

Building FAIR data literacy: using building-brick toys to teach the FAIR data principles

Tuesday 30 September 2025 15:30 (30 minutes)

The FAIR data principles [1] are fifteen high-level guidelines aimed at improving the findability, accessibility, interoperability, and reusability of research data. Although the FAIR principles do not mandate specific technologies, they encourage the use of shared, accessible, and broadly applicable methods for representing and managing data. Research communities must have a fundamental understanding of these underlying concepts to design FAIR solutions that fit their particular disciplinary needs. Teaching these principles can be challenging, especially when engaging interdisciplinary audiences with varying technical expertise levels.

In this talk, I will present an educational approach developed at FAIRmat [2] that uses the concept of connected building bricks (e.g., LEGO®) to simplify and visualize key FAIR concepts. Each data element is represented as a brick, and key characteristics, such as detailed descriptions, shared vocabularies, standard formats, and persistent identifiers, form the connections between them. This analogy-based method has been successfully employed in FAIRmat training events [3, 4], where it increased participant engagement, reduced conceptual barriers, and facilitated a deeper understanding of FAIR principles.

References:

1. M. Wilkinson, *et al.*, “The FAIR Guiding Principles for Scientific Data Management and Stewardship.” *Sci Data* 3, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>.
2. C. Draxl *et al.*, “FAIR Data Enabling New Horizons for Materials Research,” *Nature* 604, 635 (2022). <https://www.nature.com/articles/s41502-04501-x>.
3. L. Rotheray *et al.*, “FAIRmat Tutorial 11: Research Data Management, From Fundamentals to Implementation.” November 30, 2023. Accessed: September 3, 2024. [Online video]. Available at: <https://zenodo.org/doi/10.5281/zenodo.12760514>.
4. A. E. Mansour, (2023, November 23). “Introduction to the FAIR Data Principles.” Zenodo. <https://doi.org/10.5281/zenodo.10200>

Primary author: MANSOUR, Ahmed (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany)

Co-authors: WOJAS, Adrianna (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany); REHERMANN, Carolin (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany); DRAXL, Claudia (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany); ROTHERAY, Lucia (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany); AESCHLI-MANN, Martin (Department of Physics and Research Center OPTIMAS, Technische Universität Kaiserslautern, Germany); NAKHAIE, Siamak (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany)

Presenter: MANSOUR, Ahmed (Physics Department and CSMB Adlershof, Humboldt-Universität zu Berlin, Germany)

Session Classification: Parallel workshops & talks