HMC Conference
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<HMC> HELMHOLTZ Metadata Collaboration

Beitrag ID: **82**

Typ: **Talk**

# From Siloed Experiments to Collective Intelligence: Operationalizing the Post-FAIR Laboratory

While the theoretical benefits of FAIR data are well-established, the operational reality of integrating these principles into active R&D environments reveals a distinct set of challenges and opportunities. This presentation moves beyond the "why" of digitalization to the "how," based on observations from scaling semantic architectures in tribology and materials engineering.

We identify three critical pillars for the "Lab of the Future." First, the Democratization of Context: enabling PhD students to leverage advanced data structures without requiring extensive training in data science. Second, the Contextualization of Automation: ensuring that data streams from continuous robotic testing are automatically enriched with metadata to prevent high-speed resource waste. Third, the Realization of AI Utility: moving past vague promises to a concrete understanding of AI's role: from automating routine analysis to powering high-level predictive models. By addressing these pillars, we show how isolated data points can be woven into a unified, queryable asset, transforming a collection of individual projects into a robust, self-improving research ecosystem.

## ONLY WORKSHOPS - Proposed interaction format

## Alternative Track

## ONLY WORKSHOPS - Tentative audience

## ONLY WORKSHOPS - Maximum number of participants

## ONLY WORKSHOPS - Special technical requirements

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**Sitzung Einordnung:** TALK SESSION

**Track Klassifizierung:** HMC Conference 2026 Track Topics: 1. Metadata in Action: Embedding Quality and Context into Research Infrastructures