



Semantic Linking of  
Information, Content  
and Metadata for  
Early Music  
(*SLICKMEM*)

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# People

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# Early Music Online

(EMO, JISC Rapid Digitisation, 2011)

Digitised from archival microfilms and newly catalogued by the BL

300 books of 16<sup>th</sup>-century printed music

Roughly 10,000 pieces of music

Most is vocal music in partbooks, not scores

About 30 books in various forms of tablature (mostly lute, but also guitar and keyboard); including many arrangements of vocal music



# Electronic Corpus of Lute Music (ECOLM III, AHRC 2012)

Music in lute tablature encoded in *TabCode*

Metadata managed in SQL database

Web-based interface for viewing, editing and playback of lute music

EMO lute books captured by automatic encoding using Optical Tablature Recognition

Correction of OTR raw data crowd-sourced to lute-playing experts using web interface

EMO vocal music captured by OMR (Aruspix)

# Lute tablature

7  
di F. da Milano.  
Demon triffe

The image displays four systems of lute tablature, each consisting of six horizontal staves. The notation is a form of shorthand where rhythmic values are indicated by flags (vertical lines) above the staves, and fret positions are indicated by numbers (0-5) placed on the lines. The first system begins with a '7' and the text 'di F. da Milano.' and 'Demon triffe'. The tablature is organized into measures, with some measures containing multiple flags and numbers. The notation is dense and characteristic of early lute music manuscripts.

# EMO metadata

BL MARC records exported as XML

New cataloguing includes a range of types of musicological, bibliographical and historical information

Also often includes details of physical condition, printing history and ownership

Lists musical contents with composers where known, but does not describe detailed locations of musical items in the part-books

Names can include composers, poets, printers, publishers, sponsors, dedicatees, owners (early and modern)

# EMO metadata

<b>Standardised Title</b>	Melodia olympica di diversi eccellentissimi musici a IV, V, VI et VIII voci, nuovamente raccolta da Pietro Philippi Inglese, et data in luce.
<b>Transcribed Title</b>	Transcribed title page from canto part book: MELODIA OLYMPICA / DI DIVERSI ECCELLEN- / TISSIMI MVSICI A IIII. V. VI. ET VIII. / VOCI, NVOVAMENTE RACCOLTA / DA PIETRO PHILIPPI INGLESE, / ET DATA IN LVCE. / Nella quale si contegono i piu Eccellenti Madrigali / che hoggidi si cantino.
<b>Date</b>	1594
<b>Imprint</b>	IN ANVERSA. / Appresso Pietro Phalesio & Giouanni Belloero. / M. D. XCIIII.
<b>Format</b>	Copy at A.344.f. Canto (36 leaves), Alto (36 leaves), Tenore (36 leaves), Basso (36 leaves), Quinto (29 leaves), Sesto (16 leaves); Canto, Alto, Tenore, Basso: [1]-36 fols. Quinto: [1], 10-37 fols. [fol. 37 is an additional Basso part]. Sesto: [1], 23-37 fols. [fol. 37 is an additional Tenore part]; paper dimensions: 155 x 204 mm.
<b>Place</b>	Antwerp, Belgium
<b>Subject</b>	Madrigals, Italian
<b>Language</b>	Italian
<b>Type</b>	Printed music
<b>Source</b>	British Library A.344.f.
<b>Related</b>	Susan Lewis Hammond, 'Selling the madrigal: Pierre Phalèse II and the four



# EMO metadata

The dedication to Giulio Balbani by Peter Philips, dated 'Primo di Dicembre 1590', suggests the plate was taken from the first edition of the work in 1591.

Instead of the dedication the Tenore, Basso, and Sesto part books give on fol. [1v] a laudatory poem by 'I. Gheesdalius' to 'Petro Phalesio' [the poem praises Phalesio's four madrigal anthologies: *Musica Divina*, *Harmonia Celeste*, *Symphonia Angelica*, and *Melodia Olympica*]. It is considered as one of the oldest surviving market strategies in music printing as the poem instructs the reader to buy all four anthologies (Hammond 2008, p. 225). The Quinto part book includes an additional Basso part for the eight-part madrigal 'Ditemi o Diva mia'; similarly, the Sesto part includes an additional Tenore part for the same madrigal.

Copy at A.344.f. With the flyleaf manuscript annotation: 'NB. Sir John Hawkins informs us (See Vol. 3 P. 174) that Petrus Phalesius of Antwerp the Printer of this Work, was a Man of Learning, and, as it should seem, a Lover of Music, for he published many other Collections of Music, and before his House had the Sign of David playing on the Harp.'.

## **Indexed names**

Anerio, Felice, ca. 1560-1614, composer.  
Baccusi, Ippolito, ca. 1540-1609, composer.  
Balbani, Giulio, dedicatee.  
Bassani, Orazio, d. 1615, composer.  
Bellasio, Paolo, 1554-1594, composer.  
Beller, Jean, 1526-1595, printer.  
Bell'haver, Vincenzo, 1530-1587, composer.

# EMO metadata

## Table of Contents

O com'è gran martire A celar suo desire / Andrea Pevernage -- A che piu strali Amor / Cornelio Verdonch -- Voi volete ch'io muoia / Pietro Philippi -- Non al suo amante piu Diana piacque / Luca Marenzio -- Morirò cor mio / Francesco Farina -- Ahi che farò ben mio / Rugiero Giovanelli -- Morì quasi il mio core / Gio. Palestina -- Donna i begl'occhi vostri mi fan guerra / Paulo Bellasio -- Si dolci son gli sguardi e si soavi / Gio. Battista Moscaglia -- Legò questo mio core / Gio. Maria Nanino -- Veramente in Amore / Gio. Palestina -- Amor sei bei rubini (seconda parte: Perche non poss'ahime) / Pietro Philippi -- Se d'altro mai non vivo / Gio. de Macque -- Amor io sent'un respirar si dolce / Guglielmo Blotagrio -- Solo e pensoso in piu deserti campi / Gio. Battista Moscaglia -- Dolci al pestre parole / Gio. Battista Mosto -- Lumi miei cari Che lampeggiat'un si veloce sguardo / d'Incerto [anon.] -- Spuntavan gia per far il mondo adorno (seconda parte: Quando'l mio vivo sol perch'io non pera) / Luca Marenzio -- Questa si bianca neve / Gio. Maria Nanino -- Clori mia pastorella / Giacomo Gastoldi -- Dolce fiammella mia / Gio. Maria Nanino -- Amor io non potrei / Guglielmo Blotagrio -- Fiammeggiavan due stelle a me d'intorno / Cornelio Verdonch -- Questo è quel chiaro fonte / Hippolito Baccusi -- Deggio dunque partire Lasso (seconda parte: Io partiro ma il core; terza parte: Ma voi caro ben mio) / Luca Marenzio -- Chi per voi non sospira / Anibal Zoilo -- Caro soave e desiato bene (seconda parte: Perche se troppo tardi tu vedrai) / Giacomo Gastoldi -- Non son le vostri mani / Gianetto Palestrina -- Poi che ne prieg'ancor / Oratio Bassani -- Ahi crudel stato mio / Fabritio Dentici -- Movi il tuo plettro Apollo / Lelio Bertani -- Il giovenil mio core s'alberao ma diletto /

# SLICKMEM Objectives

Establish concept-lists for EMO person names, places, dates, and work-titles; evaluate existing ontologies; basic RDF of EMO metadata

Express similar concepts in EMO metadata with Similarity Ontology

Link EMO/ECOLM metadata to external resources

Extract music features (pitch/ time, chroma) from encoded lute and vocal music; test geometric & n-gram pattern-matching across EMO/ECOLM

Develop pilot Music Description Ontology to express musical features

# Sources of error

OCR errors (necessitate human intervention)

Cataloguers have to deal with:

- 16-c spelling conventions (not really errors as such)

- Printing errors and conventions, abbreviations, etc.

- Some names existing in a wide variety of forms

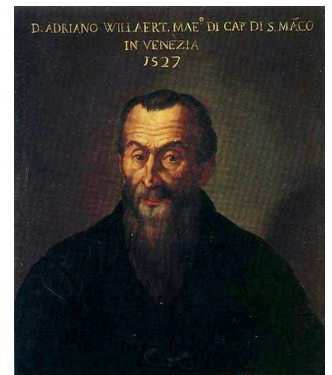
- The same musical work existing under various titles

Cataloguers sometimes make mistakes, too!

# Adrian Willaert

(c. 1490 – 1562)

<i>Adr. Vuillart</i>	<i>Adrian Willart</i>	<i>Adrianus Williard</i>
<i>Adri. Vuillart</i>	<i>Adriano</i>	<i>Adrien vvillart</i>
<i>Adrian Villart.</i>	<i>Adriano Vuigliart</i>	... etc.
<i>Adrian. Vuillart</i>	<i>Adriano VVillaert</i>	
<i>Adrian vuillart</i>	<i>Adrianus</i>	
<i>Adrian. Vvillaert</i>	<i>Adrianus Vuillart</i>	
<i>Adrian. VVillart.</i>	<i>Adrianus VVillart</i>	
<i>[Adrian Willaert]</i>	<i>Adrianus Willart</i>	



# 'Susanne un jour'

(Orlande de Lassus, 1532-1594)

*Susane un jour : canzone francese a cinque*

*Susanna*

*Susanna faire*

*Susanna frumb*

*Susanne ung iour*

*Susanne ung Jour*

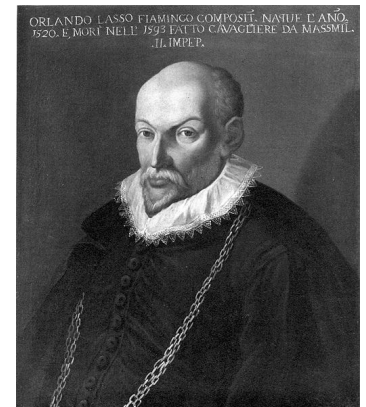
*Sussanna*

*Susane un jour d'amour sollicitée*

*Susane vn jour d'amour sollicitée*

*Susanne un jour d'amour sollicitée*

*Suzanne ung jour damour sollicitée*



# Authority lists

BL uses the Library of Congress Name Authority files for personal names

There are very few such lists for musical works

Relatively little of the music in EMO has been recorded

What about the rest?

# Music Information Retrieval (MIR)

We can use symbolic MIR methods to ascertain identity of musical works and disambiguate conflicts

Similar techniques can be used for music analysis and recognition of musical quotations

Also provides means to link with external resources, such as RISM OPAC

Publishing cumulative results of these investigations will provide a useful resource



# Future work

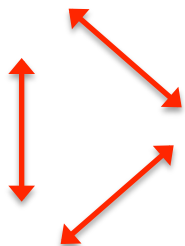
Hopefully, EMO will soon expand to include over 2,000 early printed music books at BL

Match score-content with recordings  
(combining symbolic MIR with audio MIR)

Link EMO data with BBC Early Music Show archive as proof of concept for wider linking of broadcast music with scores and other resources

IACHET MONTRISTE

Qui tollis peccata mundi miserere nobis, qui tollis peccata mundi deprecationem nostram,  
 ad dexteram patris, miserere nobis, quoniam tu solus sanctus,  
 tu solus altissimus Iesu Christe cum sancto spiritu in gloria dei patris, Amen. in  
 gloria dei patris, Amen. **P**atrem omnipotentem factorem caeli et terrae,  
 visibilia omnium, et invisibilia, Iesum Christum filium  
 dei unigenitum, ante omnia saecula, deum de deo, lumen de lumine, deum verum



7 Demonriche  
 de la Milano.

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