

# Ontology for Analytic Claims in Music (OMAC)

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Last update (Dec 2022)

# Overview

**Part I:** Research context and OMAC ontology (main)

**Part II:** Insights on ontological analysis (brief)

**Conclusions**



The Concert (1623) by [Gerard van Honthorst](#)

## **Part I:** Research context and OMAC ontology

# General research context

Semantic Web languages, models, and technologies:

- Used to handle **musical data** on the basis of an **explicit formal** treatment of domain experts' knowledge

See the paper for some references, as well as the following **Web repository**:

- **MusoW** - Musical Data on the Web: <https://musow.kmi.open.ac.uk/> (by Enrico Daga et al.)

# From music to musicology

The world of music is highly heterogeneous:

- Different **types of entities** (musical compositions, scores, editions, performances, performing requirements, composers, performers, etc.)
- Different **genres, styles, cultures, historical periods**, etc.

It is becoming common for scholars to express:

- **Features** of musical entities like who is the composer of a composition, when a composition was composed, what are its performing requirements ... but also ...
- **Observations** (aka **scholarly/analytic claims**). For example:
  - About authorship
  - About similarity
  - About date, etc.

# Our work

- To provide an **ontology of music for musicology** that represents both basic aspects of musical entities as well as scholarly analytic claims
- Main focus on: **Early Music** (1200-1600)\*

In such a way to **represent** and **share** research results on **Linked Data publishing** platforms

Development and driving insights based on: **CRIM - Citations: The Renaissance Imitation Mass Project** (ACLS grant - American Council of Learned Societies)

**CRIM**

*Citations: The Renaissance Imitation Mass Project*

<https://crimproject.org/>

# Ontology for Analytic Claims in Music (OMAC)

Ontology in OWL

Reuse **existing resources**, e.g.:

- [DBpedia ontology](#): for some classes and relations (e.g., dbp:birthPlace, etc.)
- [Dublin Core](#): for annotations (e.g., dcterms:title, etc.)
- [SKOS](#): for labeling (e.g., skos:prefLabel, etc.)
- [VIAF](#): (testing) to populate the ontology with specific musical works and composers

**Available** on GitHub: <https://github.com/HCDigitalScholarship/OMAC>

# Competency questions (CQs)

Some CQs driving the development of the ontology:

- Who is the **composer** of musical work  $x$ ?
- **When** was musical work  $x$  composed?
- Which **authorial parts** (sections and subsections) do  $x$  have (if any)?
- What are the **performing forces** of musical work  $x$ ?

Some common  
features of musical  
entities

- Which **observations** are about musical work  $x$ ?
- What is the **model for** musical work  $x$ ?
- What is the **derivative of** musical work  $x$ ?
- What is the musical schema of **analytic segment**  $x$ ?

Observations (relative  
to claim-classes in  
CRIM)



# A quick note - Authorial Structure

- Musical **Work** (a whole composition), e.g.,
  - *Missa je suis desheritée* (MJSD; by Jean Guyon) **[with sections and subsections]**
  - *Ite rime, dolenti* (Cipriano de Rore) **[with sections only]**
  - *Tota pulchra es* (by Claudin de Sermisy) **[no further decomposed]**
- Musical (**authorial**) **sections**, e.g.,:
  - *Kyrie\_MJSD*, *Gloria\_MJSD*, *Credo\_MJSD*, *Sanctus\_MJSD*, and *Agnus Dei\_MJSD*  
(customary five liturgical sections of the Ordinary of the Catholic Mass)
- Musical (**authorial**) **subsections**, e.g.,:
  - A Kyrie has three subsections: *Kyrie1\_MSJD*, *Christe\_MSJD*, *Kyrie\_MSJD*

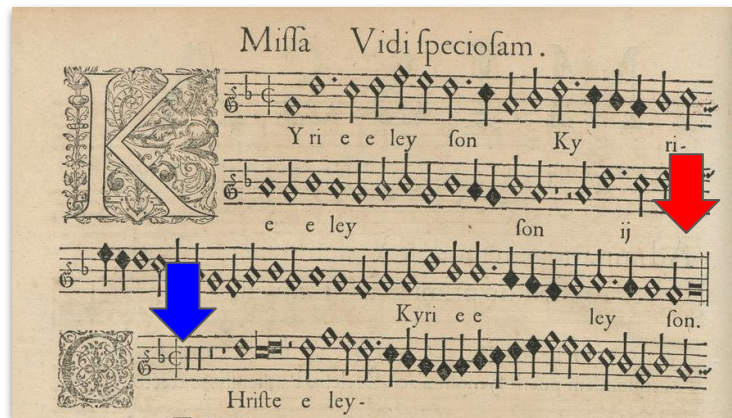
# A quick note – Authorial Structure

An example from Renaissance Paris:

Two sections from the **first movement** (Kyrie) of the

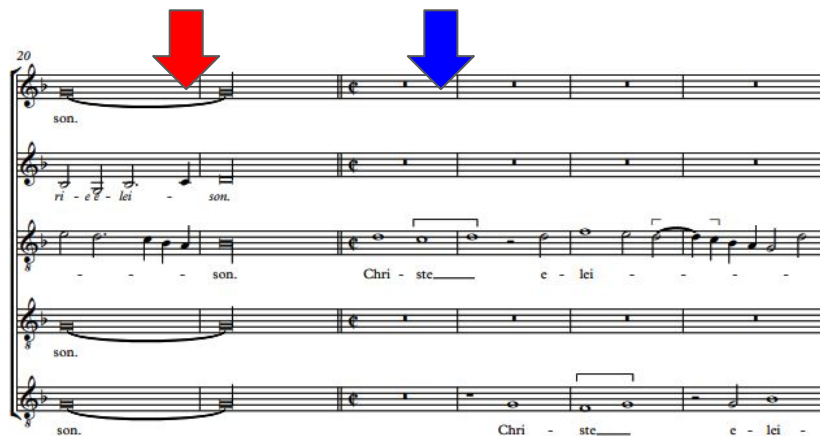
*Missa Vidi speciosam*, by **Mathieu Sohier**.

They are distinct but inseparable parts of a single movement of a larger work.



End of Kyrie

Beginning of Christe

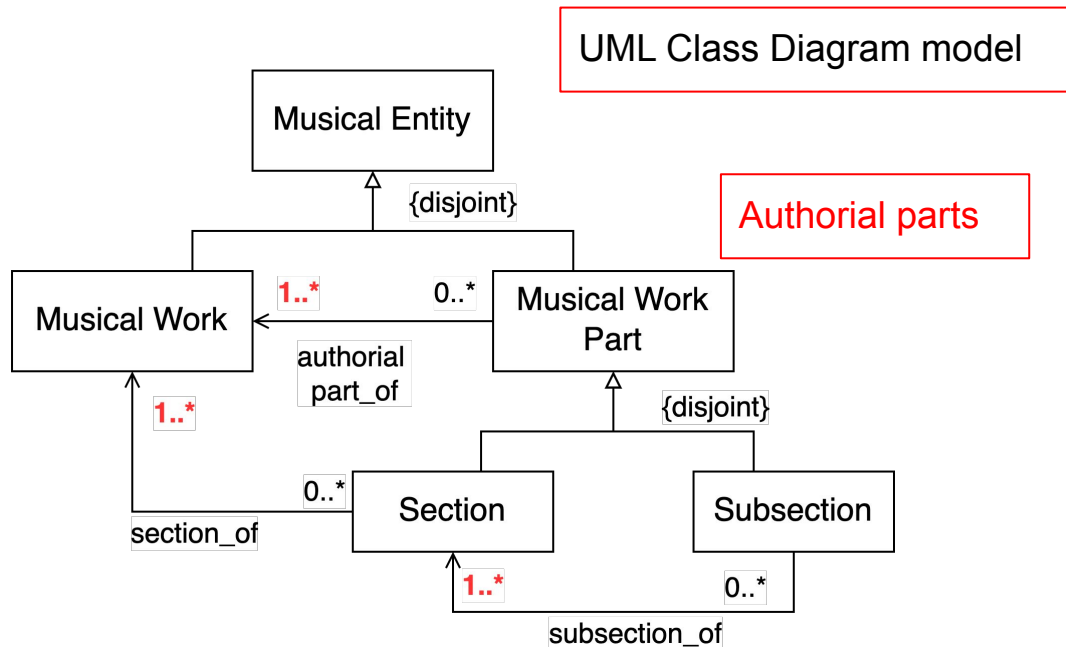


# Musical Work (partial view)

**Controversial** among music scholars whether the same authorial part can be related to **multiple** entities.

- We tend to think that this is **not** possible
- The **identity** of an authorial part is bound to a specific author/musical entity
- In principle, relations of **derivations** could be included to tell that, e.g., a section derives from another one

At the current state, the ontology does **not** use cardinality restrictions for the authorial structure of musical entities



OWL 2 object property chains like:

- has section o has subsection → has subsection

# Example of mass from CRIM's project

## CRIM

*Citations: The Renaissance Imitation Mass Project*

About ▾ Documents ▾ Analysis ▾ Forum

Missa O gente brunette [CRIM\_Mass\_0003]

*Mass*

**Genre**

Composer: Nicolas De Marle, 1568

**Work**

**Composer**

See: [http://crimproject.org/masses/CRIM\\_Mass\\_0003/](http://crimproject.org/masses/CRIM_Mass_0003/)

### Parts

#### *Mass movements*

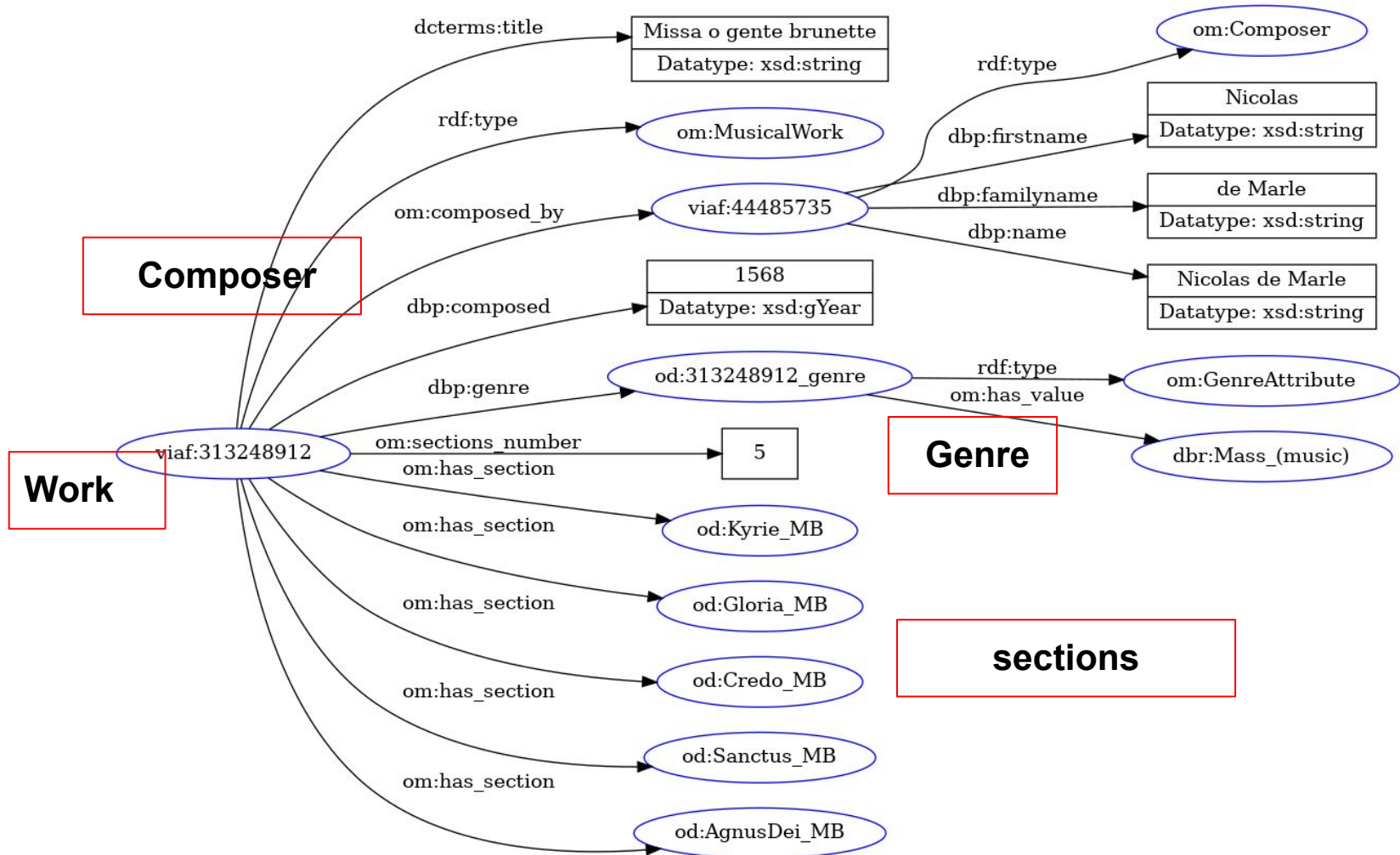
  [Kyrie](#)

  [Gloria](#)

  [Credo](#)

  [Sanctus](#)

  [Agnus Dei](#)



# Observations (aka claims)\*

Some aspects of observations:

- An observation represents the properties under which an entity is **classified by an agent** on the basis of certain procedures, research studies, background knowledge, socio-cultural contexts, etc.
- **Do not** necessarily represent true facts (e.g., mistake in authorship attribution)

Also, there can be **multiple observation** about the same entities – expressed by different scholars (sometimes independently from each other). Hence, it is possible that obs:

- Are not compatible
- Contradict each other
- Represent information at different abstraction levels
- Are reviewed in time

\*Based on on-going work with **Claudio Masolo** and **Roberta Ferrario** at **ISTC-CNR**

# Observations in CRIM

In the context of the CRIM project, musicologists focus on **two types** of obs:

- About structure
- About similarity

For some technical readings, see:

<https://sites.google.com/haverford.edu/crim-project/vocabularies/musical-types>

<https://sites.google.com/haverford.edu/crim-project/vocabularies/relationship-types>

# Observations in OMAC (insights)

Representing claims requires considering at least:

- Agent ([who](#)), time ([when](#)), "content" ([what](#))

Some modeling elements OMAC for the general modeling of observations:

- Observation ([class](#))
- observed\_by, concerns ([object properties](#)); stated\_at ([data property](#))

+ specific claim-classes/relations; e.g., **StructureObservations**, **SimilarityObservations** (covers various subclasses):

- has\_model, has\_derivative + specific CRIM relations



# An observation from the CRIM Project

## About Structure

### Observation <1>

Observer: *Ian Lorenz*

<R1> Quotation — Model for <2> Missa Tota pulchra es: Credo

Score: *Claudin de Sermisy, Tota pulchra es*

< start >

### Tota pulchra es

Superius

Contratenor

Tenor

Bassus

### Fuga

#### Voices:

- 1: Superius
- 2: Contratenor

**Entry intervals:** 4-

**Time intervals:** B2

**Regularity:** -

**Inverted:** False

**Periodic:** False

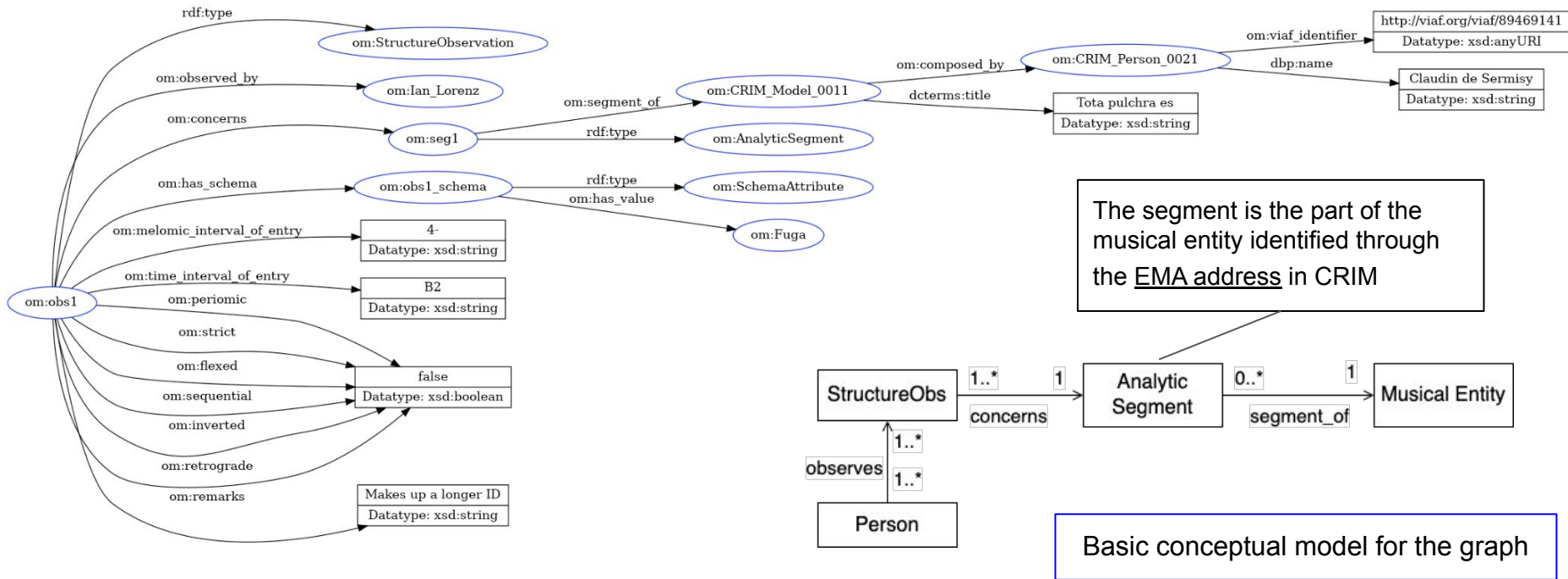
**Retrograde:** False

**Sequential:** False

**Remarks:** Makes up a longer ID

See data here: <https://crimproject.org/observations/1/>

## In RDF (data) graph according to OMAC



# A CRIM Relationship

## Relationship <R2>

[Duplicate this relationship]

**Observer:** *Ian Lorenz*

Non-mechanical transformation

Extent: -

**Remarks:** Shifted and transposed

Activity: -

Sounding in different voices: -

Whole passage transposed: -

Whole passage metrically shifted: -

Melodically inverted: -

Retrograde: -

New counter subject: False

Old counter subject shifted metrically: True

Old counter subject transposed: False

Double or invertible counterpoint: -

New combination: False

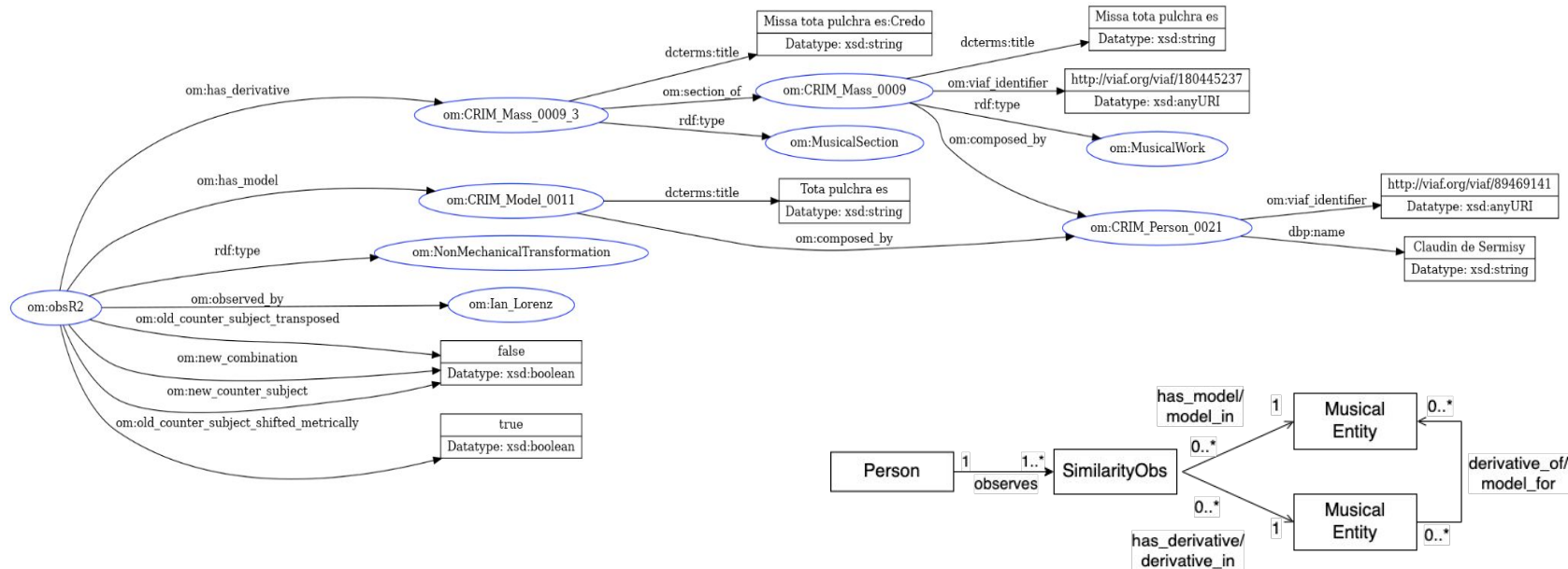
Self: -

**Model:** *Claudin de Sermisy, Tota pulchra es*

**Derivative:** *Missa Tota pulchra es: Credo*

See **data** here: <https://crimproject.org/relationships/2/>

# In RDF (data) graph according to OMAC



TO BE CHECKED HOW THIS IS  
REPRESENTED IN CRIM

Basic conceptual model for the graph

## **Part II:** Insights on ontological analysis



# What is a musical work?

This is **hotly debated** in, e.g., philosophy and musicology (see paper for references).

In different contexts, including common sense, people often classify, e.g., multiple scores as **alternatives** for the same work (≡ literary works in different editions)

But then:

- **What kind** of entity is a musical work? **Plethora** of opinions, e.g.,
  - a. Abstract Platonic entity
  - b. Mental entity in individuals' minds
  - c. etc.

For some discussions, see: Sanfilippo, E. M. (2021). [Ontologies for information entities: State of the art and open challenges](#). *Applied ontology*, 16(2), 111-135.

# What is a musical work?

“[W]ithin the tradition of what we call [...] Western art music, it has seemed axiomatic until quite recently that the basic unit of artistic production and consumption is the ‘**work**’ - a hard-edged artefact with a clear identity. [T]his common-sense or perhaps naive view is increasingly coming **under fire** from several sides.”

Talbot, M. (2000). Introduction, in: The musical work: reality or invention? Liverpool University Press

Scholars of **Renaissance music** often confront rival versions of a musical text that strain our very notion of the **stable work** in the first place.

# What is a musical work?

Our intuition:

- From a library science perspective, a musical work is a **documentary entity** useful for classification purposes to support computational tasks, e.g., relative to data management
- **But then** ... the classification of, e.g., multiple scores as alternatives for the same work is an **interpretative act**; e.g., experts sometimes disagree on how to classify a work and its arrangement(s)
- From this perspective, a musical work is a **cultural artifact** relative to specific interpreting communities

Wrt to OMAC:

- The cultural nature of (more generally) **musical entities** is not made explicit in the axiomatic structure since this would require a heavier logical machinery (see: Masolo, C., Sanfilippo, E. M., Ferrario, R., & Pierazzo, E. (2021). [Texts, Compositions, and Works: A Socio-Cultural Perspective on Information Entities](#). In JOWO 2021, CEUR vol. 2969.)



# Conclusions

Main result:

- OMAC - Semantic Web ontology in OWL - of music for musicology to express features of musical entities but also musicological claims

Future work includes:

- Further refine/test OMAC wrt CRIM and other collaborations
- Implement the ontology in an application setting relative to CRIM; use of an **Ontology-Based Data Access** (OBDA) architecture based on [OnTop](#) to connect OMAC to the project relational database in such a way to make some portions of the project data available in RDF (see next slides for insights)

# Linking OMAC to CRIM's relational DB (ongoing work)

[OBDA architecture](#) via mappings between (some portions of) the CRIM's relational database and OMAC (to be developed)

About OBDA:

[Diego Calvanese](#), Tutorial on [Ontology-based Data Access Made Practical](#), held at the EDBT-INTENDED Summer School 2022 on Data and Knowledge (EDBT-INTENDED 2022). Bordeaux, France, 4-9 July 2022.

Edit Triples Map

Mapping ID: MAPID-mass

Target (Triples Template):

```

:{mass_id} a :MusicalWork ;
    dbp:genre :{mass_id}_genre ;
    dcterms:title {title}^^xsd:string ;
    :composed_by :{composer_id} .

:{mass_id}_genre a :GenreAttribute ;has_value :{genre_id} .

```

Source (SQL Query):

```

select * from crim_crimmass

```

SQL Query results:

id	mass_id	title	...	genre_id	composer_id	date	date_sort	max_number_of_voices	min_number_of_voices
113	CRIM_Mass_0005	Missa Ave Maria		mass	CRIM_Person_0015	1515	1515	4	4
114	CRIM_Mass_0006	Missa Je suis dé...		mass	CRIM_Person_0018	1556	1556	5	4
115	CRIM_Mass_0007	Missa Je suis dé...		mass	CRIM_Person_0020	1557	1557	6	4
158	CRIM_Mass_0050	Missa Susanne u...		mass	CRIM_Person_0082			0	0
117	CRIM_Mass_0009	Missa Tota pulch...		mass	CRIM_Person_0021	1556	1556	4	4
118	CRIM_Mass_0010	Missa Voulant ho...		mass	CRIM_Person_0021	1556	1556	5	4
119	CRIM_Mass_0011	Missa Je n'en pu...		mass	CRIM_Person_0024	1557	1557	5	4
120	CRIM_Mass_0012	Missa Si bona su...		mass	CRIM_Person_0026	1557	1557	4	4
121	CRIM_Mass_0013	Missa Quo abiit ...		mass	CRIM_Person_0028	1556	1556	5	4

Example of **OBDA mapping** via Ontop's plugin on Protégé:  
it instantiates CRIM's masses as OMAC's musical works.

SPARQL query editor:

SPARQL Query

PREFIX dcterms: <http://purl.org/dc/terms/>  
 PREFIX : <http://www.omac.org#>  
 PREFIX dbo: <http://dbpedia.org/ontology/>  
 PREFIX dbp: <http://dbpedia.org/property/>  
 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

SELECT ?work ?workTitle ?composer ?composerName  
 WHERE  
 {  
 ?work a :MusicalWork;  
     dcterms:title ?workTitle;  
     dbp:genre:has\_value :mass.  
 ?work :composed\_by ?composer.  
 ?composer dbp:name ?composerName

Show 0 or ☒ all results. ☐ Use short IRIs

Stop Execute

Execution time: 403ms. Solution mappings returned: 50.

SPARQL results SQL translation

work	workTitle	composer	composerName
<http://www.omac.org#CRIM_Mass_0034>	"Missa lo mi son giovinetta"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0035>	"Missa Quem dicunt homines"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0036>	"Missa Nigra sum"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0037>	"Missa Gabriel archangelus"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0038>	"Missa Spem in alium"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0039>	"Missa Sicut"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0040>	"Missa Inviolata"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0041>	"Missa Nasce la gioia"^^xsd:string	<http://www.omac.org#CRIM_Person_003...	"Giovanni Pierluigi da Palestrina"^^xsd:string
<http://www.omac.org#CRIM_Mass_0042>	"Missa O quam gloriosam"^^xsd:string	<http://www.omac.org#CRIM_Person_006...	"Victoria, Tomás Luis de"^^xsd:string
<http://www.omac.org#CRIM_Mass_0043>	"Missa Alla dolce ombra"^^xsd:string	<http://www.omac.org#CRIM_Person_006...	"Padovano, Annibale"^^xsd:string
<http://www.omac.org#CRIM_Mass_0044>	"Missa Domina, a lingua dolosa"^^xsd:string	<http://www.omac.org#CRIM_Person_006...	"Padovano, Annibale"^^xsd:string
<http://www.omac.org#CRIM_Mass_0045>	"Missa Ultimi mieie sospiri"^^xsd:string	<http://www.omac.org#CRIM_Person_006...	"Padovano, Annibale"^^xsd:string
<http://www.omac.org#CRIM_Mass_0046>	"Missa Praeter rerum"^^xsd:string	<http://www.omac.org#CRIM_Person_004...	"Cipriano de Rore"^^xsd:string
<http://www.omac.org#CRIM_Mass_0047>	"Missa Entre vous filles"^^xsd:string	<http://www.omac.org#CRIM_Person_004...	"Roland de Lassus"^^xsd:string
<http://www.omac.org#CRIM_Mass_0048>	"Missa Domine dominus noster"^^xsd:string	<http://www.omac.org#CRIM_Person_004...	"Roland de Lassus"^^xsd:string
<http://www.omac.org#CRIM_Mass_0049>	"Missa Domine dominus noster"^^xsd:string	<http://www.omac.org#CRIM_Person_007...	"Leonhard Lechner"^^xsd:string
<http://www.omac.org#CRIM_Mass_0050>	"Missa Susanne un jour"^^xsd:string	<http://www.omac.org#CRIM_Person_008...	"Claudio Merulo"^^xsd:string

Example of SPARQL query over the CRIM's RDF virtual graph generated through the OBDA mapping in the previous slide

Edit Triples Map

Mapping ID: MAPID-mass-section

Target (Triples Template):

```

:{piece_id} a :MusicalSection ; dterms:title {title}^^xsd:string ; dbp:fullTitle {full_title}^^xsd:string ; :composed_by :{composer_id} ; :pdf_link {pdf_links}^^xsd:anyURI ; :mei_link {mei_links}^^xsd:anyURI .

:{mass_id} a :MusicalWork ; :has_section :{piece_id} .

```

Source (SQL Query):

```

select piece_id, full_title, title, mass_id, composer_id, pdf_links, mei_links from crim_crimpiece where genre_id='mass' order by piece_id

```

SQL Query results:

piece_id	full_title	title	mass_id	composer_id	pdf_links	mei_links
CRIM_Mass_0001_1	Missa Confitemini: Kyrie	Kyrie	CRIM_Mass_0001	CRIM_Person_0001	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0001_2	Missa Confitemini: Glo...	Gloria	CRIM_Mass_0001	CRIM_Person_0001	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0001_3	Missa Confitemini: Cre...	Credo	CRIM_Mass_0001	CRIM_Person_0001	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0001_4	Missa Confitemini: San...	Sanctus	CRIM_Mass_0001	CRIM_Person_0001	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0001_5	Missa Confitemini: Ag...	Agnus Dei	CRIM_Mass_0001	CRIM_Person_0001	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0002_1	Missa Vidi speciosam:...	Kyrie	CRIM_Mass_0002	CRIM_Person_0003	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0002_2	Missa Vidi speciosam:...	Gloria	CRIM_Mass_0002	CRIM_Person_0003	https://crimproject.or...	https://crimproject.or...
CRIM_Mass_0002_3	Missa Vidi speciosam:...	Credo	CRIM_Mass_0002	CRIM_Person_0003	https://crimproject.or...	https://crimproject.or...

Execute the SQL query (100 rows)

Update Cancel

Example of **OBDA mapping** via Ontop's plugin on Protégé:  
it models the structure of masses, namely, the relation between masses and their sections

## SPARQL Query

Prefixes...

```
PREFIX dcterms: <http://purl.org/dc/terms/>
PREFIX : <http://www.omac.org#>
PREFIX dbo: <http://dbpedia.org/ontology/>
PREFIX dbp: <http://dbpedia.org/property/>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
```

```
select * where {
?work a :MusicalWork;
dcterms:title ?workTitle;
:composed_by/dbp:name ?composer_name;
dbp:genre/:has_value :mass; :has_section ?section.
```

```
?section dcterms:title ?title; dbp:fullTitle ?full_title;
:pdf_link ?pdf_link; :mei_link ?mei_link
```

Show 0 or ☒ all results.☐ Use short IRIs

Stop

Execute

Execution time: 346ms. Solution mappings returned: 250.

SPARQL results SQL translation

work	workTitle	composer_name	section	title	full_title	pdf_link	mei_link
<http://www.omac.org#CRIM_Mass_0001>	"Missa Confitemin..."	"Pierre Colin"^^...	<http://www.omac.org#CRIM_Mass_0001_1>	"Kyrie"^^...	"Missa Co..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0001>	"Missa Confitemin..."	"Pierre Colin"^^...	<http://www.omac.org#CRIM_Mass_0001_2>	"Gloria"...	"Missa Co..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0001>	"Missa Confitemin..."	"Pierre Colin"^^...	<http://www.omac.org#CRIM_Mass_0001_3>	"Credo"...	"Missa Co..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0001>	"Missa Confitemin..."	"Pierre Colin"^^...	<http://www.omac.org#CRIM_Mass_0001_4>	"Sanctus..."	"Missa Co..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0001>	"Missa Confitemin..."	"Pierre Colin"^^...	<http://www.omac.org#CRIM_Mass_0001_5>	"Agnus ..."	"Missa Co..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0002>	"Missa Vidi specio..."	"Mathieu Sohier"...	<http://www.omac.org#CRIM_Mass_0002_1>	"Kyrie"^^...	"Missa Vid..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0002>	"Missa Vidi specio..."	"Mathieu Sohier"...	<http://www.omac.org#CRIM_Mass_0002_2>	"Gloria"...	"Missa Vid..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0002>	"Missa Vidi specio..."	"Mathieu Sohier"...	<http://www.omac.org#CRIM_Mass_0002_3>	"Credo"...	"Missa Vid..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0002>	"Missa Vidi specio..."	"Mathieu Sohier"...	<http://www.omac.org#CRIM_Mass_0002_4>	"Sanctus..."	"Missa Vid..."	"https://..."	"https://..."
<http://www.omac.org#CRIM_Mass_0002>	"Missa Vidi specio..."	"Mathieu Sohier"...	<http://www.omac.org#CRIM_Mass_0002_5>	"Agnus ..."	"Missa Vid..."	"https://..."	"https://..."

Example of SPARQL query over the CRIM's RDF virtual graph generated through the OBDA mapping in the previous slide

# OnTop portal for CRIM

Ontop Portal

endpoint address: <http://localhost:18080/sparql> | ontop v5.0.0-SNAPSHOT

Playground

Example queries

person x work-mass x mass-section x observation x construct x +

```
1 PREFIX dcterms: <http://purl.org/dc/terms/>
2 PREFIX dct: <http://purl.org/dc/terms/>
3 PREFIX dc: <http://purl.org/dc/elements/1.1/>
4 PREFIX dcterms: <http://purl.org/dc/terms/>
5 PREFIX dbp: <http://dbpedia.org/property/>
6 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
7 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
8 PREFIX : <http://www.omac.org#>
9
10 SELECT ?mass ?mass_title ?section ?section_tit ?pdf ?mei WHERE {
11   ?mass rdf:type :MusicalWork;
12   dbp:genre:has_value :mass;
13   dcterms:title ?mass_title;
14   :has_section ?section.
15 }
```

Table

Response

Pivot Table

Google Chart

Geo

Download

Code

Showing 1 to 50 of 250 entries (in 0.302 seconds)

Search:

Show  entries

	mass	mass_title	section	section_tit	pdf	mei
1	<a href="http://www.omac.org#CRIM_Mass_0001">http://www.omac.org#CRIM_Mass_0001</a>	Missa Confitemini	<a href="http://www.omac.org#CRIM_Mass_0001_1">http://www.omac.org#CRIM_Mass_0001_1</a>	Kyrie	"https://crimproject.org/pdf/CRIM_Mass_0001_1.pdf"^^xsd:anyURI	"https://crimproject.org/mei/CRIM_Mass_0001_1.mei"^^xsd:anyURI
2	<a href="http://www.omac.org#CRIM_Mass_0001">http://www.omac.org#CRIM_Mass_0001</a>	Missa Confitemini	<a href="http://www.omac.org#CRIM_Mass_0001_2">http://www.omac.org#CRIM_Mass_0001_2</a>	Gloria	"https://crimproject.org/pdf/CRIM_Mass_0001_2.pdf"^^xsd:anyURI	"https://crimproject.org/mei/CRIM_Mass_0001_2.mei"^^xsd:anyURI
3	<a href="http://www.omac.org#CRIM_Mass_0001">http://www.omac.org#CRIM_Mass_0001</a>	Missa Confitemini	<a href="http://www.omac.org#CRIM_Mass_0001_3">http://www.omac.org#CRIM_Mass_0001_3</a>	Credo	"https://crimproject.org/pdf/CRIM_Mass_0001_3.pdf"^^xsd:anyURI	"https://crimproject.org/mei/CRIM_Mass_0001_3.mei"^^xsd:anyURI

Running on  
local machine

Based on [Ontop](https://ontop-vkg.org/tutorial/endpoint/endpoint-docker.html) (see <https://ontop-vkg.org/tutorial/endpoint/endpoint-docker.html>)

# Thank you!

For info, comments, and suggestions please write to:

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