

A Musicological Platform for Medieval Italian Poetry and Music

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ABSTRACT

We present a web-based platform for the exploration and scholarly analysis of medieval Italian *lauda*, a repertoire of vernacular devotional non-liturgical musical works dating from the 12th to around the 16th century. Developed within the ERC Horizon Europe-funded Laudare Project, the platform provides integrated access to digitized manuscripts, musical scores, lyrics, critical annotations, and descriptive metadata through a unified, responsive interface. Users can examine manuscript images alongside their transcriptions and musical notation, as well as critical annotations created in the digitization process. To facilitate repertoire discovery, the platform offers fuzzy search capabilities and structured filtering based on source, region, century, and other metadata attributes. In addition to individual source exploration, the platform includes tools for comparative analysis, allowing users to organize and inspect multiple materials simultaneously. By combining manuscript access, music notation, textual content, and metadata within a cohesive interface, this project aims to support research, teaching, and the broader dissemination of medieval Italian musical heritage.

1. INTRODUCTION

The *lauda* repertory occupies a central position in the study of late-medieval Italian devotional culture. These vernacular, non-liturgical poems and songs circulated between the twelfth and sixteenth centuries in contexts shaped by lay confraternities, oral transmission, devotional performance, and manuscript copying [1]. Performed in oratories, chapels, and public devotional settings, they did not replace the official rites of the Church, but they reflected and reworked their musical and ritual habits in the vernacular. Their manuscript witnesses were therefore not only containers of texts and melodies. They could function as memory aids, institutional objects, para-liturgical supports, repositories of local repertoires, and records of changing scribal and musical practices [2, 3].

This material is difficult to represent because a *lauda* source is neither only a text nor only a score. A single witness may combine handwritten poetry, neumatic or mensural notation, rubrics, foliation changes, later additions, erasures, damaged supports, uncertain clefs, displaced notes,

repeated or omitted words, and indirect melodic references such as *cantasi come* indications. In many cases, the relation between words and music is not self-evident: text and music may have been copied at different moments, the music may correct or ignore textual repetitions, and some melodies are transmitted only by reference to another known tune. These features make the repertory a network of manuscript images, poetic forms, melodies, source relations, editorial hypotheses, and historically situated transmission evidence.

The Laudare Project¹ addresses this complexity by studying the composition, circulation, and dissemination of Italian religious poetry through melody [4, 5]. The web platform presented in this demo translates that research problem into a digital environment for consultation, comparison, and reuse. It combines a IIIF-based manuscript viewer, a searchable metadata catalog, mask searches over source descriptions, API access to metadata, music, and transcriptions, fuzzy text search, synchronized consultation of images and transcriptions, verse-level text–music alignment, MIDI playback, and ad-hoc rendering for mensural and non-mensural melodies.

A central design choice is to make editorial mediation visible rather than implicit. The platform builds on a controlled annotation workflow that preserves the distinction between source-oriented and editorial layers: the former remains closer to the visible manuscript evidence, while the latter records expert correction, normalization, and interpretation. Diff-like visualizations for both text and music allow users to inspect additions, deletions, corrected pitches, altered clefs, removed delimiters, and other editorial decisions.

By connecting manuscript images, structured metadata, textual transcription, music encoding, editorial history, playback, rendering, and programmatic access, the Laudare platform supports both close reading and large-scale comparative research. Its main contribution is not the publication of isolated facsimiles, texts, or melodies, but the integration of these layers around the specific problems of the *lauda*: unstable text–music relations, melody-based transmission, *cantasi come* links, and the need to compare many witnesses while preserving the trace of editorial interpretation.

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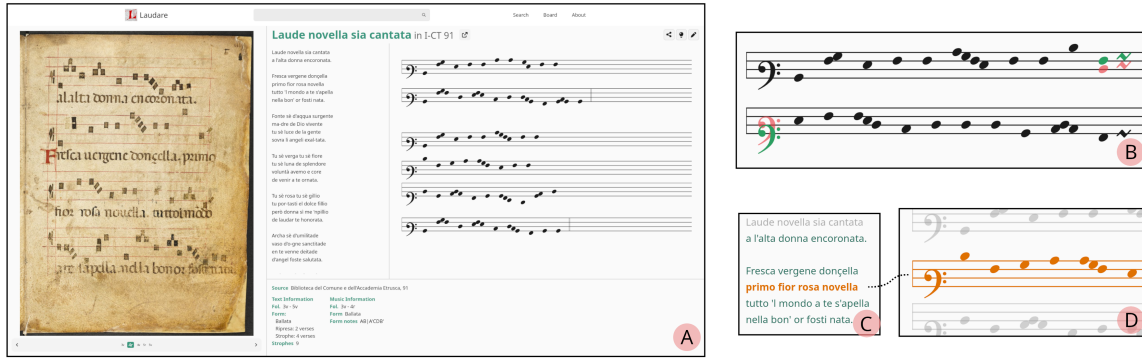


Figure 1. **A.** General layout, from left to right it presents IIIF viewer, lyrics, and music score, and metadata at the bottom; **B.** Editorial annotations, which can be shown by using the pencil button on the top right of **A**; **C** and **D** present the view when text-music sync is toggled on, by using the bulb button also at the top right of **A**.

2. RELATED WORK

The digital musicology landscape includes a few platforms whose goals partially overlap with those of Laudare, although they serve different scholarly communities, repertoires, and modes of access. Rather than comparing Laudare with general catalogs or image repositories, we focus here on projects that combine, to different degrees, source images, textual content, and musical transcription or encoding. This selection is therefore not exhaustive and functional to presenting the novelty of the Laudare platform.

Measuring Polyphony [6] is a relevant comparator for medieval encoded music linked to manuscript evidence. It focuses on thirteenth- and fourteenth-century polyphony and provides encodings, modernized renderings, MIDI, MEI/PDF downloads, metadata, and links to manuscript images where available. Laudare shares the concern for connecting transcription and source evidence, but applies it to *lauda* repertoires, where text–music relations, indirect melodic references, and verse-level alignment are central.

Furnace and Fugue [7] offers a multimedia edition of Michael Maier’s *Atalanta fugiens*, combining facsimile, emblem image, Latin/German text, translation, commentary, and MEI-based music rendering. It is relevant as a model for presenting visual, textual, musical, and interpretive layers together. Laudare differs in scale and structure, since it supports comparison across manuscript witnesses, melodic relationships, and non-standard text–music alignments.

Lost Voices / Digital Du Chemin [8] is a repertoire-level platform for texted vocal music, combining chanson facsimiles, modern transcriptions, MEI editions, recordings, commentaries, phrase-level information, and analytical tools. Its treatment of relationships among works is close to Laudare’s interest in linking items across sources. In Laudare, such links may derive from *cantasi come* rubrics and text/melodic similarity. The Laudare platform better integrates the original source images with the transcribed music and text.

Corpus Monodicum [9] is relevant because it addresses medieval monophony through MEI-based editorial transcription of Latin-texted repertoires. It is close to Laudare in its attention to texted monodic music and transmission history. Laudare, however, focuses on Italian vernacular de-

votional song, heterogeneous notation, source-specific metadata, *cantasi come* relations, and editorial change across both text and music.

MedMel [10] is also closely related to Laudare because it focuses on medieval vernacular lyric and provides digital editions of monodic melodies, especially for troubadour, trouvère, and related repertoires. The platform allows users to search lyrics and melodic patterns, switch between modern and ancient notation, export music in formats including MEI, and listen to the melody. It is therefore a strong comparator for melody search, notation rendering, playback, and vernacular song repertoires. Laudare develops adjacent needs around manuscript-image synchronization, *cantasi come* relations, verse-level text–music alignment, and editorial change across both text and music.

Table 1 summarizes the comparison across a small set of features relevant to the present demo. The table should not be read as a hierarchy of completeness, since each platform was designed around different scholarly questions. Instead, it helps clarify the particular configuration of needs emerging from the *lauda* sources that motivated specific development choices: IIIF image access, metadata mask search, API access to metadata, music, and transcription, fuzzy text search, page-level synchronization with manuscript images, verse-level text–music alignment, MIDI playback, ad-hoc rendering for mensural and non-mensural notation, melody-based linking between sources, and diff-like visualization of editorial changes in both text and music.

3. DATA PROCESSING AND SYSTEM ARCHITECTURE

The creation of the Laudare corpus involves a collaborative workflow between musicologists and philologists. As shown in Figure 2, the process starts from digitized manuscript sources. Given these, musicologists produce scholarly musical encodings for non-mensural sources using *NEON*, and for mensural sources using tools such as *MuseScore* and *MEI Friend*. The resulting musical representations are exported as Music Encoding Initiative (MEI) files. In parallel, philologists generate textual transcriptions and critical editions using *Transkribus*, producing XML-

Table 1. Comparison with related digital musicology platforms across text/music/image alignment, similarity search features, Content API, IIIF server/client, diff viewer for editorial operations, and ability to directly compare melodies and texts. ✓ indicates that the feature is clearly present; ✗ indicates that it is absent or not publicly exposed.

Platform	Text–music	Text–image	Music–image	Similarity	Compare	API	IIIF	Diff viewer
Measuring Polyphony	✓	✗	only first page	✗	✗	✗	✓	✗
Furnace and Fugue	✓	✓	✓	✗	✗	✗	✗	✗
Lost Voices / Du Chemin	✓	✗	✗	✓	✓	✗	✗	✗
Corpus Monodicum	✓	✗	✗	✗	✗	✗	✗	overflow window
MedMel	✓	✗	✗	✓	✓	✗	✓	✗
Laudare	✓	✓	✓	✓	✓	✓	✓	✓

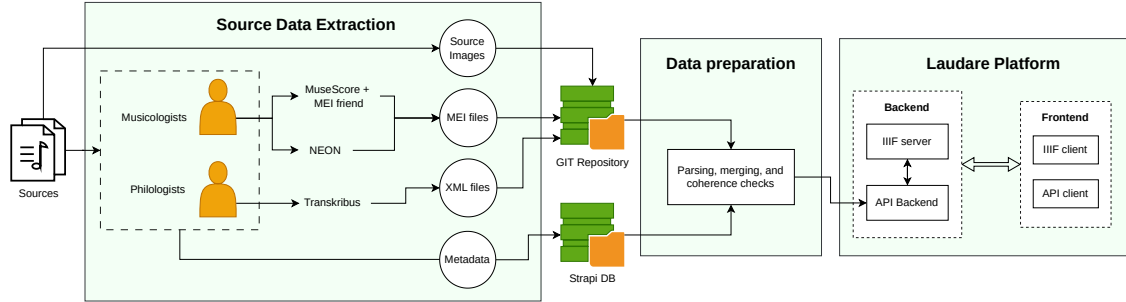


Figure 2. A sketch of the overall workflow from the sources to the platform.

based textual resources.

Alongside the scholarly encodings, manuscript images and descriptive metadata are collected and maintained as part of the corpus. These heterogeneous resources, including source images, MEI files, XML transcriptions, and metadata, are stored in a combination of a Git repository and a Strapi database.

To prepare the data for online access, a processing pipeline parses the scholarly resources, transforms them into a unified representation and builds the consumable data exposed by the backend services. This stage extracts relevant musical, textual, and bibliographic information, resolves the relationships between the different data sources, as well as the text-music alignment, which is performed naively at the verse level, according to the musical form (e.g., ballata, quatrain), with manual intervention in some cases.

The platform itself adopts a client-server architecture composed of a front-end web application, an API backend, and an IIIF image service.

The backend layer is responsible for exposing the prepared corpus data and metadata through a web API and coordinating access to the underlying resources. Manuscript images are served through a IIIF-compliant image server, allowing high-resolution visualization while maintaining efficient network usage and responsive interaction. The API backend provides access to musical, textual, and metadata resources, integrating information generated during the data preparation stage.

The frontend consists of a web-based client application that communicates with the backend services through an API and IIIF clients. All user-facing functionalities, including manuscript visualization, search and discovery, synchronized text-music navigation, and comparative analysis workspaces, are implemented within this layer. By separat-

ing data management, image delivery, and presentation concerns, the architecture promotes maintainability, scalability, and the integration of additional sources and analytical tools in future developments.

4. PLATFORM FEATURES

The proposed platform offers an integrated environment for the analysis and exploration of historical lauda manuscripts. It combines high-quality manuscript visualization, music encoding, textual resources, all within a single web interface, shown in Figure 1.

4.1 Unified Lauda View

To facilitate scholarly exploration and comparison of sources, the platform provides a unified lauda visualization layout that brings together manuscript images, lyrics, musical notation, and descriptive metadata within a single view. This integrated layout allows users to seamlessly navigate between different representations of a work without leaving the page.

Users can interactively examine text–music relationships at the verse level by selecting either a lyric line or a musical passage. The corresponding elements are automatically highlighted, and the manuscript viewer is synchronized to the relevant source page. The interface also supports the visualization of editorial interventions, allowing users to display critical annotations and editorial decisions that contributed to the final transcription. This functionality posed one of the main technical challenges of the platform, as music notation rendering libraries primarily focus on score rendering and do not provide native support for visualizing editorial differences. Consequently, by using the rendering engine low-level API, custom rendering logic

was developed to compute and display insertions, deletions, and modifications within musical notation.

Although the interface was primarily designed for desktop environments, it is fully responsive and adapts to a wide range of screen sizes and devices. Regardless of the viewing platform, users retain quick access to all available content and functionality through a layout optimized for the corresponding display.

4.2 Search and discovery

To support efficient exploration of the collection, the platform provides several mechanisms for search and discovery leveraging fast fuzzy search algorithms with different levels of importance assigned to fields such as titles and lyrics. A persistent search bar is available throughout the interface, enabling users to quickly locate lauda, sources, or other indexed content from any page of the platform.

For more targeted queries, a dedicated search interface offers advanced search capabilities through a comprehensive set of filters. Users can refine results according to multiple criteria, including textual content, source type, geographic area, source centuries, and other cataloged attributes. This approach supports both exploratory browsing and precise scholarly research workflows.

The platform also facilitates source-oriented navigation through dedicated source pages, providing users with an overview of its contents. This organization allows researchers to examine both individual lauda and their broader manuscript context, supporting studies focused on specific sources as well as comparative analyses across the collection.

4.3 Comparative analysis workspace

For comparative analysis and research-oriented workflows, the platform includes a dedicated board workspace built around an infinite canvas paradigm. This environment enables users to organize and examine multiple pieces of information simultaneously, supporting the creation of customized layouts tailored to specific analytical tasks.

The board is composed of panels that can display different representations of a lauda, including manuscript images, musical notation, lyrics, and metadata. Panel content is interchangeable, allowing users to switch between different types of information for the same lauda without modifying the overall layout. This flexibility facilitates the comparison of multiple works, sources, and editorial representations within a single workspace.

Users can freely arrange, resize, group, and remove panels, enabling the construction of complex analytical views adapted to individual research needs. The infinite canvas design removes spatial constraints, allowing large collections of materials to be organized and explored simultaneously. By supporting highly customizable visual arrangements, the board serves as a flexible environment for comparative study, annotation, and scholarly investigation.

To support long-term research activities, the state of the board is automatically persisted between sessions through local storage, allowing users to resume their work without needing to recreate previously established layouts and comparisons.

5. CONCLUSIONS AND FUTURE WORK

This paper presented a web-based platform for the exploration and scholarly analysis of medieval Italian lauda, integrating manuscript images, musical notation, lyrics, critical information, and metadata within a unified interface. Advanced search capabilities, synchronized visualizations, and a flexible comparison workspace provide researchers with a comprehensive environment for accessing, studying, and comparing historical musical sources across different devices.

Future work may define a formal data schema for platform ingestion and visualization, facilitating the integration of collections produced through alternative digitization and encoding workflows while reducing dependencies on the current data preparation process and improving interoperability with external repositories. A structured user study with musicologists and philologists will also formally assess the platform's usability and effectiveness in supporting scholarly research workflows.

6. REFERENCES

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