

RSpace integration with identifiers and RRIDs for Samples, Facilities & Instruments

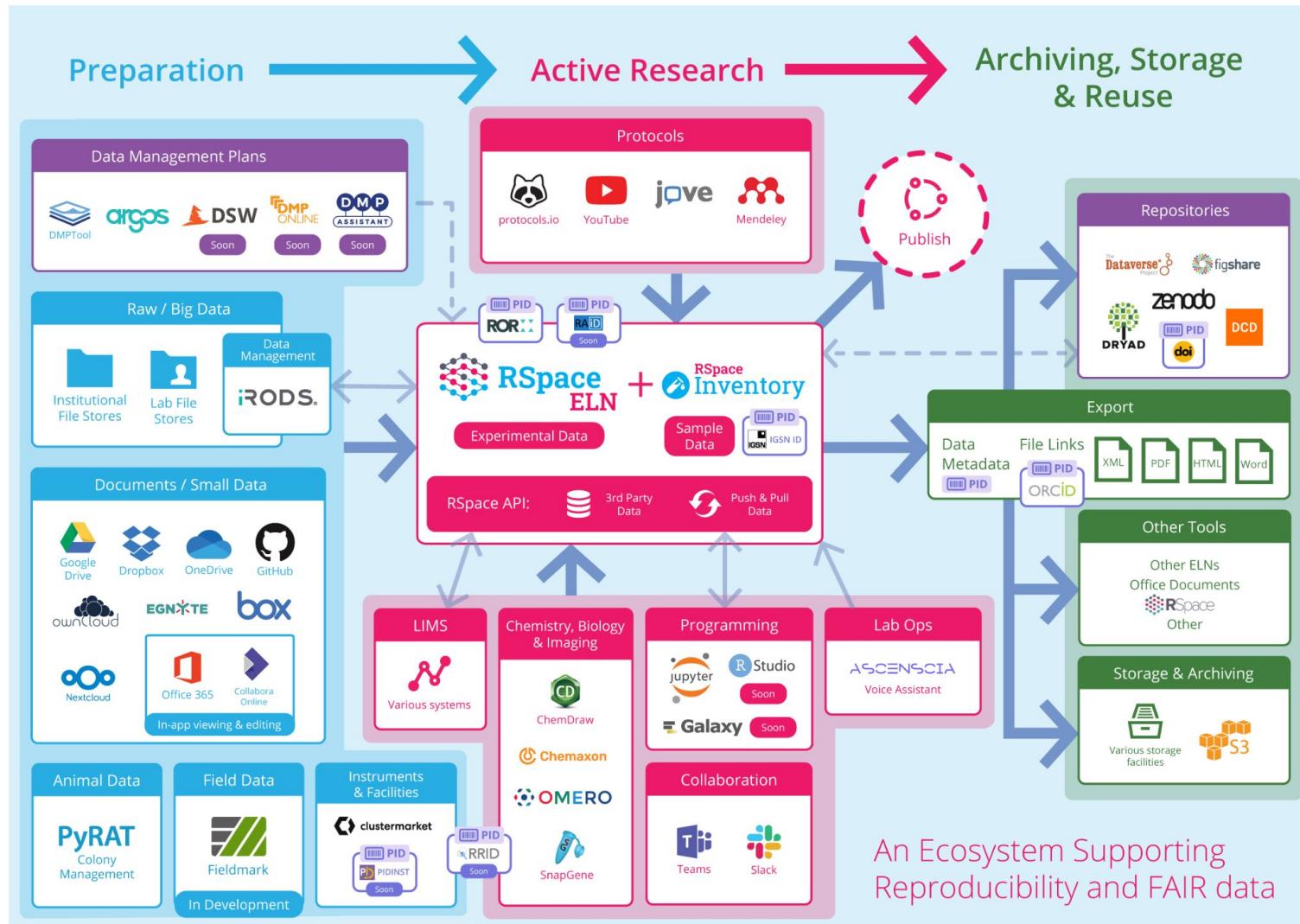
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FAIR Facilities and Instruments - Workshop 2 - August 20-22, 2024

What is RSpace ?

- Research platform for **institutional research data management**
- Lab notebook + flexible inventory management + unlimited integrations
- End-to-end support for FAIR , traceability and searchability
- **Open-source** with modern open APIs and excellent API documentation
- Currently supports:
 - Minting and management of IGSNs associated with inventory items
 - Support for ORCID, ROR, export to repositories with industry standard metadata
 - Exchange of identifiers between RSpace third party systems via API
- Coming soon, additional integrations with RRIDs and other identifiers funded by recent NSF grants

<https://www.researchspace.com/>



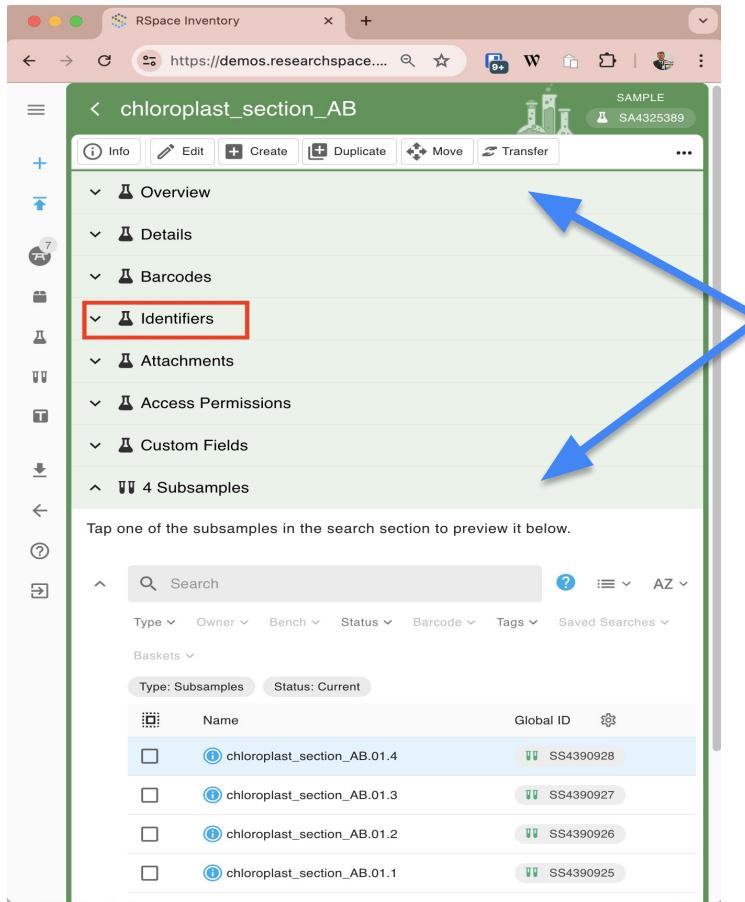
The RSpace Ecosystem - How does RSpace interact with other systems?

- Import / export of data in various formats from and to local user
- DIRECT import / export from and to data sources and repositories
- Creating LINKS to verbose data outside RSpace
- Pulling in metadata summaries from external data to associate with links
- Communicating with third-parties to mint identifiers as needed
- Accessing third-party controlled vocabularies to encourage tagging
- Exchange of data via APIs
- RSpace serves as a conduit to pass certain types of metadata, especially identifiers, from one third-party system to another (e.g Dataverse to DMPtool)

RSpace and IGSNs. First, what are IGSN IDs?

- Persistent identifiers for **material samples**
- Standardized IGSN ID schema (based on DataCite DOIs) useful for **discoverability**
- Citable & shareable public landing pages contain domain-specific metadata for **reproducibility**
- Project goal: enable a single point of access for both sample management & FAIR metadata publishing, by supporting IGSN IDs in RSpace Inventory
- You can learn more about IGSNs in RSpace in the breakout session where Rob Day will show some hands-on examples

RSpace Dedicated Identifier Creation in Sample Management System



The screenshot shows a web browser window for 'RSpace Inventory' at the URL <https://demos.researchspace....>. The main content area displays a sample named 'chloroplast_section_AB' with a global ID 'SA4325389'. A sidebar on the left contains a tree view of management options: Overview, Details, Barcodes, Identifiers (which is selected and highlighted with a red border), Attachments, Access Permissions, Custom Fields, and Subsamples. Below the sidebar is a search bar and a table listing four subsamples under the heading 'Tap one of the subsamples in the search section to preview it below.' The table columns are Name, Global ID, and a small icon. The first row is selected, showing 'chloroplast_section_AB.01.4' with Global ID 'SS4390928'.

Name	Global ID
chloroplast_section_AB.01.4	SS4390928
chloroplast_section_AB.01.3	SS4390927
chloroplast_section_AB.01.2	SS4390926
chloroplast_section_AB.01.1	SS4390925

Sub-panels dedicated to different aspects of sample management including third-party identifiers. The hands-on session will show how to quickly mint FAIR friendly identifiers from your mobile device right at the bench.

RSpace Inventory

chloroplast_section_AB SAMPLE SA4325389

Info Edit Create Duplicate Move Transfer ...

Overview Details Barcodes Identifiers

+ Create a new Identifier

Identifier <https://doi.org/10.82316/tt6k-1k80> Type IGSN State Findable Hide

PREVIEW REPUBLISH RETRACT

This IGSN ID is Findable. The IGSN ID is a citable URL that redirects to the [RSpace landing page](#). The metadata is publicly available through the landing page, DataCite Commons and the DataCite APIs. See [IGSN Documentation](#) for details

Required Identifier Properties

Creator Name Rob Day

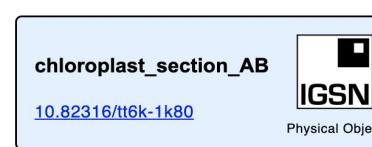
Creator Type Personal

Name chloroplast_section_AB

Publisher The University Library

Public Landing Page (hosted by RSpace)

RSpace ENTERPRISE RSpace Public Pages The University Library



General

Name: chloroplast section AB
IGSN ID: <https://doi.org/10.82316/tt6k-1k80>
Resource Type: Material Sample
Creator: Rob Day
Creator Affiliation: University of Information Technology
Creator Affiliation Identifier: <https://ror.org/05kdc4973>
Organisation: The University Library
Publication Year: 2024

Publish

Optional Fields

Subjects

Climate change mitigation
Subject Scheme Library of Congress Subject Headings (LCSH)
Scheme URI <https://id.loc.gov/authorities/subjects.html>
Value URI <https://id.loc.gov/authorities/subjects/sh2009009655.html>
Classification Code sh2009009655

Descriptions

Methods

RSpace Inventory good for samples, rooms, equipment, devices or buildings

Type: Containers Status: Current

11 top-level containers found.

<input type="checkbox"/>	Name	Global ID	
<input type="checkbox"/>	rdprincipal lab and cabinets	IC426000	
<input type="checkbox"/>	-80 Freezer_PSC B0141	IC4063233	
<input type="checkbox"/>	mass spectrometry facility	IC4030464	
<input type="checkbox"/>	microscopy facility	IC3833861	
<input type="checkbox"/>	rdprincipal storage room	IC1933325	
<input type="checkbox"/>	rdprincipal freezer room	IC12	
<input type="checkbox"/>	rdprincipal sequencing room	IC425997	
<input type="checkbox"/>	FFPE storage	IC1015820	
<input type="checkbox"/>	Fume Hood	IC2031622	
<input type="checkbox"/>	chemical shelves	IC1507334	

Search

Type Owner Bench Status Barcode Tags Saved Searches

Baskets

Open Edit Create Duplicate Move

1 All locations

Freezer 6 -30c
Visual Container

Global ID	IC425998
Description	Frostco -30
Tags	
Contents	Containers / 5

Tip: Use Command and the - key to zoom the page out to view more of the image. The [Panel Adjuster](#) can also be used to provide more room to fully display the image.

Display domain-specific fields on landing page

- Choose whether to include custom Inventory fields (domain-specific metadata) on the landing page
- Easy public sharing of domain-specific sample information

Inventory Fields

 You can include Inventory fields in the item's landing page, to openly share domain-specific metadata outside the IGSN schema.

Before publishing the IGSN ID, please ensure the fields do not contain sensitive information.

Include Inventory fields on landing page

The following fields will be included:

- Description
- Tags
- Custom Fields
- Extra Fields

Map display for geolocation data

Any point, box, and polygon coordinates are displayed visually on an interactive map, both in-Inventory and on the IGSN ID landing page

Geolocations

Leaflet | © OpenStreetMap contributors

Point Box Polygon

Point

Latitude	Longitude
54°	42.23232°

Place

Description
Gulf of California

Leaflet | © OpenStreetMap contributors

Point Box Polygon

Place

Description
An example location

Box

Northbound Latitude	Westbound Longitude
23°	53°
Southbound Latitude	Eastbound Longitude
12°	33°

RSpace ROR ID Integration

If RSpace has been configured with an ROR ID, any published IGSN IDs will automatically include the ROR ID as the Creator Affiliation metadata property.

The screenshot shows the RSpace Enterprise web interface. At the top, there is a navigation bar with links for Workspace, Gallery, Messaging, Apps, Inventory, and My RSpace. Below this is a secondary navigation bar with links for Users, Groups, Communities, Unpublish, Create Account, Operate As, Monitoring, and Maintenance. A row of icons includes Sysadmin IP White List, Institutional File Systems, ROR Registry (highlighted in blue), LDAP Settings, and System Settings. The main content area features a title 'Research Organization Registry (ROR) Integration' and a descriptive paragraph about associating a ROR ID with the instance. Below this is a section titled 'Institutional ROR ID' with a search bar containing the URL 'https://ror.org/02mhbdp94'. A note at the bottom explains how to search the ROR registry for correct ROR IDs.

By associating a [ROR ID](#) with your RSpace instance, you ensure the research outputs produced in RSpace are connected with your research organisation. All research outputs with a DOI will automatically include the ROR ID in their affiliation metadata.

Institutional ROR ID

You can search the [ROR registry](#) to ensure you are adding the correct ROR ID. If your institution does not have a ROR ID, you can submit a [curation request form](#).

RSpace ORCID ID Integration with automatic inclusion in exports sent to repositories

The image displays three browser windows illustrating the integration of RSpace ORCID ID with automatic inclusion in exports to repositories.

Left Window: User Settings | ResearchSpace

This window shows the RSpace Enterprise interface. It includes a sidebar with "My LabGroups", "My Profile", and "Create Project Group". Below the sidebar, the "My Profile" section displays:

- First Name:** Rob
- Last Name:** Principal
- I do a little science

Below this, it shows:

- E-Mail:** rspaceone1@mailinator.com
- Account Status:** Enabled
- Last Login:** 2024-08-18 20:19

At the bottom, the ORCID ID is listed as <http://orcid.org/0000-0002-6671-8301>, with a red arrow pointing from this link to the "Remove ORCID ID" button in the middle window.

Middle Window: Account - Demo Dataverse

This window shows the "Account - Demo Dataverse" page. It features a sidebar with "My Data", "Notifications", "Account Information", and "API Token". The main content area displays a search bar and a results table:

1 to 2 of 2 Results		
Algal DNA study	Draft	Unpublished
Rob Day, 2024, "Algal DNA study"	Aug 18, 2024 - rdprincipal	
Algal DNA study	DRAFT VERSION	

On the left, there are filters for "Publication Status" (Published 0, Unpublished 2, Draft 1, In Review 0, Deaccessioned 0) and "Roles" (Admin, Contributor).

Right Window: manifest.txt

This window shows the contents of a file named "manifest.txt". A yellow info bar at the top states: "Info – This draft version needs to be published. When ready for sharing, please go to the file details page." The file content is as follows:

```
Database version:1.101.2
Exported by:Rob Principal
OrcidId:0000-0002-6671-8301
RSpace application version:1.101.2
Source URL:https://demos.researchspace.com
archiveId:0b0c0b5c-25c5-439e-9c42-921b7588bc2e
archiveSource:ResearchSpace
exportDate:2024-08-19
scope:SELECTION
```

RSpace facilitates creation, use and exchange of identifiers between third party systems:

Project Details Collaborators Write Plan Research outputs Finalize Done

Funding Outcome

Funding status

- Please select one -

Grant number/url

[Save funding information](#)

Research Outputs

Link this plan to research outputs the project has generated– such as journal articles, preprints other URL-based identifier has been assigned to it.

Please note that it can take several seconds to retrieve the citation after you add a new DOI.

Dataset: <https://demo.dataverse.org//dataset.xhtml?persistentId=doi:10.70122/FK2/Z2LLDO>

[Add a research output](#)

[Save changes](#)

https://demo.dataverse.org//dataset.xhtml?persistentId=doi:10.70122/FK2/Z2LLDO

DataVERSE

rdprincipal

(ResearchSpace) Unpublished

Demo DataVERSE > rdprincipal >

Info – This draft version needs to be published. When ready for sharing, please publish it so that others can see these changes.

Algal DNA study

Draft Unpublished

Rob Day, 2024, "Algal DNA study", <https://doi.org/10.70122/FK2/Z2LLDO>, Demo DataVERSE, DRAFT VERSION

Cite Dataset Learn about Data Citation Standards.



Description	Algal DNA study
Subject	Medicine, Health and Life Sciences
Keyword	Agarose Gel Electrophoresis
License/Data Use Agreement	Custom Dataset Terms

RSpace IGSN / PID integration, summary publication available on Zenodo

- Recommendations for developing & reviewing PIDs workflows and research tool interoperability with use cases list, integration diagrams, collaboration advice.
- <https://zenodo.org/record/8284206>
- Full use case Guiding principles for implementing persistent identification and metadata features on research tools to boost interoperability of research data and support sample management workflows

Vaida Plankytė, Rory Macneil, Xiaoli Chen

Interoperability guideline

Guiding principles for implementing persistent identification and metadata features on research tools to boost interoperability of research data and support sample management workflows

Part of "Enhancing interoperability through the use of PIDs in research platforms" project
<https://easylum-grants.eu/meet-the-grantees/data-and-metadata-interoperability-through-incorporation-pids-research>

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31.07.2023

Version 1

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Coming soon: RSpace & RRIDs

Supporting Facilities, Instruments, and other Research Resources. Enhancing traceability, illuminating relationships.

RRID Portal for Tools & Facilities

[ABOUT](#) [HELP](#)

Tools

[Select Another Resource Report Type](#)[Home](#) / [Resource Reports](#) / [Tools](#)

SciCrunch Registry is a curated repository of scientific resources, with a focus on biomedical resources, including tools, databases, and cor ...[more]

SEARCH Type in a keyword to search

lithuania

[Search](#)[Save search](#)[Reset search](#)[Filter by records added date](#)[See new records](#)[Snippet view](#)[Table view](#)

Can't find your tool? Help us by registering it into the system - it's easy. Register it with the SciCrunch Registry. An RRID will be generated in 1-2 business day.

Click the to add this resource to a Collection

Options

[Log in for Collection Options](#)

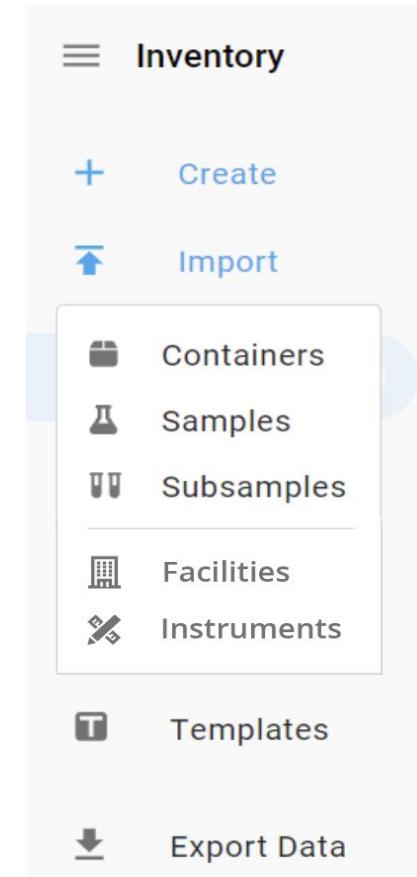
Facets

[Resource Type](#)[Keywords](#)[Related Resources](#)[Related Condition](#)[Funding Agency](#)[3 Results - 20 per page](#)[+ Show More Columns](#) | [Download 3 Results](#)

Resource Name	Proper Citation	Abbreviations	Resource Type	Description	Keywords	Resource Relationships
<input type="checkbox"/> Vilnius University, Vilnius, Lithuania	Vilnius University, Vilnius, Lithuania (RRID:SCR_011764)	Vilnius University	institution, university	Vilnius University is the oldest and largest Lithuanian higher education institution. Since its establishment in the 16th century, Vilnius University, as integral part of European science and ...[more]		is parent organization of: Crystallography Open Database (COD)
<input type="checkbox"/> Crystallography Open Database (COD)	Crystallography Open Database (COD) (RRID:SCR_005874)	COD	service resource, data repository, storage service resource, data or information resource, database	Database of crystal structures of organic, metal-organic, organic, molecule, structure, small molecule, compound, mineral, crystal structure, crystallography, polymorphism, crystal, organic compound		is recommended by: NIDDK Information Network (dkNET) is recommended by: NIDDK - National Institute of Diabetes and Digestive and Kidney Diseases

RSpace will directly Import & Reference RRIDs

- RRID <-> RSpace API Integration
- Similar to already implemented IGSN support
- Import -> Facilities / Instruments
- Item can be referenced inside of RSpace, linked to ELN/Inventory items, without losing reference to RRID and its associated metadata
- RRID will “travel together” with item to repositories
- Improvements to how RSpace pulls in and displays RRIDs referenced within linked external resources eg., Omero.



Pulling in Metadata including identifiers from an image in Omero and associating the metadata with a summary link in RSpace:

Description and Image

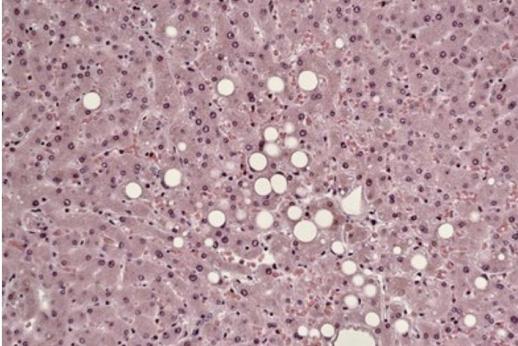
New List of Materials 

File Insert Format Table View Science Tools Online Tools

File Insert Format Table View Science Tools Online Tools

Path Description Notes

NASHmed.png



see in omero

• Description = Cell line HH01 is a Spontaneously immortalized cell line with a species of origin Homo sapiens (Human) RRID URL: https://web.expasy.org/cellosaurus/CVCL_4Z97
• Z-sections = 1
• Timepoints = 1
• Number of Channels = 4
• Pixels Type = uint8
• Dimensions(XY) = 1440 x 960
• Pixel Size (XYZ) = n/a X x n/a Y x n/a Z
• Channels = [name = Red colour = -16776961 photo interpretation = Monochrome] [name = Green colour = 16711935 photo interpretation = Monochrome] [name = Blue colour = 65535 photo interpretation = Monochrome] [name = Alpha colour = 0 photo interpretation = Monochrome]
• Tag = "URL=https://www.cellosaurus.org/CVCL_4Z97"
• Tag = "RRID=CVCL_4Z97"
• Tag = "PubMed=7514562"
• Tag = "DOI=10.1002/hep.1840190612"
• Comment = "Derived from sampling site: Liver. Cell type=Hepatocyte."
• Tag = "tissue=liver"

/project/Rob's
images/112/dataset/Hepatocytes/1418/image/NASHmed.png/15294

Using IGSN IDs together with RRIDs for samples

- RRID: description of exact **type** of item used
- IGSN ID: how was this **individual sample** processed in this lab?
 - IGSN ID metadata references RRID for a complete record

The screenshot shows a user interface for managing sample identifiers. At the top, there are two buttons: '+ Create an IGSN ID' and '+ Associate an RRID'. Below these buttons is a link 'Show all Identifiers associated with this item.' A dropdown arrow is positioned to the right of this link. The interface is organized into several sections with expandable/collapsible headers:

- Barcodes (collapsible)
- Identifiers (expanded, showing '+ Create an IGSN ID' and '+ Associate an RRID' buttons, and a 'Show all Identifiers associated with this item.' link)
- Attachments (collapsible)
- Custom Fields (collapsible)
- Notes (collapsible)

Plans for Facility RRID metadata import into RSpace Inventory

- Inventory
- Create
- Import
- My Bench 91
- Containers
- Facilities**
- Instruments
- Templates
- Export Data
- RSpace ELN
- Settings
- Need Help?
- Sign Out

LOGGED IN AS

Search

Type Owner Bench Status Barcode Tags Saved Searches

Baskets

Type: Samples Status: Current

7084 samples found.

- Census Microdata Samples Project
- Census Microdata Samples Project.01
- Crystallography Open Database (COD)

Crystallography Open Database (COD)

SAMPLE SA4325383

Info Edit Create Duplicate Move Transfer Add to Basket Export Print Barcode ...

Custom Fields

RRID: SCR_005874

Resource Report

https://dknet.org/data/record/nlx_144509-1/RRID:SCR_005874/resolver?q=&i=rrid:scr_005874

Resource Website

<http://www.crystallography.net/>

Proper Citation

Crystallography Open Database (COD) (RRID:SCR_005874)

Abbreviations

COD

Resource Type

service resource, data repository, storage service resource, data or information resource, database

Resource Relationships

is recommended by::NIDDK Information Network (dkNET)::SCR_001606, is recommended by::NIDDK - National Institute of Diabetes and Digestive and Kidney Diseases::SCR_012895, is listed by::re3data.org::SCR_006782, has parent organization::Vilnius University; Vilnius; Lithuania::SCR_011764

Related Condition

None

Export Options

Exporting selected: Subsamples.

Export Mode



Full



Key Resources Table

All data, excluding custom and template fields.

File Type



ZIP Bundle



Single CSV

A single .CSV file combining all exported items.

CANCEL

EXPORT

RSpace exports of selected inventory items include all metadata including associated RRIDs and other identifiers.

D18	A	B	C	D
1	REAGENT or RESOURCE	TYPE	SOURCE	IDENTIFIER
2	Magic Anti-Malaria HRP-II Monoclonal antibody[HRP]	Antibody	Creative Diagnostics	Cat# DMABRM008T, RRID:AB_2528349
3	Mouse anti-Malaria LDH (pan) monoclonal antibody	Antibody	Creative Diagnostics	Cat# DMABT-S15211, RRID:AB_2531355
4	Mouse Anti-Plasmodium falciparum (Malaria) Monoclonal Antibody, HRP Conjugated, Clone BDI400	Antibody	Meridian Life Science	Cat# C03400P, RRID:AB_817152
5	Mouse Anti-Plasmodium falciparum (Malaria) Antibody, HRP Conjugated	Antibody	Acris Antibodies	Cat# BM3272HGP, RRID:AB_1621238
6	Anti-Plasmodium vivax (Malaria) Polyclonal Antibody, Unconjugated	Antibody	MyBioSource	Cat# MBS535006, RRID:AB_10578141
7	Plasmodium falciparum (Malaria)	Antibody	MyBioSource	Cat# MBS531391, RRID:AB_10577873
8	Mouse Anti-Plasmodium falciparum (Malaria) merozoite surface protein 1 (MSP1) Monoclonal Antibody, Unconjugated, Clone B938P	Antibody	Meridian Life Science	Cat# C86944M, RRID:AB_817154
9	Mouse Anti-Plasmodium falciparum (Malaria) merozoite surface protein 1 (MSP1) Monoclonal Antibody, Unconjugated, Clone B937P	Antibody	Meridian Life Science	Cat# C86943M, RRID:AB_817153
10				

Sample, Measurement, Instrument relationships

- Tracking of which instruments recorded which measurements: relatedIdentifier DataCite property?
- How should modular components of an instrument be recorded, when tracking the configuration is essential for reproducibility?
- What is the PID for a measurement?

The screenshot shows a software interface with a sidebar on the right. The sidebar has two sections: 'Details' (collapsed) and 'Relationships' (expanded). Under 'Relationships', there is a section titled 'All linked items' containing two entries: '10.5435396/5352 - Parent Sample' and '10.5535335/2421 - is Part Of'.

▼ Details

^ Relationships

All linked items

10.5435396/5352 - Parent Sample

10.5535335/2421 - is Part Of

Ongoing Funded Projects

in collaboration with California Digital Library

FAIR Samples: exploring research and sample data management best practices in place-based research

Award Nr. [2433320](#)



EAGER

Advancing Research Data Management through Enhanced Vertical Interoperability

Award Nr. [2433321](#)



Conference

FAIR Samples: exploring research and sample data management best practices in place-based research

Award Nr. [2433320](#)



EAGER

- FieldMark Integration (offline field sample metadata collection)
- Data Manager/Curator role in RSpace
- Relationship modelling between entities (parent/child/etc)
- Flexibility in sample concept (singleton, batch, subsampling)
- Enhanced DMP Tool integration
- ORCID, ROR, IGSN ID enhancements (sending to repositories)
- PIDINST
- Automatic PID graph generation from RSpace
- End-to-end sample workflow guidelines for research tools

We're here to learn from you!

- We're beginning specification work for these various projects, and would be grateful for your input. Real-life use cases are invaluable!
 - We have the NSF funding, expertise and proven platform for building a powerful, FAIR, data management hub, now we want you to tell us what you need.
 - What other tools/PIDs would be useful for us to integrate with?
 - What RRID, facility, and instrument workflows should we support in RSpace Inventory?
 - What are the points of friction in adopting and using research tools & PIDs at your institution?
 - Learn more in our hands-on session in the afternoon breakout session
 - Want an extended demo? Let's keep in touch! rob@researchspace.com