

The Open Research Knowledge Graph in NFDI4ing and NFDI4DataScience

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Abstract: The Open Research Knowledge Graph (ORKG, [1]) aims to rethink scholarly communication by describing research contributions in a human- and machine-actionable manner. This shifts the focus from documents towards scientific content, thus tackling issues such as the publication flood or the reproducibility crisis. The ORKG thus plays an important role in many NFDI initiatives. Especially NFDI4ing has made use of the knowledge graph approach and achieved results in its task area ELLEN focusing on enormous data requirements such as in the energy system analysis domain.

1 Topic

With roughly 2.5 Million new publications every year, it is increasingly hard for researchers to keep track of all relevant contributions. Even in small fields, scientists are drowning in a publication flood. Challenges that require interdisciplinary work, e.g. climate change research, are especially affected by this issue.

The underlying problem is that we never updated our methods of scholarly communication to handle the vast amount of new knowledge produced in modern research. Despite the ongoing digitalization, we still rely on scientific articles - a human-to-human information exchange. This contributes to many scientific crises such as the deficiency in peer-review, the reproducibility crisis and ultimately the loss of knowledge. The Open Research Knowledge Graph aims to solve this problem by describing research contributions semantically, thus making them human- and machine-actionable [1,2]. This opens up a new range of possibilities to discover knowledge, for instance finding and comparing results towards a specific research question, even across different disciplines.

The ORKG is a tool well-suited to tackle the challenge of organizing and linking information and is thus useful for the NFDI. Especially NFDI4ing achieved impressive results in one of its task areas (ELLEN, [3]): In the context of energy system analysis, researchers used the ORKG to acquire, curate, publish and process information from various studies analyzing a future low-energy system with a focus on electricity generation for Germany [4]. This type of overview is necessary in the domain to perform trend analysis for a variety of energy sources to match the results of new simulation scenarios with existing values.

In NFDI4DataScience, task area 2 drives the discussion around the use of research knowledge graphs to improve the FAIRness of data science objects. By representing and linking artifacts such as data, code or models in a knowledge graph, TA 2 aims to solve reproducibility and reusability issues.

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2 Organization & Agenda

In this workshop, we intend to give an overview on the work of NFDI4ing and NFDI4DataScience as well as the ORKG and provide a platform for further discussion. We will give a tour through the features of the ORKG and elaborate on the use case from NFDI4ing's task area ELLEN. The attendees will learn how the ORKG can be used in various scenarios to master intra- and inter-disciplinary challenges. As the ORKG engineers its features closely along the requirements of different fields, this is a great opportunity to learn about new use cases and find new collaborations.

Planned format: Half-day Workshop, Hybrid format with speakers in Cologne and online

Target Group: All consortia, special focus on NFDI4ing and NFDI4DataScience

Topic	Duration
Welcome, Motivation & Agenda	10'
Introduction to the ORKG	15' + 5'
Introduction to NFDI4ing	15' + 5'
Introduction to NFDI4DataScience	15' + 5'
Further questions & discussion	
Short break	
Tour through ORKG's features	20' + 5'
NFDI4ing's TA ELLEN and the ORKG	20' + 5'
Knowledge graph approaches in NFDI4DataScience - Task Area 2	20'+5'
Large question and discussion section with input from audience	

References

- [1] <https://www.orkg.org/orkg/> (last accessed Feb 7, 2022)
- [2] S. Auer et al. 2020. **Improving Access to Scientific Literature with Knowledge Graphs**. *Bibliothek Forschung und Praxis*, vol. 44, no. 32020, pp. 516-529. <https://doi.org/10.1515/bfp-2020-2042>
- [3] <https://nfdi4ing.de/archetypes/ellen> (last accessed Jan 31, 2022)
- [4] F. Kullmann et al., "Greenhouse Gas Reduction Scenarios for Germany." Open Research Knowledge Graph, 2021, [doi: 10.48366/R153801](https://doi.org/10.48366/R153801).