

**Balduin Landolt (Basel), Eline Elmiger (Basel), Madita Knöpfle (Basel/
Zürich), Nora Kauffeldt (Basel), and Sven Kraus (Basel) on:**

Digital Research in Old Norse Studies: Challenges, Solutions, and Trends in Digital Old Norse Studies

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Abstract

The workshop »Digital Research in Old Norse Studies: Data Management and Infrastructure Needs« was held at the University of Basel from 5th to 8th October 2022, bringing together renowned experts in Digital Old Norse Studies and research institutions to discuss the potential and challenges of the field's digitization. The workshop aimed to identify common problems and discuss possible future collaborations. Discussions focused on various aspects of digitization, including access to digital resources, the use of research tools, and the long-term archiving of data. The importance of developing a joint strategy to meet the challenges of digitization was emphasized. A major outcome of the workshop was the establishment of a research group, which will focus on networking, promoting standards, and preserving digital data.

Balduin Landolt (M.A.) is working as a backend software developer at the *Swiss National Data and Service Center for the Humanities* (DaSCH). He is particularly interested in digital editions and is currently working on a PhD project in digital Scandinavian Studies at the University of Basel.

Eline Elmiger (M.A.) is a PhD candidate at the Department of Scandinavian Studies at the University of Basel and will be affiliated to the *Swiss National Science Foundation*-funded research project »Resonating networks. Discursive, spatial and personal hubs of research paradigms in Old Norse studies (1650–1950)«.

Madita Knöpfle (M.A.) is a teaching and research assistant at the Department of Scandinavian Studies at the University of Zurich and a PhD candidate at the University of Basel. She is doing her PhD within the *Swiss National Science Foundation*-funded research project »Novelizations. Scandinavian Prose Literature in the Late Premodern Period«.

Nora Kauffeldt (M.A.) is a PhD candidate at the Department of Scandinavian Studies at the University of Basel. She focuses on the narrative and material transmission of landscape knowledge in Old Icelandic manuscripts. Her main areas of interest include spatial and landscape theory, historical geography and the narrativity of the Icelandic sagas within their material context.

Sven Kraus (M.A.) is a teaching and research assistant at the Seminar for Scandinavian Studies at the University of Basel. In his PhD project he focuses on translation, cultural transfer and ways to combine computational methods with the theories of material philology.

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Current online resources in Old Norse Studies, such as manuscript catalogues, text archives, lexicons, or databases for spatial or population information, provide easy access to large amounts of data. However, missing or poorly implemented standards, as well as the focus on the end user rather than the reusability of the data, limit the interoperability of the systems. This has so far made computer-based research projects challenging. The working group *Digital Research in Old Norse Studies* at the University of Basel, founded in 2020 by Balduin Landolt, Eline Elmiger, Madita Knöpfle, Nora Kauffeldt, and Sven Kraus, aims to address these problems. The group focuses on methodological questions, on developing suitable research applications, and networking with other *Digital Humanities*-related research projects.

Since the limited interoperability of Old Norse online resources is often the result of a lack of exchange, the working group invited both experts from research institutions and libraries relevant to Old Norse Studies and those responsible for digital infrastructure to the workshop.

Research and Digital Technologies beyond Disciplinary Boundaries

THOMAS AHREND from the Department of Musicology at the University of Basel presented the *Anton Webern Gesamtausgabe* (AWG), which is a collaboration with the *Digital Humanities Lab* and the *Swiss National Data and Service Center for the Humanities* (DaSCH). He focused on the Sketch Editions, which, unlike the Work Editions, will be published online rather than in printed volumes. Ahrend demonstrated the prospects of a digital edition and emphasized the potential of standardized graph databases according to the Resource Description Framework (RDF) for editorial work, such as for visualizing complex correlations and as a basic tool for computer-assisted queries using SPARQL (SPARQL Protocol and RDF Query Language). Despite the different research subjects addressed by Musicology and Old Norse Studies, digitization confronts both disciplines with similar challenges: resource-intensive processing and providing access to and long-term archiving of digital data. In the discussion, it became apparent that resources and time could be saved if different disciplines came together early and identified common challenge areas.

Difficulties and Opportunities in Digital Indexing

In the session *Existing Infrastructures and Their Goals*, BEEKE STEGMANN (Stofnun Árna Magnússonar í íslenskum fræðum) and TARRIN WILLS (Københavns Universitet) spoke about edition, digitization, and dictionary projects in which they were and are significantly involved. Stegmann demonstrated the pros and cons of larger collaborations using the new series of editions *Editiones Arnarnæ Electronicæ* (EAE), which is a collaboration between the two Arnarnæan institutes in Reykjavík and Copenhagen respectively and *Menota* (Medieval Nordic Text Archive). The coordination across national borders has proved to be demanding at times. Of great value, however, according to Stegmann, is the fact that *Menota* has already developed a TEI-compliant XML standard for medieval manuscripts from Scandinavia, so source-specific configurations of the TEI XML do not need to be developed by *EAE* for a machine-readable edition. Furthermore, *Menota*'s text archive will ensure long-term

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data security for the editions. The collaboration also intends to produce a subchapter for the forthcoming *Menota Handbook*.

Stegmann went on to talk about her plan to incorporate multispectral image data on *handrit.is*, a TEI XML-based manuscript catalogue of Landsbókasafn Íslands – Háskólabókasafn and the Arnarnaganaeana Institútes. *handrit.is* is well suited for this because, being the premier online catalogue for Old Norse and Icelandic manuscripts, it has an established infrastructure with broad reach. Stegmann identified the need for standardized metadata as a major challenge in the digital cataloguing of manuscripts: these are essential for machine readability but are not always achievable. The standards are based on the ideal manuscript, an object with a single shelfmark. In practice, however, manuscripts often have complex transmission histories, so they can only be catalogued insufficiently in the given structures. In the discussion, it was pointed out that XML has a lot of potential as a human- and computer-readable format but that the manual generation and editing of XML documents carries the risk of inconsistencies. On the one hand, applications with entry forms that generate XML documents are more user-friendly, less error-prone, and help standardize data. On the other hand, she pointed out, such solutions tend to be inflexible and can hardly do justice to a manuscript in complex cases.

Wills highlighted that the digital resources of Old Norse Studies express scholarly interest in history: What has been preserved? What was codified? Who wrote the manuscript? A digital application links the past to the present and future, making it accessible to the public. Wills emphasized the importance of relational databases for linking originals and contextual and background information. However, he said, a prerequisite for interoperability in the Semantic Web is structuring and linking data (Linked Open Data) according to a standard such as RDF. Using the projects he (co-)supervised, such as the *Dictionary of Old Norse Prose* (ONP), the *Skaldic Project* (Skaldic Poetry of the Scandinavian Middle Ages), and the *Lexicon Poeticum*, he was able to demonstrate the functionalities and prospects of such applications.

The session *Towards the Future User – Cataloguing and Traceability* addressed the question of the impact of library subject indexing, digital data organization, and especially the search functions of online catalogues on catalogue users: GUÐRÚN LAUFHEY GUÐMUNDSDÓTTIR (Landsbókasafn Íslands – Háskólasafn) presented the genesis and current work on the database *handrit.is*. *handrit.is* has been publicly accessible since 2010 and replaced the previous digitization project *sagnanet.is*, which had been developed since 1997 and was online from 2001 until 2010. The online resource was intended to digitally index both facsimiles and catalogue records for the first time, based on printed catalogues of the participating manuscript collections, and making them accessible via the Internet. With *handrit.is*, TEI XML was finally introduced as a file format. Currently, the focus is on registering about 5000 manuscripts that have not yet been catalogued. Guðrún Laufey Guðmundsdóttir used these developments to illustrate the interlocking developments of technological innovations and cataloguing practices, which, over a time span of more than two decades, have led to certain inconsistencies in the data. She also pointed out the integral importance of various search masks, such as Power Search (*Ítarleit*), in making data findable and utilizable.

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To provide a comparative view, SVENJA WALKENHORST (Universität Marburg) presented *Handschriftencensus*, an online database of particular importance in German medieval studies. Despite the similar orientation, essential differences between the two catalogues became visible: for example, *Handschriftencensus* aggregates other catalogues, recurses to relational data instead of XML, and consistently links to *Gemeinsame Normdatei* (GND). The advantage of the relational structure of the catalogue is that titles are easier to find since they are necessarily standardized. However, this is also a disadvantage, since standardization always means an interpretative determination, which is a detriment to the objectivity of the catalogue. In the discussion, the discrepancy between standardized and free-text data in possible search and use scenarios was identified as a particular challenge. How researchers can feed their research data back into catalogues, which practical options already exist for doing so, and whether collaborative technologies such as the software *Git* could improve this in the future were also discussed. The participants concluded that data composition, as well as cataloguing practices, need to be documented in a clear, transparent, and accessible way to users: not only does knowledge of the condition of the data guide expectations of what can be found, it also significantly influences what research questions can be applied to the data.

Involving the Research Community in Digital Projects

In the session *Beyond the Catalogue – Customisation and Community Governance*, WILLIAM DUBA (Université de Fribourg, *Fragmentarium*) and ERMENEGILDA MÜLLER (Háskóli Íslands) explored how the scientific community can engage with ongoing projects and existing infrastructures.

Duba exemplified the *Fragmentarium* and showed how important an active community is for a successful project. As a digital laboratory for manuscript fragments, researchers can create their own entries and import IIF manifests into the MySQL database to digitally reconstruct a historical manuscript. The *Fragmentarium* will be consistently optimized to provide low-threshold access to a technologically complex toolbox. Müller extended the perspective of the session, drawing on the challenges she faced in her practical work on Icelandic paper manuscripts and watermarks. In the course of her dissertation, she encountered the problem of not being able to capture watermarks accurately and in a structured enough way in TEI XML when describing her material digitally. She then created a custom extension for TEI XML based on the *International Association of Paper Historians* standard. Müller's approach vividly demonstrated the benefits of a standard like TEI XML, which can be extended flexibly to meet individual needs and issues. However, Müller noted that this carries the risk of limited usability of the research data generated by this approach. The XML documents generated may be included in *handrit.is* without any problems, but the watermark information is not displayed on the *front end*. In addition, the effort to capture the watermarks in this level of detail is immense. It can only be done for a fraction of the manuscripts, resulting in inconsistencies in the data.

Under the title *Reflections on Icelandic Saga Map: Visions, Limitations, Futures* EMILY LETHBRIDGE (Stofnun Árna Magnússonar í íslenskum fræðum) gave an online keynote lecture on her experiences in the conception and

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development of the *Icelandic Saga Map* (ISM): she talked about the sustainability of such projects and their interoperability, initial expectations and real implementations as well as collaborative working models. She stressed the exploratory nature of these projects and the importance of bringing together the skills of humanities and computer science experts without assuming that all researchers have to have extensive programming skills.

The session *Machine Readable yet Understandable by Humans* was dedicated to the reusability of digitally indexed data by the research community. PÉTUR HÚNI BJÖRNSSON (Háskóli Íslands) showed what the use of standards enables. He loaded RDF data generated from the XML documents of the research project *Stories for all time: The Icelandic Fornaldarsögur* into the visualization component of the online edition of the *Anton Webern Gesamtausgabe*, which Thomas Ahrend had presented earlier, and executed a SPARQL query on it. Thus, he demonstrated that due to the standard applied, the *front end* of the digital *AWG* edition could also be used for graph visualization of *Icelandic Fornaldarsögur*. The following discussion dealt with Linked Open Data in more depth: the comprehensibility and interpretability of such visualizations came up, as it was not given *a priori* what meaning and what level of meaningfulness is inherent in them. The question was discussed whether a Semantic Web layer could be put on top of the existing data of *handrit.is* to extend the functionalities of the catalogue. The question of how these possibilities could be communicated to users of the catalogue, and also in teaching, led to the conclusion that digital Old Norse Studies is straddling field-specific core competences and digital methodological competences. Possible solutions discussed included increasing the integration of digital research methods into academic teaching and the organization of summer schools.

The discussion of the last session *Digital Philology in a Broader Perspective*, focused again on catalogues and their influence on research. NORA KAUFFELDT (University of Basel) took up the question of how catalogues control the perception and searchability of the material by means of decisions underlying data collection. In particular, she discussed the problem of dealing with manuscripts that have been fragmented or recombined in the course of their transmission and are held in different, unrelated shelfmarks. In response, Stegmann raised the question of whether and how research results should be integrated into a catalogue. Duba proposed the concept of a digital research laboratory as in the *Fragmentarium*: A digital research lab should enable researchers to develop and present results without having to fulfill the claim of presenting only established facts, as the catalogue does. Thus, there could also be different or controversial information.

The participants noted that transparency, documentation, and versioning are essential for both a digital research lab and catalogues to be able to reproduce the research results. The information source, the underlying data, and the decisions behind a catalogue need to be made visible, as the data can become heterogeneous and inconsistent over the years due to different approaches.

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Conclusion and Future Collaborations

During the workshop, it became apparent that many digitally based projects face similar challenges. Therefore, the final discussion on Saturday morning focused on finding ways to intensify and sustain cooperation in digital Old Norse Studies.

In retrospect, the workshop format proved to be fruitful and the discussions quickly found concrete paths in which the participants discussed both technological and practical research approaches. A dialogue beyond the immediate disciplinary boundaries emerged and inputs from neighboring disciplines were quickly integrated in the discussions. In preparation for the workshop, deliberate care was taken to invite and engage application-oriented and technology-focused researchers in equal measure. This prevented discussions from becoming too hermetic. The workshop showed that there is a great interest in the various thematic complexes of digitization in the field of Old Norse Studies but that there are still far-reaching challenges to be solved. The variety of projects presented and discussed, such as the *Icelandic Saga Map*, and the user-created extension of the TEI standard for describing watermarks, proves the already wide-ranging applications of digital methods. Incompatible metadata, however, illustrate the challenges that remain in data reuse.

In the meantime, the international research network *Digital Old Norse Studies* has been established. The network can be found online¹ and maintains a mailing list. It is an open research network that interested parties can join at any time. The network regularly holds online events and networking opportunities to foster collaboration, profit from the experiences of others, cultivate the use of standards, and thus use resources wisely.



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¹ <https://network-digital-old-norse-studies.github.io/>