

# de.NBI-SysBio Research data management and curation of systems biology applications

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Contract No. W-de.NBI-015

## Short description of the project

Systems biology projects involve frequently several collaboration partners and the collection of heterogenous data and models in diverse formats. The goal of our **de.NBI Systems Biology Service Center** (de.NBI-SysBio) is to enable scientists to manage their data, metadata along with publications and researcher profiles in a FAIR manner.

Therefore we provide **FAIRDOMHub**, a hosted, self-curated database application for data management (DM) in systems biology and beyond for large collaborative projects.

In addition we offer **SABIO-RK** a professionally curated database for enzymatic reaction kinetics manually extracted from scientific literature.

We are moreover involved in the development and maintenance of the **RDMKit** offering guidelines for FAIR DM.

## de.NBI services



### Research Data Management Platform

FAIRDOMHub (<https://fairdomhub.org>) is the free flagship instance of the FAIRDOM-SEEK (<http://fairdomseek.org>) software which allows users to upload, interlink, enrich and share all different types of data, models and standard operating procedures (SOPs).

2455 registered users, 409 projects. 122 paper citations. >30.000 visits since 2022, increasing downloads.



### Biochemical Reactions Kinetics Database

SABIO-RK (<https://sabiork.h-its.org>) offers structured information about biochemical reactions, their kinetic rate equations with parameters and experimental conditions. Data can be accessed via a user interface or web services for direct use in modelling. We offer curation service upon request.

2350 new entries, 318 paper citations (+106 for update), 8.8k searches via GUI, 40.000 visits since 2022.



### FAIR Research Data Management toolkit for Life Sciences

This toolkit (<https://rdmkit.elixir-europe.org>), established in the ELIXIR project Converge, is a cross-node service providing best practices and guidelines on how to make research data FAIR.

7719 users, 52927 views, 200 contributors.

## General information on the project

1 FTE for ELIXIR officer, student workers and SABIO-RK re-implementation paid by de.NBI Forschungszentrum Jülich.

1.5 FTE for tool development and data curation paid by Baden-Württemberg Ministry of Science, Research and Arts.

## Progress report

**SABIO-RK:** re-implementation of SABIO-RK to have a more reactive, easier to maintain version that is simpler to evolve.

### Manual data insert

**DeepCurate**  
BMBF project to support curation process and literature triage

**elixir APICURON**  
Partner in Implementation  
Study to credit the work of biocurators

### Automated data insert

**STRENDA**  
**EnzymeML**

### SABIO-VIS

BMBF project to implement  
Visual interactive search of kinetic data



**FAIRDOMHub:** multiple updates, new extended metadata functionality for richer, deeply nested metadata to enable data brokering to domain specific repositories.



**COPASI** simulation integrated into FAIRDOM-SEEK.

### Engagement in:



### Focus Groups



### Biocuration

• Steering committee

### Platforms



Data  
• Exco



Interoperability

### Implementation Studies

APICURON SyBEL

### Communities



Systems Biology

Research Data Management

• white papers

## de.NBI Training and education

**FAIRDOM User Meetings:** May 8, 2023, October 16, 2023, June 5, 2024, online. In these meetings new developments and use cases are presented and discussed, giving an insight into how FAIRDOM tools can be used.

**Training course** "Introduction to FAIRDOMHub" for COST Action "OneHealthDrugs", March 8, 2023, online.

**de.NBI Spring School** "Data Management", March 13-17, 2023, Gatersleben, Germany.

**de.NBI Training course** "Tools for Systems biology modeling and data exchange - COPASI, CellNetAnalyzer, SABIO-RK, FAIRDOMHub/SEEK", November 28-30, 2023, Magdeburg, Germany.

**de.NBI Training course** "Workshop SABIO-RK and FAIRDOMHub/FAIRDOM-SEEK", November 25-26, 2024, online.

## Publications

- Martins dos Santos V, Anton M, Szomolay B et al. Systems Biology in ELIXIR: modelling in the spotlight. F1000Res. 2022 Nov 7;11:ELIXIR-1265. doi: 10.12688/f1000research.126734.2.
- Lauterbach S, Dienhart H, Range J et al. EnzymeML: seamless data flow and modeling of enzymatic data. Nat Methods. 2023 Mar;20(3):400-402. doi: 10.1038/s41592-022-01763-1.
- Dudaš D, Wittig U, Rey M, Weidemann A, Müller W. Improved insights into the SABIO-RK database via visualization. Database (Oxford). 2023 Mar 31;2023:baad011. doi: 10.1093/database/baad011.
- D'Anna F, Jareborg N, Jetten M et al. A research data management (RDM) community for ELIXIR. F1000Res. 2024 Sep 30;13:ELIXIR-230. doi: 10.12688/f1000research.146301.2.