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## Introducing FJORD: a framework for FAIRly Jointed Open Research Data

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The increasing digitalization of science, coupled with the push for Open Science and FAIR data (Findable, Accessible, Interoperable, Reusable), presents significant challenges for managing diverse research outputs effectively throughout their lifecycle. Traditional Data Management Plans (DMPs) often lack the detail and machine-actionability needed for dynamic research processes, while Current Research Information Systems (CRIS) struggle to capture the complexity of modern research workflows and assets beyond publications. Furthermore, coordinating data management efforts and information flow between key stakeholders –researchers, research management offices (RMOs), infrastructure providers, university management (HEIs), and funders –remains a major hurdle, hindering efficient resource allocation, reproducibility, and robust research assessment.

This presentation introduces FJORD (FAIRly Jointed Open Research Data), a novel framework designed to address these challenges by creating an integrated ecosystem for managing diverse intellectual assets FAIRly by design and Jointed by interdisciplinarity.

FJORD builds upon previous work on “enhanced DMPs” as input for machine-actionable, tailored to specific research contexts and SMART (Specific, Measurable, Achievable, Relevant, Time-bound) metrics for FAIR assessment, developed for both research software engineers and infrastructure managers.

The core of FJORD comprises:

- (1) A suite of enhanced DMP templates specifically designed for diverse intellectual asset types, including i. publications, ii. research workflows, iii. models, iv. code/software, and v. datasets;
- (2) “Fjordie,” a prototype bot acting as a user-friendly frontend; and
- (3) A vector metadata-database backend leveraging “knowledge” –an ontology-driven approach to knowledge base(s) management –to process information from multiple sources and disciplines, while constructing internal customised knowledge graphs.

FJORD facilitates three crucial information pipelines:

(Pipeline 1) Streamlining reporting and compliance from researchers via RMOs to funders;

(Pipeline 2) Enabling better infrastructure planning and investment by connecting researcher needs through infrastructure managers to university management;

(Pipeline 3) Enhancing institutional research intelligence by feeding enriched, structured information (data and metadata) from researchers via RMOs to university management, functioning as an advanced, asset-aware CRIS 2.0.

The framework is currently being designed and validated through three distinct Proof-of-Concept (PoC) case studies within the context of my work as Data Steward for Data Science and IT, where I act as an embedded Open Research Data expert on each team.

These PoCs deliberately target different intellectual asset types and research domains, typically ignored and not harmonized on other international efforts (e.g., EOSC):

**Workflow Focus (Cell Biology Laboratory Case):** Applying enhanced DMPs to map and manage the entire lifecycle of life science, from instrument data at laboratory, by the generation pipeline through processing, curation, analysis, and plotting, to ultimately publishing standard operating procedures of FAIR datasets in local open data repositories.

**Code Focus (Phenomics Case):** Utilizing enhanced DMPs and FAIR-by-design principles during the coding of development and deployment of the lifecycle of a domain-specific repository for phenomics research.

**Model Focus (Digital Humanities Case):** Drafting enhanced DMPs combined with Behavior-Driven Development (BDD) using Cucumber/Gherkin syntax to define FAIR requirements for managing multiple complex

metadata models and a unifying meta-metadata-model for digital editions.

Although these case studies are in their early stages (started during 2025), initial findings demonstrate the feasibility and utility of the FJORD approach.

Preliminary results indicate that asset-specific enhanced DMPs provide valuable structure for planning and tracking diverse research outputs.

The BDD approach proved effective in translating FAIR principles into actionable requirements for complex metadata models.

Early observations suggest the potential for improved coordination between researchers and support units, and more proactive FAIR implementation when integrated early in the research lifecycle via the FJORD templates.

This presentation will detail the FJORD framework's design, its theoretical underpinnings, and the drafted architecture supporting the key stakeholder pipelines. And I will share practical experiences, challenges encountered, and initial findings from the ongoing, diverse PoCs, emphasizing their relevance to the Swiss context, since they can be explicitly connected to current Swiss Open Research Data initiatives.

Attendees will gain insights into a novel, integrated approach for operationalizing FAIR principles across various research assets and fostering better alignment between researchers, institutions, and funders in the evolving digital research landscape.

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