MEI Meets NFDI4Culture

Kristina Richts-Matthaei
Paderborn University, Germany
kristina.richts@uni-paderborn.de

Martin Albrecht-Hohmaier
Paderborn University, Germany
martin.albrecht.hohmaier@uni-paderborn.de

Daniel Röwenstrunk
Paderborn University, Germany
roewenstrunk@uni-paderborn.de

Andreas Münzmay
Paderborn University, Germany
andreas.muenzmay@uni-paderborn.de

Abstract

NFDI4Culture is the consortium for research data on material and immaterial cultural heritage and offers a user-centered and research-led infrastructure. By focusing on the digital capture as well as data-based research of cultural assets, NFDI4Culture brings together different disciplines in their research interests but also in terms of their infrastructure needs. The consortium has been funded since October 2020 for an initial period of 5 years. Paderborn University is connected to NFDI4Culture via the Center for Music, Edition, Media (ZenMEM), which bundles activities in the fields of digital musicology, music and film informatics, media science, media technologies, and in several areas of computer science with a special focus on Digital Music Edition and Digital Musicology. With its many projects, ZenMEM contributes a lot to the further development of MEI. MEI will therefore also have a special place in NFDI4Culture. In addition to general community aspects and enhancements of the format, activities will focus on the development of best practice recommendations and training materials, the further development of MEI-related tools, such as MerMEId and the MEIGarage, and concepts for data quality in MEI, but also on the improvement of standard data for musical works.

The poster will show the organizational structure of NFDI4Culture and its representation at Paderborn University, its interaction and networking with national and international infrastructures, combined with several examples where MEI is involved.

Introduction

The National Research Data Infrastructure (NFDI)[1] is a digital, distributed infrastructure that is currently under construction and will offer services and advice to the scientific community in Germany on all aspects of research data management. Its aim is to provide the German science system with a "national collaborative network that grows over time and is composed of various specialised nodes" [2, p. 2], taking the form of, for instance, services and advisory offers for research data management. Even though the focus of the NFDI is in Germany, the NFDI is integrated into international contexts and structures and will develop and provide the services, tools, and materials in international cooperation. The promoted consortia shall:

- establish rules for the standardized handling of data in close feedback with the respective specialist community;
- develop cross-disciplinary metadata standards;
- develop reliable and interoperable measures for data management and a range of services tailored to the requirements of the subject community;
- increase the reusability of already existing data, also across disciplinary boundaries;
- connect and network with partners in foreign scientific and infrastructure systems who have expertise in the area of research data management; and
- collaborate in the development and establishment of generic, cross-consortium services and standards for research data management.

---

1   https://nfdi4culture.de (accessed January 12, 2022).

In three successive rounds of calls for proposals, consortia applications are to be submitted and a total of up to 30 consortia funded. These will then jointly form the National Research Data Infrastructure [1, §6]. NFDI4Culture is one of 9 consortia that succeeded in the first round of bidding and was successfully launched in October 2020. In NFDI4Culture, researchers from the fields of musicology, art history, architecture, theatre, dance, film, and media studies work together.

Over the last 15 years, the guidelines and the encoding format of the Music Encoding Initiative (MEI) have become the de facto standard in the German academic landscape for representations of musical sources, but also for the description of source-related documents and the interlinking and preservation of music-related knowledge. For this reason, the Music Encoding Initiative is widely represented in the NFDI4Culture consortium, both as a community and with its guidelines and tools.

1 The NFDI4Culture Consortium

The NFDI4Culture consortium for research data on material and immaterial cultural heritage focuses on the interdisciplinary discoverability and accessibility as well as the long-term preservation and continuous maintenance of the very heterogeneous data from the entire field of culture and the associated humanities disciplines. This includes digital 2D copies of paintings, photographs, and drawings as well as digital 3D models of culturally and historically significant buildings, monuments or audiovisual data of music, film, and stage performances. NFDI4Culture cooperates with national, European, and international infrastructures and is compatible with them. The structure of NFDI4Culture, which is closely linked to the academic community, is intended to make existing and new services accessible to the broad research community.

The long-term preservation and availability of these research data in accordance with FAIR principles[2] is of central importance, not only for future scientific success in the humanities, but also for the cultural self-image of individuals and society as a whole. So far, there is no coordinated initiative for professional research data management at the national level in this subject domain. NFDI4Culture aims to create a user-oriented, research-led infrastructure that covers a broad spectrum from musicology, art history, and architecture to theatre, dance, film, and media studies. To this end, partners from research, memory institutions, professional associations, and infrastructural institutions of various sponsorships from the federal government, the states, local authorities, and the private sector have come together (Figure 1).
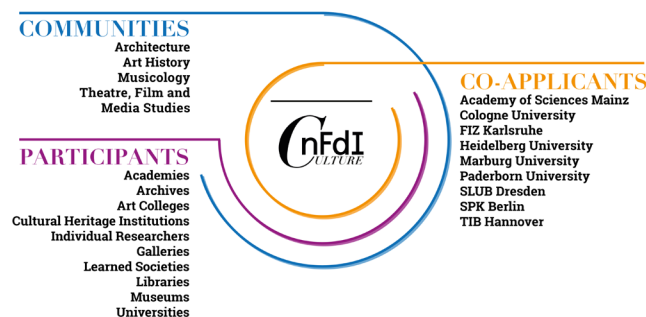

Figure 1: The NFDI4Culture Community.

The consortium consists of a geographically, thematically, and institutionally balanced network of nine co-applicants and more than 60 participants. It aims to ideally represent the broad spectrum of different actors in the cultural heritage domain. The co-applicants comprise four universities (Cologne, Heidelberg, Marburg, Paderborn), three infrastructure institutions (FIZ Karlsruhe, TIB Hannover, SLUB Dresden), Germany's largest institution in the GLAM sector (Stiftung Preußischer Kulturbesitz), and the Academy of Sciences and Literature, Mainz. This group is joined by 11 academic societies each representing one of the research domains that together make up the community of interest.

---

2   https://www.go-fair.org/fair-principles/ (accessed January 12, 2022).

Paderborn University is connected to NFDI4Culture via the Center for Music, Edition, Media (ZenMEM),[3] which bundles activities in the fields of digital musicology, music and film informatics, media science, media technologies, and in several areas of computer science with a special focus on Digital Music Edition and Digital Musicology.[4]

2 MEI Relevant Topics in NFDI4Culture

The Music Encoding Initiative plays an essential role not only in the context of musicology. In theatre and dance studies and, for example, film studies, connections can also be created via musical content and data. MEI also plays a key role in these contexts, bringing together experts from different subject areas. These researchers work together with librarians, software developers, and infrastructure providers to further develop the MEI encoding format in close collaboration with the MEI community, to discuss questions of the quality of MEI-encoded data, to develop tools and services around musical data, and to improve knowledge and skills in dealing with music encoding in general with the help of best practice guidelines and teaching & training offers.

Supporting Community Activities

One of the key objectives of NFDI4Culture is to support communities that are relevant in the context of material and immaterial cultural heritage data. In this context, the consortium regards itself as a promoter, trying to connect these communities and to give them a platform for exchange with each other. In a forum on data standards and data quality, NFDI4Culture would like to bring experts and communities together and discuss in regular workshops especially those issues that cannot be solved within just one community.

By advising and, in some cases, directly supporting projects, NFDI4Culture can and will also promote more far-reaching developments in the context of the MEI.

Additions and Extensions to the Encoding Format

NFDI4Culture is aware of a continuous adaptation of the encoding format of the MEI. Various extensions to the data format resulting from the needs of the researchers will be designed, discussed in the community, developed in workshops, documented, and finally implemented. This includes, for example, the question of standardized metadata for works and the use of authority data. This issue is already being addressed within the Music Encoding Initiative and can now be linked via NFDI4Culture with activities in other research subjects and communities and thus be integrated, for instance, into the context of the GND4C[5] of the German National Library.

A second topic for connecting communities and activities in research projects is the integration and synchronization of audio-visual media in MEI. In the context of popular and electronic music, the question of suitable encoding formats arises in order to be able to describe hardware and instruments with adequate metadata on the one hand, and to be able to semantically represent non-notated music on the other. In addition, the linking of notated music with semantically described audio and/or video data, for example in the context of film music, is a desideratum that will be addressed in NFDI4Culture, too.

Aspects, Tools, and Criteria for Quality of Encoded Music Data

Since the creation of digital corpora with encoded music (among other data concerning tangible and intangible cultural assets) will be a central task of science and memory institutions for the next few years, the question of the quality of the encoded data is becoming increasingly important. NFDI4Culture aims to develop criteria and tools to simplify the process of producing high-quality data. What aspects of encoding music are important for the quality of the data? NFDI4Culture will take a wide range of perspectives to approach this question. In addition to the constant examination of the data model and its description, this also includes, for example, the semantic validation of the codings with the help of scripts that are built into MEIGarage,[6] as well as coordina-

---

3   https://zenmem.de (accessed January 12, 2022).

4   https://www.muwi-detmold-paderborn.de/forschung/nfdi4culture (accessed January 12, 2022).

5   https://wiki.bsz-bw.de/display/GND4C/GND4C+Home (accessed January 12, 2022).

6   https://meigarage.edirom.de (accessed January 12, 2022).

tion processes in the field of metadata, provision of encoding guidelines and schemas together with data, clear licensing of the corpora, persistent and unique identifiers, and version control of digital objects.

Further Development of Tools and Services Around MEI

The MEI community has produced essential tools and services in the context of various projects over the last two decades, some of which will be supported and further developed in the context of NFDI4Culture. One of these tools is the Metadata Editor and Repository for MEI Data (MerMEId),[7] which was originally developed for the collection and publication of a catalogue of works by Carl Nielsen at the Danish Centre for Music Editing and has since been reused by several projects worldwide. After the funding for MerMEId expired, a community has emerged – due to the still ongoing demand in research projects –, which is now further developing the software and optimizing it for subsequent use. NFDI4Culture participates in the work of this community and supports the development and provision of the software with working time and infrastructure.

In addition to the further development and expansion of the transformation and validation platform MEIGarage, there are also plans concerning the enhancement of, for instance, deep learning methods to recognize measures on images of scores and store the coordinates in MEI's facsimile tree.

Best Practice Guidelines and Teaching & Training Offers

Probably the most important goal in NFDI4Culture is to teach competencies and skills in dealing with digital data and methods. For this purpose, the Cultural Research Data Academy (CRDA) was established, which aims to transfer knowledge to the disciplinary communities with the help of best practice recommendations, workshops, teaching materials, summer schools, and other participatory formats such as code sprints, book sprints, or hackathons. In this way, NFDI4Culture hopes to help increase code literacy in our communities, including the area of GLAM institutions.

NFDI4Culture will establish a communication platform that enables and facilitates access to knowledge, and will function as sort of a one-stop shop for researchers, providing support through various help desks and advice agencies. Tools for automatically enriching musical data with annotations, or licensing issues are just two examples from the comprehensive range of topics dealt with in NFDI4Culture.

Works Cited

[1]   Gemeinsame Wissenschaftskonferenz. "Bekanntmachung der Bund-Länder-Vereinbarung zu Aufbau und Förderung einer Nationalen Forschungsdateninfrastruktur (NFDI). Vom 28. November 2018 [Announcement of the Federal-State Agreement on the Establishment and Funding of a National Research Data Infrastructure (NFDI). From November 28, 2018]" *Bundesanzeiger. Amtlicher Teil* (December 21, 2018).

[2]   RfII – Rat für Informationsinfrastrukturen. *Leistung aus Vielfalt. Empfehlungen zu Strukturen, Prozessen und Finanzierung des Forschungsdatenmanagements in Deutschland*. Göttingen, 2016. English version: RfII – German Council for Scientific Information Infrastructures. *Enhancing Research Data Management: Performance through Diversity. Recommendations Regarding Structures, Processes, and Financing for Research Data Management in Germany*. Göttingen, 2016, https://rfii.de/?p=2075.

---

7   http://www5.kb.dk/en/nb/dcm/projekter/mermeid.html (accessed January 12, 2022).

nationale
Forschungsdaten
Infrastruktur
for CULTURE

MEI meets NFDI4Culture

NFDI4Culture is the consortium for research data on **material and immaterial cultural heritage** in the German National Research Data Infrastructure program (NFDI). NFDI4Culture will provide **knowledge, methods, tools and infrastructure** throughout the research data lifecyle, from data capture and enrichment, to standards and data quality, tools and services, publication and preservation all the way to education and training.

Supporting community activities

NFDI4Culture sees itself as a promoter for **connecting communities** and is giving communities a platform for **overarching topics**.

The needs of scholars for MEI structures to encode audio- and video-based data, and to incorporate additional metadata for electro-acoustic music and electronic instruments, are possible topics for funded workshops, furthering collaboration between communities.

Additions and extensions to the encoding format

Regarding the **extension and linking of the MEI format**, NFDI4Culture will provide bridges between **communities** and link **experts** together.

Contexts which are already in progress are, for example: standardised metadata for works using authority data from the German National Library, and a DFG viewer for musical resources that combines MODS and MEI in METS containers.

Aspects, tools, and criteria for quality of encoded music data

Quality of encoded music is a central issue within NFDI4Culture – not least for the development of repositories that meet **scholarly standards**.

In addition to defining which aspects are relevant in the context of encodings of musical content, the consortium aims to design methods and tools to test and enhance the quality of encoded music.

Further development of tools and services around MEI

NFDI4Culture will provide both **financial and human resources support** for the further **development of tools and services** around MEI.

Support for the further development of MEI tools and services ranges from accompanying the transition of MerMEId from an in-house effort to a community development model, to the extension of MEIGarage to completely new developments from the communities.

Best practice guidelines and teaching and training offers

The **Cultural Research Data Academy (CRDA)** aims to teach **competencies and skills** in dealing with digital data and methods – not only but also essentially in the field of digital musicology.

Included will be best practice recommendations, workshops, teaching materials, and summer schools, as well as more participatory formats, such as code sprints, book sprints and hackathons.

Dr. Kristina Richts-Matthaei
kristina.richts@uni-paderborn.de
https://orcid.org/0000-0001-8569-1995

Dr. Martin Albrecht-Hohmaier
martin.albrecht.hohmaier@uni-paderborn.de
https://orcid.org/0000-0002-5279-7408

Daniel Röwenstrunk
roewenstrunk@uni-paderborn.de
https://orcid.org/0000-0001-6271-2095

Prof. Dr. Andreas Münzmay
andreas.muenzmay@uni-paderborn.de
https://orcid.org/0000-0002-8373-4055

PADERBORN UNIVERSITY
The University for the Information Society