NanoCommons

Nano-Knowledge Community

Iseult Lynch, UoB

Online Jaqpot Hackathon - Take your research from the bench to the community by making your models available as a web service

Electronic Laboratory Notebooks

NanoCommons Workshop, 2020-06-03, #nanocommons

This project has received funding from the European Union Horizon 2020 Programma (H2020) under grant agreement no. 731032.

Data Management – what & why?

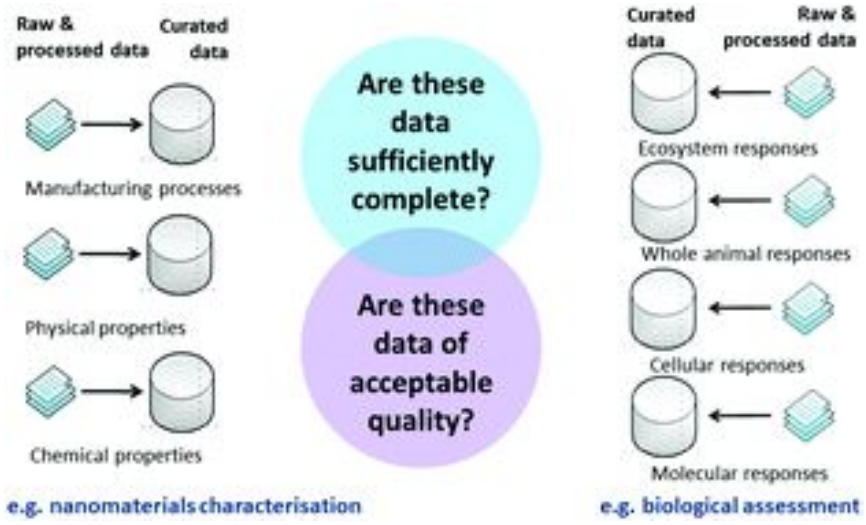
NanoCommons
Nano-Knowledge Community

Definition

Data Management is the implementation and application of processes, which allow the acquisition, storage, manipulation and analysis of data during its lifecycle.

Cause & Effect

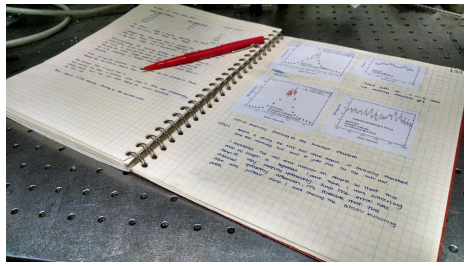
- Is the most neglected scientific process
- Most labs, at a global scale, are yet to enter the 21st century
- Poor data management can:
  - lead to significant loss of data and metadata
  - decrease the quality of data and scientific publications
  - lead to the loss of significant insights
  - Does not allow further data exploitation (e.g. AI, machine learning)



What is an Electronic Lab Notebook?

NanoCommons
Nano-Knowledge Community

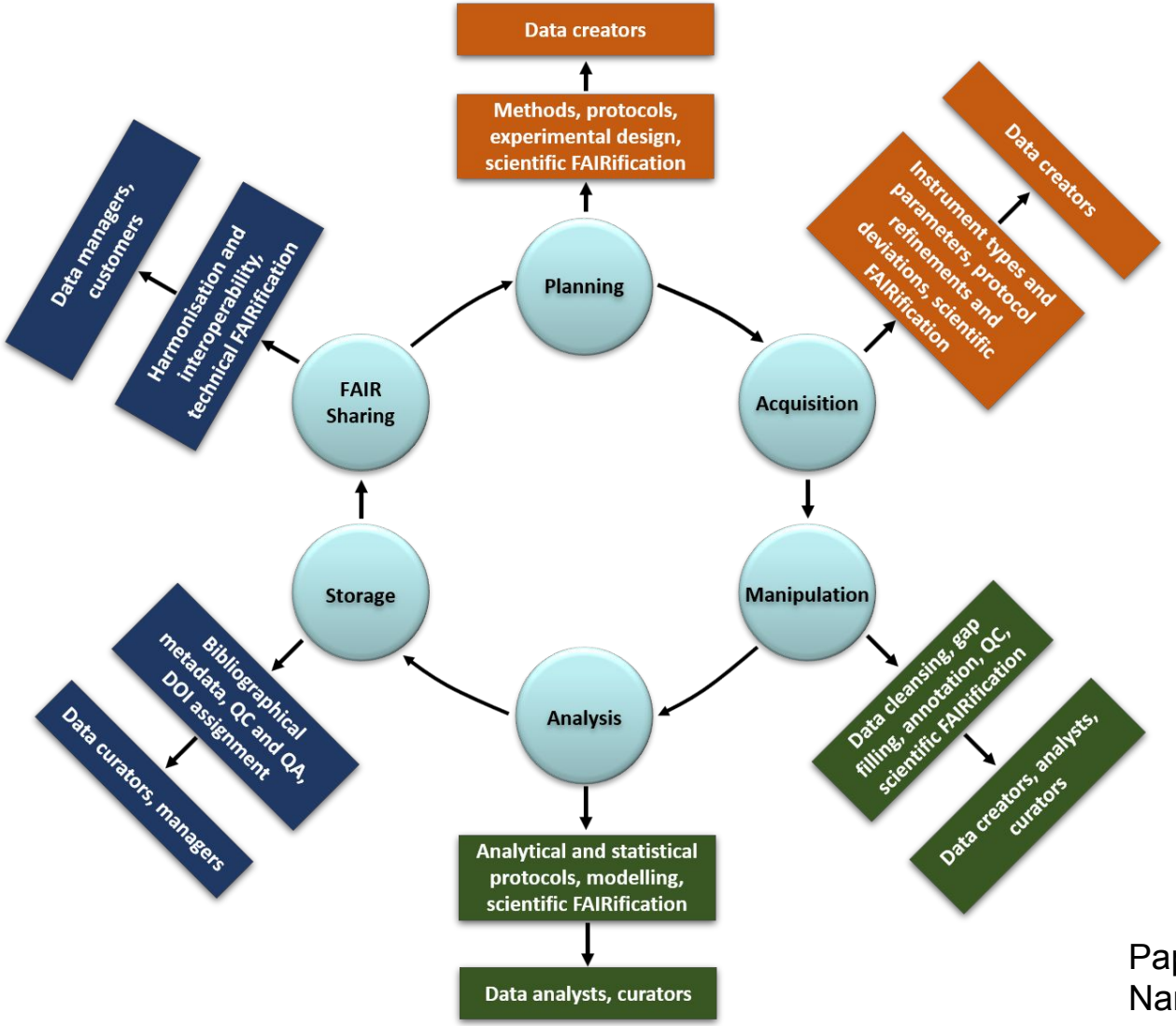
- A computer program designed to replace paper lab notebooks
- Used to manage scientific workflows, covering entire **data lifecycle**
- It can store both **data** and **metadata** information
- Lab notebooks are treated as legal documents (e.g., for patenting)!



Advantages of ELNs over PLNs:

- Easier to search within (for data, protocols, calibrations, chemicals etc.)
- Simplify data copying and backups
- Support collaboration amongst many users

Data lifecycle & metadata



Metadata is "data about data."

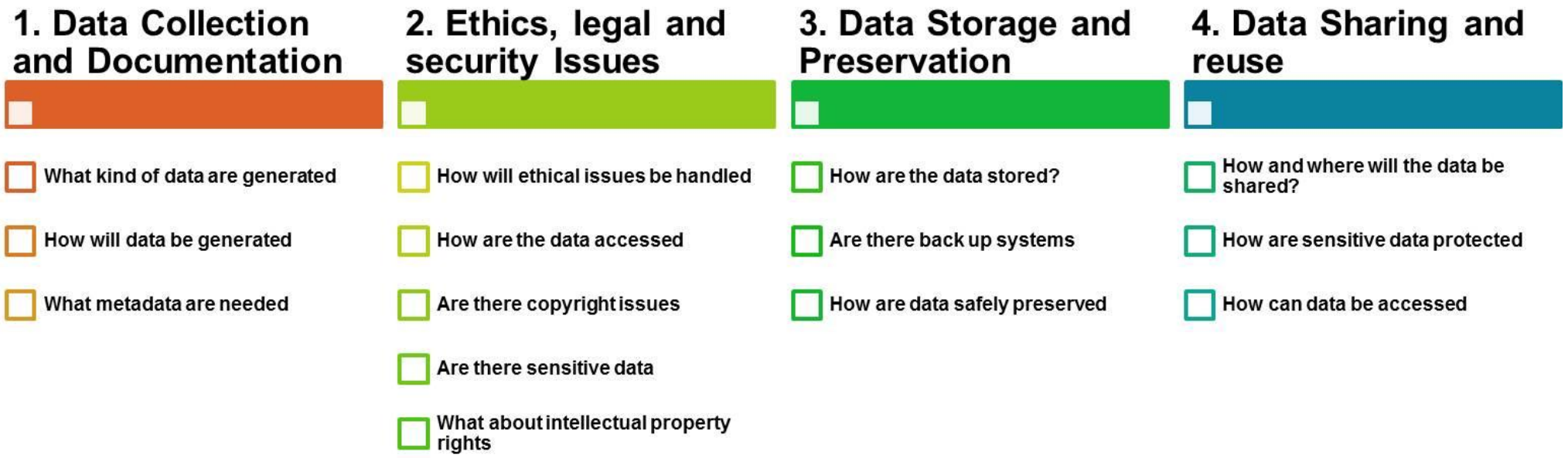
Descriptive metadata – assay type, cell line used, concentrations, calibrations, instrument and software parameters, etc.

Technical metadata – statistical approach, data cleaning / gap filling approach etc.

Bibliographic metadata – who generated the data, publication information, licence information, etc.

Paper for submission to Nanomaterials special issue "From Nanoinformatics to Nanomaterials Risk Assessment and Governance"

Data Management Plan



https://www.nanocommons.eu/deliverable-d10-1-v2-0-second-version-of-nanocommons-data-management-plan/

Please feel free to use it / built on it. V3.0 coming shortly with more specific examples of managing access to specific datasets – experimental, computational and literature curated.

Multiple ELN suppliers

https://labsexplorer.s3-eu-west-1.amazonaws.com/content/files/list-eln-summary_40e11eff-1584348490.pdf

	Intend for...	Highlighted features	Format	Pricing	Score
Labfolder	All scientific fields	Timestamps Digital signature	SaaS, software	Free for 3 users 3+ paid users	24
LabArchives	All scientific fields	Integration with LIMS Features modules	SaaS + Apps	Free plan Paid plan	22
sciNote	All scientific fields	Export all data Integration with other softwares	SaaS Software	Free plan Premium plan	21
eLabFTW	All scientific fields	Timestamps Integration with some lab tools	Open-source software	Free	21
Benchling	Biology Chemistry	Timestamps Free for academics	SaaS	Free plan Paid plan	20
eLabJournal	Life science	App available Workflow management	SaaS Mobile app	From 10€/month/user	20
Labii ELN	All scientific fields	Integration with LIMS Pay per use	SaaS	Pay-as-you-go plan	20
Findings	All scientific fields	Progress tracker Quick access to resources	iOs	Free plan Paid plan	20
Uncountable	Chemistry engineering fields	AI-based suggestions for experiments	SaaS	Price on request	19
RSpace	All scientific fields	Data encryption Intuitive design	SaaS Software	Free plan Premium plan	19
Hivebench	Life science	Electronic signature Automatic backups	SaaS Software	Free plan Premium plan	19

Ranked according to following criteria:

User-friendliness: 0-5 points

Completeness: 0-5 points

Connectivity (to equipment / other software): 0-5 points

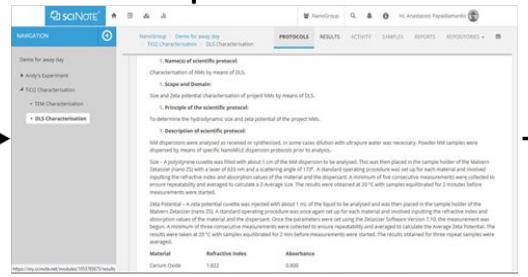
Price: 0 to 5 points

Special bonus points are given by Labs Explorer's team members up to 5.

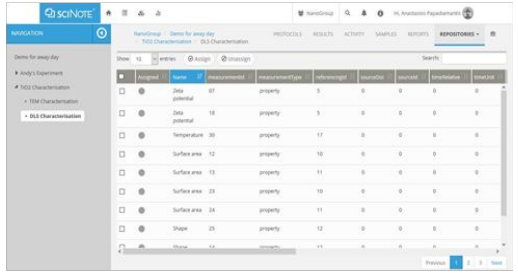
Data Acquisition & Management

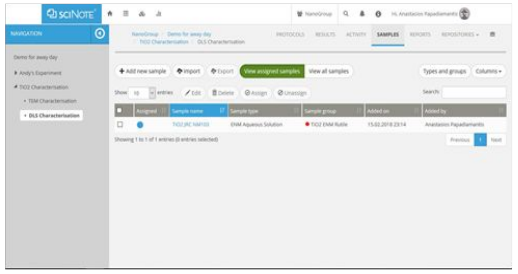
NanoCommons
Nano-Knowledge Community

Experimental design and protocol implementation

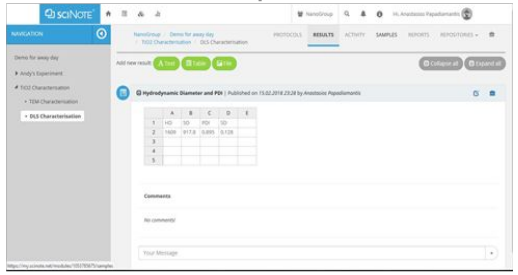


Data curation and annotation and automated extraction

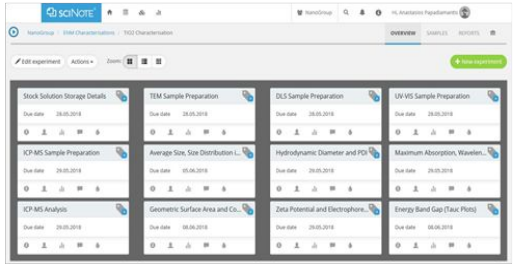




Samples and endpoints implementation

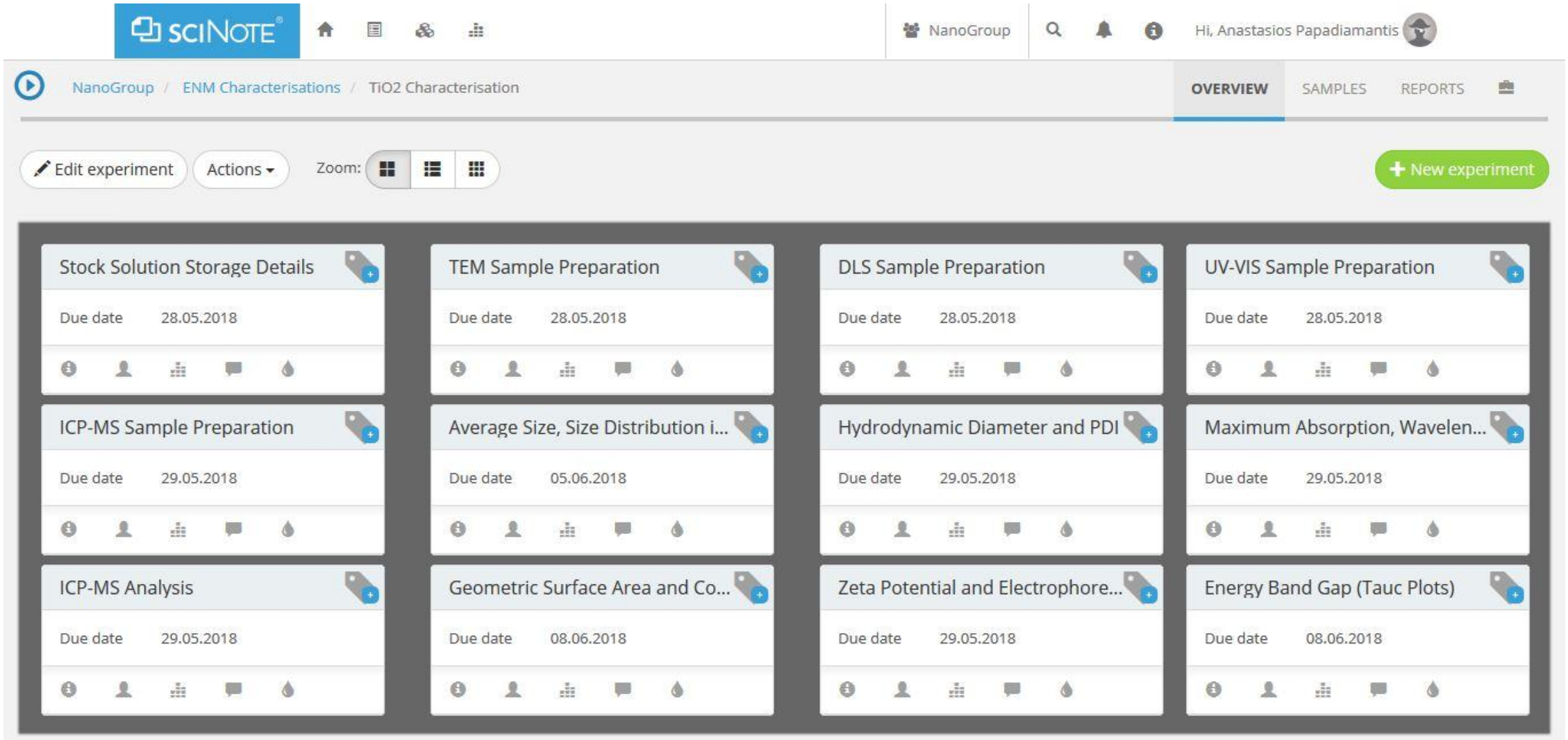


Data acquisition



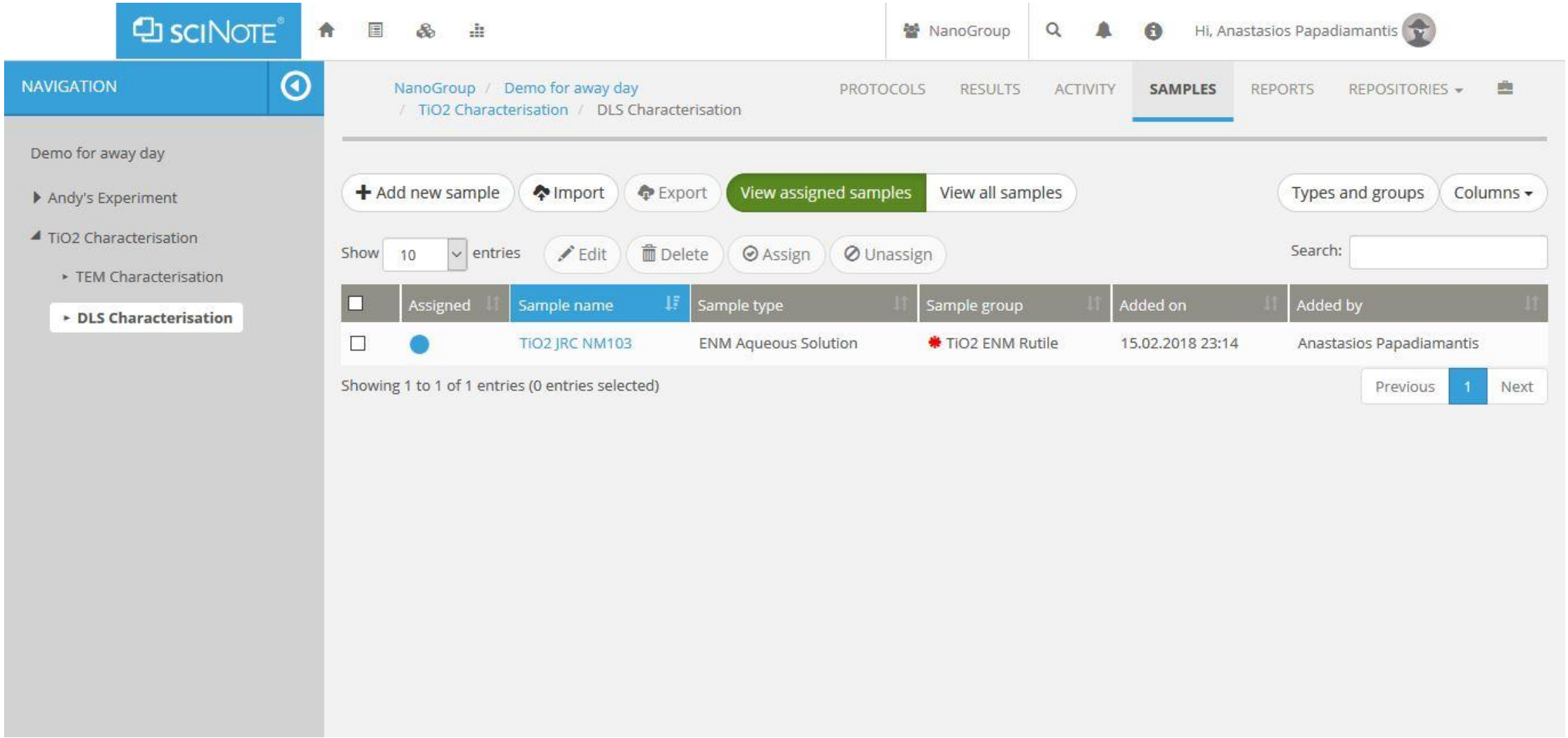
Experimental workflow assignments

Data capture: Experimental Workflow



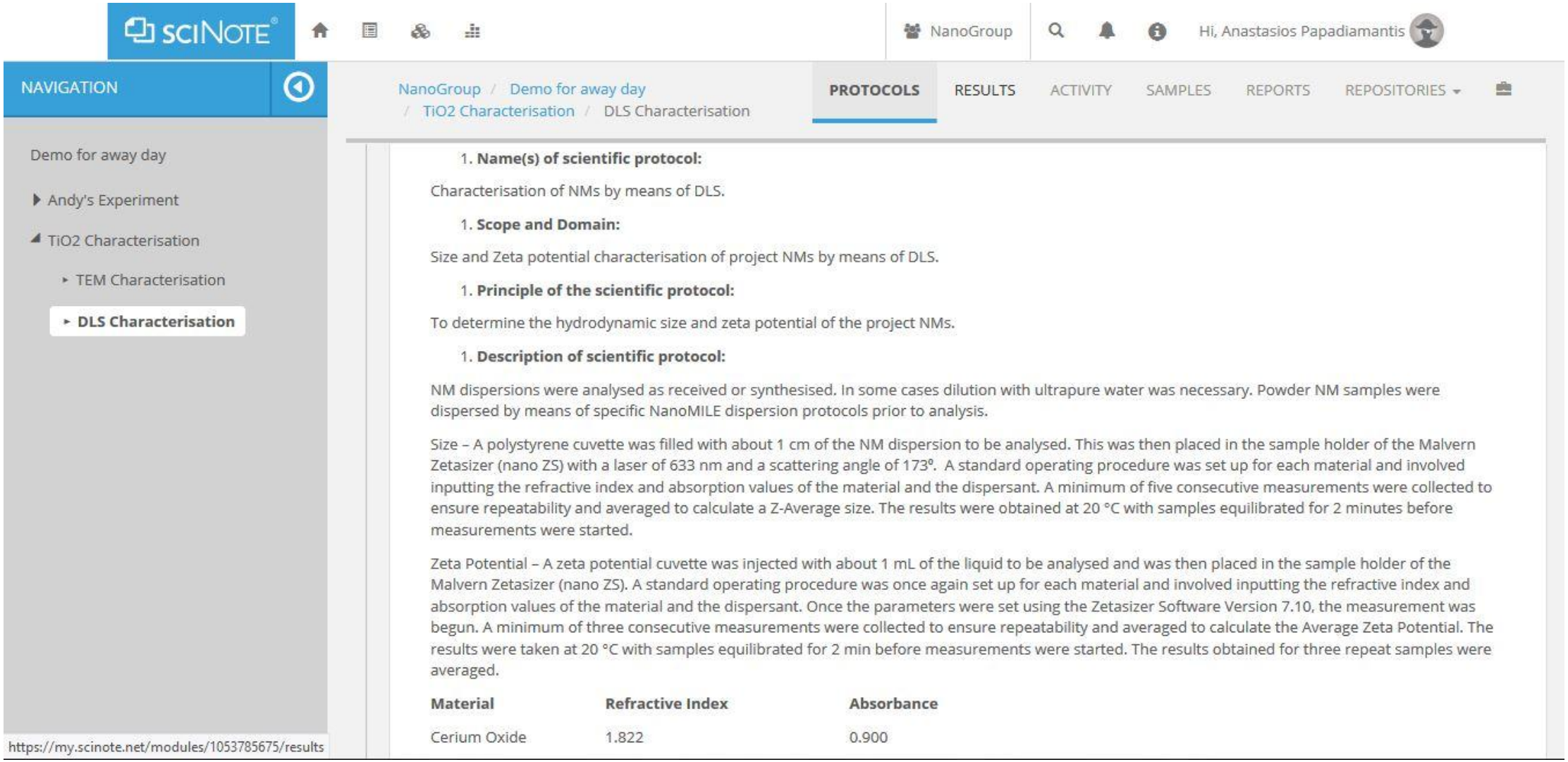
- **Multiple-branch experimental workflows**

Data Acquisition & Management



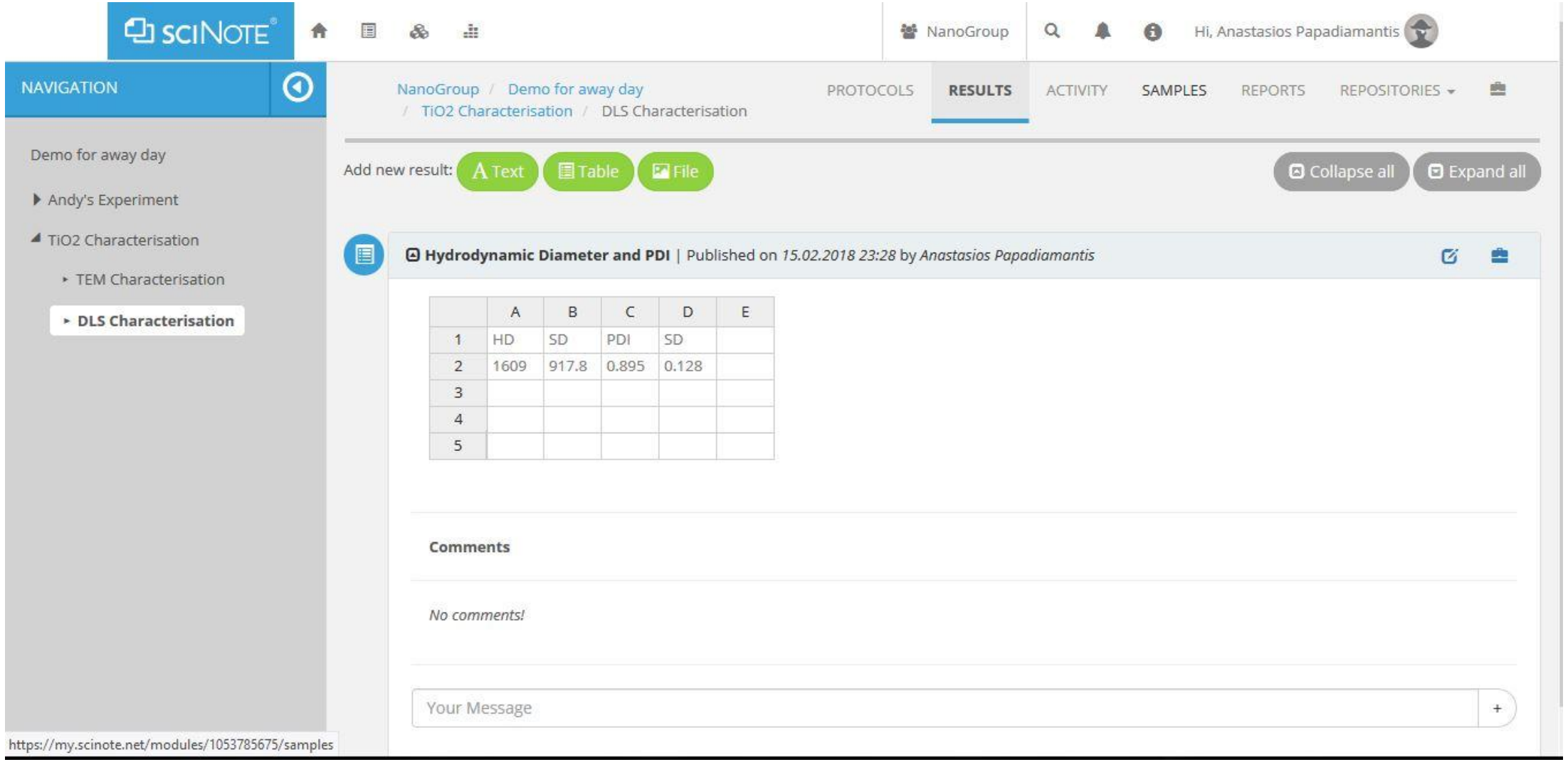
- **Sample insertion and assignment**

Data Acquisition & Management



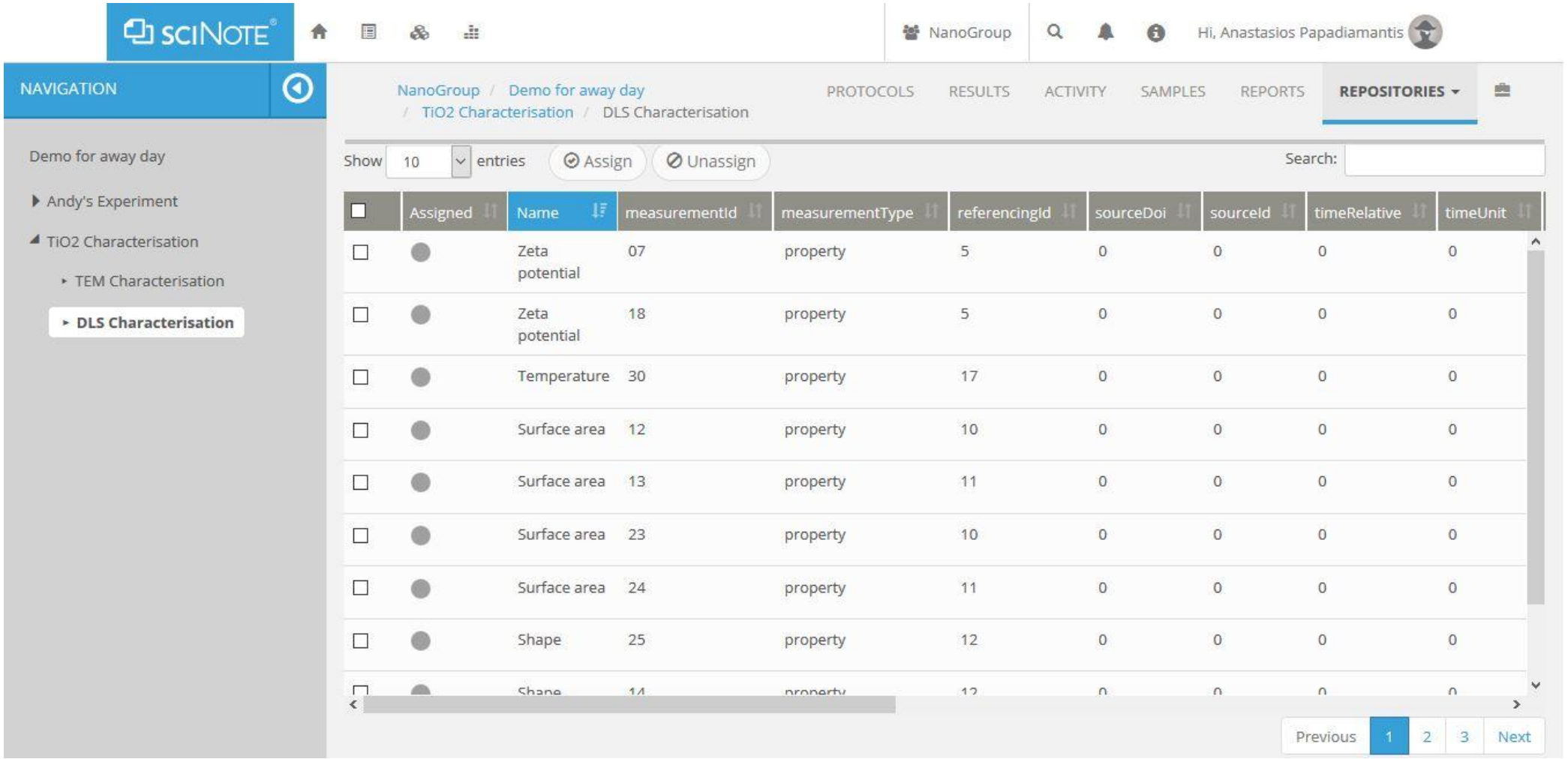
- **Fully linked analytical protocols**

Data Acquisition & Management



- **Specific experimental results**

Data Acquisition & Management



- **Direct link to data curation template**
- **Automatic extraction and shipment to data repository via email**

Transnational Access – Help to set up your ELNs

Experimental Workflows
Design & Implementation

Data Processing
& Analysis

Data Visualisation
& Predictive Toxicity

Data Storage
& Online Accessibility

https://www.nanocommons.eu/apply-for-access/

https://www.nanocommons.eu/contact/

Nanomaterials characterisation

Nanomaterials bio-nano interactions: protein and metabolite coronas etc.

Nanomaterials environmental fate & transformations

Toxicity and Ecotoxicity (in vitro and in vivo) assays, including high throughput and omics approaches

Image analysis etc.

Thank you & Questions?