

**"Connecting The Work, The Score, and the Critic:
The CRIM Project and the OMAC Ontology"**

Richard Freedman (Haverford College, USA)

rfreedma@haverford.edu

and

Philippe Canguilhem (Université de Tours)

philippe.canguilhem@univ-tours.fr

Link to these slides:

https://bit.ly/CRIM_MSH_2023

The Imitation Mass: An Art of *Recombination*

- A composer's workshop : visible choices; interlocking musical ideas shifted in time and space
- Old sounds and meanings in new contexts, both sacred and secular (the medium is the message)
- Audience attending Mass thinks : "I (think I) already heard this (but not that way)". Indeed, it has been transformed in many ways...

Model
(average duration 4-5 mn)

Any polyphonic work
(mostly French Chansons,
Italian Madrigals, Latin Motets)



Mass
(average duration 25-30 mn)

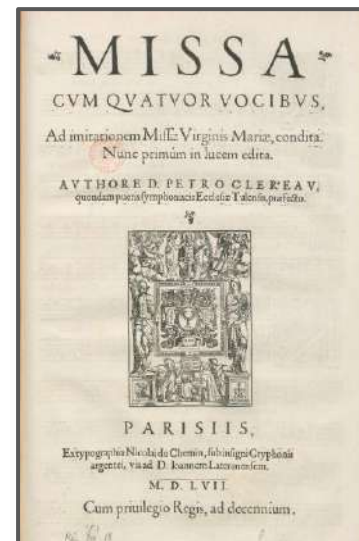
Kyrie (2-5 mn)

Gloria (4-10 mn)

Credo (5-10 mn)

Sanctus (4-8 mn)

Agnus (4-8 mn)



Professional recording:
vocal ensemble Odhecaton, dir. Paolo Da Col (CD Ramée, 2009)

Palestrina: Veni sponsa Christi

Chant source ==>



Veni sponsa Christi

Giovanni Pierluigi da Palestrina

Cantus
Ve - - - spon - sa Chri - - - sti, ve - ni spon - sa Chri - - - sti,

Altus
Ve - - - ni spon - sa Chri - - - sti,

Tenor
-

Bassus
-

6
-

11
Ve - - - ni spon - sa Chri - - - sti,

Imitative duo

Voices:

- 1: Cantus
- 2: Altus
- 3: Tenor
- 4: Bassus

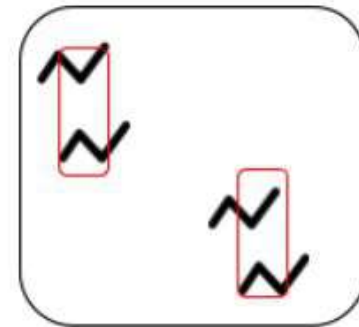
Entry intervals: 4-5-4-

Time intervals: B/1/4/1

Regularity: Flexed

Invertible counterpoint: False

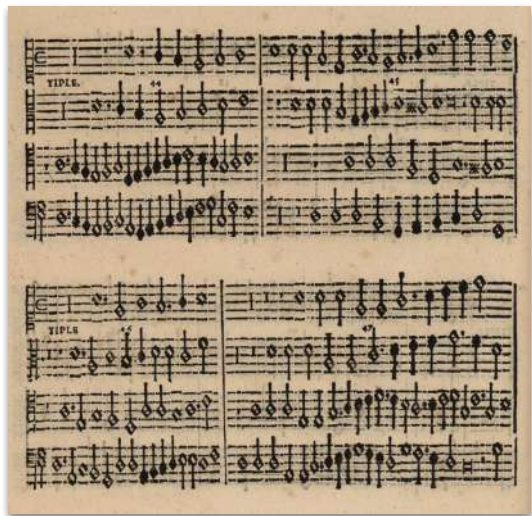
Added entries: -



Renaissance Counterpoint: Jeux des cartes?

Pietro Cerone, *El melopeo y maestro* (1613)

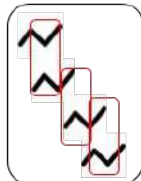
Contrapuntal Commonplaces



Presentation Types Used in CRIM (with thanks to Peter Schubert!)

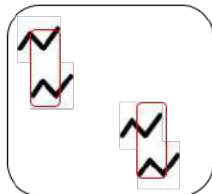
Periodic Entries (PE_n)

- Identical Time Interval
- Exact (or flexed) melodic profile
- Repeating contrapuntal 'modules' of intervals



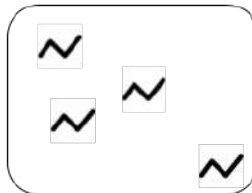
Imitative Duos (ID)

- Pairs of Identical Time Interval (e.g 1-2-1, or 2-1-2)
- Exact (or flexed) melodic profile
- Repeating contrapuntal 'modules' of intervals



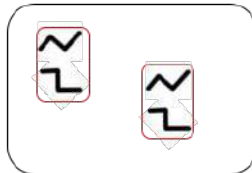
Fuga (Fuga)

- Any Time Interval (fixed or variable)
- Exact (or flexed) melodic profile
- *Non-repeating* contrapuntal 'modules' of intervals



Non-Imitative Duos (NIM)

- Any Time Interval (fixed or variable)
- Dissimilar melodic profiles
- Repeating contrapuntal 'modules' of intervals



Palestrina's Second Thoughts: The First Soggetto of the Motet and its Treatment in the Mass As Observed by CRIM participants and Predicted by CRIM Intervals Algorithms

Motet mm. 1-7 Imitative Duos C>A>T>B
Selected Relationships (see [complete list](#) for this phrase)

Mass Movement and Musical Type	CRIM Relationships?	Predicted by CRIM Intervals?
Kyrie m. 1 ID CA >TB	R 260 R 104 R 1037	CRIM ID OK Also the ensuing Fuga a3 A>C>B and Singleton Bassus 17
Credo m. 1 ID CA > TB, with new gap between entries.	R 2496	CRIM finds Fuga for two voices, C>A. The other two voices are too varied to be identified as part of the same pattern.
Sanctus m. 62 ID TB > CA Hosanna in triple mensuration	R 1531	No
Sanctus m. 82 PEN a3 T>B>C	R 1541	CRIM PEN a3

The First Soggetto of the Motet and its Treatment in the Mass As Observed by CRIM participants and Predicted by CRIM Intervals Algorithms

Motet mm. 1-7 Imitative Duos C>A>T>B
Selected Relationships (see [complete list](#) for this phrase)

Mass Movement and Musical Type	CRIM Relationships?	Predicted by CRIM Intervals?
Gloria m. 44 PEN a4 T>C>B>A	R 265 R 333	PEN a3, T>C>B. Missed the A because of rhythmic variation to accommodate text
Sanctus m. 1 NIM CT > AB > TB	R 346	CRIM Fuga a2 and Fuga a4 C>A>T>B
Agnus dei m. 35 Fuga a3 C>A>Q	R 403	CRIM Fuga a3
Sanctus m. 59 Fuga a2 A>C Hosanna in triple mensuration	R 1529	CRIM Fuga a12 A>C>T>C>A>B>A>T>A>C>B>T
Credo m. 53 Homorhythm, with soggetto as tenor for Et incarnatus est	R 1730	CRIM Soggetto

Palestrina: Veni sponsa Christi

Veni sponsa Christi

Giovanni Pierluigi da Palestrina

Cantus
Ve - - - spon - sa Chri - - - sti, ve - ni spon - sa Chri - - - sti,

Altus
Ve - - - ni spon - sa Chri - - - sti,

Tenor
- - - - -

Bassus
- - - - -

6
- - - - - sti, ve - ni spon - sa Chri - - - sti,

11
Ve - - - ni spon - sa Chri - - - sti,

Imitative duo

Voices:

- 1: Cantus
- 2: Altus
- 3: Tenor
- 4: Bassus

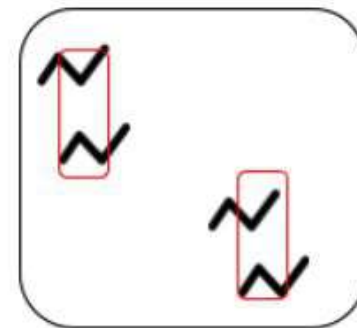
Entry intervals: 4-5-4-

Time intervals: B/1/4/1

Regularity: Flexed

Invertible counterpoint: False

Added entries: -



Palestrina: Missa Veni sponsa Christi: Kyrie

Missa Veni sponsa Christi: Kyrie

Giovanni Pierluigi da Palestrina

Cantus
Ky - ee - le -

Altus
Ky - ri - e - e - le -

Tenor

Bassus

6
- i - son, Ky - ri - ee - le - i - son, Ky -

- i - son, Ky - ri - e - e - lei -

Ky - e - e - le -

Ky - ri - e - e - le -

Imitative duo

Voices:

- 1: Cantus
- 2: Altus
- 3: Tenor
- 4: Bassus

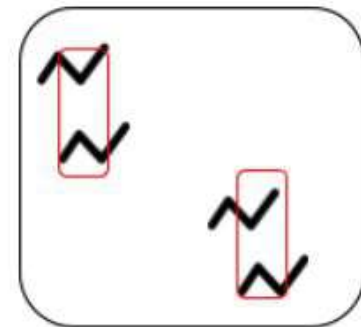
Entry intervals: 4-5-4-

Time intervals: B/1/4/1

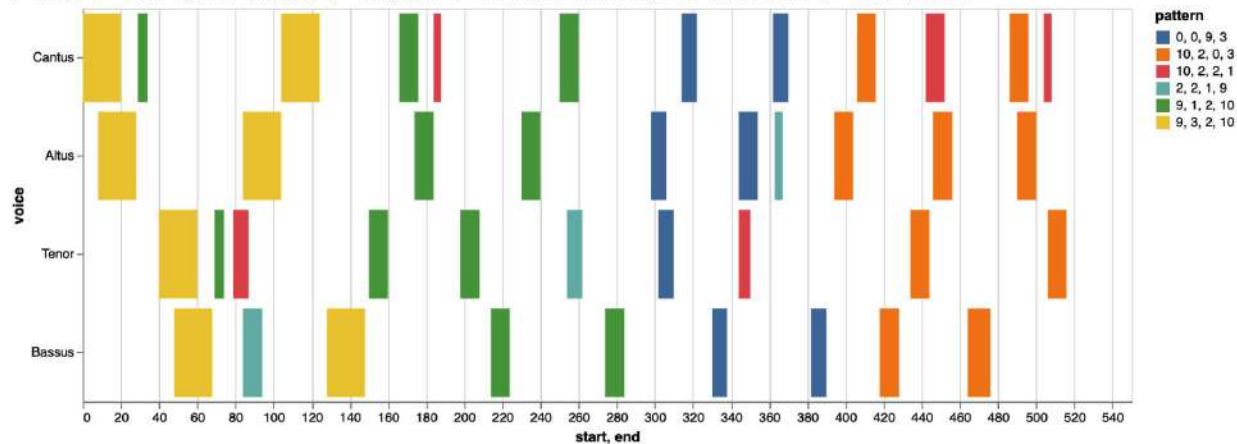
Regularity: Flexed

Invertible counterpoint: False

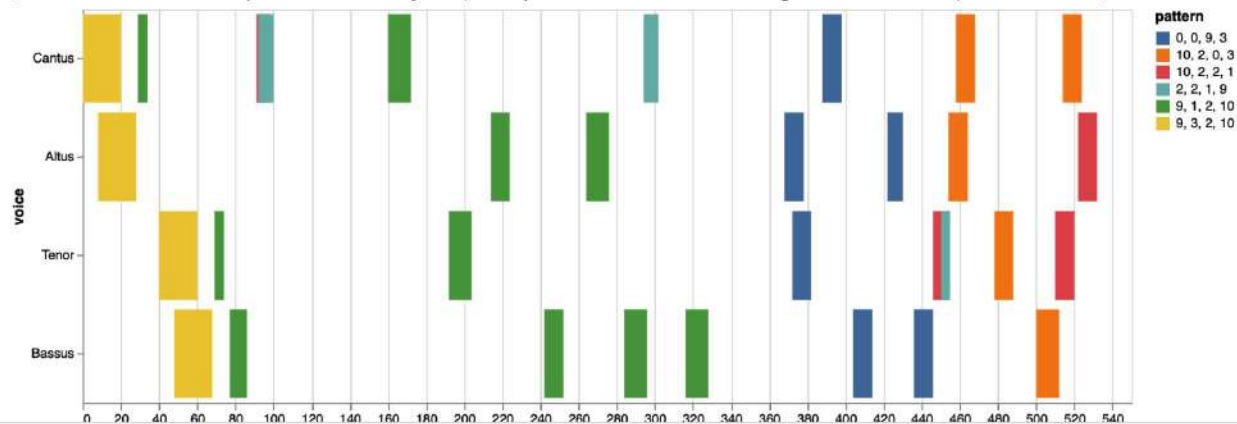
Added entries: -




```
{'title': 'Veni sponsa Christi', 'composer': 'Giovanni Pierluigi da Palestrina', 'date': 1570}
```



```
{'title': 'Missa Veni sponsa Christi: Kyrie', 'composer': 'Giovanni Pierluigi da Palestrina', 'date': 1599}
```



Palestrina: Missa Veni sponsa Christi: Gloria

41

- us Pa - - - tris. Qui tol -

- - - tris. Qui tol - lis pec -

Pa - - - tris. Qui tol - lis pec -

46

- lis pec - - ta mun - - - di,

Qui tol - lis pec - ca - ta mun -

Qui tol - lis pec - ca - ta mun - di,

51

52

Detailed description: The image shows a musical score for Palestrina's Gloria. It consists of two systems of four staves each. The first system (measures 41-45) shows the vocal parts with lyrics: '- us Pa - - - tris. Qui tol -' and '- - - tris. Qui tol - lis pec -'. The second system (measures 46-50) shows the vocal parts with lyrics: '- lis pec - - ta mun - - - di,' and 'Qui tol - lis pec - ca - ta mun -'. Blue arrows point to specific notes: one in the top staff of the first system, one in the second staff of the first system, and one in the bottom staff of the second system.

Periodic entry

Voices:

- 3: Tenor
- 4: Bassus
- 1: Cantus
- 2: Altus

Entry intervals: 8+5-8+

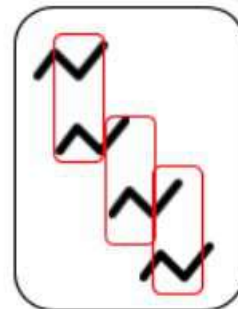
Time intervals: B1/1/1

Regularity: Strict

Sequential:

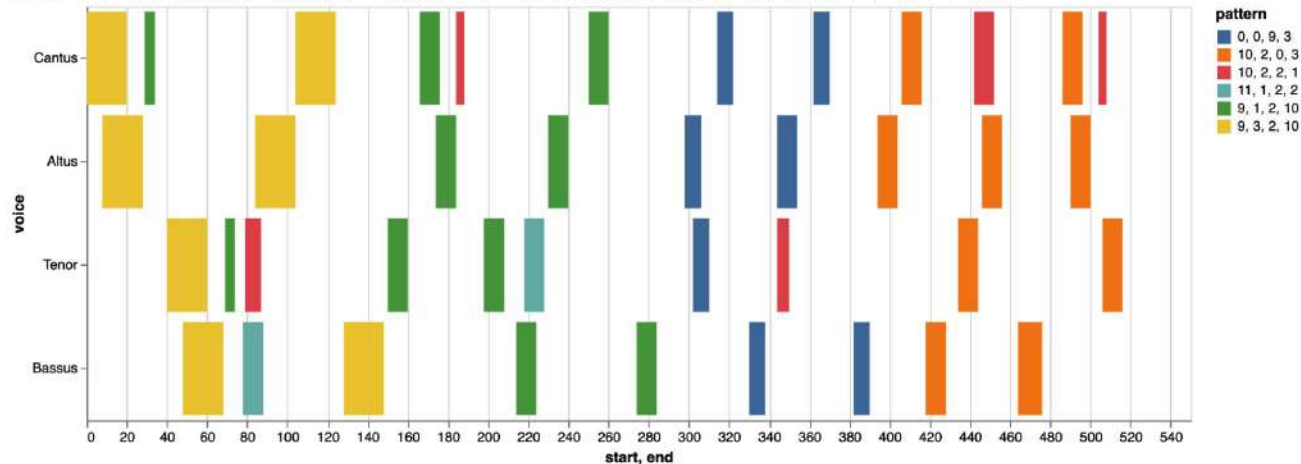
Invertible counterpoint:

Added entries:

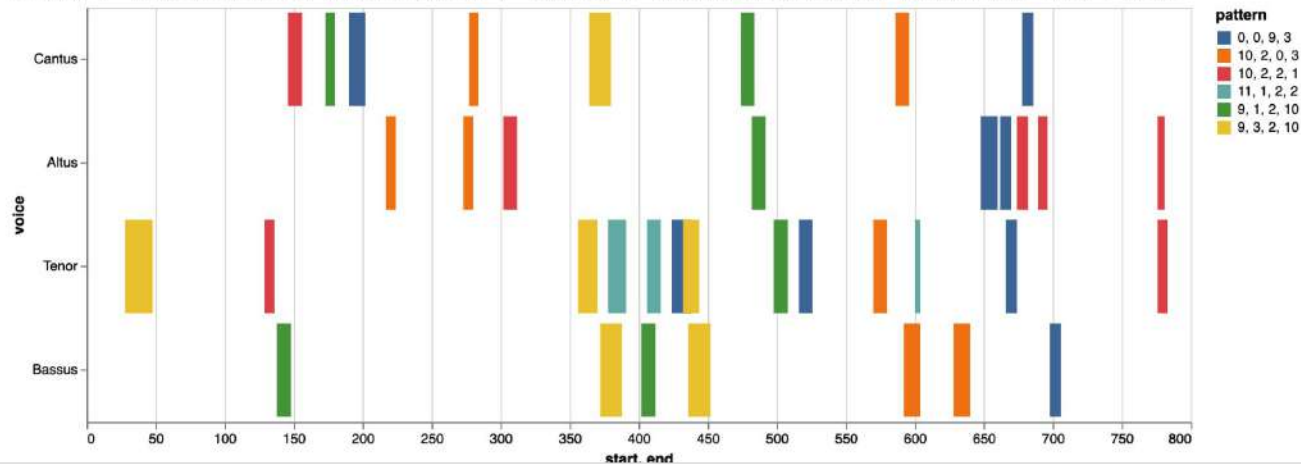


start, end

{'title': 'Veni sponsa Christi', 'composer': 'Giovanni Pierluigi da Palestrina', 'date': 1570}



{'title': 'Missa Veni sponsa Christi: Gloria', 'composer': 'Giovanni Pierluigi da Palestrina', 'date': 1599}



Palestrina: Missa Veni sponsa Christi: Sanctus

Missa Veni sponsa Christi: Sanctus

Giovanni Pierluigi da Palestrina

Cantus
San - - ctus, San - - ctus, San - - ctus,

Altus
San - - ctus, San - - ctus,

Tenor
San - - ctus, San - - ctus,

Bassus
San - - ctus, San - - ctus,

Non-imitative duo

Voices:

- 1: Cantus
- 2: Altus
- 3: Tenor
- 4: Bassus

Entry intervals: 5-4-

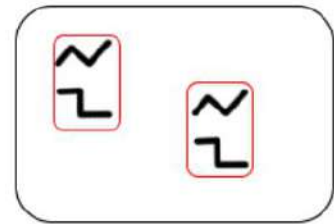
Time intervals: S4/9

Regularity: Strict

Sequential: False

Invertible counterpoint: False

Added entries: -



CRIM Thesaurus of Relationship Types

Categories

These are the basic categories of relationships between Masses and Models

QtE	Quotation (Exact)	QtM	Quotation (Monnayage)
TrM	Transformation (Mechanical)	TrNM	Transformation (non-Mechanical)
Nw	New Material	Om	Omission
		Self	Self

They describe the treatment of various elements from the [Thesaurus of Musical Types](#)

See also:

CRIM [Defintions of Musical Types](#)

CRIM [Abbreviations and Symbols](#)

What is Similarity in Music?

Difference and sameness!

Made visible via controlled vocabulary

And system of citation:

- Which works?
- What segments?
- What patterns?
- What relationship?
- Found by who?

Citation and Addressability

A quotable digital musical text

Observation <3791>

Observer: *Manon Manfredi*

<R1896> Non-mechanical transformation — Model for <3792> Missa Je suis déshéritée: Kyrie

Pierre Cadéac, Je suis déshéritée

< highlight >

Soggetto

Voice:

Superius

Rhythmic durations: True

Melodic intervals: True

Ostinato: False

Periodic: False

Remarks: Deux soggetti différents, un à la voix de superius l'autre à la voix de ténor.

8
per-du mon a - mi. Seu - le - t'il m'a lais - sé - e, Plei - ne de
mi. Seu - le - t'il m'a lais - sé - e, Plei - ne de pleurs
Seu - le - t'il m'a lais sé - e, Plei - ne de pleurset de sou -
mon - mi. Seu - le - t'il m'a lais - sé - e, Pleine de pleurset de sou - ci, Plei - ne de

EMA Reference= filename + 8-9/1,1/@all,@all

[Read the full MEI specification here](#)

measures/staves/beats

Analytic claims as Digital Objects

Observation <1>

[Duplicate this observation]

Observer: Ian Lorenz

Analyst

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

Score: Claudin de Sermisy, Tota pulchra es

Observed Work

Analyzed Features

< start >

Tota pulchra es

Claudin de Sermisy

Superius

Contratenor

Tenor

Bassus

Fuga

Voices:

- 1: Superius
- 2: Contratenor

Entry intervals: 4-

Time intervals: B2

Regularity: -

Inverted: False

Periodic: False

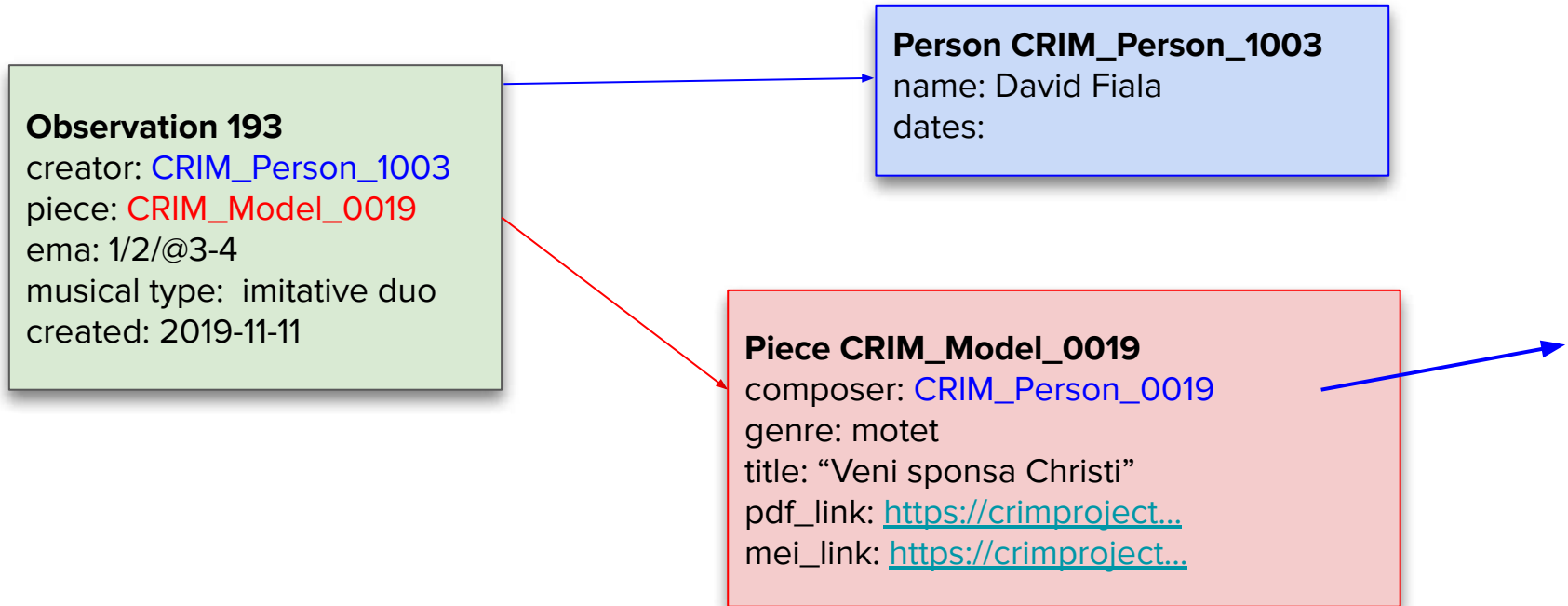
Retrograde: False

Sequential: False

Remarks: Makes up a longer ID

Structuring and Storing Data: Defining Object Types

Digital objects for **persons**, **works**, **observations**, etc as a relational database.



How CRIM Works

Scores + MEI

Mass movements

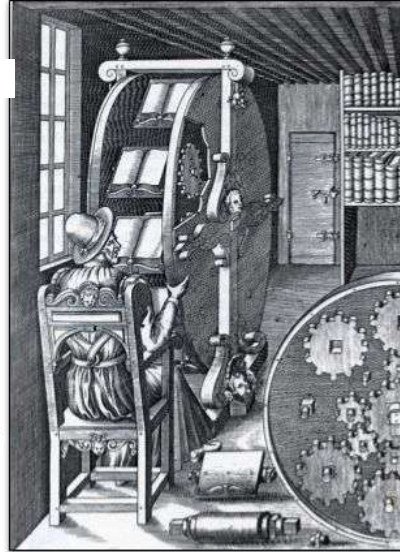
- MEI Kyrie
- MEI Gloria
- MEI Credo
- MEI Sanctus
- MEI Agnus Dei

Analyst Observations

Ave Maria

Analyst observations on a musical score for 'Ave Maria'.

Web Application and Database



Data Analysis

Index	(Superius)	Altus	Tenor	Bassus
0	0.0	G4	Rest	Rest
1	4.0	C5	-	-
2	8.0	-	Rest	Rest
3	12.0	C5	-	-
4	16.0	D5	G3	Rest
...
553	1256.0	-	D4	G3
554	1268.0	C5	G4	-
555	1272.0	-	-	C4
556	1264.0	C5	G4	-
557	1266.0	-	-	C4

Relationships and Discussion

CRIM

Observation ...

CRIM interface showing observation details and musical notation.

Ontology for Analytic Claims in Music (OMAC)

<https://github.com/HCDigitalScholarship/OMAC>



Semantic Web ontology (in OWL2) for music and musicology.

It represents both musical entities like

- Musical works (genre, authorial parts, composition dates, etc.)
- Composers
- ...

Main testing with Early Music in the scope of CRIM

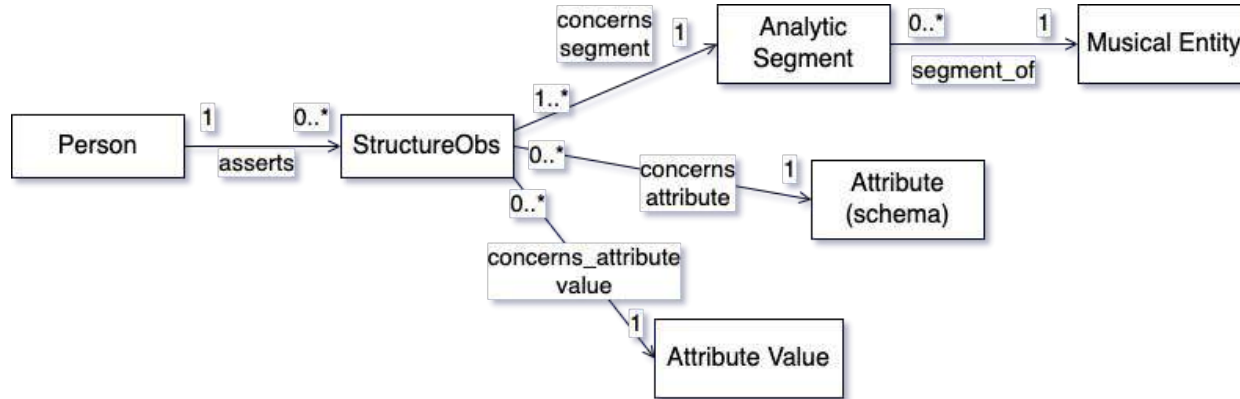
And musicological claims (aka observations):

- Claim about structure
- Claim about similarity
- Claim about authorship
- Claim about composition date
- ...

Observational vocabulary and observational data inherited from CRIM

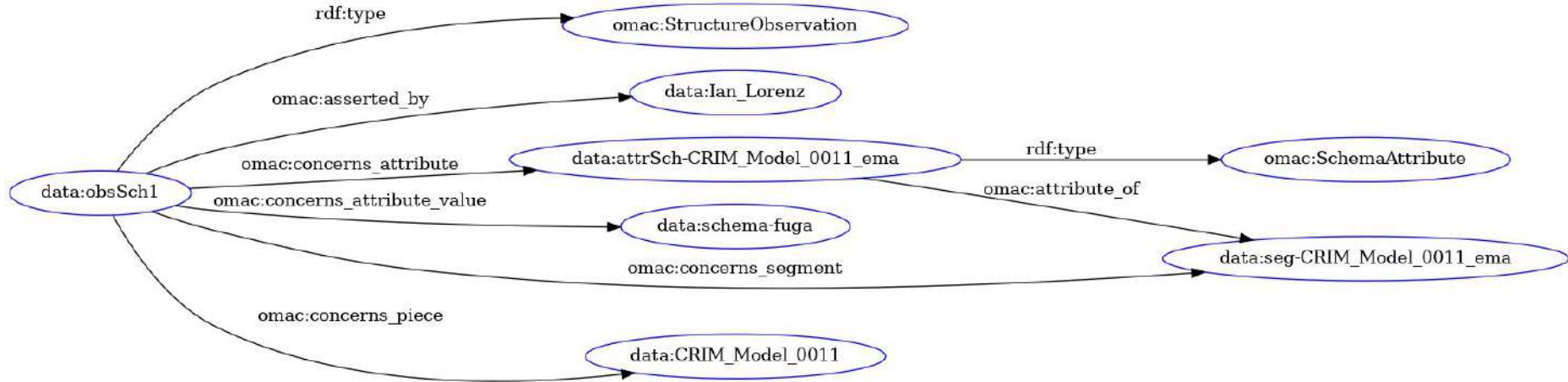
Essay/publications on OMAC forthcoming.
Preliminary presentation at [SWODCH 2022](#)

Structure claims in OMAC



Partial view of Structure Claims (a claim that assigns a schema-attribute to an analytic segment)

The Structure Claim according to OMAC



Namespaces:
rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
omac: <https://www.omac.org/ontology#>
data: <https://www.omac.org/data#>

Partial view of Ian Lorenz's claim about structure

SQL Query for CRIM Data with OMAC



<https://omac.crimproject.org/>

Ontop Portal endpoint address: <https://omac.crimproject.org/sparql> | ontop v5.0.1

Playground Example of SPARQL queries

Person-works

```
1 PREFIX dcterms: <http://purl.org/dc/terms/>
2 PREFIX dbp: <http://dbpedia.org/property/>
3 PREFIX dbo: <http://dbpedia.org/ontology/>
4 PREFIX omac: <https://www.omac.org/ontology#>
5 # PREFIX : <https://www.omac.org/resource/> # TODO: when moving to the server, uncomment here and comment/delete the next line
6 PREFIX : <http://localhost:10000/resource/>
7
8 SELECT * WHERE {
9   ?person a dbo:Person; dbp:name ?name; dbp:composer ?work.
10  ?work dcterms:title ?workTitle; dbp:genre/omac:has_value :genre-mass.
11 }
12
```

Table Response Pivot Table Google Chart Geo  

Showing 1 to 50 of 50 entries (in 0.311 seconds) Search: Show entries

	person	name	work	workTitle
1	http://localhost:10000/resource/person-CRIM_Person_0001	Pierre Colin	http://localhost:10000/resource/me-CRIM_Mass_0001	Missa Confitemini
2	http://localhost:10000/resource/person-CRIM_Person_0003	Mathieu Sohier	http://localhost:10000/resource/me-CRIM_Mass_0002	Missa Vidi speciosam
3	http://localhost:10000/resource/person-CRIM_Person_0009	Nicolas De Marle	http://localhost:10000/resource/me-CRIM_Mass_0003	Missa O gente brunetta

Digital Objects That Are:

Sustainable (by virtue of declared and interoperable data formats)

Discoverable (by virtue of Linked Open Data and Semantic Web technologies)

Attributable (inaugurating collaborative models of scholarship)

Towards new models of scholarly authority, credit and responsibility.