NATIONAL HIGH MAGNETIC FIELD LABORATORY

FAIR Data Ideals at the MagLab and Why They Don't Work

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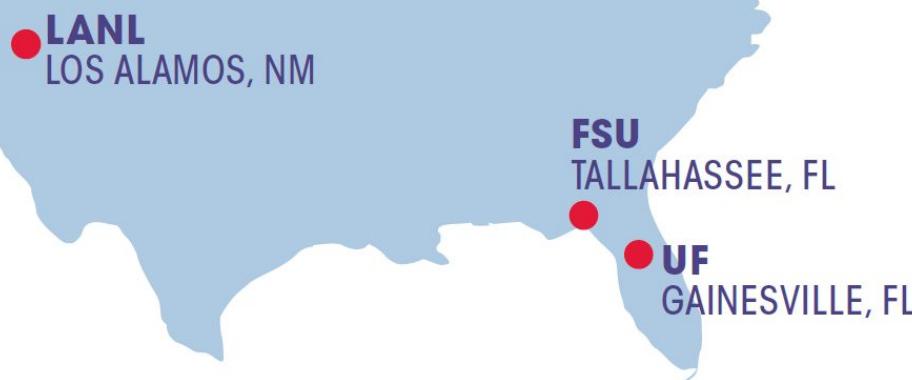
Headquartered at **Florida State University,** the MagLab also has branch campuses at the **University of Florida** and **Los Alamos National Laboratory.**

LANL
LOS ALAMOS, NM

FSU
TALLAHASSEE, FL

UF
GAINESVILLE, FL

MagLab at a Glance 2022 (https://nationalmaglab.org/about/print-media/at-a-glance)

NATIONAL **M**AG**L**AB

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- **Pulsed Field**
Short, ultra-powerful magnetic fields up to 100 T

- **High B/T**
Magnetic fields up to 15 T combined with ultra-cold temperatures of 0.4 mK

- **Advanced Magnetic Resonance Imaging & Spectroscopy (AMRIS)**
High-resolution solution and solid-state, NMR, animal imaging & human imaging

- **DC Field**
Steady, continuous magnetic fields up to 45 T

- **Electron Magnetic Resonance (EMR)**
Magnetic resonance techniques associated with the electron

- **Nuclear Magnetic Resonance (NMR)**
Solid & solution state NMR & animal imaging
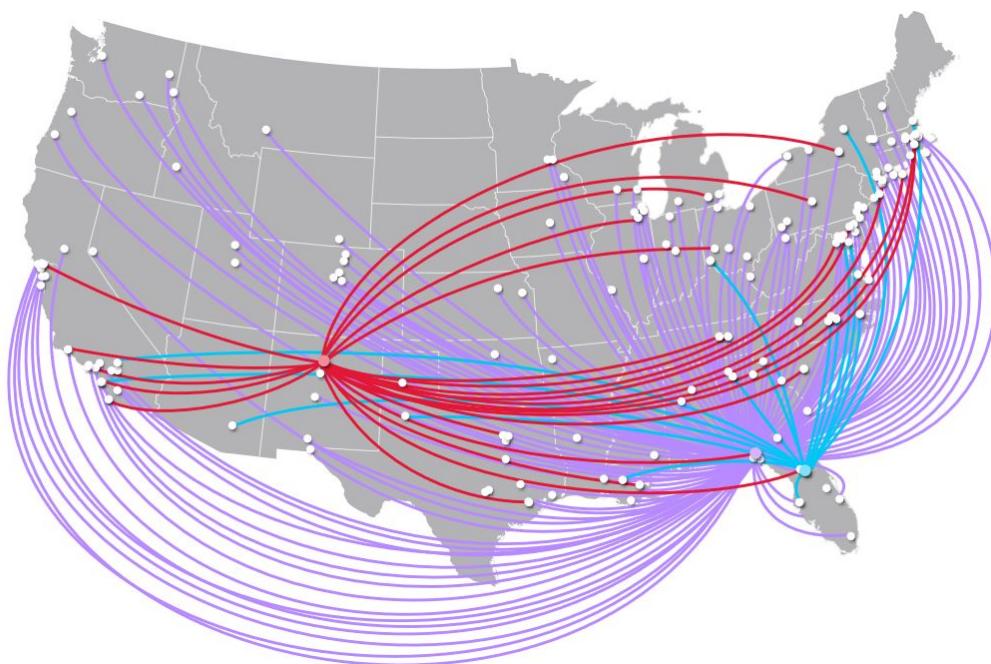
- **Ion Cyclotron Resonance (ICR)**
Ultra-high resolution and high mass accuracy Fourier transform ion cyclotron resonance (FT-ICR) mass spectrometry
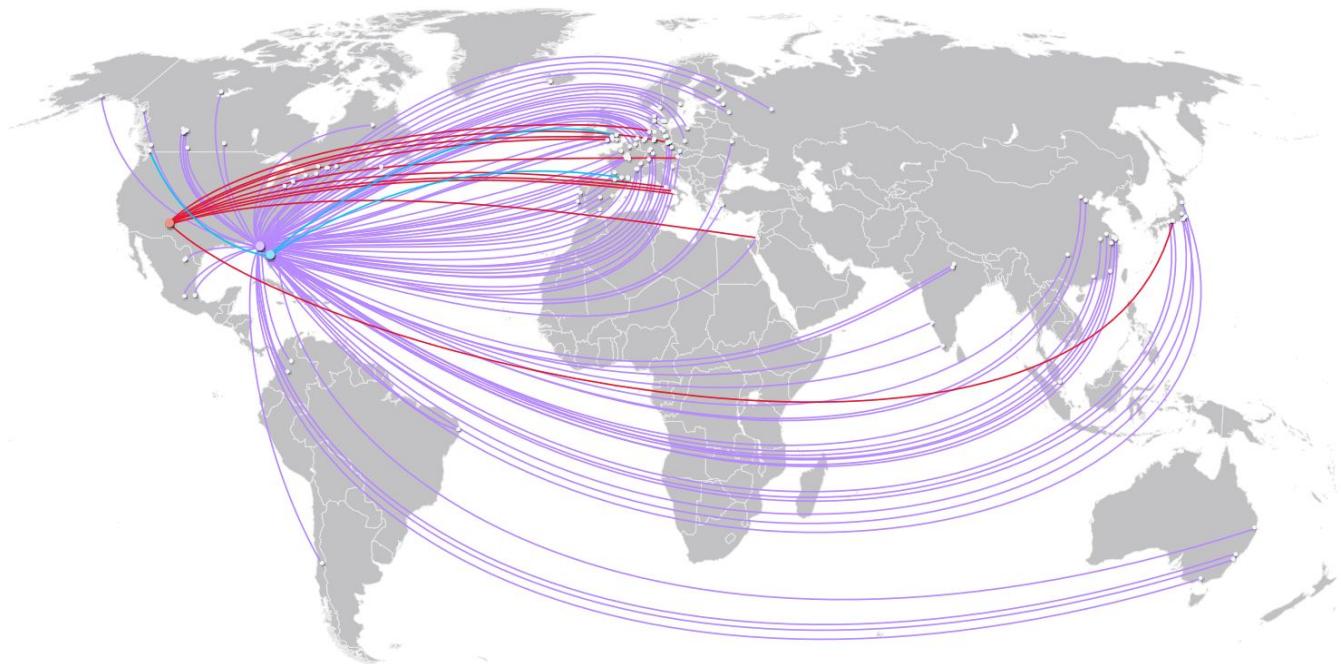
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MagLab Overview
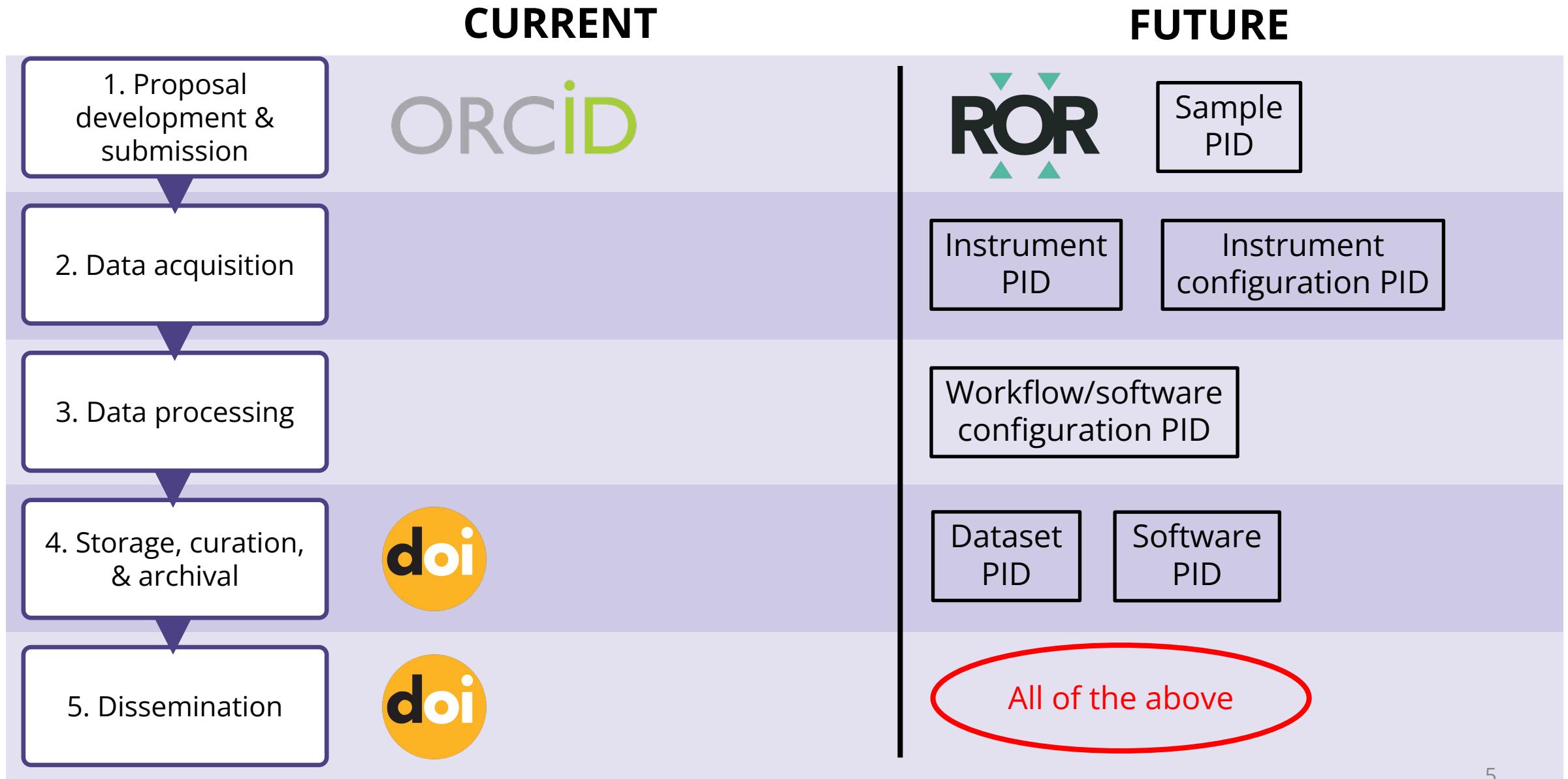
In 2022, our **1958** users represented **327** universities, government labs and private companies worldwide.

In 2022, MagLab users published **352** articles in peer-reviewed journals.

MagLab at a Glance 2022 (https://nationalmaglab.org/about/print-media/at-a-glance)
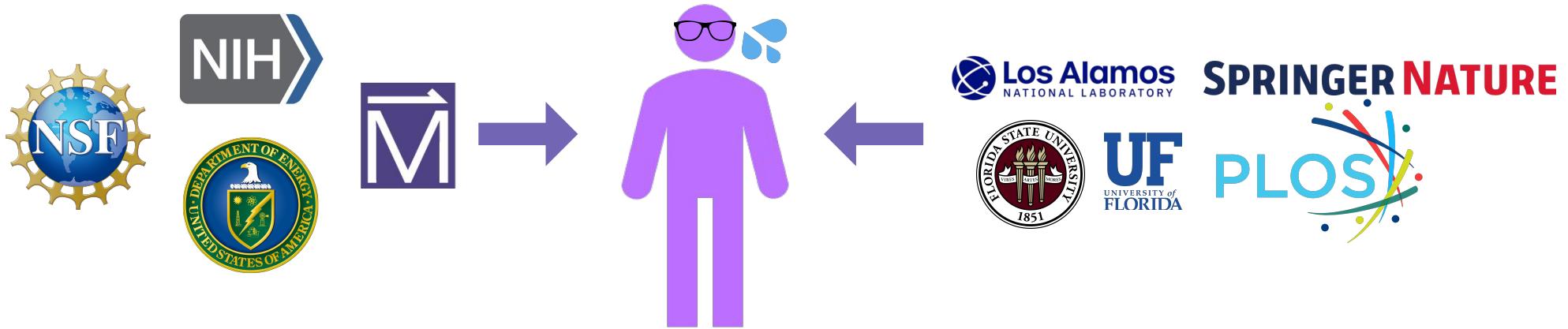
Implementation of PIDs

PID Use Case 1

Enabling users to meet data sharing requirements

Ideal
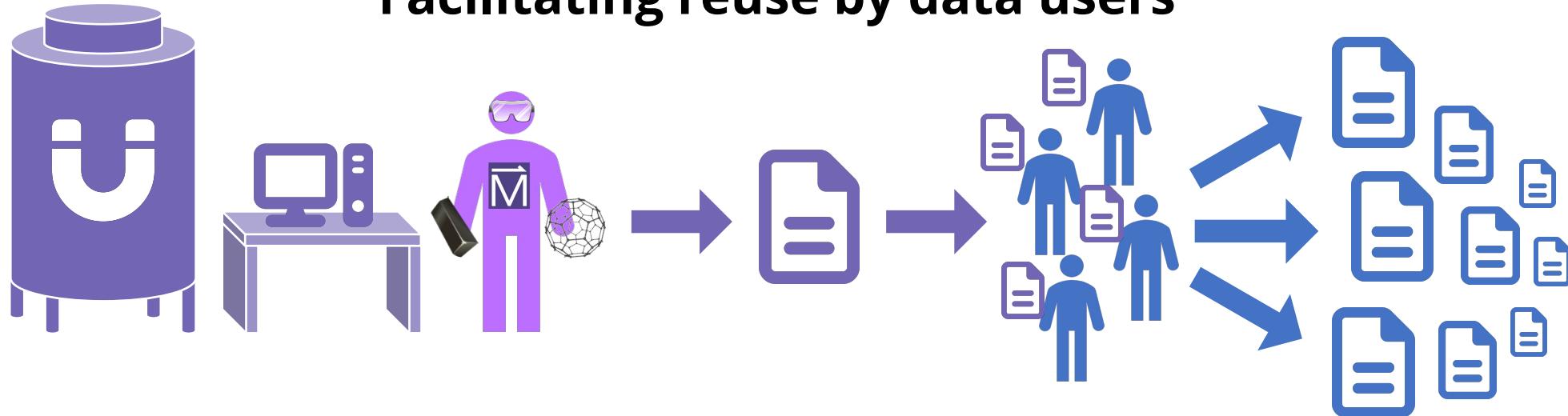
- Automated capture and packaging of data and metadata with PIDs for vocabulary and context
- Automated upload to an appropriate repository which assigns PID and facilitates reporting to publishers and funders

Challenges

- Current procedures require extensive manual input for a well-annotated product
- Different funding agencies/international users not part of the system
- Varying policies between funders/publishers

Facilitating reuse by data users

Ideal
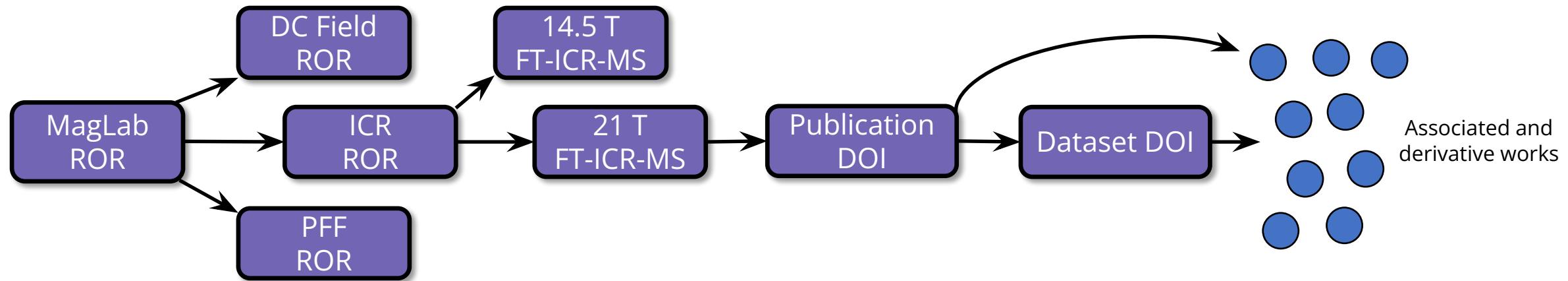
- Complete sample metadata
- Detailed and accessible instrumental metadata, including both stable and changing components
- Replicable analysis workflow
- Complete and accessible datasets and publications

Challenges

- Radically different sample types
- Instrumental setups difficult to capture in detail
- Administrative overhead from PID assignments and maintenance
- Gaps in user knowledge/unavailable information

PID Use Case 3

## Tracking the creation and propagation of products of MagLab research
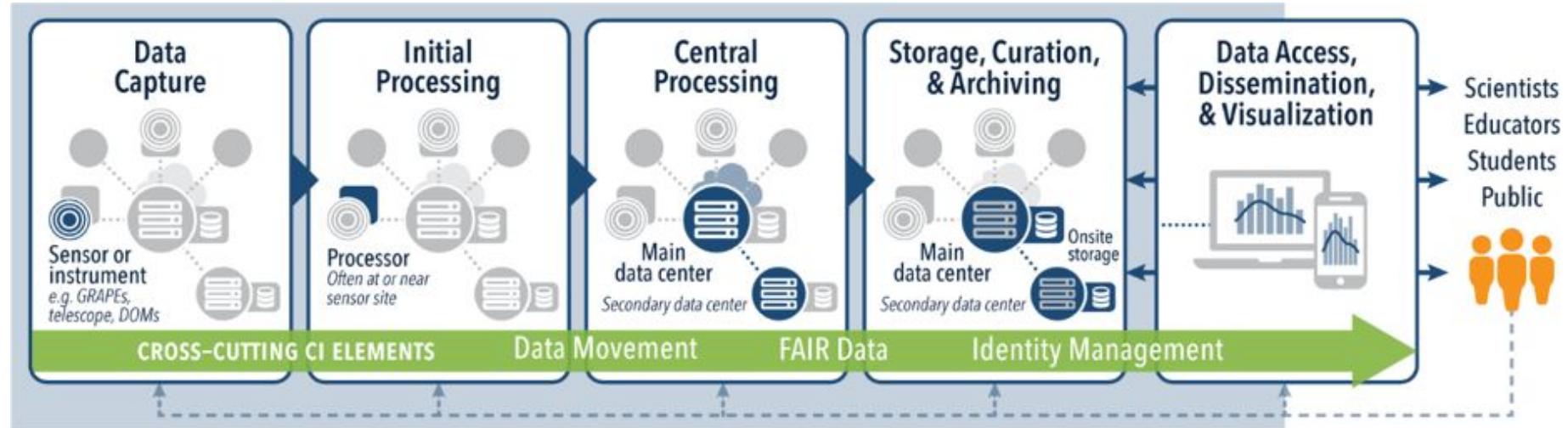
Ideal

- Assessment of the MagLab's impact on the body of published literature – both direct and indirect.
- Comparative analyses with other facilities
- Tracking connections between users and colleagues and recruiting new users
- Tracking global reach

Challenges

- Missing extremely relevant PIDs
- Missing a way to assign them and have them associated with the data product
- Existing/in-development standards may not be suitable for all disciplines
- User reporting is extremely inconsistent/incomplete

CI Compass Data Lifecycle Model[1]

MagLab Data Lifecycle Model

| 1. Proposal development & submission | 2. Data acquisition | 3. Data processing | 4. Storage, curation, & archival | 5. Dissemination |

Scientists

Educators

Public

Etc.

1. The Major Facilities Data Lifecycle in a Nutshell. https://doi.org/10.5281/zenodo.5550224