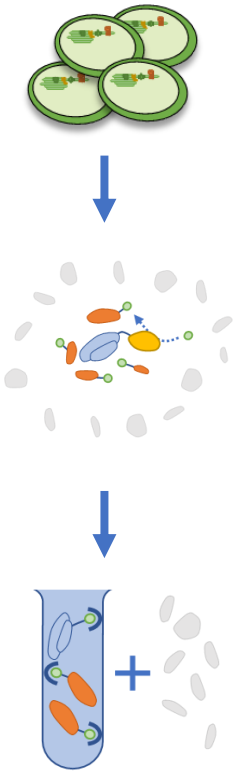
Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

Biotinylation/isa.assay.xlsx

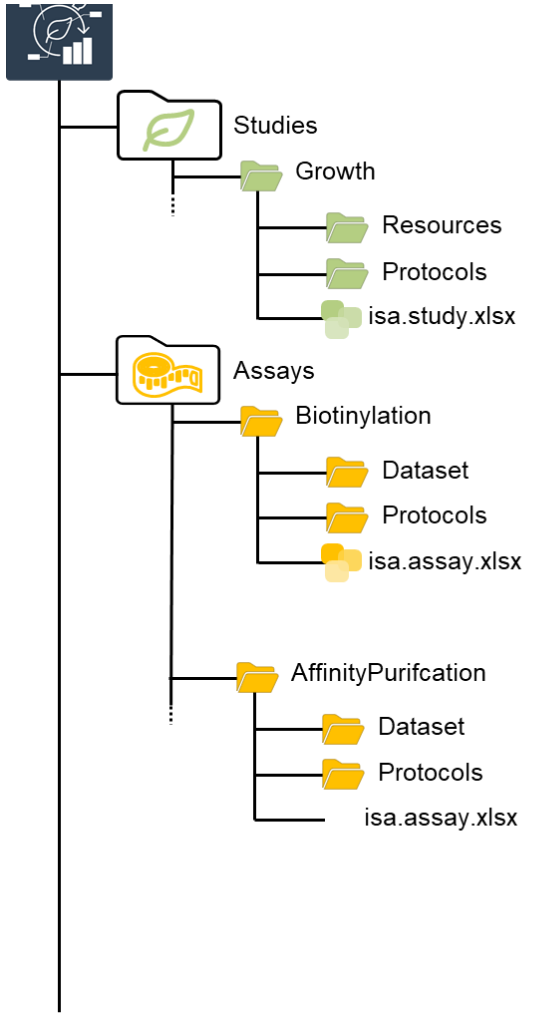
Input [Sample Name]	Parameter [temperature]	Parameter [light intensity exposure]	Parameter [Biotin-phenol]	Output [Sample Name]
RBCL_TurboID_1_preExp	24	60	100	RBCL_TurboID_1_postBio
RBCL_TurboID_2_preExp	24	60	100	RBCL_TurboID_2_postBio
RBCL_TurboID_3_preExp	24	60	100	RBCL_TurboID_3_postBio
FBP_TurboID_1_preExp	24	60	100	FBP_TurboID_1_postBio
FBP_TurboID_2_preExp	24	60	100	FBP_TurboID_2_postBio
FBP_TurboID_3_preExp	24	60	100	FBP_TurboID_3_postBio
Cher4_1_preExp	24	60	100	Cher4_1_postBio
Cher4_2_preExp	24	60	100	Cher4_2_postBio
Cher4_3_preExp	24	60	100	Cher4_3_postBio

AffinityPurifcation/isa.assay.xlsx

Input [Sample Name]	Parameter [affinity column]	Parameter [Buffer]	Parameter [Biotin]	Output [Sample Name]
RBCL_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_1_eluate
RBCL_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_2_eluate
RBCL_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_3_eluate
FBP_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_1_eluate
FBP_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_2_eluate
FBP_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_3_eluate
Cher4_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_1_eluate
Cher4_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_2_eluate
Cher4_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_3_eluate

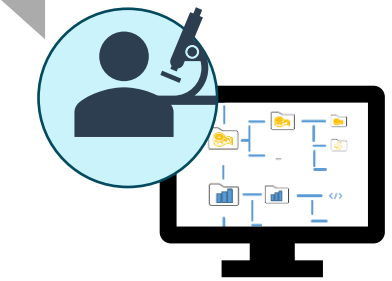


Important ARC Concepts: Meta Data



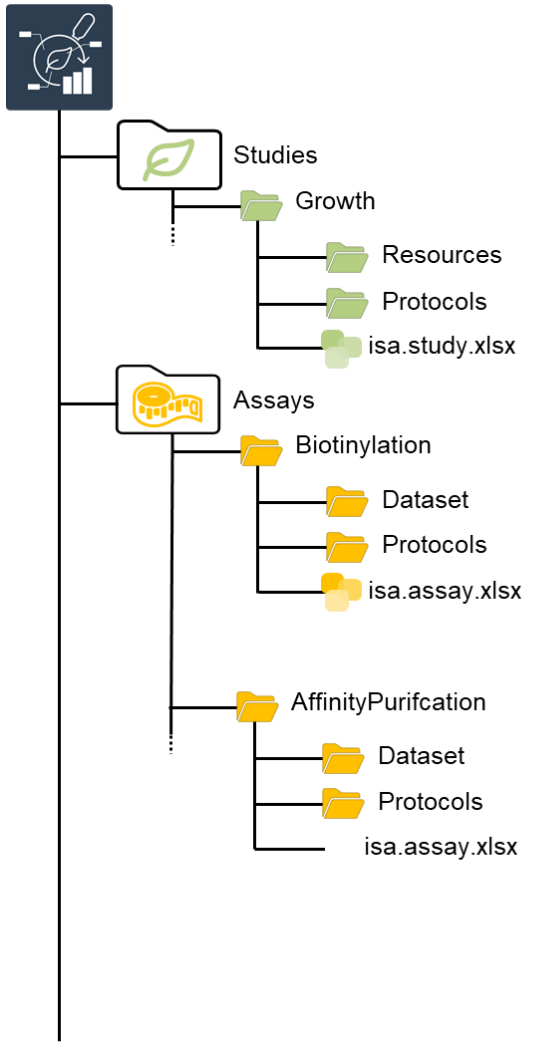
Input [Source Name]	Charact	perature]	Output [Sample Name]
RBCL_TurboID	Chlamyd		RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamyd		RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamyd		RBCL_TurboID_3_preExp
FBP_TurboID	Chlamyd		FBP_TurboID_1_preExp
FBP_TurboID	Chlamyd		FBP_TurboID_2_preExp
FBP_TurboID	Chlamyd		FBP_TurboID_3_preExp
Cher4	Chlamyd		Cher4_1_preExp
Cher4	Chlamyd		Cher4_2_preExp
Cher4	Chlamyd		Cher4_3_preExp

Q: Ok, great! But how is this FAIR? I do not know how you defined „temperature“, or what the unit of the value 24 is?



Researcher B

Important ARC Concepts: Meta Data

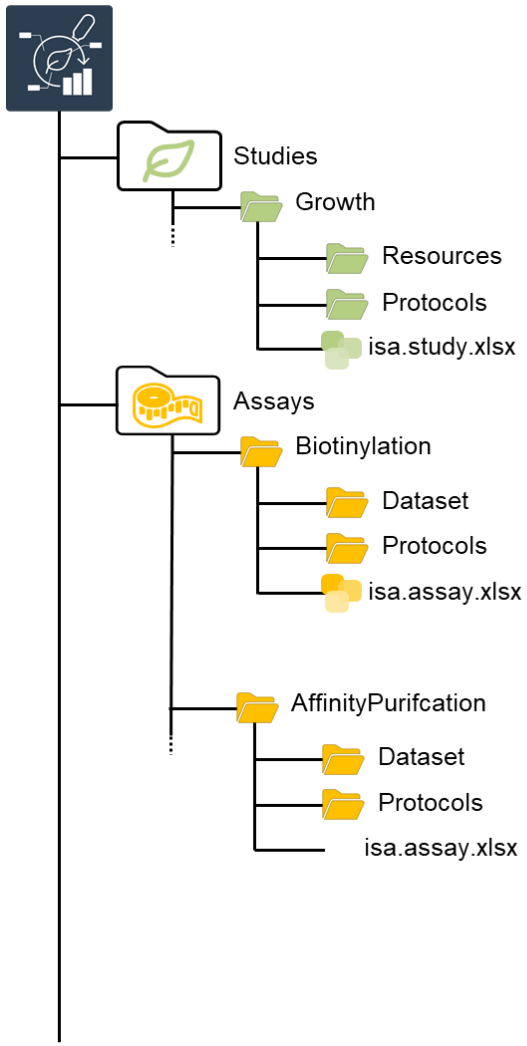


Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

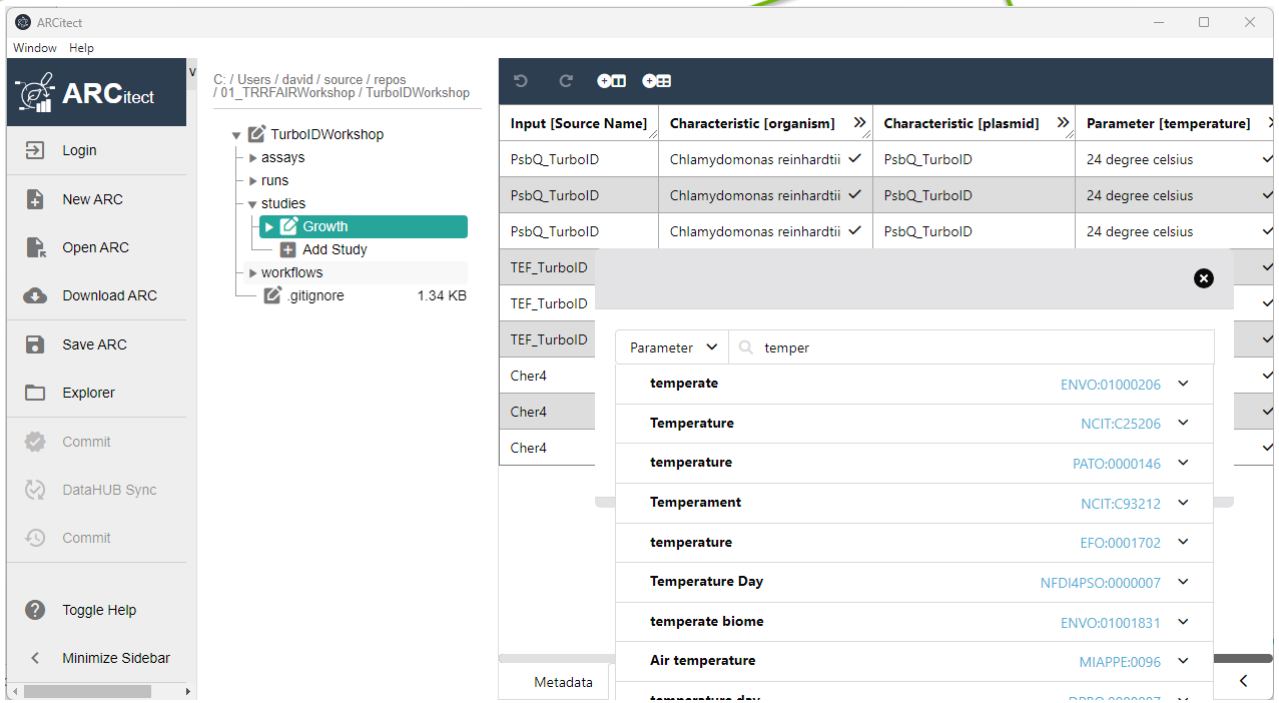
Parameter [temperature]	Unit	Term Source REF (PATO:0000146)	Term Accession Number (PATO:0000146)
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027
24	degree ce	UO	http://purl.obolibrary.org/obo/UO_0000027

Important ARC Concepts: Meta Data

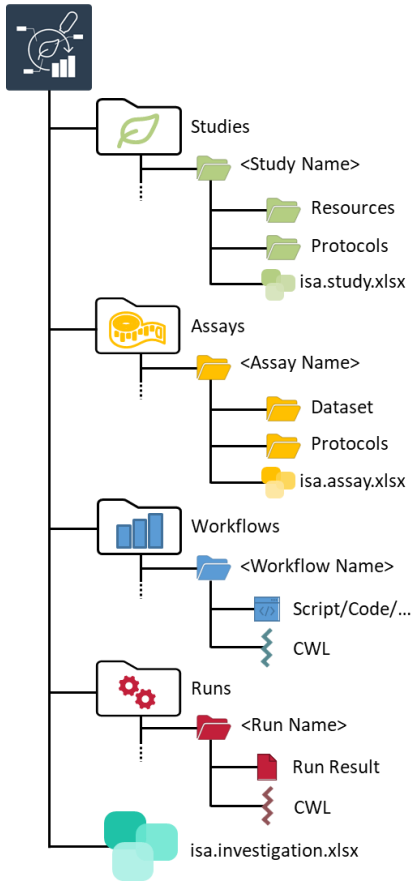


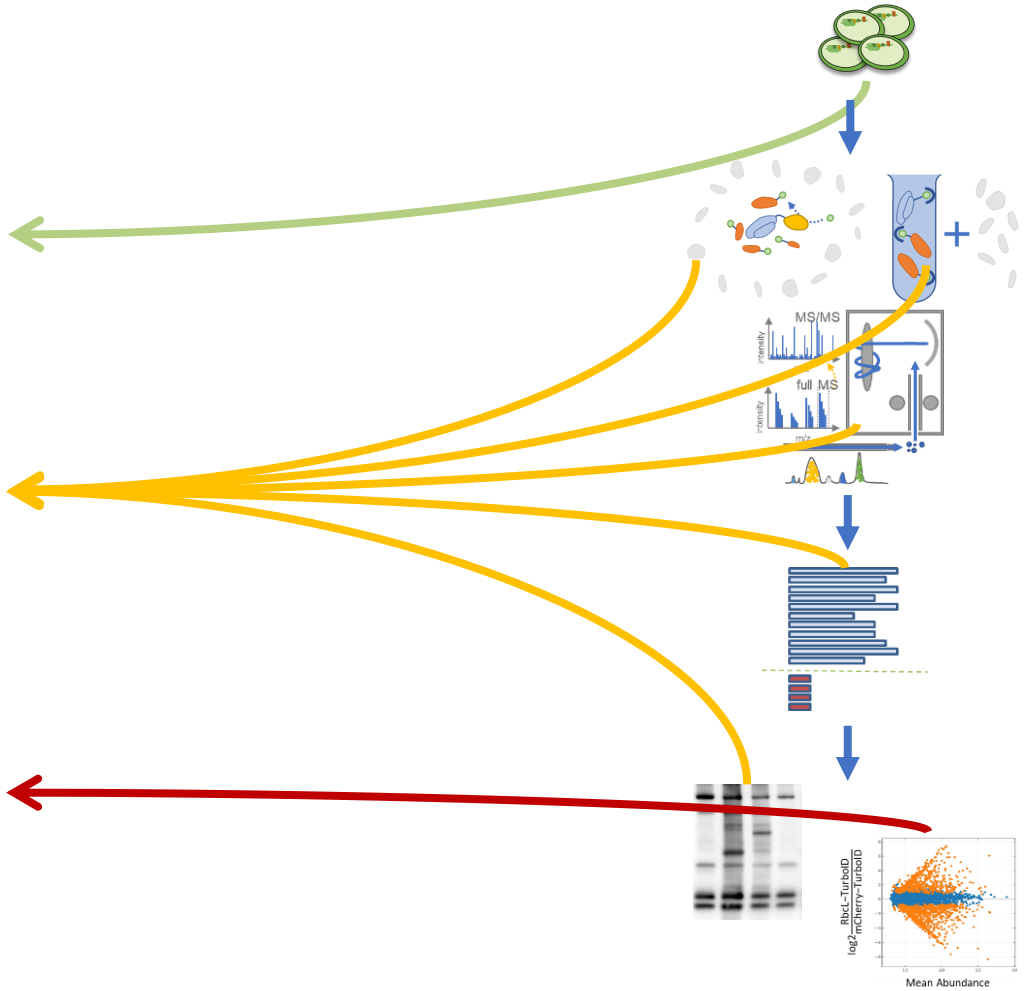
Growth/isa.study.xlsx

Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

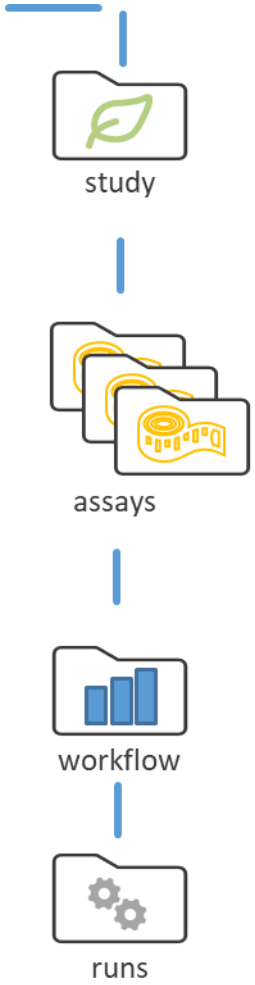


Important ARC Concepts: Meta Data





Agenda of part two



I. Important ARC concepts by example: Structure

II. Important ARC concepts by example: Meta Data Annotation Principle

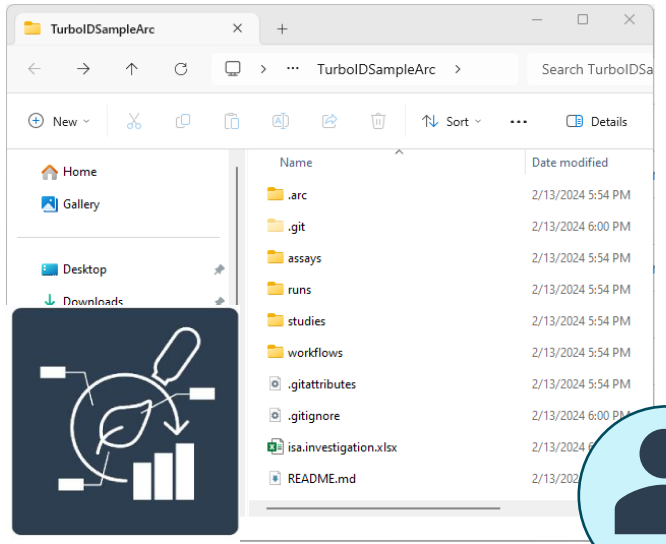
III. ARCs for FAIR collaboration using the PLANTDataHUB

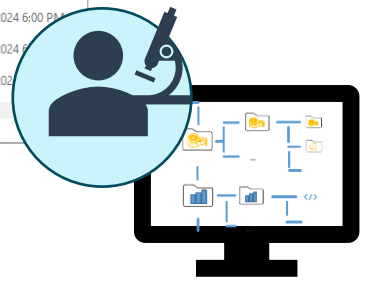
ARCitect

IV. Complete Walk-Through using the ARCitect

Now: ARCs as a single RDM entry point

Researcher As data management solution:
Annotated Research Context (ARC)



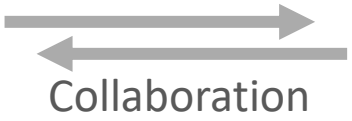


Researcher A

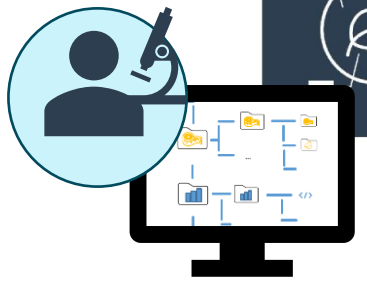
How do we exchange data?

More Metadata?

Any Updates?

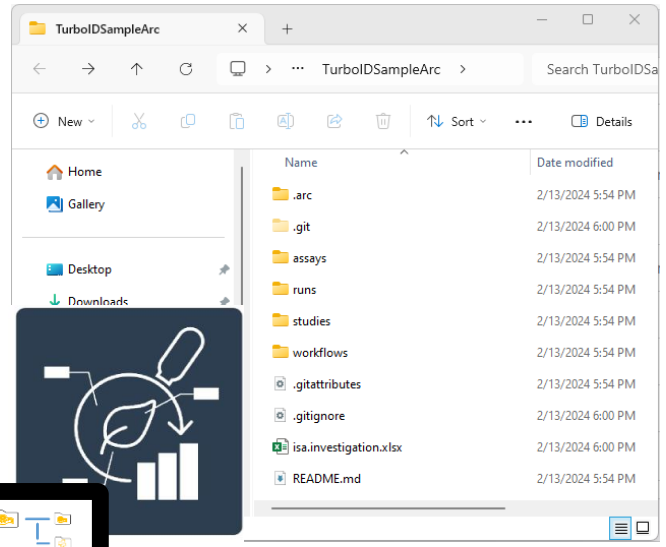


Collaboration



Researcher B

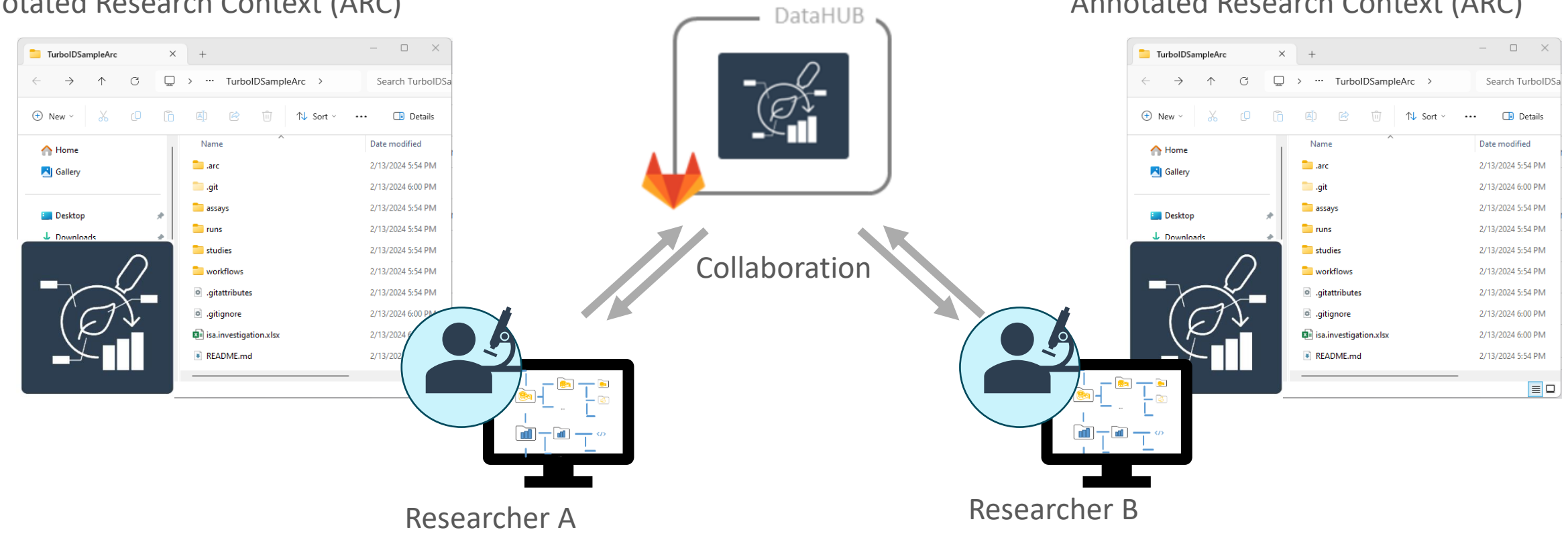
Researcher Bs data management solution:
Annotated Research Context (ARC)



Now: Using the PLANTDataHUB to collaborate

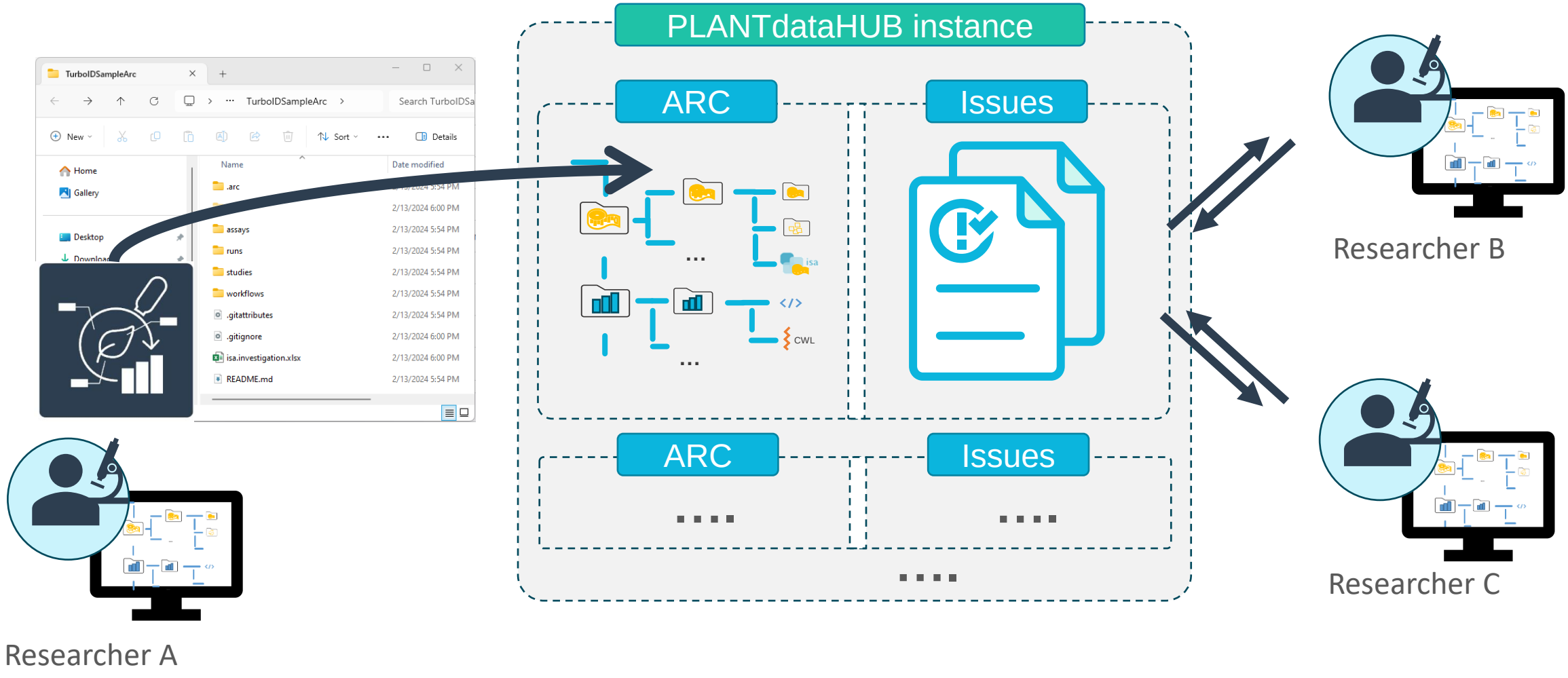
Researcher As data management solution:
Annotated Research Context (ARC)

Researcher Bs data management solution:
Annotated Research Context (ARC)

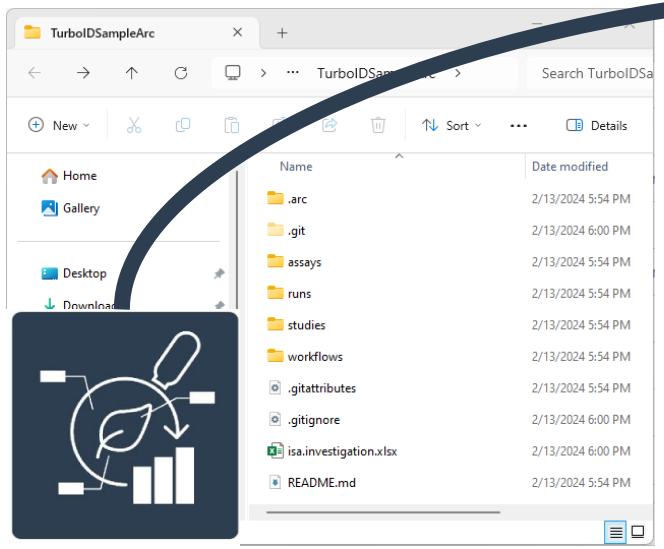


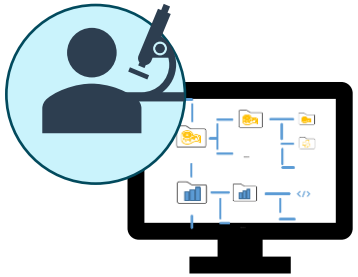
https://doi.org/10.1111/tpj.16474

Now: Using the PLANTDataHUB to collaborate

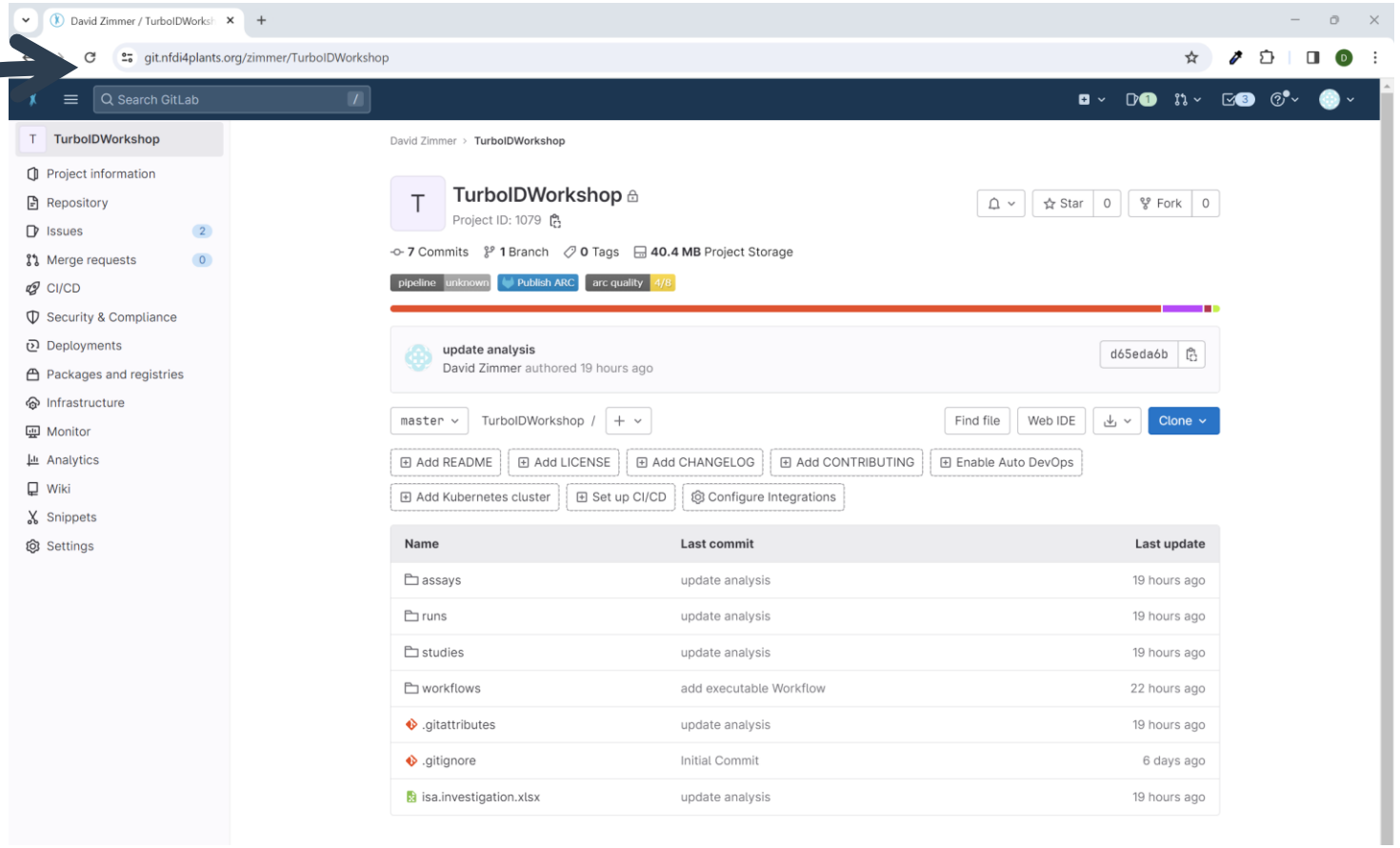


Now: Using the PLANTDataHUB to collaborate

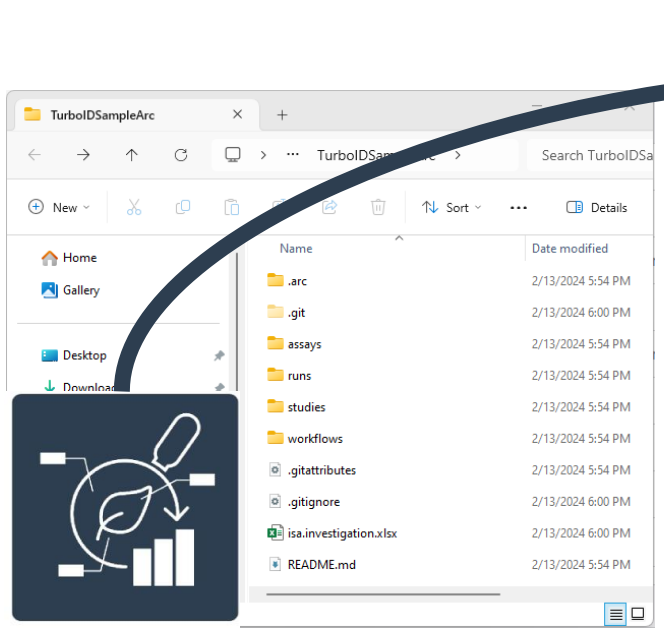


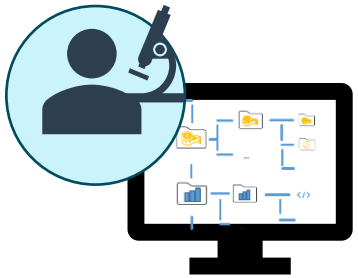


Researcher A

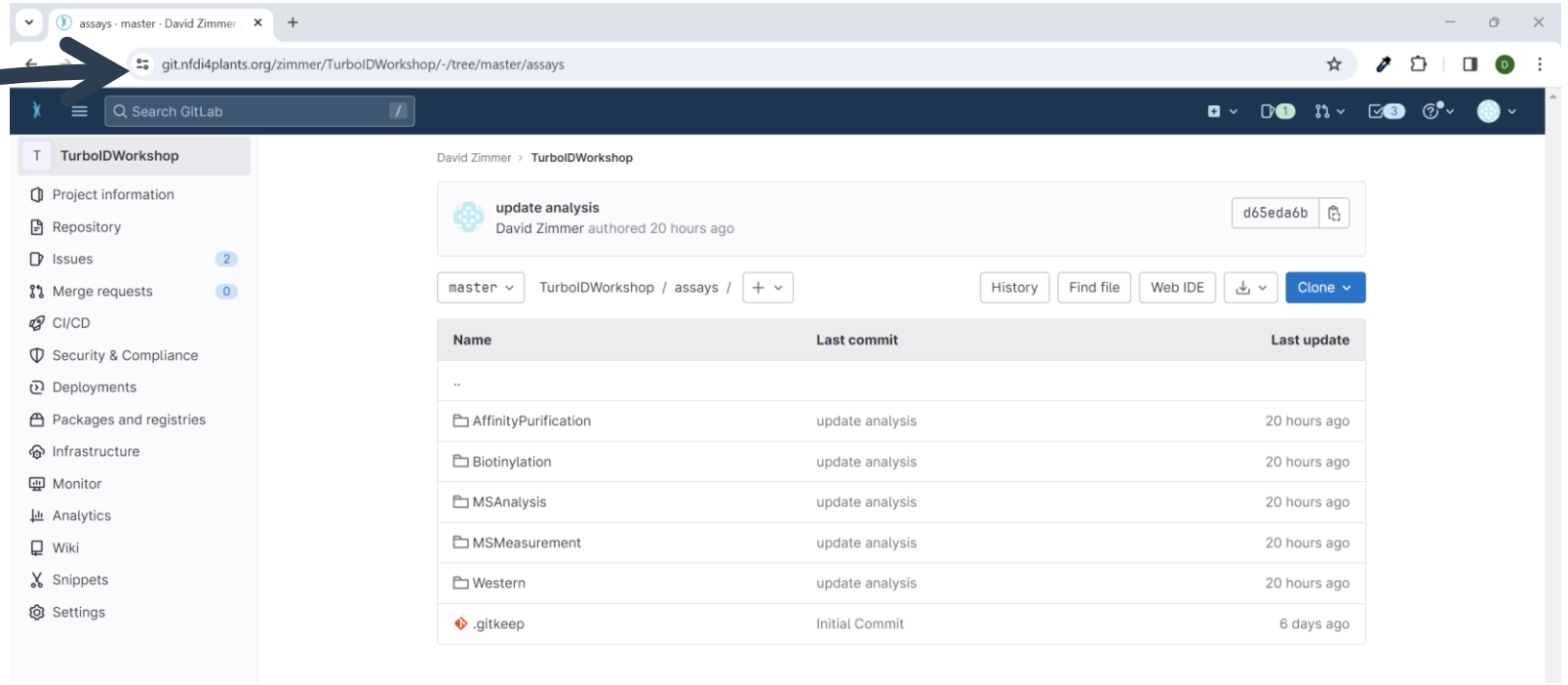


Now: Using the PLANTDataHUB to collaborate

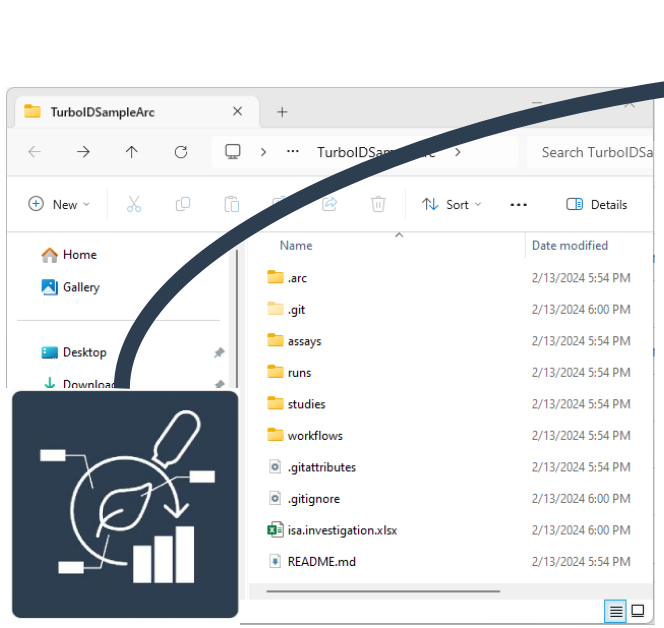


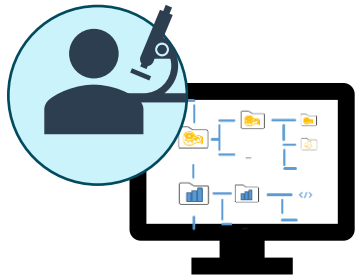


Researcher A

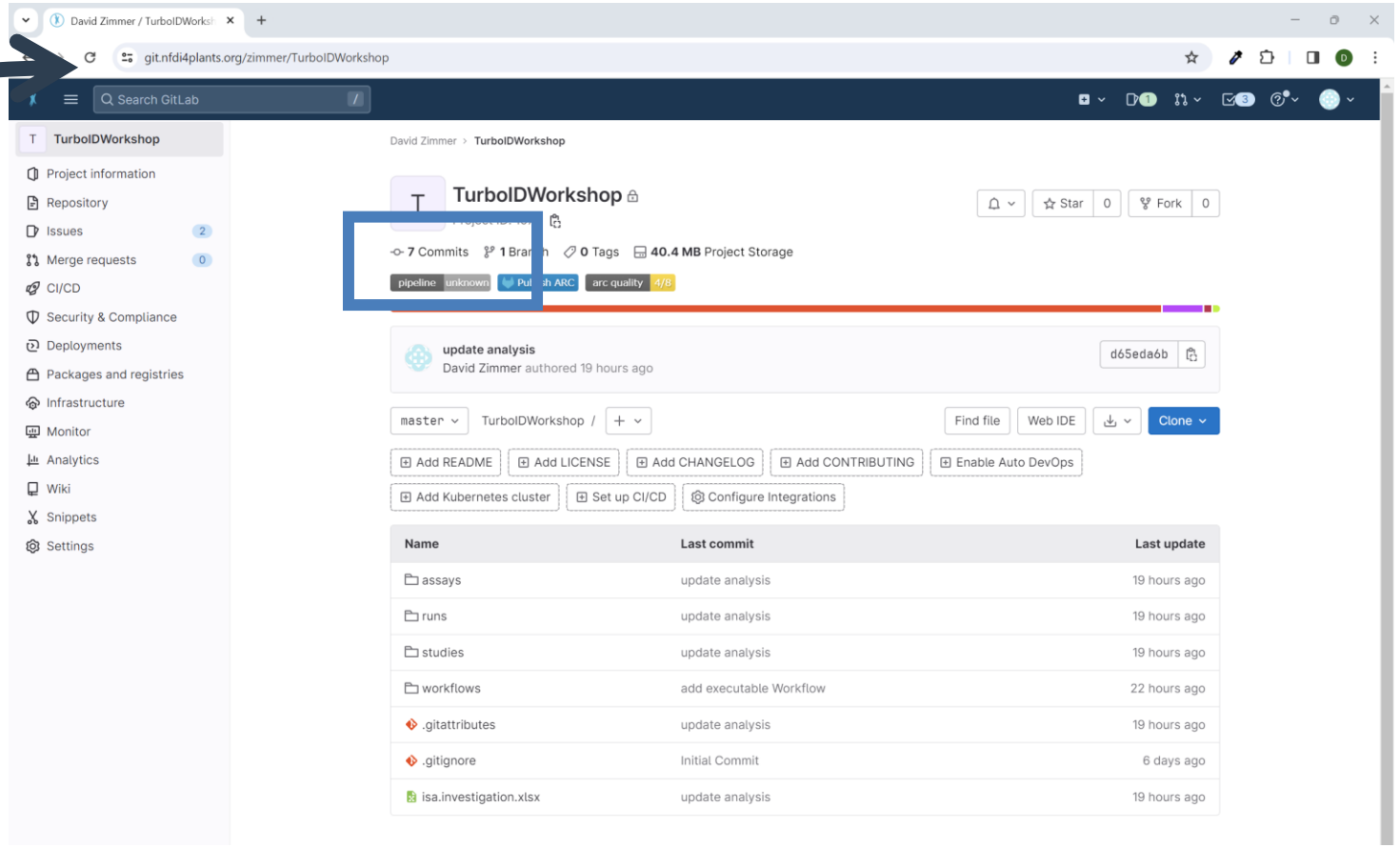


Now: Using the PLANTDataHUB to collaborate

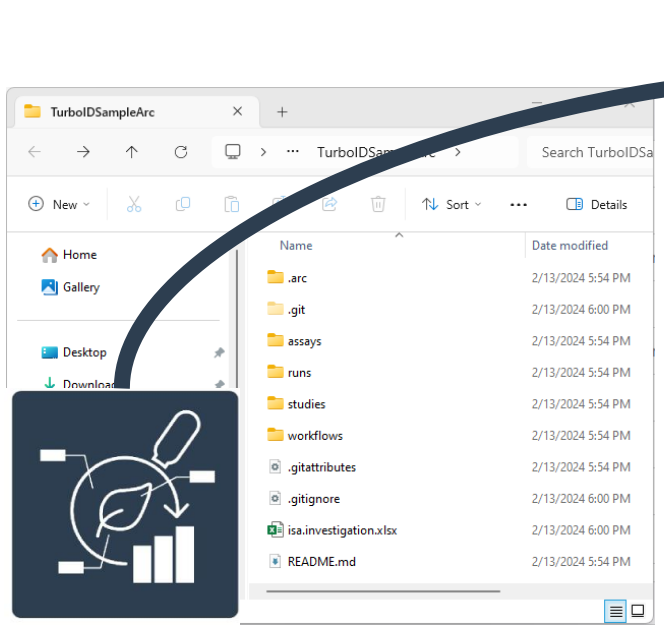


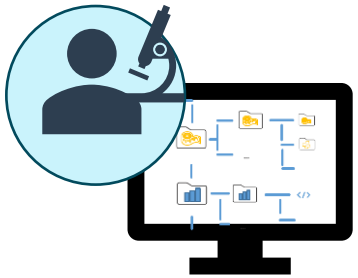


Researcher A

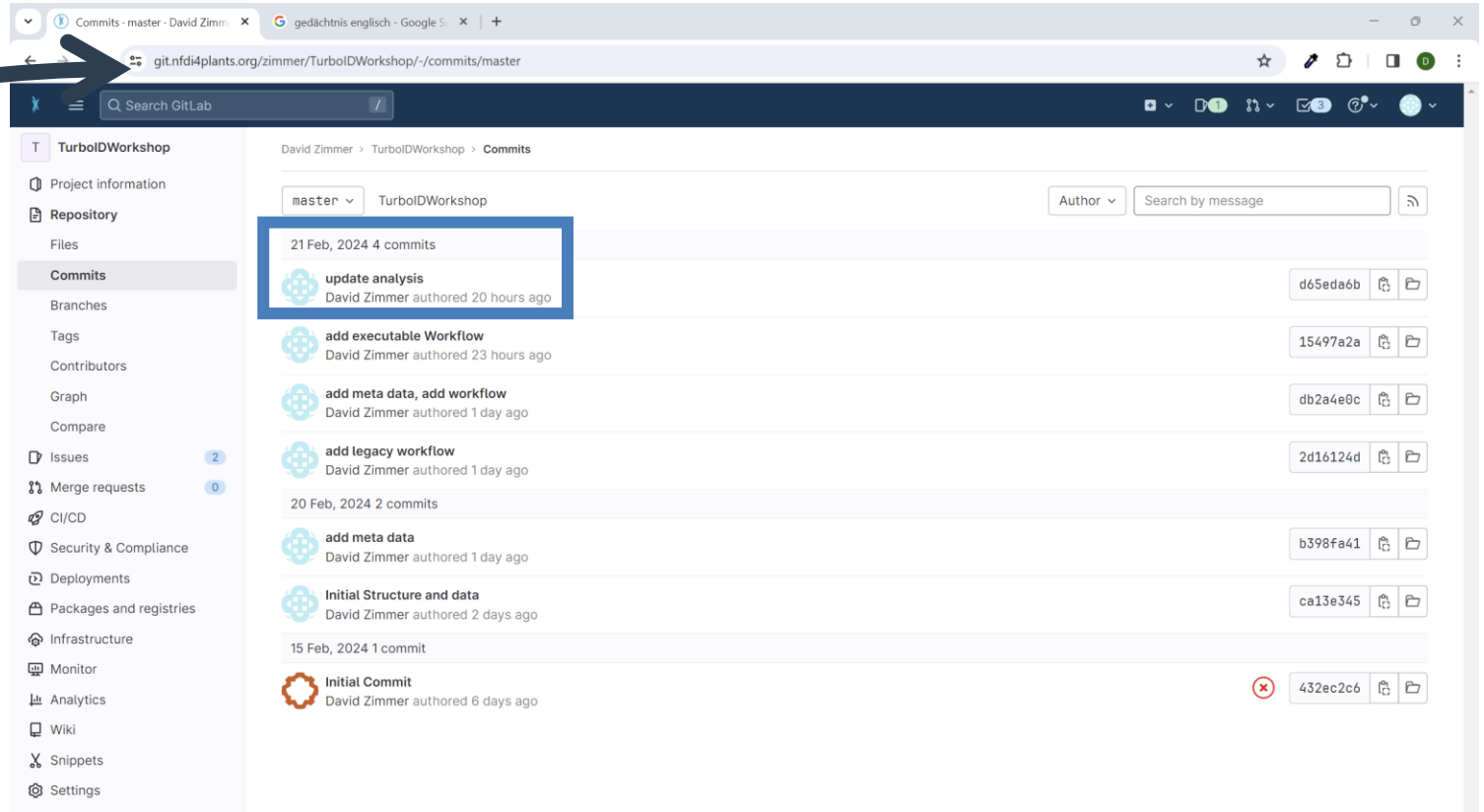


Now: Using the PLANTDataHUB to collaborate

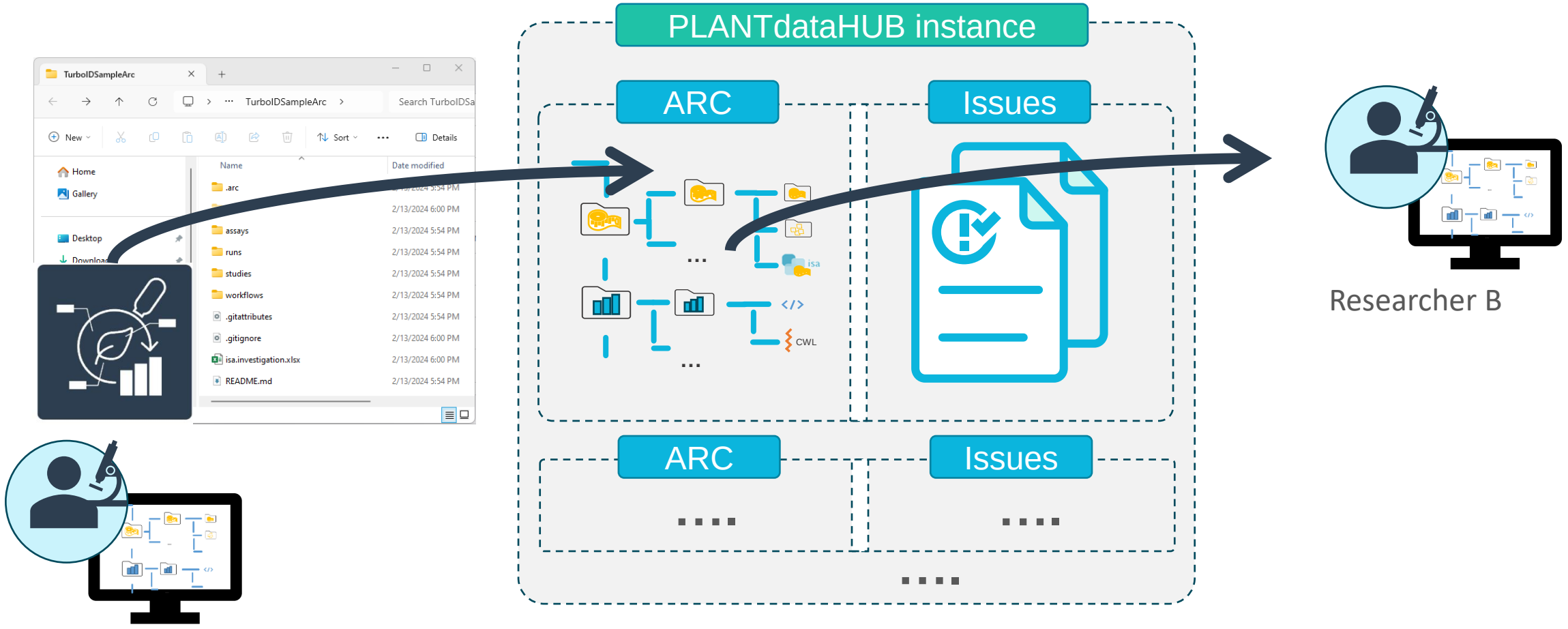




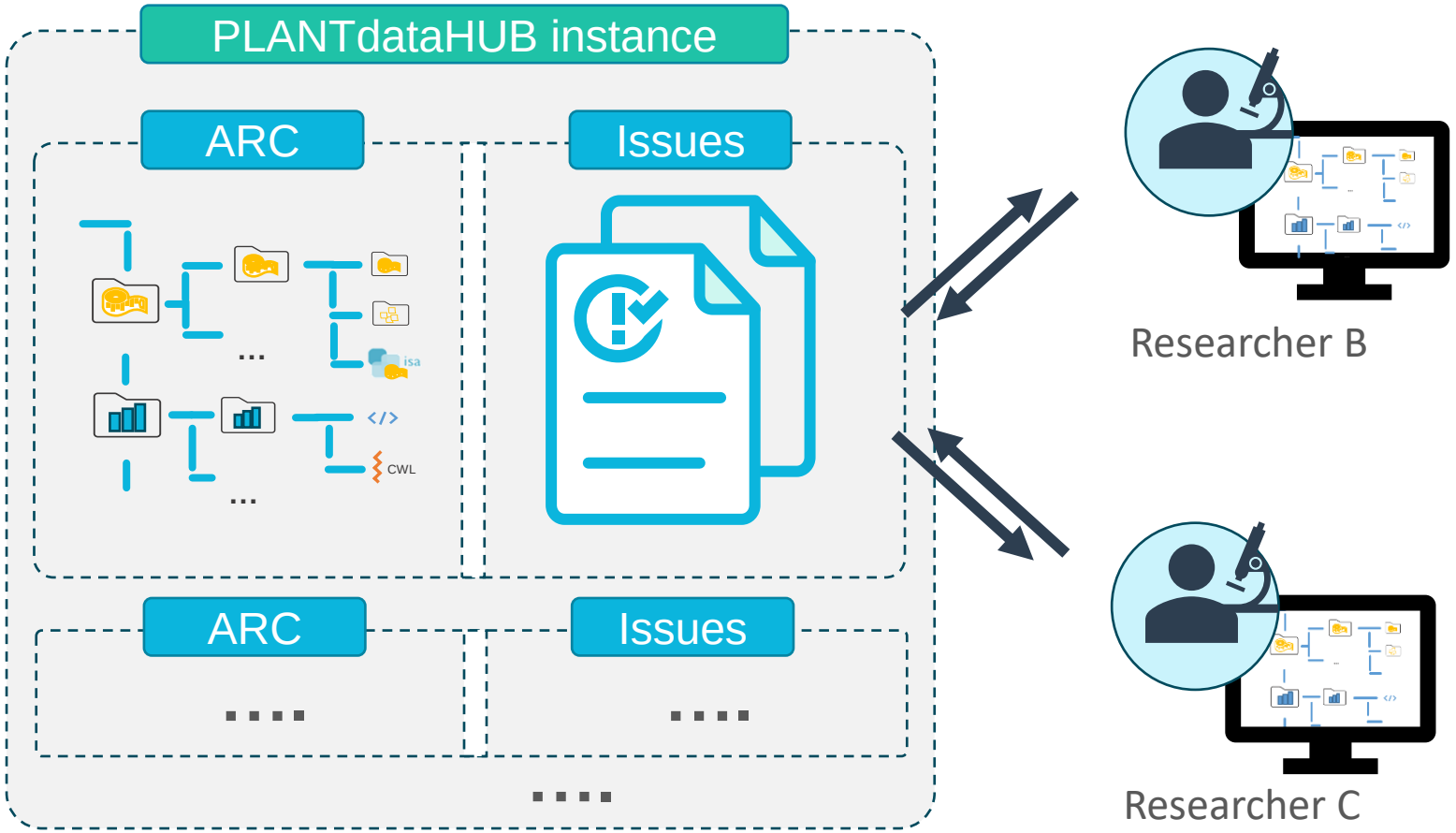
Researcher A



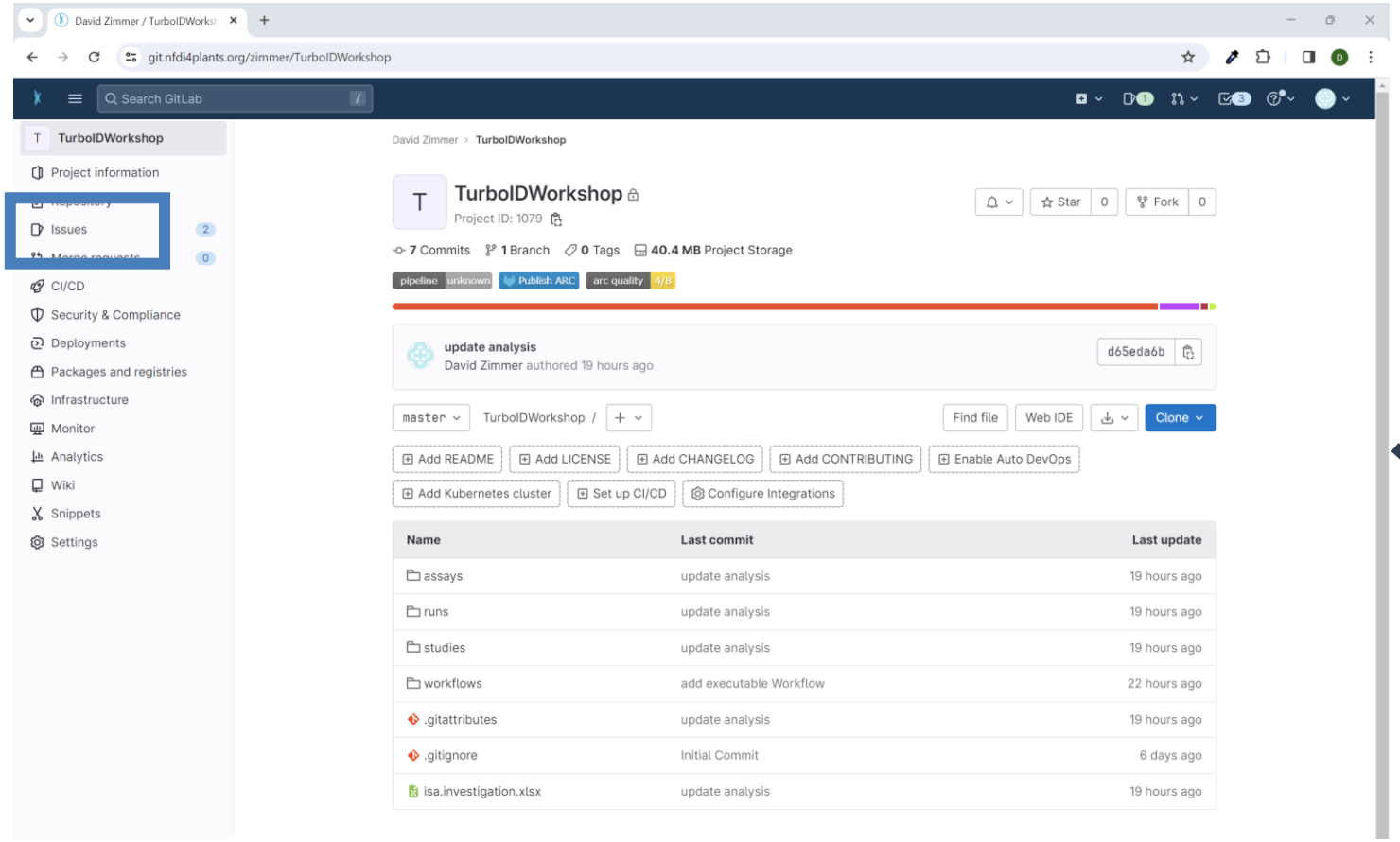
Now: Using the PLANTDataHUB to collaborate

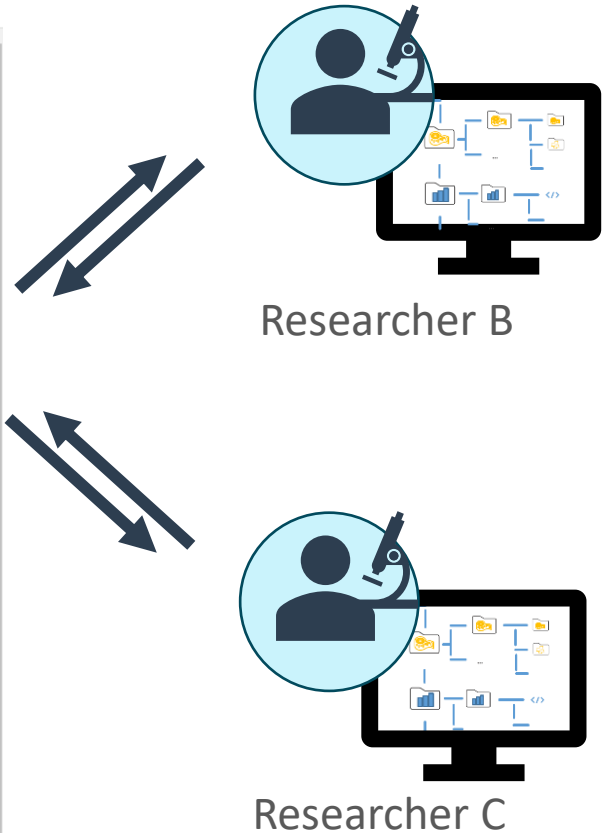


Now: Using the PLANTDataHUB to collaborate

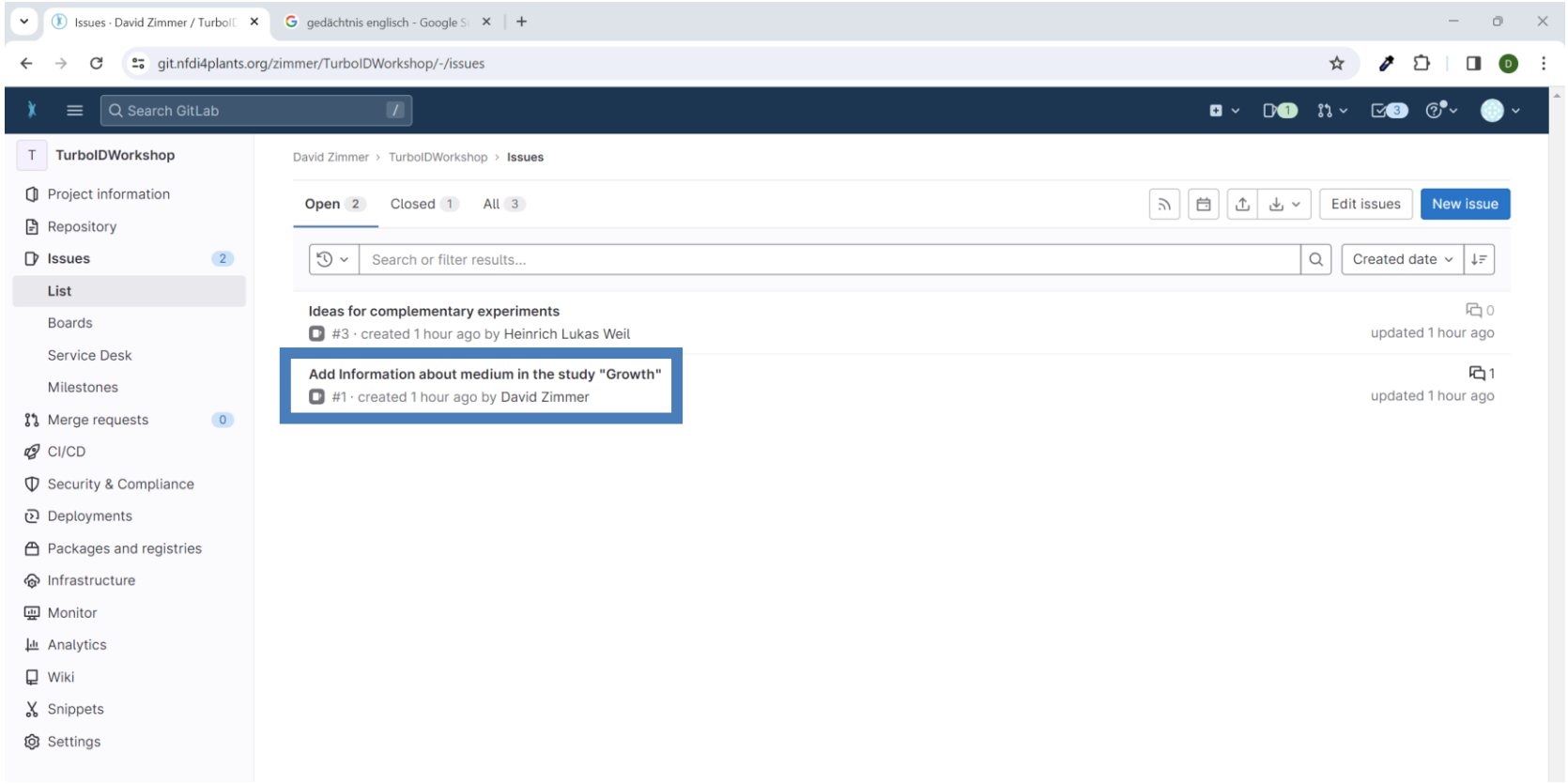


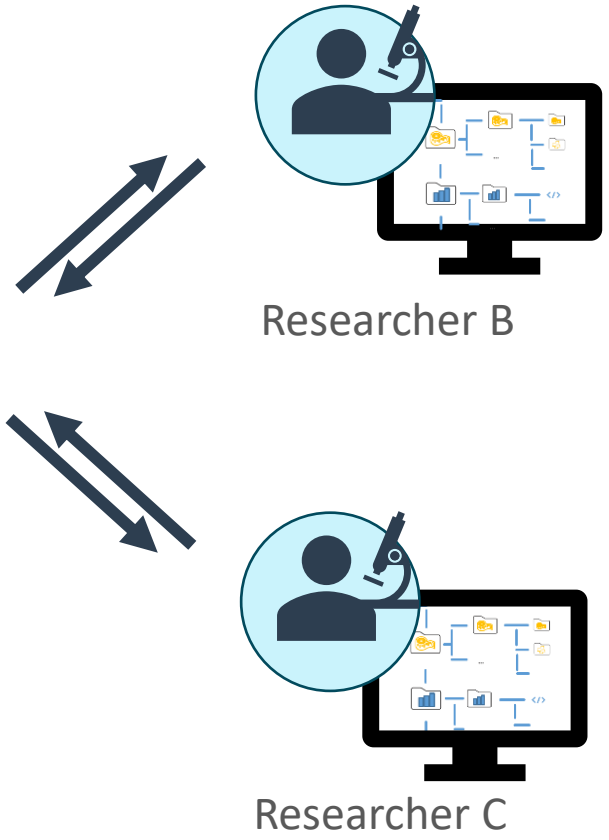
Now: Using the PLANTDataHUB to collaborate



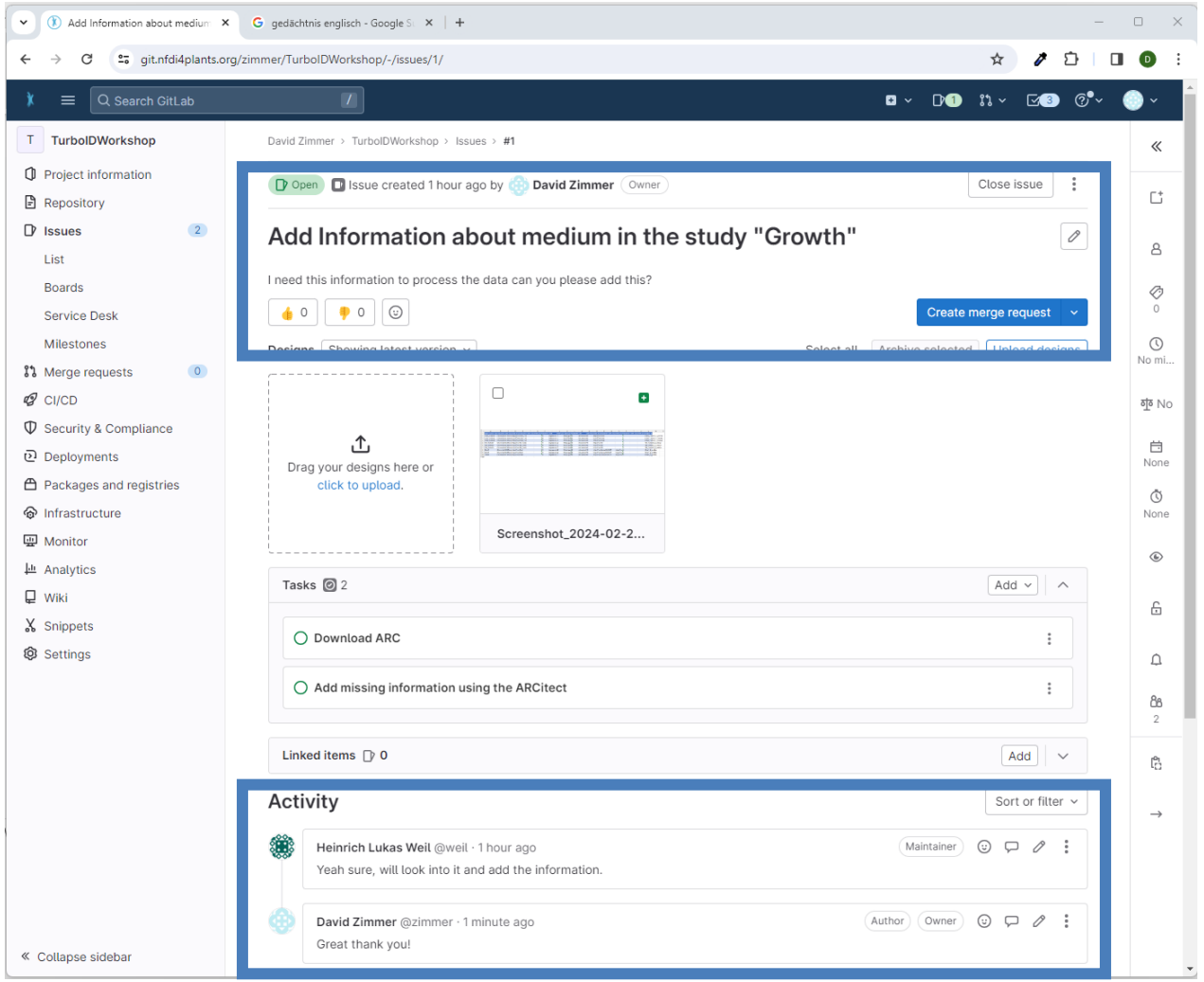


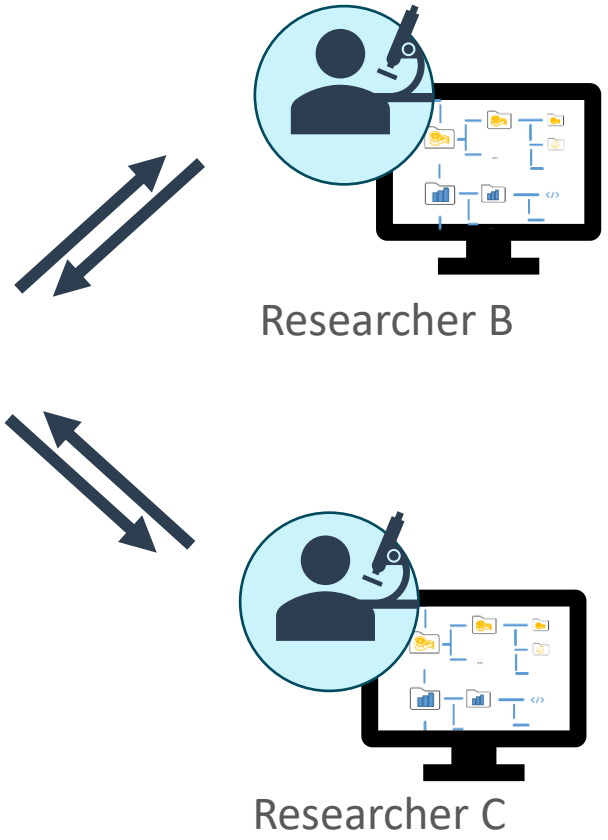
Now: Using the PLANTDataHUB to collaborate



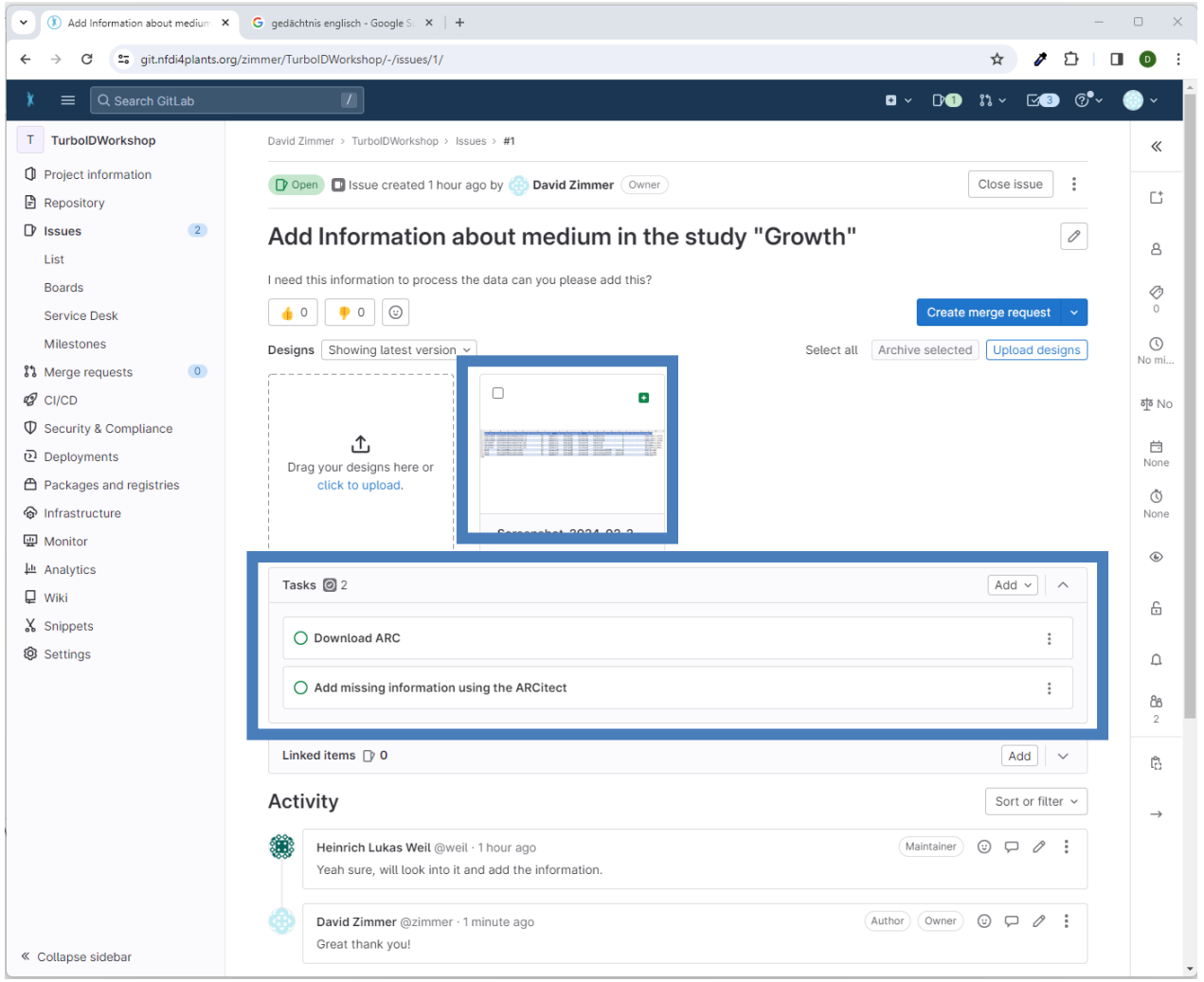


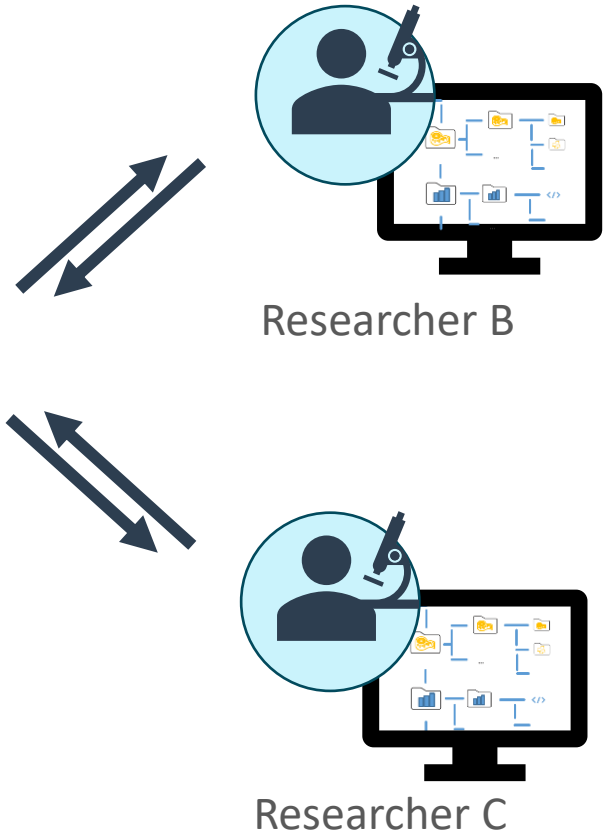
Now: Using the PLANTDataHUB to collaborate



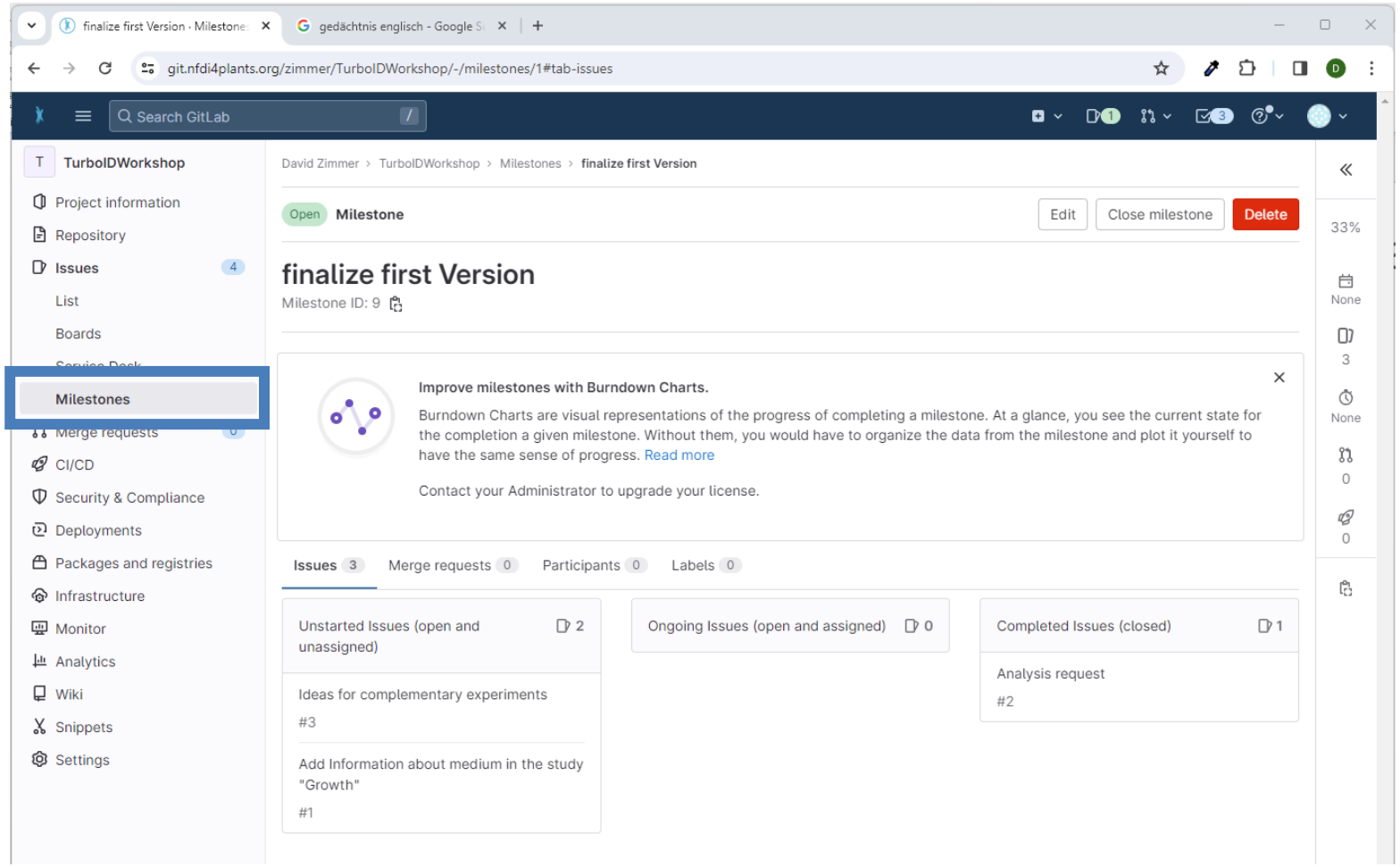


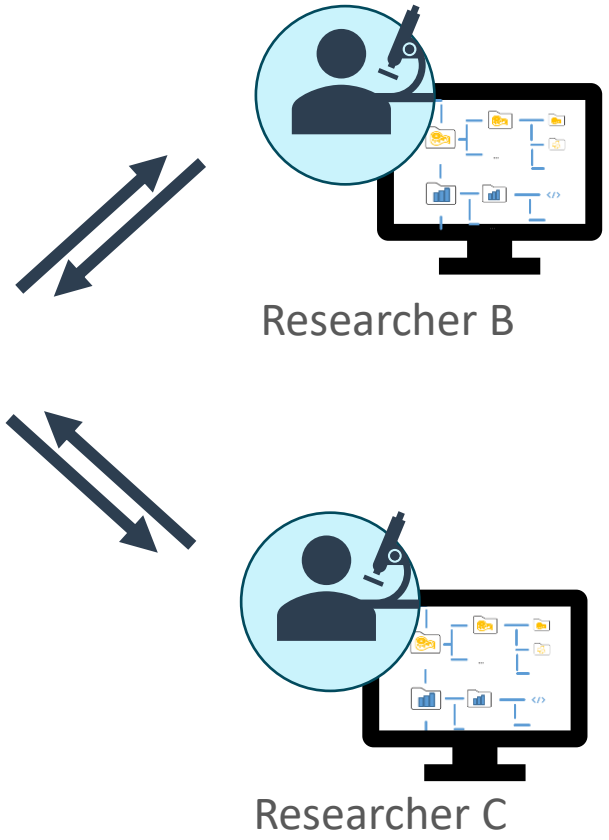
Now: Using the PLANTDataHUB to collaborate



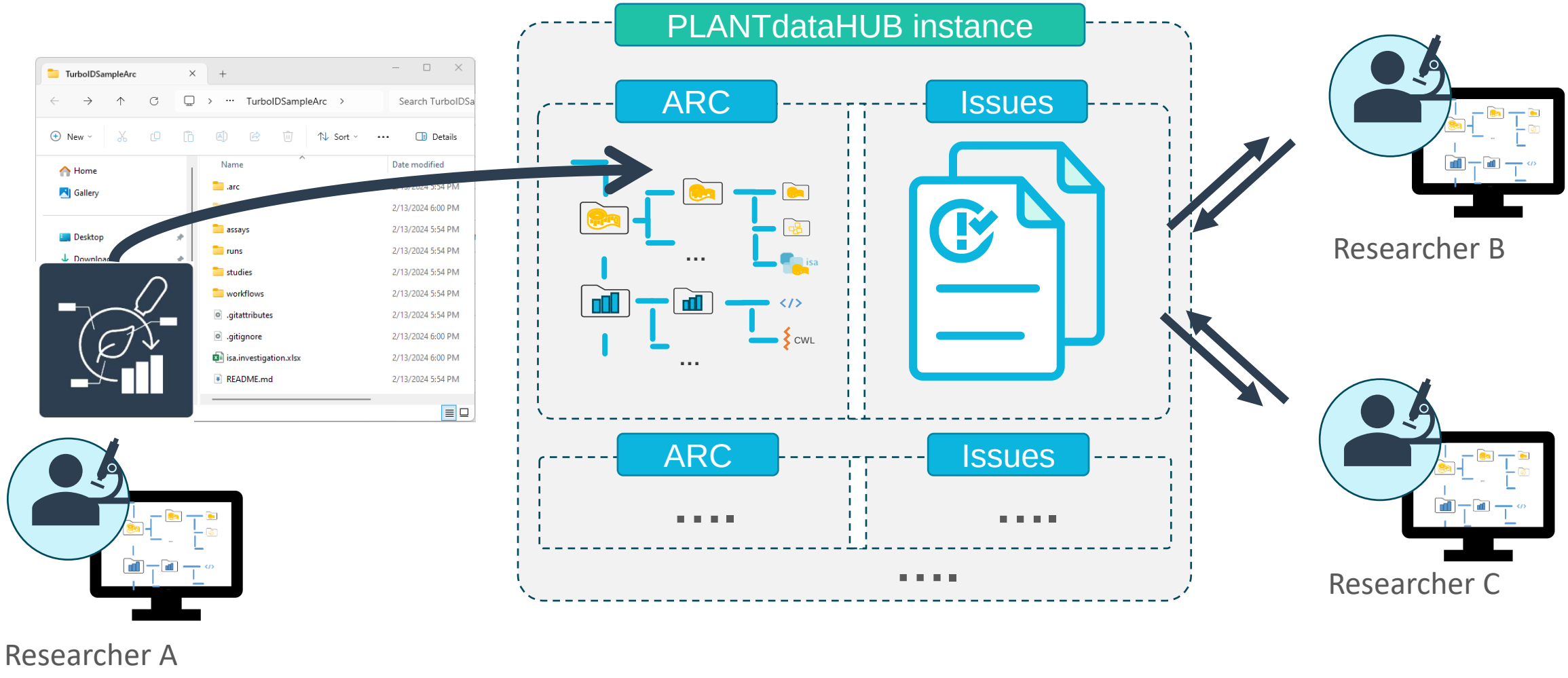


Now: Using the PLANTDataHUB to collaborate

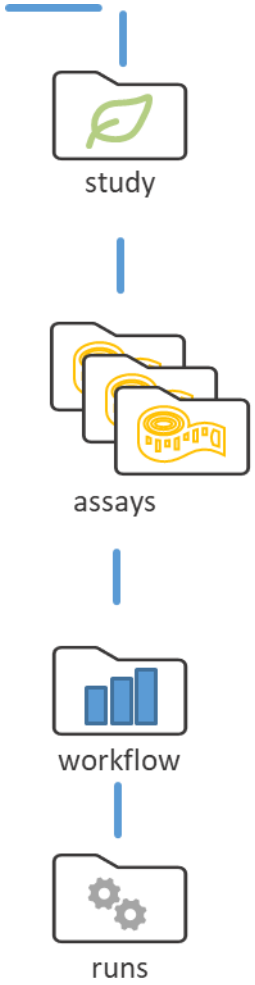




Now: Using the PLANTDataHUB to collaborate



Agenda of part two



I. Important ARC concepts by example: Structure

II. Important ARC concepts by example: Meta Data Annotation Principle

III. ARCs for FAIR collaboration using the PLANTDataHUB

ARCitect

IV. Complete Walk-Through using the ARCitect

IV: Prerequisites

- Create an DataPLANT Account:
  - Visit: https://git.nfdi4plants.org/explore
  - Click “Sign in”
  - Either connect your ORCID account or create an DataPLANT account using “SIGN UP”
- Download the Arcitect:
  - This tutorial is performed using Arcitect version 0.0.28 newer versions might be available but might have an different look
  - The software is still at an early state, if you find bugs and want to help, please report your bugs here
- Optional: Have a look at the NFDI4Plants Knowledgebase

Agenda

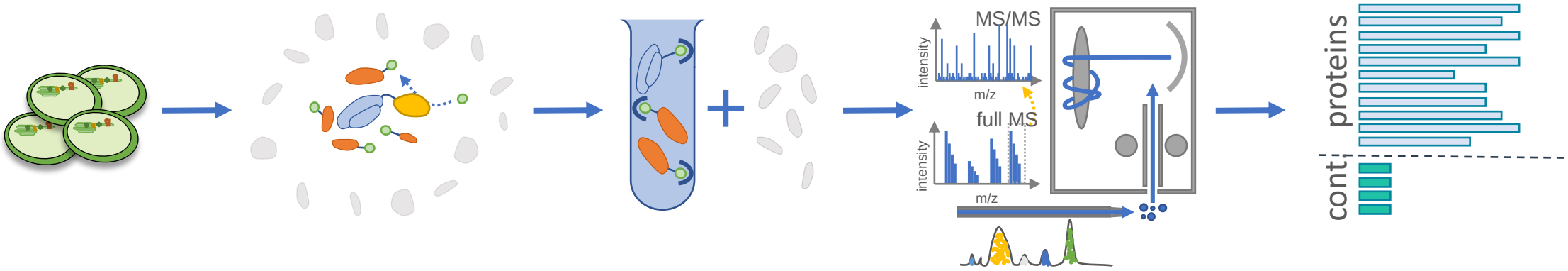
I. Initialize ARC structure and add data
II. Add Meta Data
III. Login to the DataHUB and synchronize our ARC
IV. Explore the ARC online
V. Execute an workflow in the ARC

I. Initialize ARC structure and add data

- Open the Arcitect
- Create a new ARC

I. Initialize ARC structure and add data

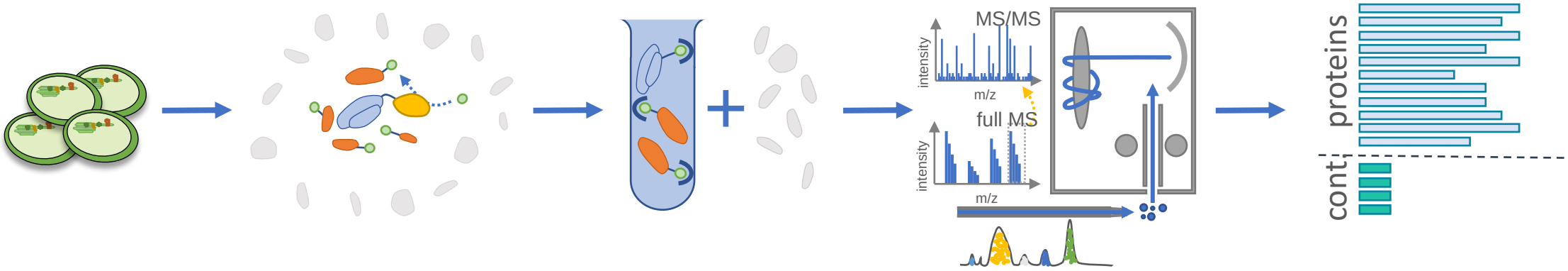
- Inspect our experiment and layout the ARC accordingly
  - Add one study called growth



Growth | Biotinylation Assay | Affinity Purif. | MS Measurement | MS Analysis

I. Initialize ARC structure and add data

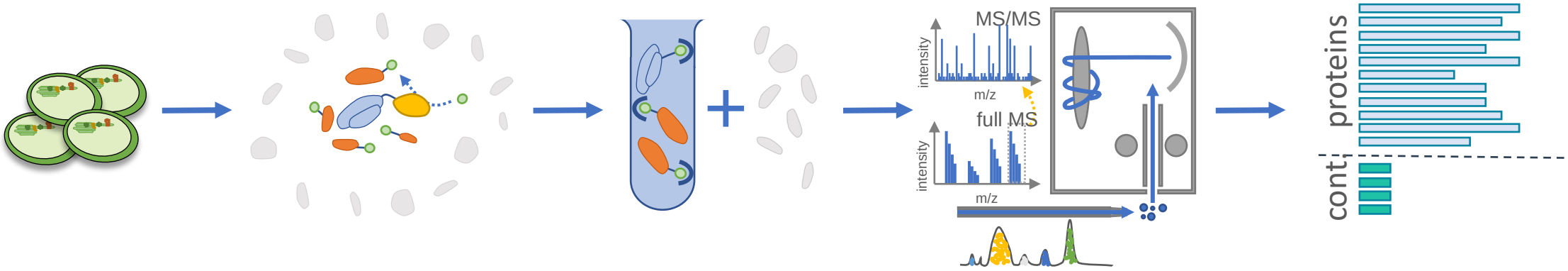
- Inspect our experiment and layout the ARC accordingly
  - Add one study called growth
  - Add four Assays called “Biotinylation”, “AffinityPurification”, “MS Measurement” and “MS Analysis”



Growth | Biotinylation Assay | Affinity Purif. | MS Measurement | MS Analysis

I. Initialize ARC structure and add data

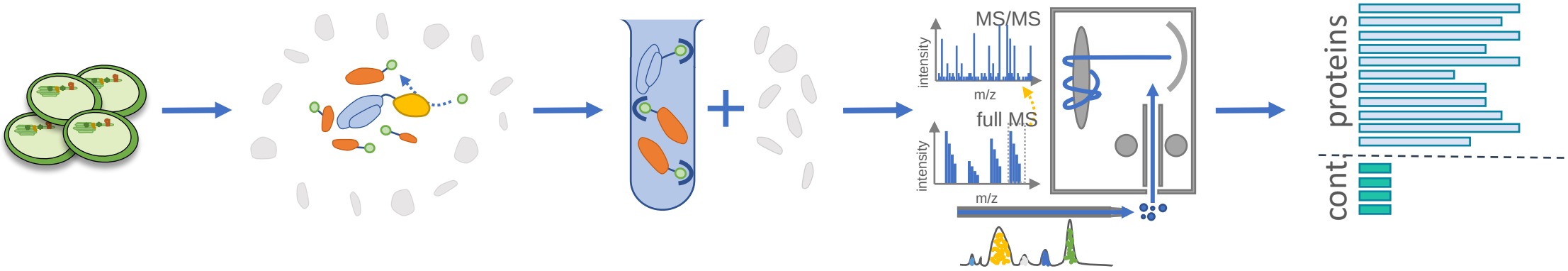
- Add our experimental data
  - Add MS raw data to the assay MSMeasurement



Growth Biotinylation Assay Affinity Purif. MS Measurement MS Analysis

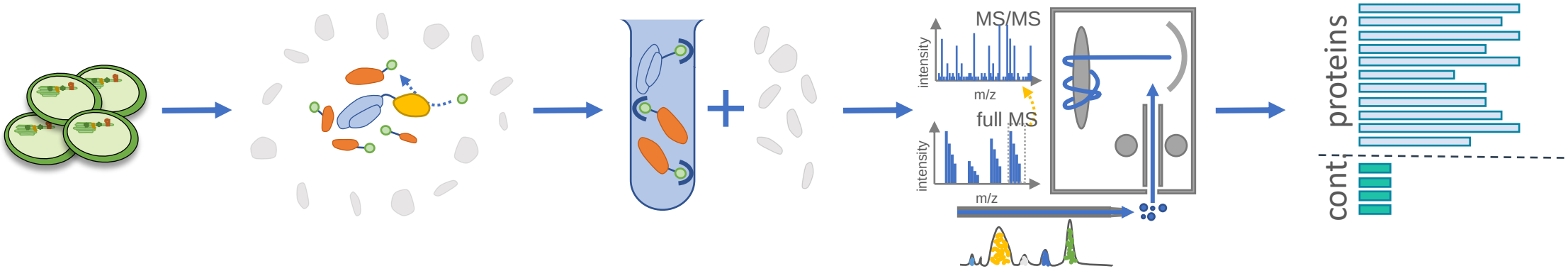
I. Initialize ARC structure and add data

- Add our experimental data
  - Add MS raw data to the assay MSMeasurement
  - Add MS analysis data to the MSAnalysis assay



I. Initialize ARC structure and add data

- Add our experimental data
  - Add MS raw data to the assay MSMeasurement
  - Add MS analysis data to the MSAnalysis assay



Agenda

I. Initialize ARC structure and add data
II. Add Meta Data
III. Login to the DataHUB and synchronize our ARC
IV. Explore the ARC online
V. Execute an workflow in the ARC

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.
  - Add the columns Characteristic [organism], and Characteristic [biological replicate group] to describe the input

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.
  - Add the columns Characteristic [organism], and Characteristic [biological replicate group] to describe the input

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.
  - Add the columns Characteristic [organism], and Characteristic [biological replicate group] to describe the input

II. Add Meta Data

- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.
  - Add the columns Characteristic [organism], Characteristic [plasmid] and Characteristic [biological replicate group] to describe the input
  - Add the columns Parameter [temperature], Parameter [light intensity exposure] and Parameter [Biological replicate] to describe the process that produced our samples in the output column

II. Add Meta Data

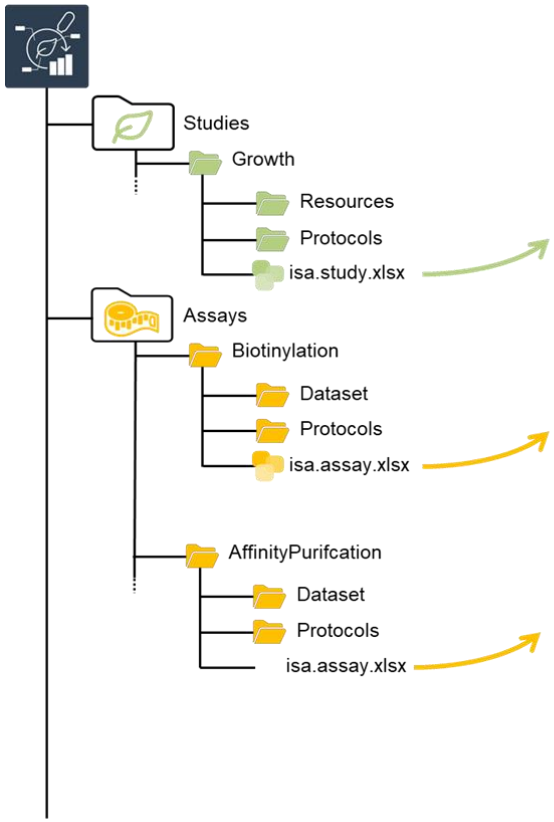
- Add Meta Data to the study “Growth”
  - Visit the Growth study and add a new workbook and name it “Growth”
  - Add an Input [Source Name] column and an Output [Sample Name] column
  - Add your Sources named “RBCL”, “FBP” and “Cher4”, each three times
  - Add your Samples named “RBCL_TurboID_1_preExp”, “RBCL_TurboID_2_preExp” etc.
  - Add the columns Characteristic [organism], Characteristic [plasmid] and Characteristic [biological replicate group] to describe the input
  - Add the columns Parameter [temperature], Parameter [light intensity exposure] and Parameter [Biological replicate] to describe the process that produced our samples in the output column

II. Add Meta Data

- Add Meta Data to the assay “Biotinylation”
- Visit the Assay “Biotinylation”and add a new workbook and name it “Biotinylation”
- Add an Input [Source Name] Column and and Output [Sample Name] Column

II. Add Meta Data

- Add Meta Data to the assay “Biotinylation”



Growth/isa.study.xlsx

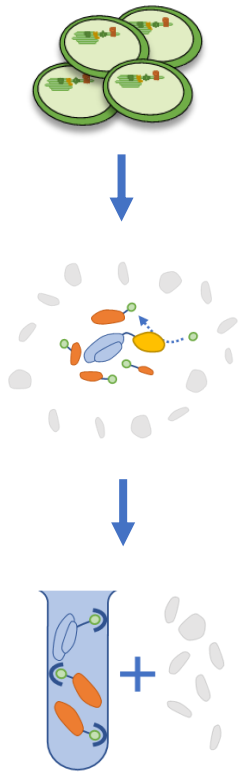
Input [Source Name]	Characteristic [organism]	Characteristic [biological replicate group]	Parameter [temperature]	Output [Sample Name]
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_1_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_2_preExp
RBCL_TurboID	Chlamydomonas reinhardtii	RBCL_TurboID	24	RBCL_TurboID_3_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_1_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_2_preExp
FBP_TurboID	Chlamydomonas reinhardtii	FBP_TurboID	24	FBP_TurboID_3_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_1_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_2_preExp
Cher4	Chlamydomonas reinhardtii	Control Group	24	Cher4_3_preExp

Biotinylation/isa.assay.xlsx

Input [Sample Name]	Parameter [temperature]	Parameter [light intensity exposure]	Parameter [Biotin-phenol]	Output [Sample Name]
RBCL_TurboID_1_preExp	24	60	100	RBCL_TurboID_1_postBio
RBCL_TurboID_2_preExp	24	60	100	RBCL_TurboID_2_postBio
RBCL_TurboID_3_preExp	24	60	100	RBCL_TurboID_3_postBio
FBP_TurboID_1_preExp	24	60	100	FBP_TurboID_1_postBio
FBP_TurboID_2_preExp	24	60	100	FBP_TurboID_2_postBio
FBP_TurboID_3_preExp	24	60	100	FBP_TurboID_3_postBio
Cher4_1_preExp	24	60	100	Cher4_1_postBio
Cher4_2_preExp	24	60	100	Cher4_2_postBio
Cher4_3_preExp	24	60	100	Cher4_3_postBio

AffinityPurifcation/isa.assay.xlsx

Input [Sample Name]	Parameter [affinity column]	Parameter [Buffer]	Parameter [Biotin]	Output [Sample Name]
RBCL_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_1_eluate
RBCL_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_2_eluate
RBCL_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	RBCL_TurboID_3_eluate
FBP_TurboID_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_1_eluate
FBP_TurboID_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_2_eluate
FBP_TurboID_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	FBP_TurboID_3_eluate
Cher4_1_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_1_eluate
Cher4_2_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_2_eluate
Cher4_3_postBio	Streptavidin	2x SDS Laemmli buffer with biotin	100	Cher4_3_eluate



II. Add Meta Data

- Add Meta Data to the assay “Biotinylation”
- Visit the Assay “Biotinylation”and add a new workbook and name it “Biotinylation”

II. Add Meta Data

- Add Meta Data to the assay “Biotinylation”
- Visit the Assay “Biotinylation”and add a new workbook and name it “Biotinylation”
- Add Meta Data!

II. Add Meta Data

- Repeat for all assays
- … or inspect the prepared ARC called “LiveARC_WithMetaData”

II. Add Meta Data

- Repeat for all assays
- … or inspect the prepared ARC called “LiveARC_WithMetaData”
- Use the file picker to add file references to assays

II. Add Meta Data

- Repeat for all assays
- … or inspect the prepared ARC called “LiveARC_WithMetaData”
- Use the file picker to add file references to assays
- Inspect the Output of the assay “AffinityPurification” and how it maps to the assay “Western Plot”

Agenda

I. Initialize ARC structure and add data
II. Add Meta Data
III. Login to the DataHUB and synchronize our ARC
IV. Explore the ARC online
V. Execute an workflow in the ARC

III. Login to the DataHUB and synchronize our ARC

- Login to your DataPLANT account
- Commit our changes locally
- Sync our new Commit with the DataHUB

Agenda

I. Initialize ARC structure and add data
II. Add Meta Data
III. Login to the DataHUB and synchronize our ARC
IV. Explore the ARC online
V. Execute an workflow in the ARC

IV. Explore the ARC online

- Visit the DataHUB and identify your ARC
- Explore your ARC structure
- Inspect your Commits

IV. Explore the ARC online

- Visit the DataHUB and identify your ARC
- Explore your ARC structure
- Inspect your Commits
- Make local changes and sync again
- Inspect your Commits

IV. Explore the ARC online

- Visit the DataHUB and identify your ARC
- Explore your ARC structure
- Inspect your Commits
- Make local changes and sync again
- Inspect your Commits
- Create an issue
- Create an milestone

Agenda

I. Initialize ARC structure and add data
II. Add Meta Data
III. Login to the DataHUB and synchronize our ARC
IV. Explore the ARC online
V. Execute an workflow in the ARC

V. Execute an workflow in the ARC

- Add the workflow and the run parameters using the ARCitect
- Execute the workflow using cwltool as described here