



**NanoCommons**

Nano-Knowledge Community

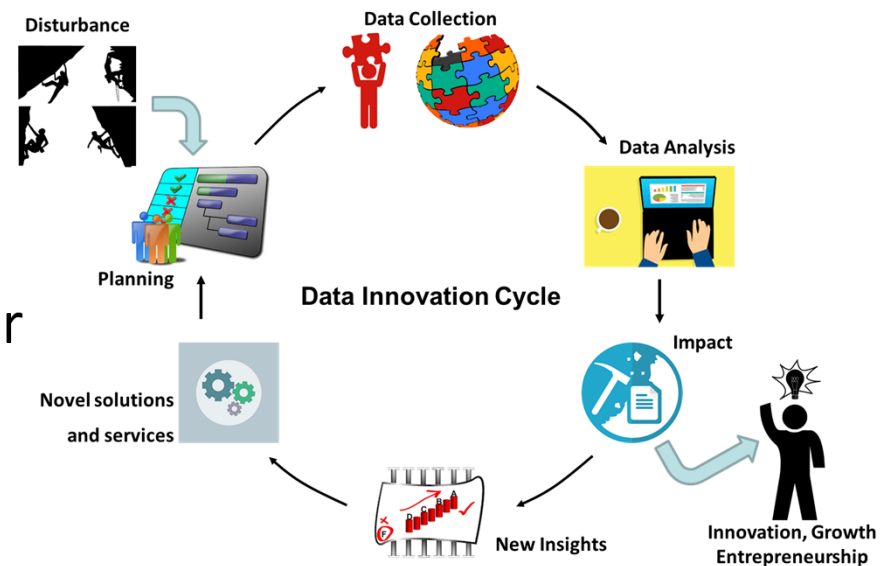
# Enabling FAIRness and Openness of EU NanoSafety Cluster data. The NanoCommons and NanoSolveIT approach



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

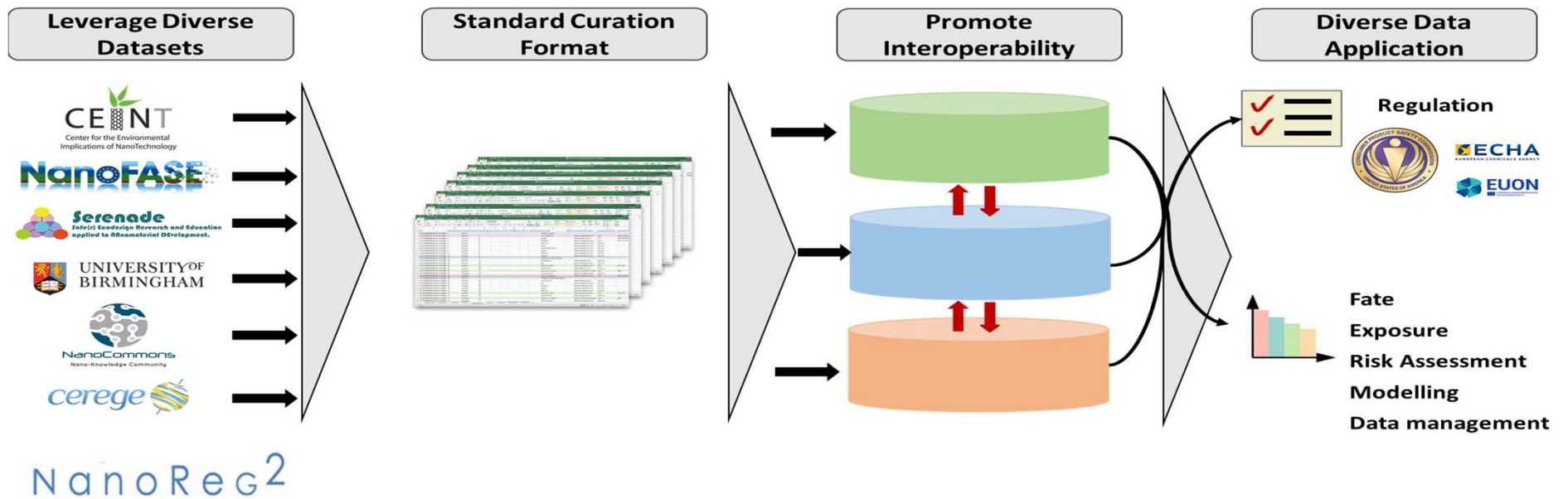
# Data Driven Innovation: Disruptive or disrupted?

- Nanosafety research is becoming a **data-heavy field**
- **Data exploitation** can lead to better insights, new ideas and novel solutions – **Disruptive innovation**



- There is only a finite amount of iterations that can be performed with **restricted data!** – **Disrupted innovation**
- **NanoCommons** is promoting data driven innovation through the exploitation of the data produced from EU funded, national and international projects

# NanoCommons overview



- Bridge different fields by promoting data comparability and project continuity
- **Read-across approaches are currently absent for NMs**, but would reduce the cost of nanosafety research and regulation dramatically
- **NanoCommons is creating an e-infrastructure for reproducible science, enhancing data integration & enabling nanoinformatics workflows**

# FAIR Data Benefits & Impact

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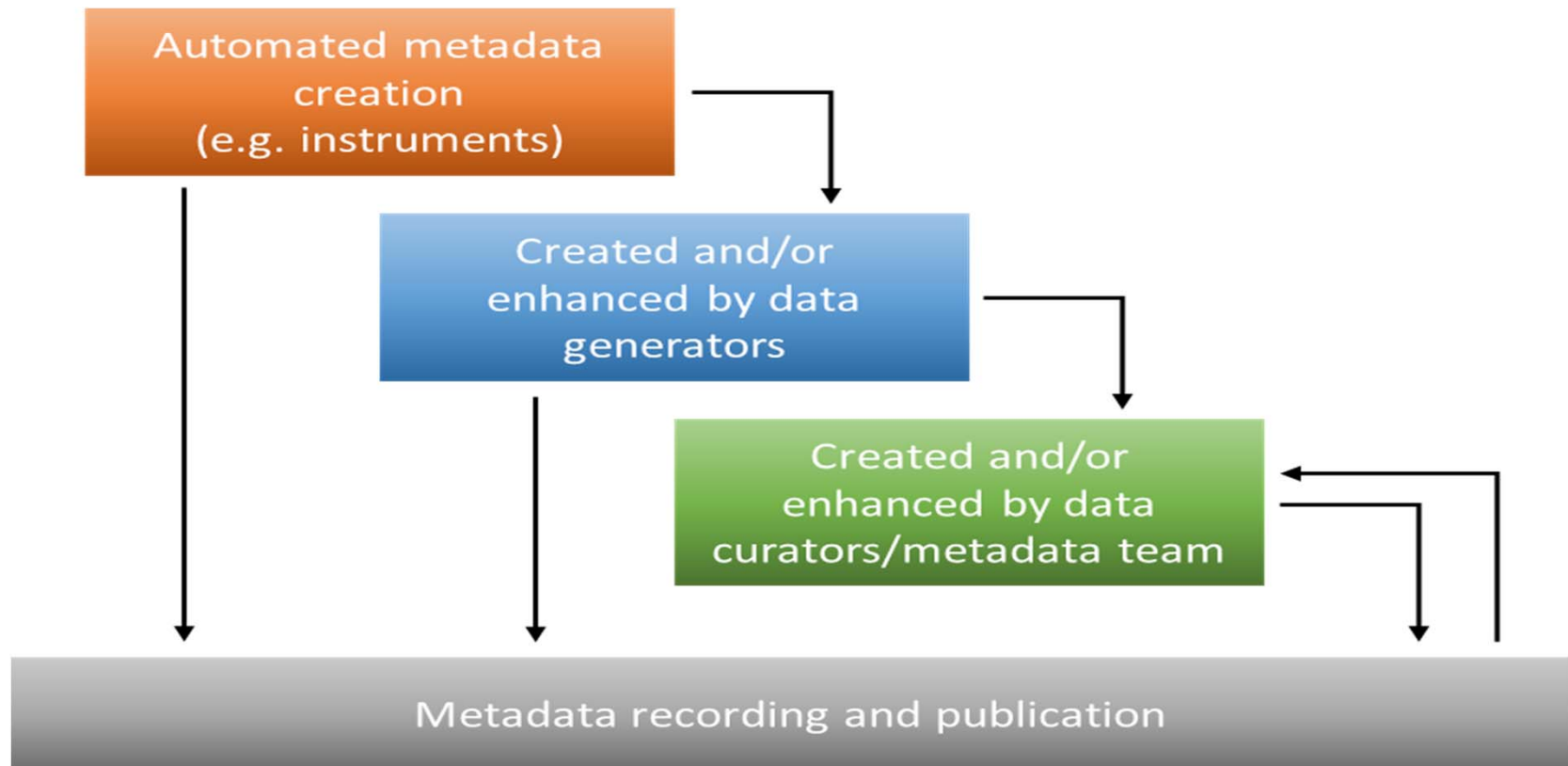


- Knowledge discovery
- Data and knowledge integration
- Data harmonisation, sharing and reusability
- Discipline/field independent, not one fits all model
- Data and metadata are machine readable, promoting interoperability and hidden pattern uncovering
- Maximum data exploitation and impact
- Increased citations and visibility
- NanoCommons is creating a **FAIR data ecosystem** for data integration, sharing, enrichment and **full exploitation**;



**FAIR ≠ OPEN**

# Metadata Implementation



- **Achieve interoperability through data annotation**

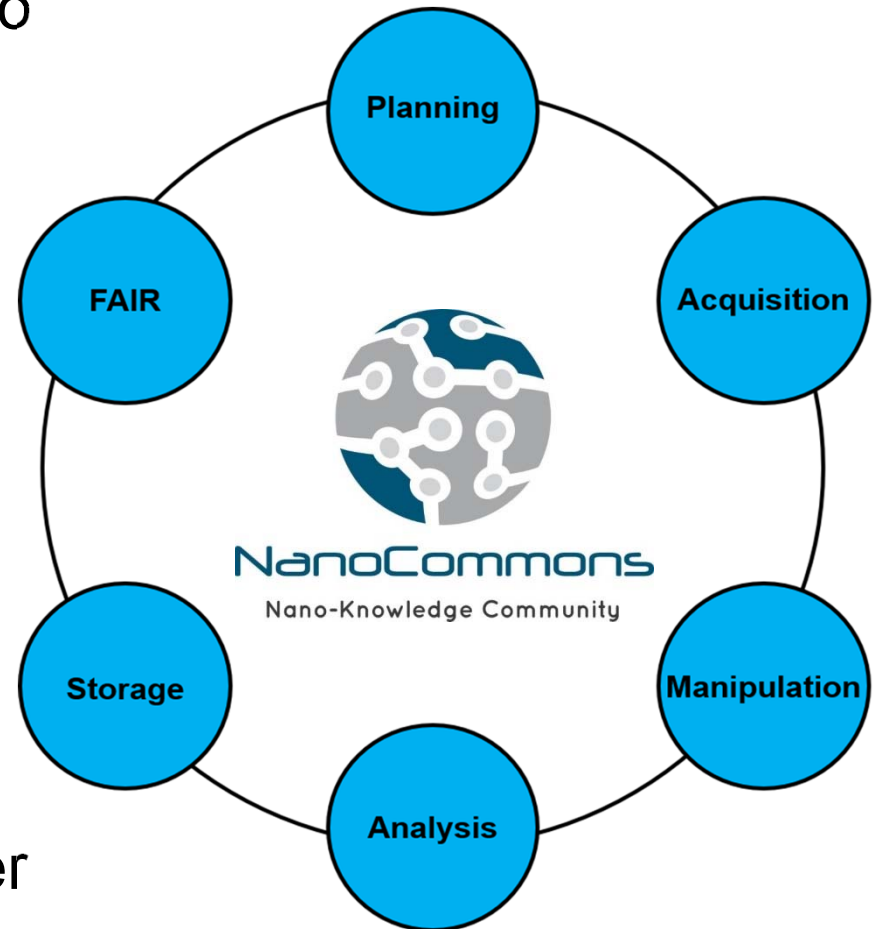
# The data lifecycle

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Core goal of NanoCommons is to integrate data management into nanosafety data generation.

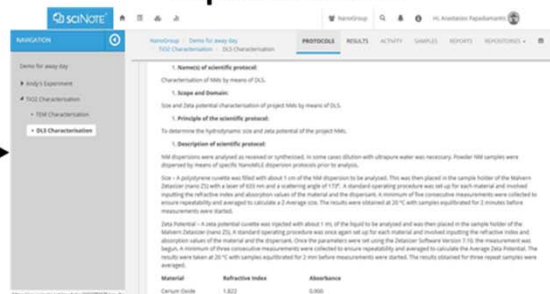
## Benefits:

- Not an after-thought
- Data is immediately available / accessible
- “Curation” is done at the template creation stage
- QA then by database manager to confirm data completeness

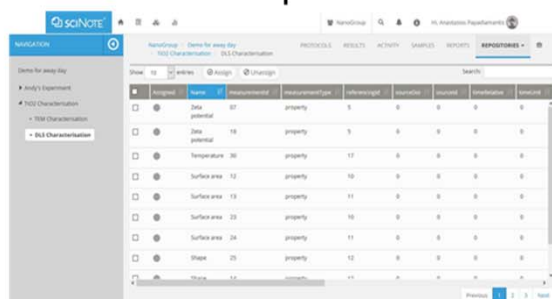


# Data Acquisition & Management

## Experimental design and protocol implementation

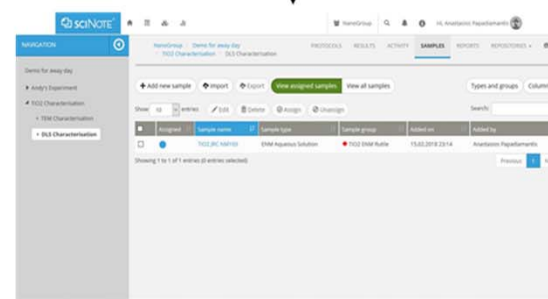


Data curation and annotation and automated extraction

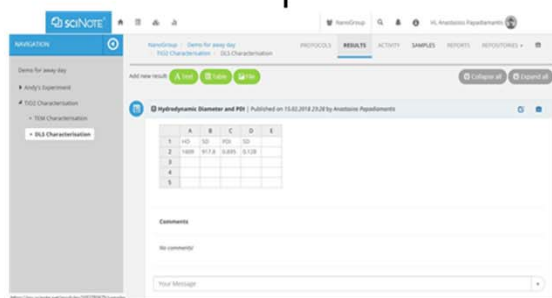


Sample ID	Value	Measurement	Measurement type	Measurement unit	Absorbance	Refractive Index	Zeta Potential	Surface Area	Surface Area
1	27	zeta potential	property		0	0	0	0	0
2	18	zeta potential	property		0	0	0	0	0
3	36	Temperature	property		0	0	0	0	0
4	12	Surface area	property		0	0	0	0	0
5	13	Surface area	property		0	0	0	0	0
6	23	Surface area	property		0	0	0	0	0
7	24	Surface area	property		0	0	0	0	0
8	25	Shake	property		0	0	0	0	0
9	14	Shake	property		0	0	0	0	0

Samples and endpoints implementation

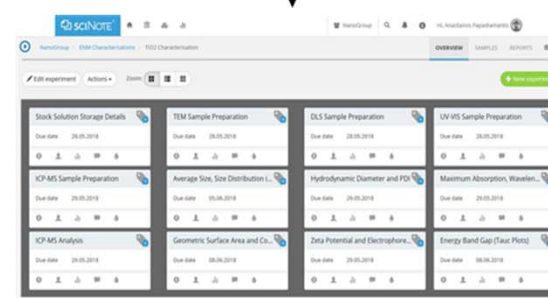


Data acquisition

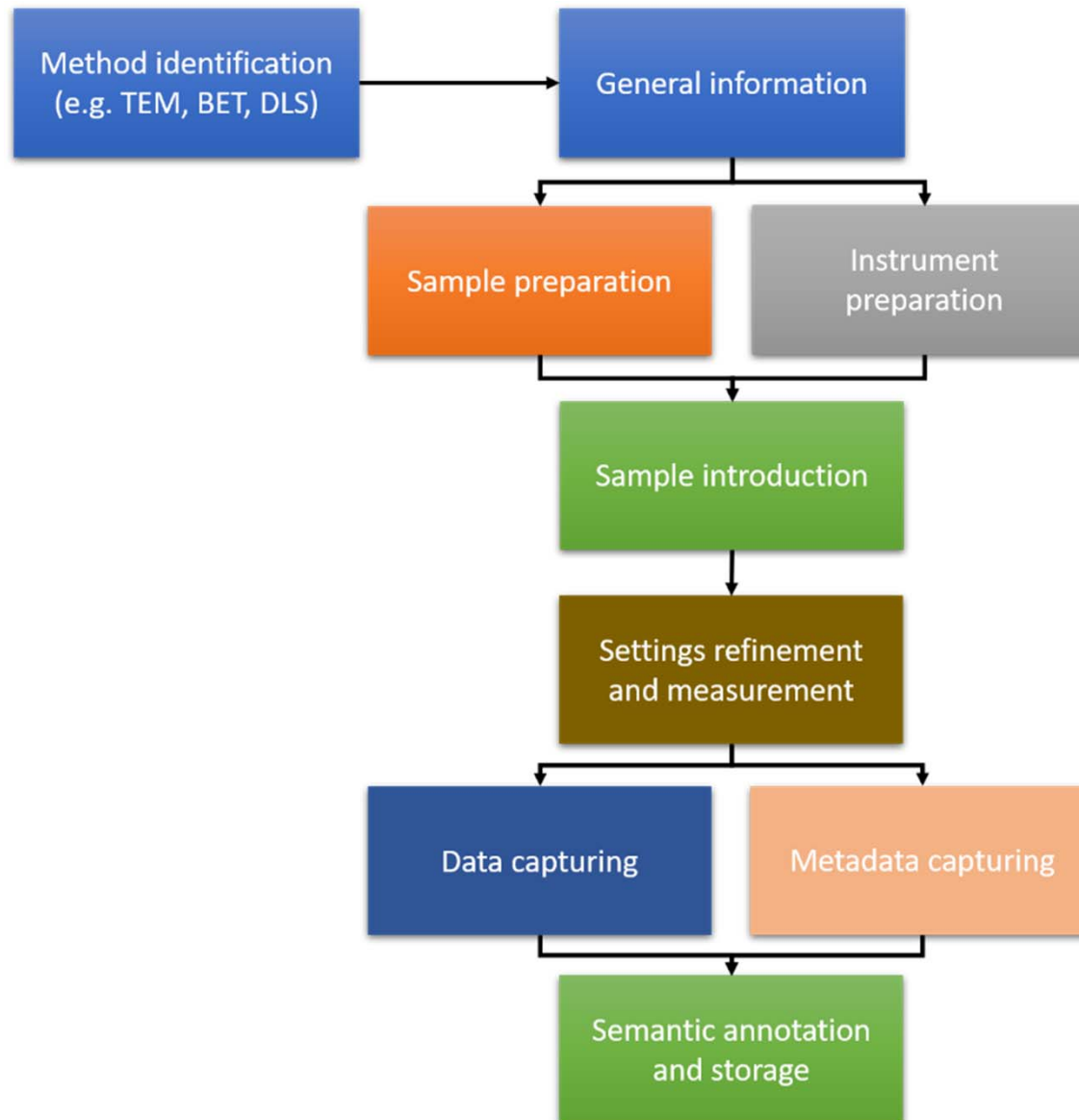


A	B	C	D
1	10.1	0.1	0.1
2	10.1	0.1	0.1
3	10.1	0.1	0.1
4	10.1	0.1	0.1
5	10.1	0.1	0.1

Experimental workflow assignments

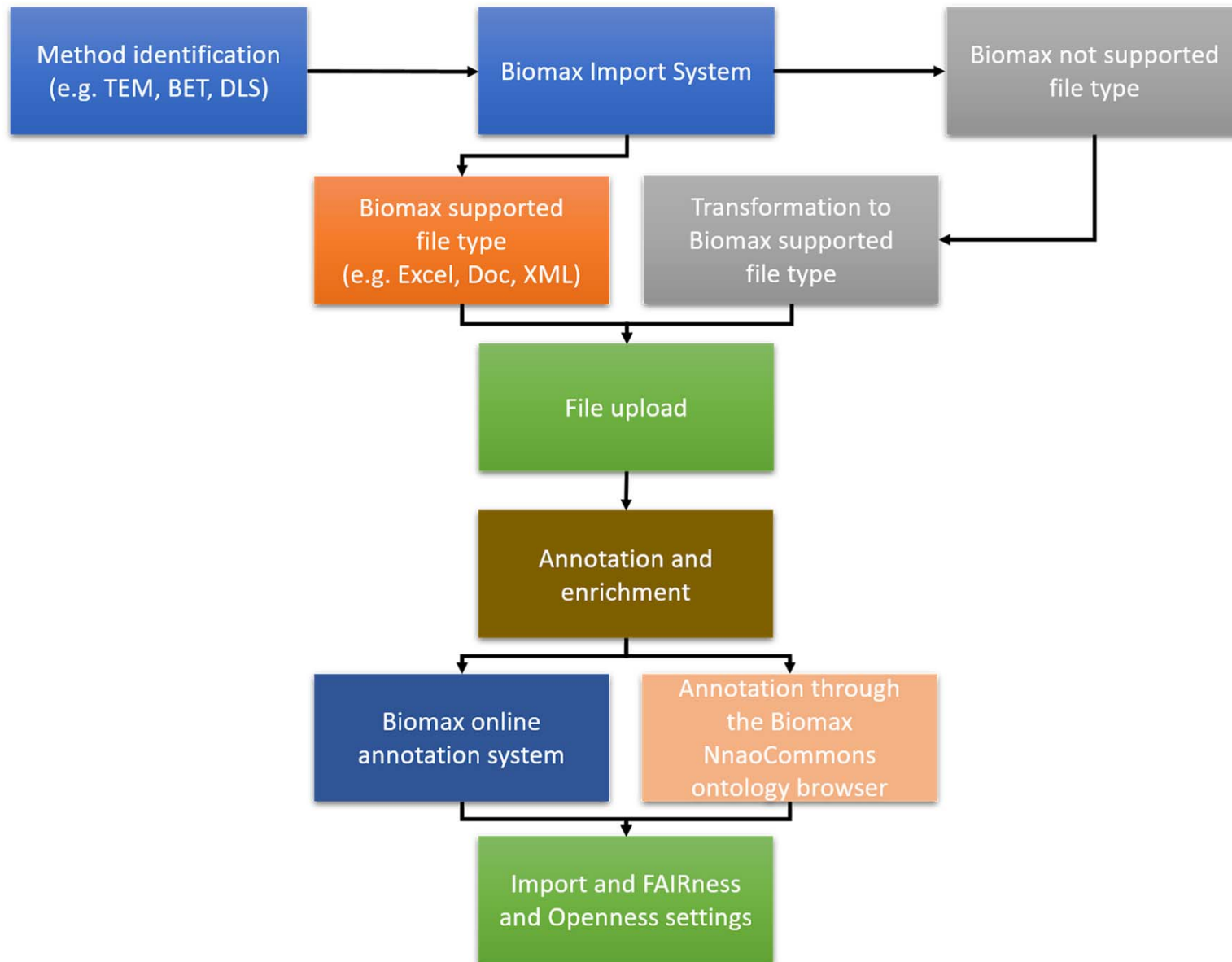


# Protocol Preparation





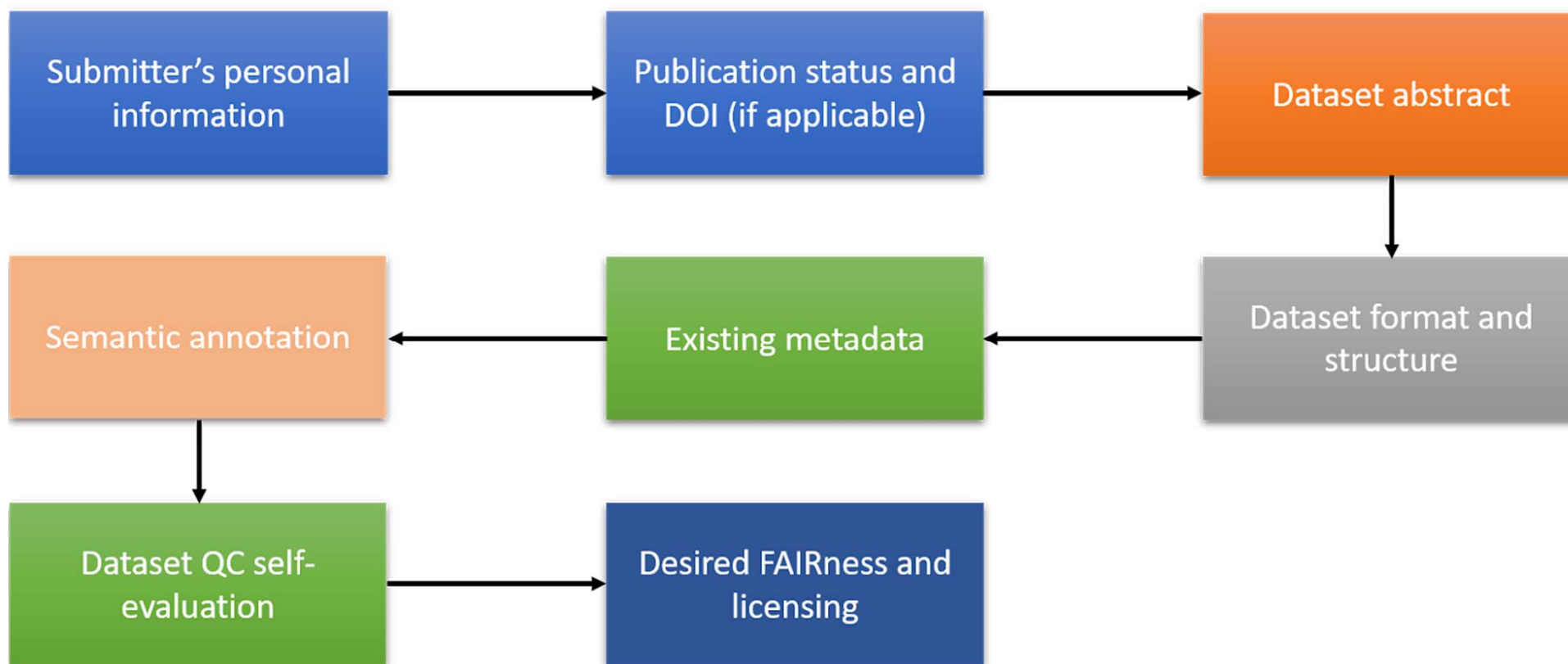
# Data Annotation





# User Data Integration Workflow

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## European Nanomaterials registry

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- globally unique persistent identifiers for nanomaterials – allow datasets to be confidently linked based on identical materials
- Importantly, the ERM identifier is batch specific and the ERM is age specific (life cycle).
- Computational nanomaterials will also be assigned a unique identifier.

<https://github.com/NanoCommons/identifiers/blob/master/registry>

<https://github.com/NanoCommons/identifiers/>

# Get involved



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GitHub, Inc. [US] | <https://github.com/NanoCommons/identifiers/>

## European Registry of Materials

The European Registry of Materials is a simple registry with the sole purpose to mint material identifiers to be used by research projects throughout the life cycle of their project. The identifier is nothing more than that identifier, and not by default linked to any information. Think of it as a pre-registration of the intention to study the material.

Once the identifier is created by a research project, the idea is that it is used throughout the whole study, from the design to the final reporting. It is meant to be used as unique, persistent identifier to be used in descriptions of experimental designs, in (open) notebooks, in reports, in project milestones and deliverables, and in journal articles.

### The identifier

The identifier can be used in two ways. For regular writing, it can be used as in its compact form. For semantic web approaches, the full IRI can be used. Both will be considered equivalent and refer to the same identifier.

### The associated information

To encourage wide adoption, the information that the registry will provide is kept to a minimum. This registry is not a database.

### Required information

The only required information to provide during a registry is a name or label. This label can be anything. It can be a anonymized label, a descriptive label, or a more rich description. Importantly, the label itself has no meaning. Moreover, the label does not have to be unique.

### Optional information

The following bits of information are welcome but not required (in random order):

- unique chemical composition
- batch and/or lot number
- an ontological classification (could be suggested based on the chemical composition?)

Contact me if interested to start registering your nanomaterials:

[i.lynch@bham.ac.uk](mailto:i.lynch@bham.ac.uk)



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## Access to our tools & Services

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- NanoCommons **integrates the nanomaterials communities** around an agreed set of approaches for **data generation, data management and nanoinformatics** to support the risk and hazard assessment of NEMs.
- NanoCommons is **integrating and developing tools and services** for use by the nanomaterials communities
- These tools and services can be **accessed** through the **NanoCommons Transnational Access scheme**



Experimental Workflows  
Design & Implementation



Data Processing  
& Analysis



Data Visualisation  
& Predictive Toxicity



Data Storage  
& Online Accessibility



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# The impact

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- **Remove barriers** from nanosafety **regulatory and industry** processes
- Develop an **integrated Knowledgebase** to facilitate development and application of regulatory tools such as **grouping & read-across**
- Create an **interconnected community** via a **FAIR data single market**
- Enable **full exploitation of EU-funded research data** & promotion of **data driven innovation** leading to **positive socioeconomic impact**.



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Implications of NanoTechnology

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