

NFDI4Ing Conference 2022: Unifying the Understanding of Research Data Management in Engineering Science Editorial Letter for the NFDI4Ing Conference 2022 Special Issue

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With the title “Unifying the Understanding of Research Data Management (RDM) in Engineering Science”, NFDI4Ing welcomed you online on October 26th and 27th, 2022 to its annual conference, hosted by the RWTH Aachen University. As the NFDI4Ing speaker and conference host, I am personally highly delighted about the numerous and multifaceted contributions at the conference. In this special issue of ing.grid, we present publications based on some of the presentations given in the conference.

Over the history, humans have always been seeking ways for building an understanding for common ways of communication and exchanging messages. One of the remarkable examples was the Rosette Stone (German: *Stein von Rosette*) – an ancient stone-shaped stele that was discovered in 1799 on an expedition in the city Rosette in the Nile delta. At the time of discovery, the stone as was partially damaged and not entirely preserved. It appeared to display three blocks of text in three different languages (Ptolemaic hieroglyphics, demotic Egyptian script, and ancient Greek script). An announcement from the king of upper and lower Egypt which was meant to gain the widest reachability towards different nations and people of different languages. The assumption that each text describes the same content in a different language enabled Jean-François Champollion and later on other archaeologists to resolve one of the long mysteries of the ancient Egyptian symbols in 1822.

Although we live nowadays in a highly digitalized world with easy communication options where e. g. languages and texts are translated automatically on the fly, the need for a common ground of communication is more vital than ever. Moreover, within the realm of engineering sciences exists the challenge of divergent linguistic nuances, encompassing business terms, vocabulary, synonyms, and the potential for a lack of comprehension regarding the discourse of experts hailing from disparate fields. Thankfully, in the contemporary context, the necessity for a physical tangible Rosetta Stone has been obviated. Nonetheless, a mechanism is needed to facilitate and ensure a shared comprehension of our discourse.

In terms RDM, the discussions held during the conference represent one step toward establishing and unifying a collective understanding of RDM within engineering sciences. Furthermore, the

ongoing dialogues serve as our contemporary “Rosette Stone”, fostering mutual understanding among diverse disciplines. In practice, this mutual understanding will not be reached right away. It is a process in which we are all trying to unify the views on what RDM stand for, what the ultimate goals of RDM are, and how it should be applied.

We conduct the annual NFDI4Ing conferences while we also recognize that there will always be differences and various views on RDM understanding. Such conference will, however, help to bridge the gaps between individual points of view, build connections to exchange ideas, and eventually lead to collective intelligence about RDM. Moreover, it advances and unifies international (research) data management and fosters a good scientific practice. Therefore, we discuss open issues and future challenges on topics such as terminologies, metadata, ontologies, repositories and many more, ultimately contributing to a much needed cultural change in engineering research.

The format of the NFDI4Ing Conference 2022 was meant to enable discussions in bidirectional ways in the context of contributions as well as networking activities along the program. A broad audience followed our invitation to the event along with a manifold collection of speakers. The constructive feedback was a key factor for scientific progress. Whether researchers, teachers, or industry representatives – all those interested in (research) data management were welcome. Through presentations of research results, informative workshops and tutorials, as well as case studies, we look forward each year to more exchange and discussion on how data management can be implemented in engineering theory and practice.

To foster the scientific focus of the NFDI4Ing conference, a peer review process was introduced. Two blind peer reviews and a third review by experts resulted in a score for the submitted contributions. Among the 42 abstracts submitted for the conference, 35 were deemed suitable and accepted for presentation. All accepted contributions were eligible to further elaborate on their contribution’s topic in form of a article to be published in this special issue of ing.grid. Represented are the following seven conference contributions, linked to the conference materials and abstracts via the abstract ID:

- [Beyond Data Literacy in Engineering Education](#) by Samira Khodaei (ID: 831) [1]
- [Towards Improved Findability of Energy Research Software by Introducing a Metadata-based Registry](#) by Stephan Ferenz (ID: 812) [2]
- [Betty’s \(Re\)Search Engine: A client-based search engine for research software stored in repositories.](#) by Vasiliy Seibert (ID: 814) [3]
- [Agile Research Data Management with Open Source: CaosDB](#) by Timm Fitschen (ID: 824) [4]
- [RDM Platform Coscine – FAIR play integrated right from the start](#) by Ilona Lang (ID: 802) [5]
- [PIA – A Concept for a Personal Information Assistant for Data Analysis and Machine Learning in industrial application](#) by Christopher Schnur (ID: 798) [6]
- [Metadata Standards and Metadata Generation in HPMC](#) by Giuseppe Chiapparino et al. (ID: 806) [7]

This year, two awards were granted: The NFDI4Ing Award for the best RDM solution and The NFDI4Ing Award for the best conference contribution. Winners' choice was made by the following elected jury of five experts from the NFDI4Ing Community Clusters:

- [Dr.-phil. Ina Heine](#) from the RWTH Aachen University as representative for NFDI4Ing Community Cluster 41 (Mechanical and industrial engineering)
- Dr.-Ing. Benjamin Lambie from the TU Darmstadt as Representative for NFDI4Ing Community Cluster 42 (Thermal engineering and process engineering)
- [Dr.-Ing. Michael Selzer](#) from the Karlsruhe Institute of Technology as Representative for NFDI4Ing Community Cluster 43 (Materials science and engineering)
- [Dr. David Hecker](#) from the German Aerospace Center (DLR) as Representative for NFDI4Ing Community Cluster 44 (Computer science, systems and electrical engineering)
- [Dr. Jan Linxweiler](#) from the TU Braunschweig as Representative for NFDI4Ing Community Cluster 45 (Construction engineering and architecture)

The winning contributions for the [awards](#) were:

- NFDI4Ing Award 2022 for the best RDM Solution:
[RSpace: An Electronic Lab Noteook designed to enhance FAIR workflows and FAIRification of research data](#) (ID: 826) by [Rory Macneil](#) from Research Space, Edinburgh, Scotland
- NFDI4Ing Award 2022 for the best Conference Contribution:
[Prepare RDM for Decentralized and Blockchain Based Data Source](#) (ID: 852) by Wendy (Pengyin) Shan of the Digital Initiatives, University of Alberta Library, Canada

Both winners are active at institutions outside of Germany, just like about 16% of the 297 registered participants. Due to the international focus of the 2022 conference, seven of the 40 contributions and key notes originated from outside Germany. On the first day 178 unique participants joined the meeting with an average participation time of 244 minutes. The second day was visited by 158 unique participants and an average time of 253 minutes was spent in the meeting by the participants. This equals an average participation percentage of around 50% of the total conference time, which lasted eight hours each day.

At the end of the conference, we were very pleased to receive the feedback where 88% of the participants were rather or very happy with the conference. Their answers show that their expectations were met or exceeded. Along with the mostly positive feedback, we have collected some opportunities for improvement that will be passed to the future conferences. A complete summary of the conference with additional information on the execution of the conference including related files as well as feedback of the participants can be found under [NFDI4Ing GitLab](#) (rf. Software availability).

No doubt that a conference lasting two days might leave many thoughts unspoken. Therefore, we would like to extend the exchange into this journal. We have chosen [ing.grid](#) as a platform to achieve this especially due to its commitment to the principles of open data, open access and open review. Therefore, in this special issue, we collected publications based on some of the presentations of the NFDI4Ing conference 2022.

My sincere thanks go out to everyone who engaged in organizing and conducting the conference. Moreover, I deeply thank everyone who participated at the conference with a contribution, with a question or a discussion point, and with taking the results forward into their communities. I am convinced that such contributions and exchange are a firm foundation of the research data management in the engineering sciences in Germany and world-wide.

Yours sincerely,

Prof. Dr.-Ing. Robert H. Schmitt
Spokesperson of NFDI4Ing

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2 Roles and contributions

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