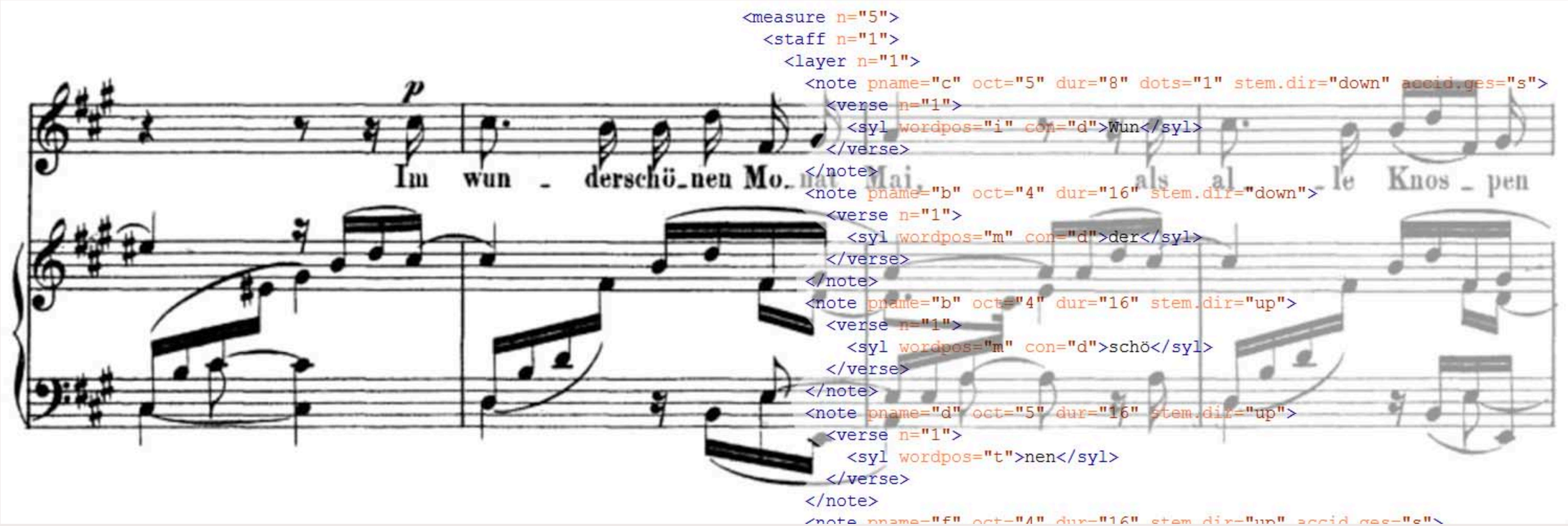
Music Encoding Initiative

MUMT-621 Assignment 2

Yifan Huang 2022.02.07

Why encoding?

Unstructured/human-readable data → Structured/machine-readable data



What's MEI

- The Music Encoding Initiative (MEI): a community-driven, open-source effort to define a system for encoding musical documents in a machine-readable structure.
- Based on eXtensible Markup Language (XML) schema
- Several notation systems are supported, including common Western music notation (CWMN), mensural notation, neume notation, and guitar and lute tablature.
- In addition, MEI can record the relationships between notational features and digital page images and audio recordings.
- It can also encode information about the notation and its intellectual content in a structured and systematic way.

mei（"pretty"）

"What Is MEI?" n.d. Accessed February 6, 2022. https://music-encoding.org/about/.

MEI History

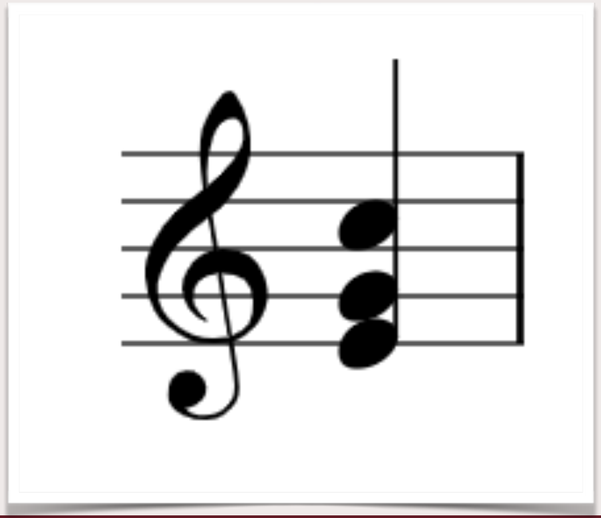
- **In 1999**, Perry Roland created an XML schema (DTD) for the representation of music notation. Eventually, this DTD became known as MEI, drawing on the same principles that guided the creation of the Text Encoding Initiative (TEI).
- Perry presented his initial work at the first ISMIR conference **in 2000.**
- The first of the two workshops took place in Charlottesville, Virginia, July 29th-31st, **2009**. At this meeting it was decided that MEI held promise as an open-source, scholarly standard for music representation. This workshop marked the beginning of MEI development as an international community-driven effort.
- **In 2013**, the first Music Encoding Conference was held in Mainz, Germany. This offer prompted the community to formalize its governance structures, leading to the introduction of the MEI Community By-laws, the Technical Team, Interest Groups, and the MEI Board which oversees the activities of the community.

"What Is MEI?" n.d. Accessed February 6, 2022. https://music-encoding.org/about/.

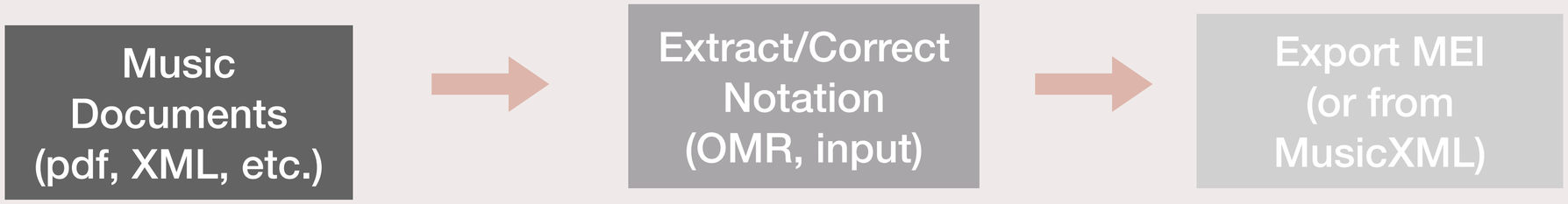
MEI & XML

- XML is a hierarchical encoding system
- Elements are the core objects in an XML representation, and are represented using “tags.”
- Attributes of an element are used to define properties of a particular object and are represented as key-value pairs

```
<chord dur= "4">
<note pname="e" oct="4" dur="4"/>
<note pname="g" oct="4" dur="4"/>
<note pname="c" oct="5" dur="4"/>
</chord>
```



Simple workflow to get MEI

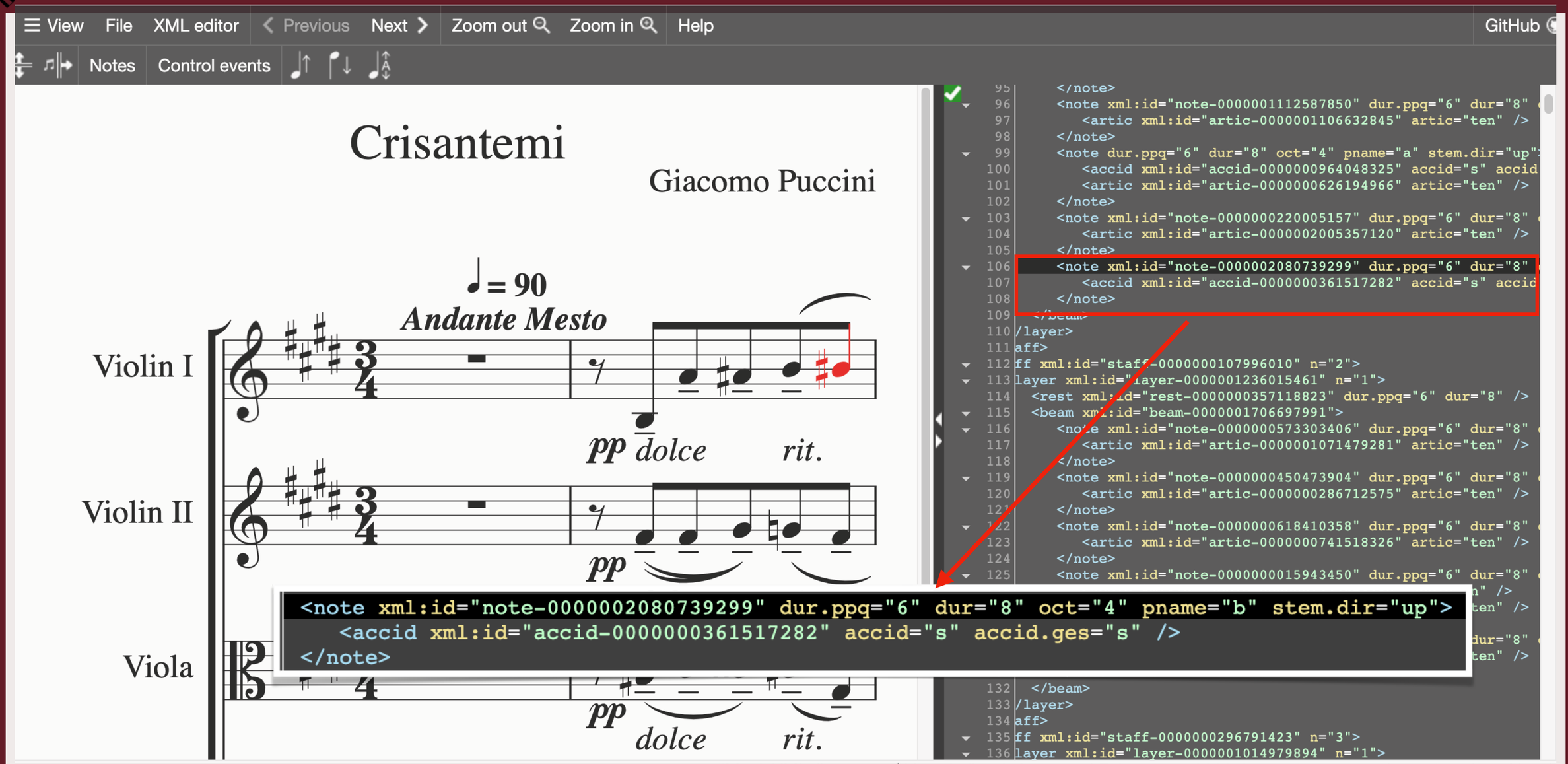


Useful tools

- **Verovio**
  - A fast, portable and lightweight open-source library for engraving Music Encoding Initiative (MEI) music scores into Scalable Vector Graphics (SVG).
  - Supports conversion from MusicXML to MEI.
  - Online editor and online code generation
- **MEI Encoding Tools (Github)**
  - XSLT Stylesheets for converting MEI to other formats (e.g., MusicXML, MARC, MODS, etc.)
  - XSLT Stylesheets for converting other formats to MEI (e.g., MusicXML, MARC)

(Laurent, Zitellini, and Roland 2014)

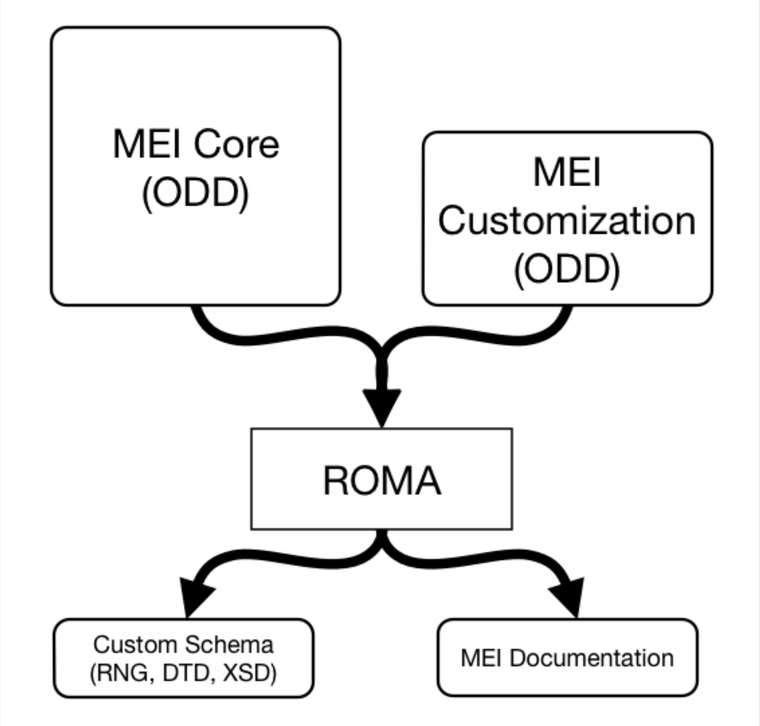
"GitHub - Music-Encoding/Encoding-Tools: Tools for Working with or Transforming MEI Encodings." n.d. Accessed February 6, 2022. https://github.com/music-encoding/encoding-tools.



"MusicXML Converter | Verovio." n.d. Accessed February 7, 2022. https://www.verovio.org/musicxml.html.

MEI Schema Customization

- The MEI Schema may be customized to express and validate different types of music documents.
- ‘ODD’ (“One Document Does it All”) is a TEI XML format used to express schema fragments, prose documentation, and reference documentation for any XML markup scheme as a single document.
- The first is the MEI “core” ODD file. This contains the rules and definitions of the behaviors of all elements supported by MEI, in all modules. The second is a “customization” file. This file, also written using ODD, is used to modify the encoding features supported in the generated schema, either by altering the behavior of the core MEI elements or by defining new ones.
- Roma is a web-based interface for creating TEI customizations, which allows you to fill in simple forms to choose modules, add and delete elements, change attributes, and make other customizations.

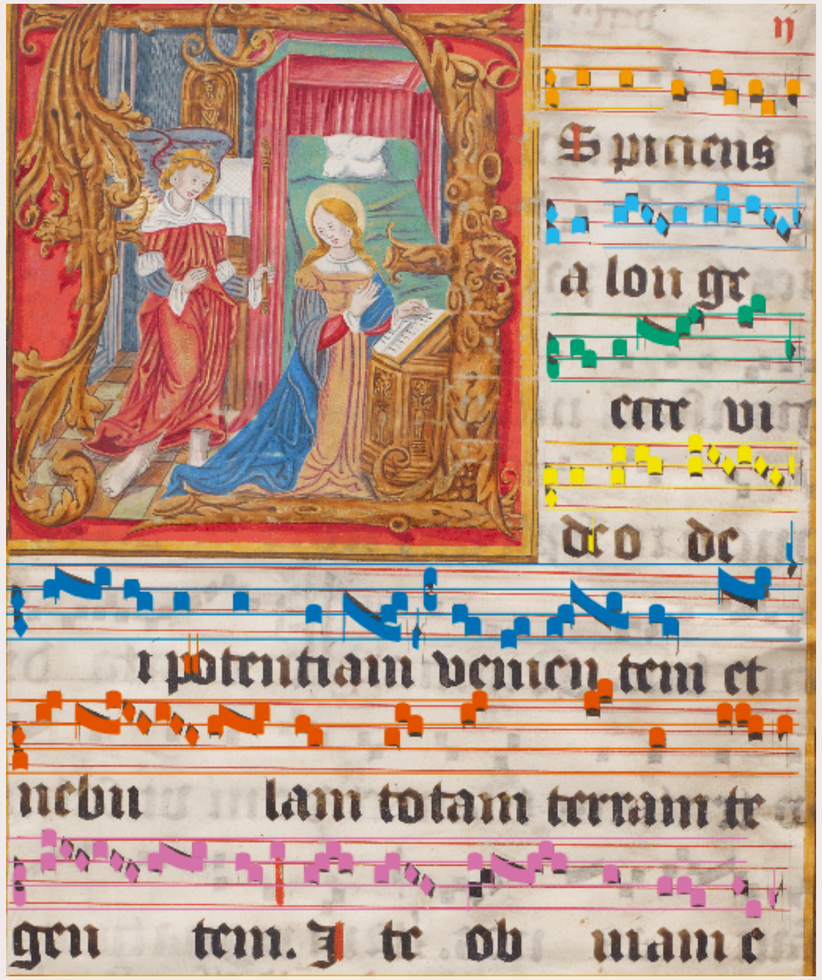


MEI Schema Customization

“GitHub - Music-Encoding/Encoding-Tools: Tools for Working with or Transforming MEI Encodings.” n.d. Accessed February 6, 2022. https://github.com/music-encoding/encoding-tools.

MEI & Neon

- Neon.js is an online and open-source neume notation by DDMAL
- It is based on MEI format and the changes can be reflected in the underlying MEI file.
- It can be used to correct errors made in the process of OMR in a crowdsourcing way.
- Neon.js supports MEI as a digital data representation for square-note notation and uses open-source software libraries to facilitate manipulation of this data format.
- Neon2 is a successor to Neon.js. Neon2 uses the functionality of Verovio for manipulating, validating, and rendering MEI documents in the browser. It is more usability and flexibility.



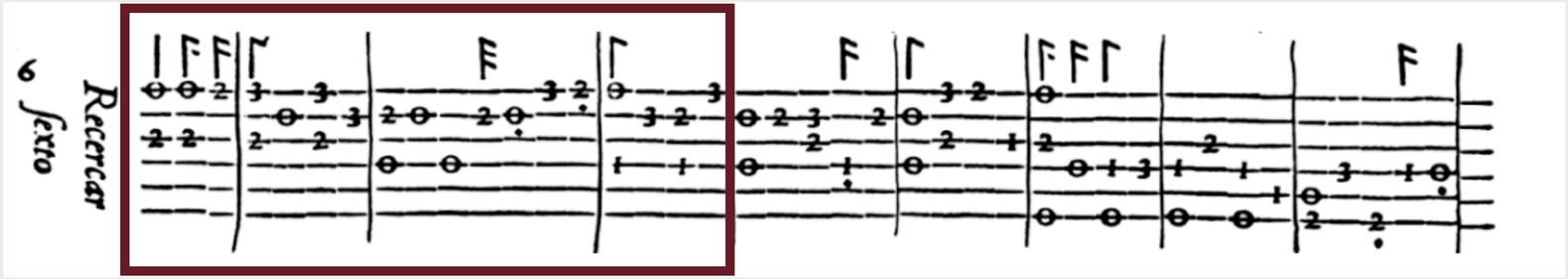
Neon2 rendering an MEI file over the source image with each <staff> element's contents highlighted in different colours. Image taken from the Salzinnes Antiphonal (CDM-Hsmu 2149.14) manuscript.

(Burlet et al. 2012; Regimbal et al. 2019)

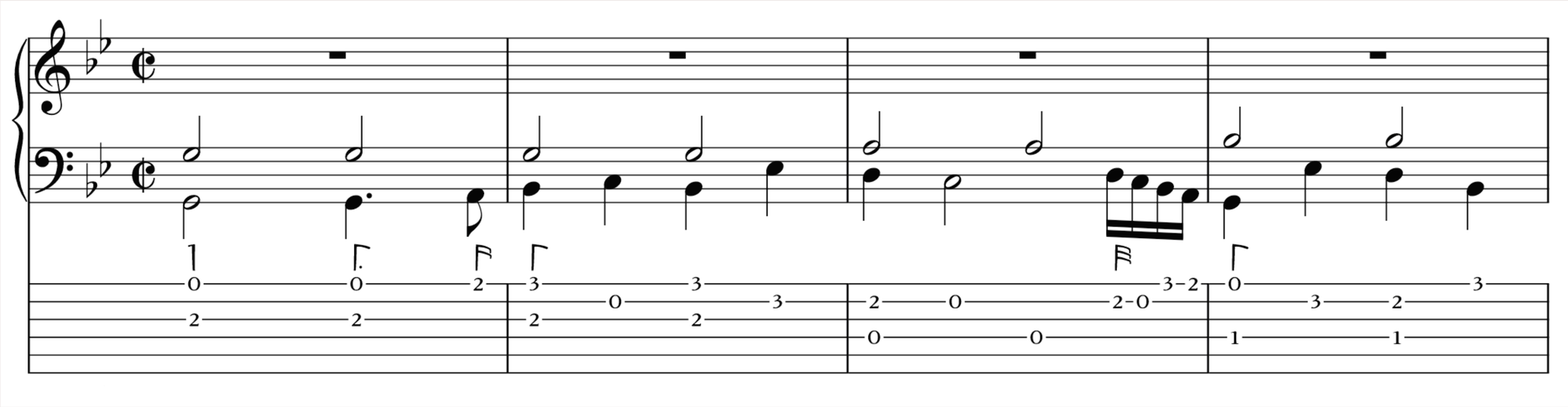
TabMEI

- A Module for encoding instrumental tablatures.
- A substantial part of Western art music for plucked, bowed, and keyboard instruments from roughly the early 16th to the late 18th century is notated in tablature, a prescriptive notation system that provides the actions a player must take rather than a description of the sounds these actions produce
- The mid-20th century saw a revival of tablature for plucked instruments — principally the same as the earlier system, but now for modern (electric) guitar and bass guitar — with the rise of popular music, enabling a large audience to reproduce its favourite music.
- In this early stage, TabMEI focuses on plucked instruments, and inlcudes historical lute tablature and tablature for the modern (electric guitar).
- It is compatible with the Verovio CMN and mensural music renderer

(Valk et al. 2015)



Giovanni Maria da Crema, Intabolatura de lauto, Libro primo (Venice, 1546). Recercar sexto, first system. Italian lute tablature with numbers indicating the frets and lines indicating the courses to be played.



Verovio rendering of the tablature fragment

(Valk et al. 2015)

Future

- Include more non-Western notation
- Include more “creative” modern notation
- Include more detailed modules
- Expand data creation possibilities: develop more plug-in for other notation software
- Improve online editor
- Grow MEI community

Technical team

The Technical Team consists of interested developers and two Board-appointed Co-Chairs. The Co-Chairs act as administrative chairs of the Technical Team, e.g. calling meetings and coordinating development efforts. They also have administrative privileges for the MEI repositories. The MEI Technical Team holds regular virtual and in-person meetings, maintains the MEI repository on GitHub (https://github.com/music-encoding), prepares new releases of MEI by reviewing and implementing revisions and features requested by the community, and supports the wider MEI community with their technical expertise.

- **Benjamin W. Bohl (Technical Co-Chair)**, Institut für Musikwissenschaft, Goethe Universität Frankfurt, Frankfurt am Main and Musikwissenschaftliches Seminar Detmold/Paderborn
- **Johannes Kepper (Technical Co-Chair)**, Musikwissenschaftliches Seminar Detmold/Paderborn
- **Andrew Hankinson**, RISM Digital Center, Bern
- **Perry Roland**, Alderman Library, University of Virginia, Charlottesville
- **Ichiro Fujinaga**, McGill University, Montréal
- **Laurent Pugin**, RISM Digital Center, Bern
- **Klaus Rettinghaus**, Enote, Berlin
- **Daniel Röwenstrunk**, Musikwissenschaftliches Seminar Detmold/Paderborn
- **Craig Sapp**, Center for Computer-Assisted Research in the Humanities, Stanford University
- **Raffaele Viglianti**, Maryland Institute for Technology in the Humanities
- **Thomas Weber**, Notengrafik Berlin GmbH

Reference

1. “GitHub - Music-Encoding/Encoding-Tools: Tools for Working with or Transforming MEI Encodings.” n.d. Accessed February 6, 2022. https://github.com/music-encoding/encoding-tools.

2. “What Is MEI?” n.d. Accessed February 6, 2022. https://music-encoding.org/about/.

3. “TEI: Text Encoding Initiative.” n.d. Accessed February 6, 2022. https://tei-c.org/.

4. Burlet, Gregory, Alastair Porter, Andrew Hankinson, and Ichiro Fujinaga. 2012. “NEON.Js: Neume Editor Online.” Proceedings of the 13th International Society for Music Information Retrieval Conference, ISMIR 2012, no. Ismir: 121–26.

5. Regimbal, Juliette, Zoe McLennan, Gabriel Vigliensoni, Andrew Tran, and Ichiro Fujinaga. 2019. “Neon2 : A Verovio-Based Square-Notation Editor.” In Music Encoding Conference Proceedings.

6. Valk, Reinier de, David Lewis, Tim Crawford, Ryaan Ahmed, Laurent Pugin, and Johannes Kepper. 2015. “Crafting TabMEI, a Module for Encoding Instrumental Tablatures.” In Music Encoding Conference Proceedings, 75–82.

7. Pugin, Laurent, Rodolfo Zitellini, and Perry Roland. 2014. “Verovio: A Library for Engraving MEI Music Notation into SVG.” Proceedings of the 15th International Society for Music Information Retrieval Conference, ISMIR 2014, no. Ismir: 107–12.

8. Roland, Perry. 2000. “XML4MIR: Extensible Markup Language for Music Information Retrieval.” In Proceedings of the 1st International Symposium on Music Information Retrieval, 9p. Plymouth, Massachusetts, USA.

Thank you!

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