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FELLOWSHIP FINAL REPORT

Citations: The Renaissance Imitation Mass (CRIM)

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REPORT INFO

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ABSTRACT

Building upon recent developments in digital music scholarship, *Citations: The Renaissance Imitation Mass* investigates similarity and borrowing in music on a massive but detailed scale, using digital tools that only a few years ago were beyond our grasp. Our work focuses on the craft of musical counterpoint, and how musicians of the sixteenth century transformed pre-existing pieces to make intricate cyclic compositions from familiar sounds. The CRIM team, an accomplished group of scholars and data scientists active in Europe, North America, and Australia, will assemble a diverse collaborative network of music scholars and students at colleges, music schools and university graduate programs, extending the reach of digital scholarship to new users, and building new communities.

1- Introduction

What is similarity in music? The allusiveness of musical discourse is so fundamental to the Western tradition that it is hard to imagine a work that does not in some way make reference to some other composition, type or topic. Indeed, over the last 1000 years music has continued to reference earlier pieces, from the layered polyphony of medieval motets to the rampant borrowing of George Frideric Handel, from the topical allusions of film music to looped sampling heard in hip-hop. *Citations: The Renaissance Imitation Mass* (CRIM)[1,2] focuses on an important but neglected part of this allusive tradition: the so-called "imitation" or "parody" Mass of the sixteenth century, in which short sacred or secular pieces were transformed into long five-movement cyclic settings of the Ordinary of the Catholic Mass: Kyrie, Gloria, Credo, Sanctus, and Agnus Dei. The resulting works are far more than collections of quotations. The sheer scope of the transformation required the composer to re-think the model, adapting pre-existent melodies to fit new words, while shifting, extending, or compressing ideas in new musical contexts and to meet new expressive purposes. If counterpoint is a craft of combinations, then the imitation mass involves the art of recombination on a massive scale. These works offer an unparalleled way to learn how composers heard (and understood) each other's music.

Our capacity to measure the Imitation Mass, however, has been dampened by two basic factors: the sheer number of possibilities for contrapuntal elaboration, and the idiosyncratic ways in which individual scholars have sought to explain and exemplify them. The CRIM project, with its digital capacities for managing citations, claims, and counter-claims in a collaborative environment, answers both of these key challenges in ways that will set the stage for the investigation of related corpora as

well. It opens the digital investigation of the inner workings of musical counterpoint to new generations of students and emerging scholars, drawing musicologists into conversation with each other, and into collaborative projects with specialists in Renaissance studies, data science and the digital humanities more broadly.[3]

Throughout our work we considered a number of broad questions, including:

1) How did compositional practice change over the course of the sixteenth century, and what can borrowing tell us about how composers understood their craft?

2) What connections can we draw between sixteenth-century statements on compositional practice and the various patterns that we observe today?

3) What relationship does the process of musical modelling bear to the wider humanist concern for *imitatio* of classical models?

4) How do the processes of adaptation heard in our corpus compare with those of other musical styles?

5) How can digital techniques help us to model new notions of similarity among musical works, whether the result of explicit modeling of the sort we hear in imitation masses, or more broadly through affinities of style?

6) How might the digital domain inaugurate new modes of scholarly communication, connecting specialists from different fields in productive ways?

2- Experimental details

CRIM brings together specialists from musicology and data science in an effort to address these questions using a rich array of open-source tools and methods. Coordinated and directed by Freedman, the team advances on various fronts simultaneously by:

1) Documenting vocabularies for analysis and annotation, including music-theoretical language for analysis; systems of encoding; and addressable scores.[4] This work takes advantage of the Music Encoding Initiative (MEI), which does for musical texts what the Text Encoding Initiative (TEI) is already doing for literary ones, allowing scholars to interrogate texts in ways that encourage open inquiry of these pieces. Such XML (extensible markup language) encodings work across any computer platform, and can be enhanced by successive users;

2) Elaborating CRIM analyses in machine-readable no less than in human-readable form. Using standards such as linked open data and open annotation, CRIM will inaugurates new ways of describing and publishing critical commentary for music;

3) Mapping CRIM examples as families of contrapuntal types and of relationships between works. Data analysis and mapping tools like those used in linguistics or bioinformatics will provide the means to put thousands of patterns into contexts that are at once vast and highly detailed, permitting close and distant reading of musical scores;

4) Connecting qualitative and quantitative approaches to scholarship, with narratives that call upon large bodies of detailed, reproducible evidence, and new kinds of patterns that call out for explanation.

3- Results and discussion

CRIM advanced considerably during Freedman's time in at the CESR thanks to the efforts of various old and new team members. Freedman undertook the painstaking work of curating and correcting over 2500 analytic relationships already added to CRIM during earlier phases of work (see ***Figure 1*** *for a sample relationship*). Walter and Viglianti revised the code[5] that collects, manages, indexes and renders citations–the crucial routines that stand at the interface between the human analysts and the machine systems that expose the larger patterns among the specific instances they find. Students at Haverford under the supervision of Dr. Andrew Janco completed updates for the CRIM discussion space.

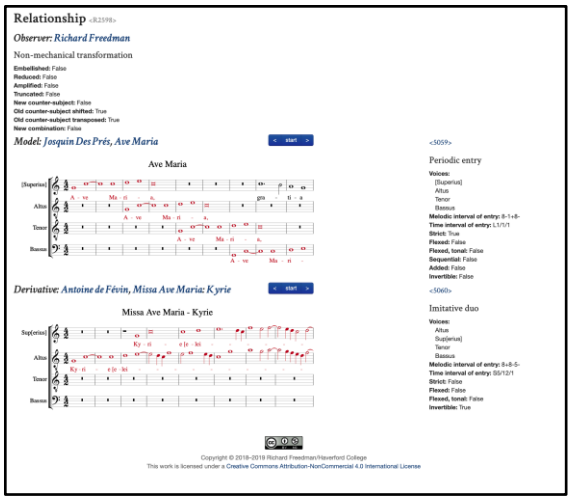

Figure 1. CRIM Relationship (https://crimproject.org/relationships/2598/)

While in Tours Freedman met another Le Studium Fellow, Dr. Emilio Sanfilippo, whose expertise with machine-readable representations of knowledge ("ontologies") proved of immediate and lasting benefit to the CRIM project. They collaborated on translating into logical form the analytic assertions ("claims" in the parlance of our discussions) by which musicologists make various claims about musical structure, style, meaning or value (**Figure 2**). These models can in turn be shared on OntoHub, a widely-used repository for dissemination of linked data standards

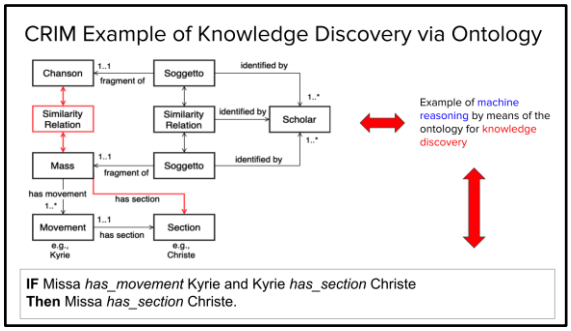

Figure 2. Schematic representation of ontology for critical claims about a musical passage.

Data analysis constituted a third axis of work during 2019. Fiala and Freedman discussed the general problems of the nature of similarity in music in general, and the idiom of Renaissance counterpoint in particular. On a purely musical level the composers of imitation masses reveal extraordinary inventiveness as they put contrapuntal patterns heard in their models through a series of recombinations, transformations, and rehearings in the five movements of the Ordinary as they were sung over the course of the larger drama enacted by the Mass itself. We were thus very interested to understand how we might explore CRIM data (the musical data and the analytic metadata alike) from a distance no less than from the details of an individual composition, imagining measures of similarity that were procedural no less than sonic.

These priorities were advanced in particular by new CRIM collaborator Dr Daniel Russo-Batterham, whose twin expertises in musicology and data science helped us to render CRIM data in heat maps, dynamic tree diagrams, and other visualizations that made apparent many forms of similarity that would otherwise remain unknowable except in isolation (**Figure 3**). Dr. Corey McKay also showed us how the algorithmic investigation of CRIM symbolic scores could reveal statistical no less than sonic similarity among works using tools like *jSymbolic*.

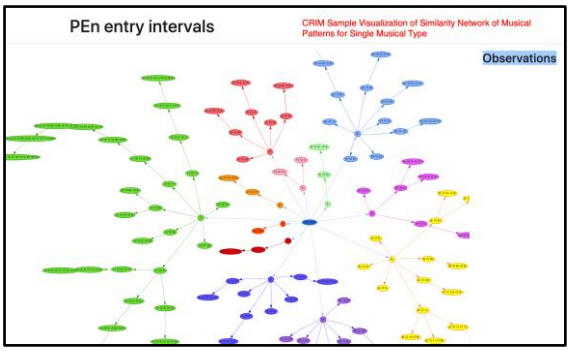

Figure 3. Tree-graph representation of the musical type Periodic Entry (PEn) showing chains of patterns related by similar intervals of contrapuntal entry.

4) The CRIM community continued to grow during 2019. Assisted by CRIM participant Ian Lorenz (an advanced Ph.D. student at McGill University) Freedman led an extended workshop at the annual Conference on Medieval and Renaissance Music (held in Basel in early July) where three dozen scholars and students learned about CRIM techniques and vocabularies. In November an international (and intergenerational) team of some 35 students and scholars gathered in Tours for three days of learning and debate devoted exclusively to CRIM. We had sessions devoted

to the digital techniques that make this work possible, including presentations by Dr. Raffaele Viglianti and Dr. Elena Pierazzo, Director of the digital scholarship program at the CESR), Emilio Sanfilippo, and others. But the much of our time in Tours was spent in close study of the music, with sessions devoted to our vocabularies, individual works, and even a workshop in which a team composed a movement of a "new" imitation mass using CRIM concepts. We also planned a series of pedagogical modules that could be shared across institutions as a way to broaden participation in CRIM and to advance the understanding of digital approaches to musicology more generally.

4- Conclusion

CRIM will redeploy the long-standing interest of musicologists in the intertextual dimension of Renaissance polyphony in a new digital medium that exposes those connections in ways previously unimaginable. The resulting insights will be shared in workshops, colloquia, and in conventional publications. Using machine-readable standards (particularly Linked Open Data standards) that are in turn based on logical representations (ontologies) of works and the interpretive claims about them, CRIM observations can be discovered and cited in online discussions, data visualizations, as well as in traditional publications as durable URLs.

Perspectives of future collaborations with the host laboratory

Freedman and his colleagues at the CESR eagerly look forward to the next phase of our work together. Technical development will continue through the efforts of Viglianti, Walter, Russo-Batterham, and Sanfilippo, as we elaborate the technologies that make CRIM data easier to create, manage, visualize, and publish in both human- and machine-readable forms.

5- Articles published in the framework of the fellowship

The success of CRIM will hinge on the community building no less than the development of code, standards, and tools. This year Freedman and colleagues brought CRIM to a number of scholarly gatherings involving digital humanists and musicologists alike, including:

Richard Freedman, "Citations: The Renaissance Imitation Mass (CRIM) and the Quotable Musical Text in a Digital Age." Paper presented at the Digital Humanities conference, Utrecht University, Utrecht, The Netherlands, July 9-12, 2019.

Richard Freedman, "Citations: The Renaissance Imitation Mass (CRIM) and the Quotable Musical Text in a Digital Age." Workshop conducted at 47th Conference on Medieval and Renaissance Music, Basel University, Basel, Switzerland, July 3-6, 2019.

Richard Freedman, Raffaele Viglianti and Emilio Sanflippo, "The Quotable Musical Text in a Digital Age: Modeling Complexity in the Renaissance and Today." Workshop conducted at Music Encoding Conference, Vienna, Austria, May 29–June 1, 2019.

Richard Freedman, Organizer, *Counterpoints: Renaissance Music and Scholarly Debate in the Digital Domain*, Workshop-Conference at CESR, Tours, November 14-16, 2019.

6- Acknowledgements

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and the required computing infrastructure, are offered indefinitely and without additional cost.

7- References

[1]Freedman, Richard, and David Fiala, Project Directors, *Citations: The Renaissance Imitation Mass (CRIM)*, Programme Ricercar, Centre des études supérieures de la Renaissance, Université de François-Rabelais, Tours, France, 2015-2018. URL: https://crimproject.org

[2]Freedman, Richard, and David Fiala, Directors. *Editor's Forum for Citations: The Renaissance Imitation Mass (CRIM)*. URL: https://sites.google.com/haverford.edu/crim-project/home

[3]Richard Freedman, Raffaele Viglianti, and Adam Crandell, "The Collaborative Musical Text," *Music Reference Services Quarterly* 20 (2017), 1-17.

[4]Raffaele Viglianti, "The Music Addressability API: A draft specification for addressing portions of music notation on the web," *Proceedings of the Third International Digital Libraries for Musicology Workshop* (DLfM 2016), New York, USA, August 2016, pp. 57-60. Available online at URL: http://dl.acm.org/citation.cfm?id=2970044.2970056

[5]*The CRIM Project*, Micah Walter and Raffaele Viglianti, developers. Django framework for *Citations: The Renaissance Imitation Mass* web site and tools. Code at URL: https://github.com/CRIM-Project/CRIM-online