



**LISTAHÁSKÓLI ÍSLANDS**  
Iceland University of the Arts

**Innovative Practice in Conducting: Graphic  
Scores, Sonic Batons, and Open Ensembles for  
New Performance Formats**

**Practice-based Research**

Majella Clarke

**Final Thesis for a Master of Music degree**

**Icelandic Academy of the Arts**

**Department of Music**

**January 2024**



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Final thesis for a Master of Music degree in New Audiences and Innovative Practice

Supervisor: Dr Angela Rawlings

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This paper is a 30 ECTS final thesis for a Master of Music degree in New Audiences and Innovative Practice at Iceland University of the Arts. It is not allowed to copy this thesis in any way without author's consent.



## **Abstract**

“Innovative Practice in Conducting: Graphic Scores, Sonic Batons and Open Ensembles for New Performance Formats” is an artistic project that explores the multifaceted role of the conductor.

This thesis aims to contribute to scholarship and the innovative practice of conducting. The approach uses practice-based research to explore repertoire for the sonic conducting baton and visual music (graphic scores and open notations) through experimenting with alternative and diverse performance formats that present the contrasting roles a conductor as musician, artistic director, innovator, and leader can deliver in a performance.

The methodologies utilize both scholastic and experimental approaches to research and develop the (*Seasonally Adjusted*) *SONOMES* final performance. The method of multi-model research and literature review was implemented to obtain a broad view of repertoire, performance practices and technologies that were relevant to the project. Case studies of technologies enabled a deeper perspective of technology outcomes that were taken into consideration in the development of the sonic baton. Experimentation, performance, and reflection, on the application of technologies in performance, and the presentation of different and innovative performance formats were essential methods in practice-based research. Score analysis and collaboration with composers has always been, and should continue to be, part of the fundamental practice of conducting. Finally, frameworks were developed as a method to present a structured perspective on the experiments, performances, and collaborations. The exegesis culminates in ten assertions on the role of the conductor that are applicable to both traditional and innovative practice of conducting.

The thesis concludes that the role of the conductor continues to evolve alongside notation and ensemble formulation with further potential for innovation of practice driven by technology’s impact on the music-science paradigm and societal shifts in experiencing music as a collective.

## **Preface**

This thesis, with performance exegesis, is written in a style reflecting an emerging academic convention that incorporates the more recent developments in expressive narrative, deliberately written to interchange between the first-person and third-person. The voice of the first-person is a growing trend in applied research in the creative field, reflecting the experiments, experience, and viewpoints of the creative individual. I feel particularly aligned with the philosophy outlined in the article *How should I write about my work? Notes on publishing artistic research* (Arlander 2022). At the same time, substantial material in this thesis is also written and submitted for publication in internationally peer reviewed journals, as well as following the standard academic structure in a Master's degree thesis and therefore conforming to objective scholarship in the third-person. The decision to interchange between the first-person and third-person is deliberate. The third-person is more formal and objective, and will be used to open the thesis, present the conceptual framework, literature review, methodology and specific analyses and conclusions. I use the first-person in the exegesis when writing from personal experience, discussing experiments, and reflecting on elements of the performative creative process. In this process, this thesis joins the growing trend of applied research where interchangeable tone of voice, especially incorporating the first-person, is more commonly applied in feminist, arts-based practitioner research with narrative enquiry that can draw on personal experiences, while employing third-person analysis to interpret the significance of these analyses.

## **Acknowledgements**

I knew I was given such a gift when my thesis supervisor, Dr Angela Rawlings, pointed out that “the submission and publication of a thesis is akin to getting a tattoo – tattoos are permanent on the skin and each tattoo represents a monumental life experience”. So too is a thesis with its intention of leaving lasting imprints on an individual journey. It is a process of profound significance, and like the end of a great film that scrolls through hundreds of credits, let this thesis acknowledge and ink the names of those persons who have been a special part of my journey.

I am extremely grateful to the NAIP program directors Sigurður Halldórsson and Dr Berglind María Tómasdóttir and my supervisor Dr Angela Rawlings. Without their supervision and support, my journey in the New Audiences and Innovative Practice degree

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The Intelligent Instruments Lab (IIL) at the Iceland University of the Arts, and especially Nicola Privato, Sean Patrick O'Brien, Victor Shepardson, Dr Jack Armitage and Dr Thor Magnusson, played an essential and integral part of my sonic baton project – for the ideas, support, and feedback – thank you!

My deepest gratitude for the incredible opportunity to perform my Masters final performance in the Harpa Concert Hall's Hörpuhorn up against Ólafur Eliásson's glass facade. The effort and dedication put forth by the Harpa team with Ása Briem, Gylfi Bragi Guðlaugsson, and Pröstur Albertsson, for which it was evident that a great deal of thought and care went into creating and using that space with the projections and the enhanced artistic experience this gave for both performers and the audience.

Alongside the NAIP degree program, I had the privilege of studying at the Sibelius Academy Finland's Open University and this played an important role in developing my knowledge and practice of conducting. I would like to thank Maestro Atso Almila, Maestro Justin Doyle, Minna Kangas, Dr Jari Puhakka, Dr Annamari Pöhlhö, Dr Christopher Palameta, Dr Jose Monero, Katariina Malmberg, Charles Quevillon, Jani Sunnarborg, Tuuli Lindeberg, and Eulalie Emeriaud.



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To the late Dr Louise Crossley and family, thank you for bequeathing the Tasmanian Symphony Orchestra with a program, under the direction of Elena Schwarz, to develop Australia's base of women conductors and giving them the chance to start their career working with a professional orchestra in Australia.

During my degree program, I had the honor of working as a conductor with many musicians from orchestras and ensembles outside my degree program: Korvat Auki, Tasmanian Symphony Orchestra, Seinajoki City Orchestra, Sibelius Academy and its Baroque Academy, thank you for your instruction and support.

And finally, to my family, Timo, Aurora, and my mother.

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# ***1. Introduction***

## **Context**

Orchestral conducting as a performance practice has been in the spotlight lately with the release of the film *Tar*, starring Cate Blanchett in the leading role of Lydia Tar, a conductor whose life is explored in the film. More recently, the release of the film *Maestro* starring Bradley Cooper as Leonard Bernstein has continued to raise popular culture's interest in the conductor. While both films explore some very real aspects of the practice of conducting orchestras, it has also raised discussion on the role of conductors as leaders and the delicate balance of influence conductors need to maintain when engaging in orchestral life, see (Burke 2023; Carras 2023; Hobday 2023). Furthermore, a concerning counter-trend of proudly conductorless orchestras and ensembles has begun to emerge catching the interest and increasing devotion of musicians (Clarke 2022; Seifter 2008; and Wang et al 2020) so that one might ask what is driving a number of ensembles and orchestras around the world to reduce, and in some cases, eliminate, the role of the conductor? Subsequently, what are the emerging and new roles that conductors can perform to counter the trend and increase the relevance of the orchestra and symphonic music in society?

At the same time, around the world, symphony orchestras are emerging from one of the most difficult periods since their propagation in the mid-nineteenth century. While symphonic classical music was already in decline before the pandemic, (see Carlton 2003; Clouse 2016; Gregor 2012; Kolb 2001; McClintock 2017; Yarrow 1988), it could be that the impact of the corona virus pandemic on classical symphony orchestras has accelerated the decline, creating career uncertainty (Cohen and Ginsborg, 2022), industrial action (Hernandez 2021; Lebrecht, 2022; Raihala, 2023), and in some cases, an existential crisis (International Federation of Musicians 2023; Tilden 2023).

Concurrently, technologies are also creating more artistic possibilities for symphony orchestras, composers and music artists. Some examples include the Adelaide Symphony Orchestra's Virtual Reality Orchestra (Niscioli, 2019), London Philharmonia's Virtual

Reality immersive entertainment (Fallon, n.d.) and the Finnish National Opera and Ballet's Opera Beyond (Haapasaari 2022). While financial workplace realities within the orchestra are a partial driver of a new music-science paradigm, the continued convergence of music, science and technology, is certainly creating new and prolific forms of artistic expression within large scale collective music productions. This ultimately initiates the problem statement for the thesis:

*Technologies and socio-cultural shifts are eradicating hierarchies distributing power to the people. Classical music and the role of the conductor are no exception to global democratizing forces. Ideally, in a not-so-distant future, anyone will have access to technologies that can make themselves a composer, a performer and a conductor. We are currently experiencing an evolving music-science paradigm; what might this paradigm mean for innovative practice in the art of conducting?*

## **Conceptual Framework**

This thesis aims to contribute to scholarship, performance, and the innovative practice of conducting. As orchestras and ensembles around the world are reducing the traditional role of the conductor, historically centered within hierarchy, the time has come to ask what are the new roles that can arise for the conductor when considering technology, new power models, innovative performance formats (e.g. performative installations, shared leadership) and attracting the curiosity of audiences to listen. Furthermore, how can we reorient the practice of conducting to address issues such as inclusivity, experimentation, and exploring multifaceted and innovative approaches to the practice of conducting, while at the same time placing emphasis on musical experiences that present beautiful thinking? This later point is of significance for this project because exploring conducting from a specialist viewpoint through purely technological, leadership, musicological or organizational theories would neglect the whole point of why conductors devote their lives to the orchestras they serve.

“Innovative Practice in Conducting: Graphic Scores, Sonic Batons and Open Ensembles for New Performance Formats” is an artistic project that examines the multifaceted role of the conductor with scope for exploring innovative practice. What are the commonalities and critical moments in ensemble construction, notation and performance formats throughout the last millennium that led to changes in the role of the conductor? To what extent can

technology and socio-cultural shifts reshape the iconic practice of conducting? The research questions for the project are nested within the problem statement for the thesis and its conceptual framework, presented in Figure 1.

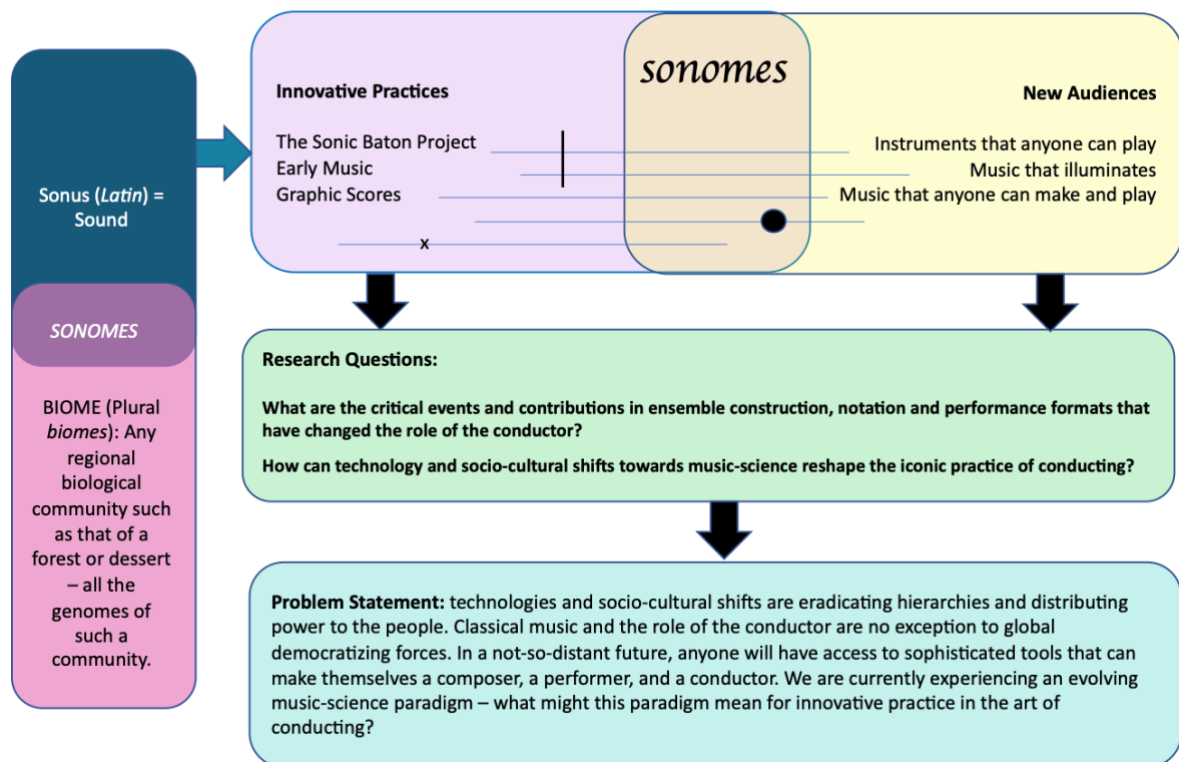


Figure 1: Conceptual Framework for the Project

Therefore, to be holistic in the exploration of innovative practice in conducting, the project and subsequent thesis and exegesis culminate in three concurrent areas of conducting experimentation that considers the connection between innovative practice and new audiences. These three areas are:

1. The Sonic Baton Project;
2. Early Music; and
3. Conducting Graphic Scores

The Sonic Baton is a project in collaboration with the Intelligent Instruments Lab (IIL), Iceland University of the Arts (IUA). As an output of the project, the article *Sonic Experimentalism in the Practice of Conducting: sound sticks and magic wands, or the*

*emergence of a new music science paradigm?* is under submission to an international peer review journal (Leonardo ISAST, MIT Press) and is attached as Appendix I to this thesis. Subsequently, this thesis and exegesis will place the focus of analysis and performance on graphic scores in music over the last millennium and explore what it means within the innovative practice of conducting and exploring new performance formats.

## **Limitations and Contribution**

Challenges and limitations were encountered through experiments and research in the project. All aspects of the project were self-funded and relied on the generosity of collaborations and in-kind support from performers, venues, researchers, fellow students, and staff of the Iceland University of the Arts. The research and experiments that ensued throughout the project encountered the following limitations.

**Technology limitations when developing the sonic baton:** these limitations are discussed in the Appendix I in the draft article *Sonic Experimentalism in the Practice of Conducting: sound sticks and magic wands, or the emergence of a new music science paradigm?* which discusses the importance of the iterative process to learn and improve technologies. The sonic baton still has limitations in its scalability and commercialization, which could be further reduced with appropriate funding resources and multiple design iterations. This thesis does not explore or address the full technical elements involved in the development of the sonic baton in collaboration with the Intelligent Instruments Lab. These elements, including the artificial intelligence technologies, will be explored through several articles intended for international peer review and conferences, including shared authorship for the articles.

**Limitations in instrumental availability and balance:** the ideal situation would be to have a full professional orchestra to perform ambitious graphic scores with specialists in lighting, stage design, projection mapping, animation etc. However, Iceland University of the Arts having a relatively small performance program, does have limitations with the balance and availability of some instruments, which is reflected in the repertoire choice in the final performance. This limitation was managed through scoring arrangements of music around

the final ensemble formation and challenges all musicians to be resourceful in such situations.

**Limited research studying the performance of graphic scores and open notations from the perspective of the conductor:** The literature review process and score analysis revealed, on one hand, composers have written graphic scores that utilize conductors, however not lot of these compositions have been recorded and are on the peripherals of conductor repertoire. This limitation was viewed as an opportunity to contribute both to scholarship and innovative performance practice in conducting, and thus a driving motivator of the project.

**Limited research on new performance formats from the perspective of the conductor:** the conductor as a performing ensemble member within different performance contexts has not been extensively studied outside of its traditional role of directing large orchestras and ensembles within the concert experience. This creates an opportunity to contribute to the study and experimentation of new performance formats furthering knowledge from a conductor perspective.

Acknowledging that innovation in the practice of conducting can have a broad range of possibilities, this project oriented itself to leverage the resources available in Iceland and at IUA. The culture and local support quickly became evident in the NAIP degree program, and therefore research and experimentation prioritized the sonic baton project, the focus on visual / graphic scores and open notations and experimenting with new performance formats external to the concert experience including performative lectures, performative audio-visual installations, and exhibition performances.

## **Structure of the Thesis**

This thesis is structured into six chapters and a conclusion. This chapter sets the context and rationale for exploring innovative practice in conducting and presents the problem statement, conceptual framework, contribution and limitations, and outline of the thesis. Chapter two explores the foundation of the MMus degree program New Audiences and Innovative Practice (NAIP) and asks what that means for the practice of conducting. The Musical Chairs



Framework was developed to simplify and explore the dynamics and the importance of innovation in the practice of conducting against the necessity of gaining new audiences alongside the steadfast traditional concert goer. Chapter three outlines the methodologies in the project which include literature review, framework development, critical reflection, score analysis, performance analysis, repertoire analysis, as well as collaboration with composers. Chapter four presents the literature review for the project which has been aligned with the research questions in the conceptual framework.

Chapter five presents the performance exegesis and its creative experiments and is written in the first person. It presents personal approaches, preferences, influences, and reflections on performance outcomes. Chapter six presents the findings and discussion on why it is important to explore and communicate the multiple roles that a conductor may perform, whether it be in the performance of graphic scores or musical notation. The conclusion presents the project experiences within the problem statement and outlines future paths for research and performance experimentation with a focus on technologies for new performance formats and the possibilities for exploring these new performance formats within the practice of conducting.

## ***2. New Audiences and Innovative Practice***

### **The Musical Chairs Framework**

When it comes to addressing new audiences and innovative practice of conducting, a complex task is at hand. This is because the role of the conductor as musical leader, artistic director, musician, composer, performer has evolved extensively since musicians started playing music together. Technology developments of the twentieth century led to a redistribution of the almighty power of the orchestral conductor, and the democratization of orchestral life further led to the dilution of conductor power and the emergence of conductorless ensembles (Clarke 2022). So, when it comes to understanding the potential for innovative practice within conducting, it needs to be placed within the full practice and historical context of conducting with all the traditions and their conservations. That is because there is still a desire by audiences for these symphonic traditions making that aspect of conducting practice highly relevant to the profession. To be able to continue the analysis with depth, one must distinguish innovative versus traditional practices in conducting, as well as new audiences versus the familiar audience.

Drawing from almost two decades of experience in strategic management consulting, the Musical Chairs Framework has been developed by the author to understand the interplay between traditional and innovative practices in conducting alongside new versus familiar audiences (see Figure 2). Frameworks are commonly developed and used by management consultants to simplify complex problems, gain alternative perspectives, and create structure for developing analysis and understanding. Many frameworks that continue to be commonly used today in the consulting profession include the Ansoff Matrix, BCG Growth-Share Matrix and Porters Five Forces (Ansoff 1957; Henderson 1998; and Porter 1980). By developing a new framework approach, the complex problem can be disaggregated and simplified.

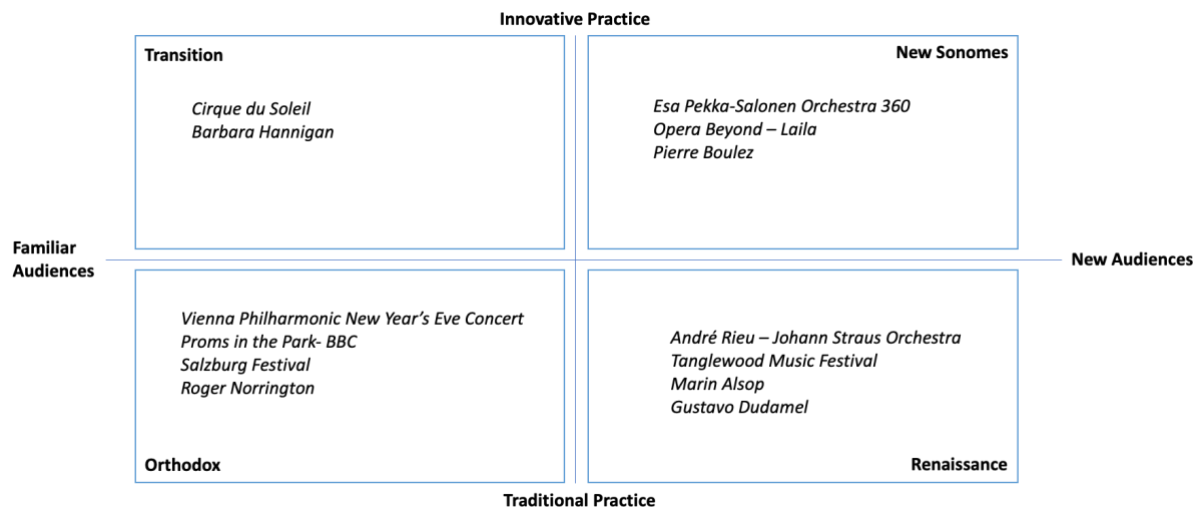


Figure 2: The Musical Chairs Framework by Majella Clarke

The horizontal axis presents the spectrum of audiences. Familiar audiences know the artistic format and often have familiarity with the repertoire and performance content. New audiences are those that have yet to experience the performance content and are usually looking for new creative experiences. The vertical axis reviews the spectrum of practice, from traditional to innovative. Traditional practice typically conforms to stylistic norms, notation, instrumentation, and performance techniques and can be argued to have deep cultural and historical significance. Innovative practice can incorporate the use of technology, the blending of genres, unconventional instrumentation, audience interaction, cross-media approaches, and cross-cultural influences to name a few.

The following intersections can be used to describe the experiences when practice and audience converge in a section of the spectrum.

**Orthodox** is typically used to describe something that adheres to traditional practices and standards or in accordance with established norms. It is the opposite of innovative. In the practice of conducting, we might see as orthodox the programming and concert experience of the Vienna Philharmonic Orchestra at their New Year’s Eve Concert in the Großer Saal of the Musikverein in Vienna, commonly featuring a program of classical music compositions, particularly waltzes and polkas by Johann Strauss II. The Vienna Philharmonic’s web information about the New Year’s concert is a useful source to review

the history and significance of what has become an orthodox practice in programming for the orchestra (Vienna Philharmonic, n.d.).

**Transition** is used to describe when the traditional audience begins to shift from a familiar to an unfamiliar experience and is likely to encompass various reactions and emotions that the audience goes through during the process. It can signify a change and adaptation that members of the audience go through as they shift from subscribing to traditional performance formats to innovative performance formats. Think Barbara Hannigan in concert. Hannigan is a conductor and singer who both conducts and sings at the same time, even though the concert experience is presented in a traditional format. Hannigan's performance of "Mysteries of the Macabre" composed by György Ligeti with the Avanti! Chamber Orchestra for the Festival "Présences 2011" presents one of many available examples online (Bosc 2011).

**Renaissance** is used to describe the experience of audiences with renewed interest in traditional artistic practice. Usually this might be due to efforts to make the experience more accessible or relevant to contemporary audiences. The term expansion might be considered to convey the idea of broadening the reach of a traditional art form to attract new and diverse audiences. Gustavo Dudamel has engaged diverse communities and brought classical music to new audiences. Marin Alsop has also been an advocate for gender and diversity in classical music and has played a role in broadening the traditional classical music audience base. A review of Alsop's projects presents extensive work towards diversity an inclusion including the Global Ode to Joy Project in partnership with Carnegie Hall, The Taki Alsop Conducting Fellowship to support women conductors, OrchKids for developing musical and social skills with schools in Baltimore and Rusty Musicians for adult non-professional musicians in collaboration with the Baltimore Symphony Orchestra, (Alsop 2023).

**New Sonomes** is used to describe the new audiences built around innovative practice. These include avant-garde, cross-genre, experimentalists and mavericks with eccentric, sometimes iconoclastic audiences. On the conductor front, Pierre Boulez developed innovative conducting techniques for conducting complex contemporary music, including a conductor notation; for an example, refer to Boulez' score of *Le Marteau sans maître* (Boulez 1957). Esa Pekka-Salonen has explored innovative technologies such as orchestra 360 and

conducting multimedia performances and has been at the forefront of innovation in classical music (HAM Helsinki 2018).

## **Delineations**

This NAIP Project hopes to demonstrate innovative practice in conducting with the application of new technologies to sonify the conductor while exploring different performance formats utilizing an open performative installation rather than a traditional concert experience to conduct graphic scores. New audiences are sought in the project by opening the experience to the public and by providing visual material and projections that can help the audience connect with the music and its performance.

The word “sonome” itself is a confirmed neologism and it originates through the combination of the Latin word for sound (*Sonus*) with the Greek word *Biomes*, which primarily refers to biotic communities that exist in nature (Clements, 1917). The term biome was further developed to specify “a certain grouping of species and varieties is characteristic of each biome” (Shelford and Olsen, 1935) and the definition was further reviewed and disambiguated in the article *The Biome* (Carpenter, 1939), which reviewed all contributions towards the meaning of the word biome. The interesting word in the definition of biome was that of “community,” as this NAIP project intends to explore different sound communities from both the performer and audience perspectives. In this context, the word *Sonome* is explored through identifying the intersection of new audiences and innovative practice spanning both conducting and new performance formats. The result is ultimately new communities of sound.

Innovation is a dynamic and often continuous process. However, there does come a point when an innovative approach expires or becomes mainstream or redundant. The music industry does protect innovative intellectual property, such as compositions, lyrics, sound designs and other contributions to culture with copyright laws. New instruments and musical technologies and software are often patented and licensed. These trademarks, copyrights, patents, and licenses have validity dates for which the right to use is transferred after a period, (Givoni 2015). While the duration of protection differs depending on the medium of expression, for sake of drawing a clear line, let’s assume that innovation loses its disruptive force when the intellectual property right protection lapses. In understanding that innovation

is really a fleeting moment in the timeline of human creativity, it would point to the common phenomenon where all traditions that evolved over a short period of time were once innovations. This has implications for the application of the new audiences and innovative practice and the Musical Chairs Framework, as it means the categorizing of audiences and practice is dynamic, and that assignments of new audience and innovative practice are likely to become familiar audiences and traditional practice at a point.

### ***3. Methodologies to Support Practice-Based Research***

This research design uses practice-based research methods with performative exegesis to explore innovative practice in conducting and investigate the research questions:

1. What are the commonalities and critical moments in ensemble construction, notation and performance formats throughout the last millennium that led to changes in the role of the conductor?
2. To what extent can technology and socio-cultural shifts reshape the iconic practice of conducting?

The first question is retrospective, while the second question is prospective. When taking into consideration the many different research methods available to address the above research questions, ultimately the choice is shaped by a combination of philosophical beliefs, aesthetics, curiosities, and available resources. In this respect, the practice-based research methods outlined below are influenced by feminist post-modern contributions to music.

Table 1 presents an overview of the methods, aims and approaches that were utilized throughout the project. The methods for the practice-based research are explained, while the approaches are discussed in the literature review, presentation of frameworks and performance exegesis.

#### **Multimodal Research and Literature Review**

Traditional research from academic resources is utilized in this thesis supplemented by the inclusion of other media, such as videos, graphic scores, documentaries, websites, recordings, score markings and social media. The inclusion of non-literary sources and forms of expression is known as multimodal research (Dicks et al, 2006). Literat et al (2018) observe the significance of multimodal research given the hegemony of text-based knowledge and new modes of expression and argue that multimodal research can strengthen diverse participation in knowledge production, while also offering a more nuanced method of inquiry. To support the literature review, Large Language Models (LLMs) such as OpenAI's ChatGPT, and Web Search Engines such as Google and Google Scholar, were used to broaden research and accessibility of literature for the literature review. Video-sharing platforms including Vimeo and Youtube were used to search and access performances and video materials. Social media, specifically Facebook, was used to connect with composers and request consultations and examples of graphic scores from composers.

<b>Aim</b>	<b>Methods</b>	<b>Approach</b>
Broad review of literature and materials in field of conducting practice	Multimodal literature review	Literature review, Web Search Engines, Large Language Models, performance program notes
Study specific performances and technologies relevant to conducting	Case Study Analysis	Specific cases to examine the application of technologies on conducting and performance
Broad Review of graphic scores and open notations for conductors	Multimodal literature review Score Analysis Composer Consultation	Literature review, Web Search Engines, Large Language Models, performance reviews, program notes Analysis and experimental performance of scores Consultation and discussion with composers
Gain feedback on literature review, case studies and exploration of topic	Presentation of Project	Presentation of interim research in academic forums: SAE Forum, Meet the Masters, IUA NAIP Mentor
Explore innovative practice and new audiences in the field of conducting	Framework Development Multimodal Review	Development of the Musical Chairs Framework, Crazy Horses Framework, examination of video performances, review of online materials to support observations and delineations
Experimentation with the sonification of conducting practice	Experimentation Score Analysis Composer Collaboration	Experimenting with sound, amplification and conducting, Experimenting with sensors, data and movement in conducting Curation and commissioning of repertoire to demonstrate sonification of conducting practice
Present performances and source feedback on the experience	Demonstration Performance Reflection	Open demonstration of sonic baton to the public in connection with curated visual scores at the Living Art Musuem, Earth Day Concert Collaborations and Commissions with composers
Identification of alternative performance formats	Experimentation in Performance, Reflection	Performative Audio Installation, Performative Audio Visual Installation, Performative Visual Installation, Concerts, Performative Lecture, Exhibition Performance
Creation of Notations	Composition Reflection	Experimentation, literature review, performative lecture, exhibition

Table 1: Overview of Methods and Approaches to support Practice-Based Research



## **Case Study Analysis**

Case study analysis was used to examine specific technologies and experiences when taking a retrospective on the different approaches to integrating technologies in the practice of conducting. The case studies were used to present the commonalities and differences in the development of the sonic baton, and to ascertain that the outcomes from the sonic baton developed at the center of this project is unique and innovative. The results are presented in the attached draft publication in Appendix I.

## **Experiments**

Experimentation is an important part of the project from both the research and performative aspects. Experimentation occurred in three areas for the project. The first area was the sonic baton, which went through several iterations during the project. This is described extensively in the performance exegesis in Chapter 5. The second area of experimentation was in performance with open ensemble construction and new performance formats occurring through collaborations with different ensembles and musicians. The third area of experimentation was in the curation, collaboration, commissioning, and performance of graphic scores, presented in the performance program notes (Appendix II) and performance exegesis in Chapter 5.

## **Framework Development**

The project was designed to be complex because innovative practice in conducting can take on a spectrum of applications. Therefore, to be able to simplify and analyze influences and approaches to the project, two frameworks were developed to support and structure the analyses. The first framework was introduced in Chapter 2 of this thesis as the Musical Chairs Framework which analyses new audiences and innovative practice from a conductor perspective. The second framework is presented in Chapter 5 in the performance exegesis and is titled the Crazy Horses Framework to present and analyze influences and the extent of planning to study performance, experimental and learning outcomes.

## **Composer Collaboration and Consultation**

Multiple consultations and collaborations with composers occurred throughout the project. Composers were sourced through a call for scores utilizing graphic and open notation through the Finnish ensemble Korvat Auki, through the Composers and Performers Facebook group, and various networks. Some of the composers consulted did not have works performed in the project but were an important source for recommending other composers and giving guidance on approaches for when and why to use a conductor in the performance of graphic scores. Important composer collaborations that emerged from this project are discussed in Chapters 5 and 6, as well as the program notes for (*Seasonally Adjusted*) SONOMES and the Earth Day Concert.

## **Score Analysis and Interpretive Strategies**

The analysis of scores is an important method in the project, as it is the basis of all the performative work. Sourcing graphic, open notation, visual scores that specifically require a conductor was challenging as not a lot of research and performative material is available. Based on the literature review, consultation and multimodal searches, there is plentiful content on graphic scores, but most of the content does not include a conductor. Once the scores were sourced, the score analysis could commence. As there is limited research and performative examples of conductors conducting graphic scores, the score analysis was self-directed or in close consultation with the composer. Devised performance practice was used in multiple performances of graphic scores, as conductor and performers came together to devise expressions to unify conducting gestures with the visual material and the instrumentalist's audible responses to gestures.

Score analysis was used to organize instrumentalists and create an appropriate performance program that could highlight different conducting and ensemble leadership techniques. In the case of the choral Christmas carol selection, score analysis was used to arrange scores for specific voices and ranges, and to create arrangements and transpositions that can suit the voices and instruments in the (*Seasonally Adjusted*) SONOMES performance. Typical score analysis was also applied and included the analyses of score structures, harmonies, notations, historical and stylistic features, expressive markings, and instrumentation, for

which the author's training as a conductor was essential in the interpretive strategies. Significant research has been devoted to exploring the importance of score analysis within the practice of conducting (Strouse 1987; Meier 2009; deRaizabel 2019; Rudy 2022).

## **Performance and Reflection**

Reflection in performance and experimentation is an important part of practice-based research (Draper and Harrison, 2010; Biggs, 2004) especially in the performance and education of music. Performances were prepared with rehearsal schedules and assignments of instruments and repertoire. The reflection process started before the rehearsals and would go through several cycles before each performance. This is because the nature of conducting— as with the role of music producer, curator, artistic director, and performer— requires different questions in reflection at different points in the preparation of a performance.

In the organization of rehearsal schedules and repertoire assignments, I would ask in the open ensemble, who is available to make the rehearsals? Is this repertoire suitable for the performer? How is the repertoire innovative? Should I make changes to the repertoire/stylistic approach to improve the performative outcome?

As a conductor reflecting on rehearsals taking the roles of performer and artistic director, the questions after each session would reflect on what went well? What needs to be improved? What is in my control to improve? What have I learnt from past experiences that I will change in my next performance? How will I make those improvements for the final performance?

Finally, as a curator with the responsibility of programming, self-reflection led to multiple revisions in repertoire choice following a reflective process that would ask, is the repertoire appropriate given the theme/season? Is the repertoire diverse in style, period, and representation? Overall, reflecting on performance and experiments played a crucial role throughout the NAIP degree program courses and performances, and the final performance reflections are presented in Chapter 5 in the performance exegesis.

## 4. Literature Review

Conducting as a practice has evolved parallel to the ensemble formation and evolution of composition techniques and notational innovations. Looking back over more than a millennium of collective music tradition, with primary influence originating from the Christian church, the early origins of conducting are found to be rooted in chironomy, known as the art of using gesticulations and hand gestures to lead oratory and rhetoric. Mengozzi (2010) refers to Guido of Arezzo's *Epistola ad Michahelem* which proposes a new method for sight-singing based on the first six syllables, *ut, re, mi, fa, sol, la*. These syllables correspond to the first syllables of each verse of the Hymn of St. John "Ut Queant Laxis" and are the birth of modern solfège (Mengozzi 2010, 1-8). Killam (1988) reviews the essential background to the Guidonian hand and its evolution noting that solmization with the Guidonian hand was a central method of learning music for over 500 years (Killam 1988, 251-257). Leman, Nijs and Di Stefano (2017) discuss the role of the Guidonian hand as a method for directing sight-singing based on the connection of syllables to pitches (Leman, Nijs and Di Stefano 2017, 175-180). Belan (1984) made their in-depth doctoral thesis discussing chironomy, including the Guidonian hand, in the leading of Gregorian chant and plainsong. In ancient music, the concept of a leader to unite multiple performers of monophonic plainsong was in place, for which non-metric rhythm was a feature that required the leader to gesture the change of pitch and syllable. The development of gestures at this period was connected closely with the evolving music notation (Belan 1984, 1-47).

Dyer (1980) cites Elias Salonom's *Scientia artis musicae* of the late 13<sup>th</sup> century, which references instrumental and vocal polyphony (Dyer 1980, 83-95). Hindemith (2022) refers to Salomon's *Tractatus de musica* for one of the earliest descriptions of the conductor as leader of ensemble and describes how conducting groups of musicians started and refers that the leader "is one of the singers, who has to know everything about the music to be sung. He beats time with his hand on the book and gives cues and rests to the singers." (Hindemith 2022, 136-137). The time beating emerged with choral polyphony and the need for tactus emerged as the music developed harmonic complexity. Miller (1968) revisits Franchinus Gaffurius' *Practica Musicae* which describes the tactus as the pulse of a healthy person (Miller 1968, 120). As polyphony and secular music emerged though the Renaissance, the music leader's role would be to keep tactus for the ensemble and this role led to the

leadership to use the motion of a long staff to keep the pulse for the ensemble. Jean-Baptiste Lully is credited with introducing the use of a long staff called a "bâton" to beat time and "ferociously attack each artist, much as Don Quixote charged the windmills, striving blindly to beat them into submission" (Heyer 2000, 15).

So having moved from instructor of unified interval movement to tempo keeper, the next innovation to reshape conducting arguably comes from the opening of Beethoven's 5<sup>th</sup> symphony, starting on an offbeat in symphonic unison. The role of the fermata's length in disrupting the musical tactus has been one of the defining compositions that requires a conductor, (Sabaneev 1928, 307-309; Weingartner 1907, 119). Many conductors and musical accounts through the 18<sup>th</sup> and 19<sup>th</sup> century discuss the role of the conductor with almighty authority over the orchestra and fidelity to composer, with their role in directing colour, texture, and phrasing, in addition to navigation of tempi complexities (see for example Galkin 1988; Hurwitz 2012; Bowen et al 1993; Gatdula 2015).

The next innovation in conducting is, arguably, Igor Stravinsky's *Rite of Spring*, premiered in Paris in 1913. The complexity of the music, and its continually changing rhythmic meter, required the conductor to memorize and embody time-keeping gestures to keep the orchestra together. In this level of complexity, the conductor is most certainly needed to maintain unity in the ensemble, (Caetani 2016; Craft 1966; Broody 2000; Francis 2013) in addition to give a common artistic vision to an orchestra of more than 100 musicians.

Composers of the 20<sup>th</sup> century started to use the conductor for unifying complex ensemble harmonies. Even though some ensembles were exceedingly small consisting only of a few players, a conductor was required to perform the work. Some notable examples of complex repertoire requiring conductors for navigating compositional complexities include *Pierrot Lunaire Op.21* by (Schoenberg 1914), *Kreuzspiel* (Stockhausen 1960), and *Differences for five instruments and tape* (Berio 1958).

Pierre Boulez is credited for deriving and innovating a conductor notation to navigate the growing complexities even for a small ensemble, see *Le Marteau sans maître* (Boulez 1957). The 20<sup>th</sup> century saw composers take ensemble formation and performance to the limits of

previously known complexities and further require more direction and skill from conductors. However, the boundaries of complexities were further stretched for the conductor with compositions that required, and have a defined role for, multiple conductors and orchestras in the one composition; see *Strategie* for two orchestras and two conductors (Xenakis 1959-1962), and *Gruppen* and *Carre* (Stockhausen 1971).

While these orchestral complexities were receiving their world premiere, often originating from Darmstadt, a Summer music festival in Germany which continues to play a significant role in the dissemination, composition and performance of avant-garde and experimental music, a counter-movement was forming that was exploring alternative notations for performing complexities in musical performance. Some notable contributions that subverted the role of the conductor include Dieter Schnebel's *Visible Music I* for instrumentalist and conductor, Pauline Oliveros' text scores including *Two Double Basses at Twenty Paces and Conductor*, and Cornelius Cardew's "*Treatise*" coinciding closely to his book *Stockhausen Serves Imperialism* (Schnebel 1962; Oliveros 1968; Cardew 1971; Cardew 1974).

Towards the conclusion of the twentieth century, music liberated itself in notation and ensemble formation. The role of the conductor was viewed as traditional, such that in the early 21<sup>st</sup> century, the conductorless ensemble emerged as a trend and question to the role of the conductor as artistic authority (Clarke 2022).

The next big change in the role of the conductor is emerging from technology and digitalization. The following section delves into how technology and digital innovations over the last two decades have resulted in diverse experiences opening conducting to the public, with a focus on the sonification of the baton and conducting gesture.

## **Technology and the Practice of Conducting**

Sonic batons and sound sticks are by no means novel as we go into the third decade of the 21<sup>st</sup> century. The first of the sonic-inspired batons to be prototyped include the 1997 Mathews Radio Baton and Improvised Nodes, which tracked conductor gesture motion in three-dimensional space with electrical signals conveyed through MIDI cables using

standard MIDI conventions, (Mathews and Boulanger 1997; Boulanger 1997). A decade later, artist Joseph Young developed a sonic baton using a MIDI controller for “conducting noise.” Designed by Dr Mike Blow, Young’s sonic baton attached an accelerometer with a custom-made Arduino board that translates movement into MIDI data. The data is transmitted to the laptop via a specialist MAX/MSP patch which interfaces with control software in Ableton Live (Young 2012).

Das Haus der Musik in Vienna displayed its own virtual conducting installation with a focus on conducting selected classical music repertoire pre-recorded by the Vienna Philharmonic Orchestra. The conductor would take the wand and select the piece they would conduct. The selections included *The Danube Waltz*, the *Annen Polka* and the *Orpheus Quadrille* by Johann Strauss II, *Eine Kleine Nachtmusik* by Mozart, Brahms’ *Hungarian Dance No. 5* or the *Radetzky March* by Johann Strauss I. Some conducting gestures are transferrable to the virtual experience, such that the larger the plane covered in moving the wand, the louder the orchestra played. Using a time-stretch algorithm, the conductor sets and controls the tempo of the music, see Haus der Musik (n.d.).

Similar to the virtual conductor installation at Das Haus der Musik, the *UBS Virtual Maestro* is an interactive conducting system designed and developed by Immersion Music to simulate the experience of orchestral conducting for the public attending a classical music concert. The system utilizes the Wii Remote, which users hold and move like a conducting baton to affect the tempo and dynamics of an orchestral video/audio recording. Similar to Young’s sonic baton, an accelerometer is used to generate data based on gesture and is connected to the Wii Remote which is used to control playback speed and volume in real-time, see Nakra et al (2009).

A quite different, yet similar, experience that turns the regular museum visitor into a virtual conductor is the Mendelsohn – *Effectorium* at the Mendelssohn-Haus Museum in Leipzig. Using compositions by Felix Mendelssohn, the installation is made of twelve speakers. Using Leap Motion, the gesture controls the tempo when the conductor selects “playback audio with conducting.” The touchscreen serves as a control center to give visualization of the score and set parameters, such as the acoustics and tuning of the instruments, from

classical pitch A = 430Hz – to modern concert pitch A= 443 Hz, and also allows the conductor to mute and select specific instruments in the score (Create Digital Music 2014).

The technologies used in virtual conducting installations and sonic batons provide novel experiences in conducting to the public. However, there are two impediments to their scalability, which make them unique novelties that are unlikely to be scaled. The first is that the installations and software from Effectorium and Das Haus der Musik are large installations making them difficult to dismantle and set-up. They include large screens and sensors and are limited to the repertoire the system is trained in. The sonic batons developed by Young and Mathews Radio Baton were significantly more transportable; however, their electrification requires a complex cable set-up for signal processing and amplification, and they are limited in terms of sonic diversity as the sound source is specifically MIDI data in those cases.

Taking these limitations of transportability, scalability, creativity and usability into account, the sonic baton was developed to optimize all these previous limitations and therefore makes its a valid contribution to the development of the technologies that sonify conducting gesture.



## 5. Performance Exegesis

### Context and Artistic Intent

My project culminates in a final performance titled (*Seasonally Adjusted*) *SONOMES* in collaboration with Harpa Concert Hall, Intelligent Instruments Lab, professional musicians, and students and staff from the Iceland University of the Arts.

The collaboration required the preparation of a detailed plan for the performance, so that Harpa representatives could assess its suitability and resourcing of the program. In the detailed plan, the target audiences, instrumentation and technical needs are identified and included in the performance specifications, see table 2 below.

Specifications	Performance Summary
<b>Date</b>	18th December 2023
<b>Venue</b>	Harpa Concert Hall, 2nd Floor
<b>Duration</b>	Approx. 60 minutes
<b>Purpose</b>	Iceland University of the Arts, MMus NAIP Final Performance
<b>Instruments</b>	Vocal Soloists, SSAA, Violin*3, Viola, Cellos, Double Bass, Flute, Clarinet, Oboe, Sonic Baton
<b>Genres</b>	Medieval, Renaissance, Baroque, Contemporary, Experimental
<b>Format</b>	Performative visual installation; performative audio-visual installation with sonic baton
<b>Technical Needs</b>	Projectors and screens to present the visual content in the Harpa open space. The sonic baton uses wireless signal processing with portable speakers.
<b>Target Audiences</b>	Interdisciplinary artists, music technologists, curators, researchers, students, general public, tourists, composers, musicians, entrepreneurs
<b>Projection Content</b>	Graphic scores, text scores, Architectural graphs, neumes, AI generated art.

Table 2: (*Seasonally Adjusted*) *SONOMES* Performance Specifications

To inform the target audiences about the open concert in Harpa, email invites are sent to targeted persons from the academic and artistic institutions in Iceland to reach scholars, composers, students and interdisciplinary artists. Local music enthusiasts and the general

public will be reached predominantly through the Harpa venue’s social media, posters and newsletter emails.

## **Programming Principles**

Early in the NAIP degree program, I developed a series of principles for research and performance to guide the project’s outcomes and contributions to further musical and artistic practice., These principles outlined in the table 3 below influence my approach to performances and research, including the curation of graphic scores.

<b>Principles</b>	<b>Explanation</b>
<b>Inclusive and Diverse Artistic Research</b>	Transcultural research outputs and artistic practice outcomes that give equal space to the curation, contribution, and performance of the works of women and people from diverse backgrounds, alongside the status quo.
<b>Inspire New Audiences</b>	Attract, inspire and educate new audiences with multiple outcomes and experiences arising from the project directed at different segments of society.
<b>Demonstrate Innovative Practice</b>	Contribute significantly to artistic research in the field of conducting and ensemble direction with innovative practice.
<b>Technology-Driven</b>	Experiments utilize technology to drive and demonstrate innovative practice.
<b>Artistically Inspirational</b>	Creating and sharing live performances that charm fellow artists and performers and lead to new ideas.

Table 3: Research and Performance Principles

While these principles played an important role in shaping the final program, they also created additional challenges in finding the appropriate repertoire to demonstrate innovative practice in conducting as well as reach new audiences. The timing of the concert also played a critical role in the decisions on repertoire which I aligned with the performance principles.

### ***(Seasonally Adjusted) SONOMES***

The dilemma is simple. Set in one of the most beautiful concert halls in the world at the Harpa Concert Hall for a performance open to the public, a week before Christmas – should the program curator neglect the season and focus on the program’s specific genre? Or create an additional challenge and aim to integrate seasonal vibes into the specific genre of

conducting graphic scores? I renamed the performance program when the final date was agreed and placed one week before Christmas, a national holiday in Iceland. The term *Seasonally Adjusted* makes a play on words, coming from statistics to smooth out seasonal variations in data to reveal the underlying trends. The program for the concert was seasonally adjusted to present a balance of Christmas music alongside pre-chosen and commissioned repertoire that would showcase the sonic baton and explore graphic scores and visual music requiring the utilization of the conductor.

A week of research identified some examples of visual music and sound pictures within the seasonal theme with gratitude extended to Karl Stockhausen's sound picture of *Die 10 wichtigsten Wörter (The Ten most Important Words)* as presented in the Online Merker Article "*BERGISCH GLADBACH bei Köln: Ausstellung KARLHEINZ STOCKHAUSEN – KLANG BILDER*" (Online Merker 2018). Stockhausen's sound picture, though not listed in the official catalogue of compositions from Stockhausen, served as an inspiration for a performance which I arranged for voice, Bass Clarinet, Flute/Piccolo and conductor. The arrangement consisted of seven iterations with each voice taking an accompanying role while at least one other voice had the primary theme. What was particularly original about the arrangement, was the arrangement for the conductor. The arrangement of Stockhausen's sound picture was developed to demonstrate the different types of conducting that a conductor can use within different variations on the theme. The arrangement applies principles of chironomic conducting to gesture intervals, conducting gesture focused on indicating expression and articulation, conducting of the sound picture (where down beats line up with each line) and modern conducting designed to unify the ensemble's tempi and rhythm. The arrangement also explores extended techniques for the assigned instruments, including sprechstimme and flute whispers. The arrangement synopsis is presented in Appendix III.

For this concert, to maintain the consistent use of projected images, the two seasonal carols *Coventry Carol* (anon. 1571) and *Varpunen Jouluaamuna* (Kotilainen 1913) sourced and generated visual images to accompany the music. The *Christmas Coventry Carol* is sung at Christmas to remember the Massacre of the Innocents, typically celebrated on the 28th of December. The Massacre of the Innocents is the subject of numerous paintings from the

Renaissance era and therefore an accompanying visual of approximately the same period was sourced from artist Peter Paul Rubens, who depicted the scene twice in his artistic career at around the same time that the *Coventry Carol* was being sung. The images used in the performance as well as supplementary information were presented in the program notes and are available in the Appendix II.

The second set of visuals uses prompt engineering methods with text-to-image generator Leonardo.AI to generate a series of images that are based on the lyrics of the Christmas song *Varpunen Jouluaamuna* (English translation: *The Sparrow on Christmas Morning*). *Varpunen Jouluaamuna* is a Finnish/Swedish carol from the 19th century about the long cold winters, the hope of Christmas and the spirit of a dead child who visits their sister as a sparrow, who feeds the sparrow only to find it has passed on Christmas morning. I used an AI image generator because it created a new possibility to connect the words of the Christmas song with images and, arguably, is an example of innovative practice. The images were deliberately cropped and chosen to align with the song, and three generations were selected from twenty using Leonardo.AI, see Figure 3.

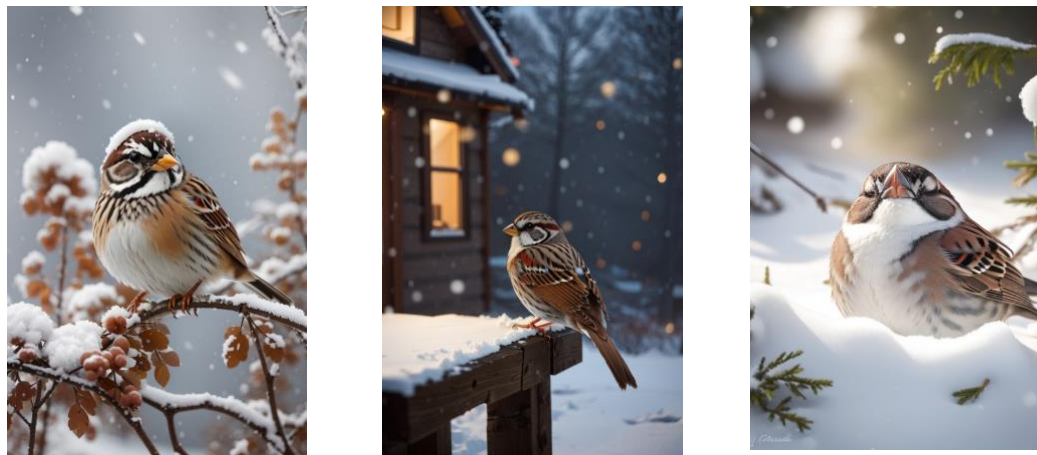


Figure 3: Images generated by Leonardo.AI. in response to “Snow covered flowers, lake frozen in winter, homeless my sparrow”, November 22, 2023.

Some of the seasonal music selected in the performance was chosen because of the visual contributions of the composer. I found researching and curating this aspect of the program particularly interesting as the music was from the medieval and early renaissance music eras and the challenge was to find suitable music with visuals, while maintaining performability

and adherence with stylistic features on modern instruments. The music of Hildegard von Bingen (Reisenkodex c.a.1180-1185) was reviewed and *O Viridissima Virga* was chosen because of the meaning of its words that praise the mother of Jesus and the connection with Christmas. Hildegard von Bingen was, in addition to a composer of early church music, a visionary so that several of her visuals were chosen<sup>1</sup> to accompany the performance of *O Viridissima Virga*. The preparation of the performance of *O Viridissima Virga* used devised performance practice, through experiments with the ensemble. The decision to assign musical lines to players was based on ensuring all ensemble members had an assigned part of play, and that when iterating the line of the vocal soloist, the music improvisation would reflect and reinforce the words and ensure the soloist had enough melodic support throughout the performance. The conductor's role in the performance was to lead the devised rehearsals and collaborate with ensemble, and to use gesture to invite and confirm devised features of the performance. The gestures assigned were choreographed based on Lawrence D. "Butch" Morris' contribution to the art of conduction, where "Conduction embraces a sonic arena in which to construct, deconstruct, and reconstruct with and from the basic properties of pitch, duration, intensity and timbre." (Veronesi 2017, 39). The book *The Art of Conduction* (Veronesi 2017) provides a Conduction lexicon with diagrams to support instruction on gesture, signage and an explanation when these may occur in performance.

Baude Cordier's composition and visual score *Rondenaue upon a Heart: Belle, Bonne, Sage* from the Chantilly Codex collated and published by the American Institute of Musicology (Apel 1972) was initially chosen for its visually striking score in the shape of a love heart. The composition's text opens with "A ce jour cy que l'an se renouvelle" (English translation: On this day that the year becomes new), and therefore made the seasonal selection.

The performance of Dieter Schnebel's *Visible Music I* (Schnebel 1962) for Conductor and Instrumentalist, also applied devised performance practice. The composition provides ample instruction on how to approach the performance of the graphic score, for which the conductor gesture aligns with instrumental sonification and the visual graphic. In this performance, professional flutist Anna Maria Tabaczyńska opened sonic possibilities by using extended

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<sup>1</sup> Hildegard and Volmar, (Digitalization by International Society of Hildegard von Bingen Studies n.d.), *Scrivias 2.2 Trinity* (Salvadori 2019, 61) *Scrivias 1.3 The Firmament* (Salvadori 2019, 46).

techniques on the flute. The conducting choreography was original, inspired by the graphic score and sonic possibilities working with the flute.

The graphic score *From the Other Place* by Hildur Guðnadóttir used color assignments to notes as part of a rule-based graphic score. In my performance of this composition, I lead the change in the notes (chosen by the string players) and determined the duration of notes in the unified section of the composition. The dynamics score was of significance for my part as a conductor, as the dynamics change when the notes changes. Conducting this composition requires the conductor to place emphasis on the type of energy in the preparation gesture and then maintaining that energy for its duration. The conductor also performs a structural role in the performance of this unique and incredibly creative composition.

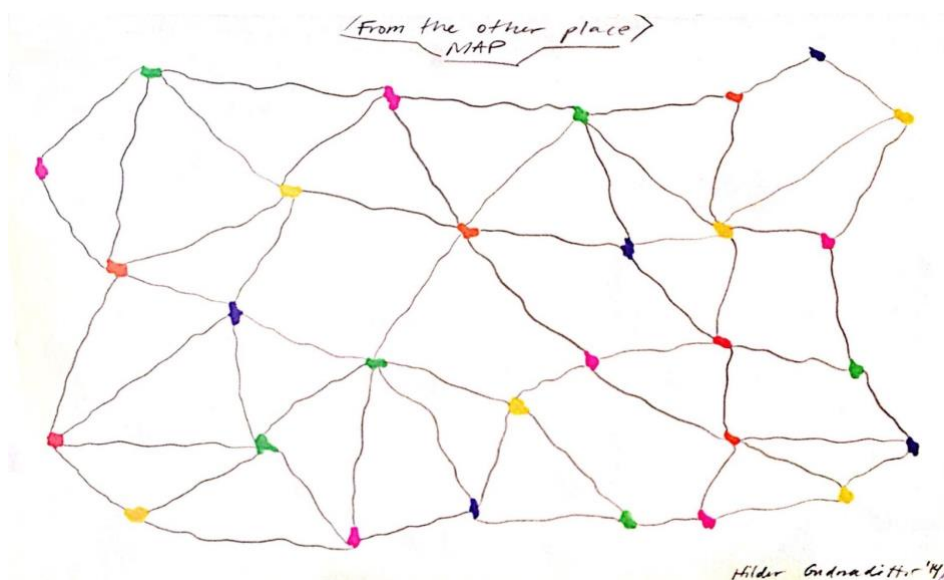


Figure 4: Hildur Guðnadóttir. Excerpt *From the Other Place* (2014)

The other compositions performed in *(Seasonally Adjusted) SONOMES* are discussed in the subsequent sections under the appropriate headings to avoid repetition in their analysis.

## Previous Projects and Influences

Over the course of the NAIP program, there have been both internal and external influences that have shaped my practice, conceptual framework, research, and program curation. Since there have been many influences on my practice over the past eighteen months, I developed

the “Crazy Horses” framework<sup>2</sup> to structure the discussion on influences on my work, categorizing internal versus external influences on the Y axis and planned vs. unplanned influences on the X axis, refer to Figure 5. The rationale behind the framework is that I would personally like to discover elements for what makes for an innovative project and test the importance of agility in implementation.

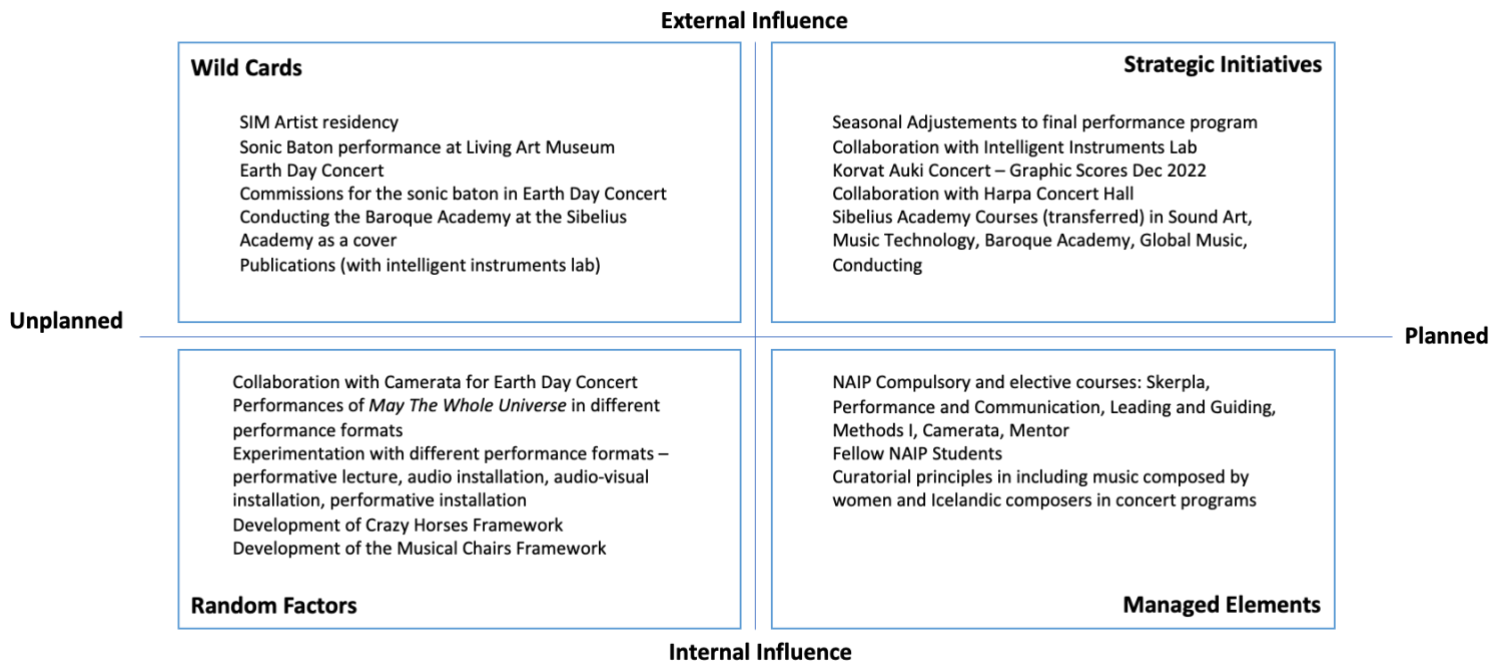


Figure 5: Crazy Horses Framework by Majella Clarke

This is especially important because experimentation can be scheduled but the outcomes of experimentation cannot be planned. Furthermore, I wanted to discover to what extent agility in approach via planned vs. unplanned influences should be considered in preference for a creative performative experience. In this respect, the following features of the framework are defined.

**Internal Influences** come from within the NAIP Program; this includes influences from fellow students, teachers, advertised opportunities from within the NAIP and all things associated with the NAIP curriculum.

<sup>2</sup> The framework’s name takes its inspiration from Robert Ashley’s graphic score composition In Memoriam... Crazy Horses Symphony (Ashley 1963).

**External Influences** come from outside the NAIP Program; these include discussions, activities, opportunities, performances, courses outside the NAIP and can include the Iceland University of the Arts, Sibelius Academy in Finland, Independent Masterclasses, Intelligent Instruments Lab etc.

**Planned Influences** are delineated within the NAIP curriculum, within the NAIP study plan, within an initially agreed approach, transfer of previous studies or what was presented in the plan at the end of the first semester (Methods I course).

**Unplanned Influences** can be spontaneous influences, influences due to rejection or failure, opportunities given, unforeseen influences that shape the project, curiosities that lead somewhere.

### **Managed Elements**

Managed elements are internal planned influences. The Skerpla graphic score class, with lecturer John McCowen, played a pivotal role in shaping my final performance program. The course grew my curiosity on what is available for conductors with respect to graphic scores. What is the current state of practice in using graphic scores in the practice of conducting? My question yielded sparse answers, as research and performances that use conductors in the performance of graphic scores are few. I started developing a repository of repertoire in graphic scores, visual music, alternative notations and sound pictures that required a conductor and I asked other conductors, curators, cultural managers, educators and composers for their thoughts. My conducting teacher Maestro Arturo Tamayo had suggested Dieter Schnebel's *Visible Music I*. The initial suggestion to study this composition was driven by my need to explore and diversify my left-hand gesture so that it does not mirror the right hand all the time. The study of graphic scores to explore and experiment with the choreography of conducting gesture commenced shortly before I started the NAIP program, so it was timely to take the Skerpla graphic score class. In the class, I encountered Bergþóra Ægisdóttir's graphic score *May The Whole Universe*, inspired by the words of Simone Weil from her book *Gravity and Grace* (Weil, 1997). The in-class improvisation of the graphic score was with four wind players with Bergþóra's voice.



To further my instrumental practice, I joined Camerata, and as a result, the final performance is enriched with early music, including “eye music.” Some of Camerata’s ensemble members have been invited to participate in the final performance. The experience also led to several unplanned influences discussed further below.

In the NAIP course, during the Performance and Communication’s required Performance Lecture, I originally explored the possibilities of sonifying conducting and creating conductor gesture notations based on Laban’s eight efforts<sup>3</sup> and movement analysis. This exercise eventually led to the development of the sonic baton. Of equal importance in the same course, we were tasked with a collective improvisation of some of our most memorable tunes. Fellow NAIP student and vocal artist Vala Sigridur Gudmundsd. Yates mentioned that in her opinion, one of the most beautiful pieces of music she heard was *Heyr, himna smiður*, written by the Icelandic Kolbeinn Tumason in 1208. The music was composed in the 1970s by Þorkell Sigurbjörnsson (1938-2013), one of Iceland’s foremost contemporary composers. Fellow student Ólöf Valsdóttir agreed with Vala citing a similar experience, so this made me curious. The first day I heard this hymn, I played it many times. I was so moved by the harmonies and words – it is indeed one of the most beautiful contributions to human music that remains on the peripheral of choral repertoire. I played it for several singers around the world, and it had the same effect on them. I made an early decision that this piece of music must be part of my NAIP performance program.

The NAIP course Methods I was a fundamental component and contributed significantly to the artistic vision for the final performance, aptly titled “*(Seasonally Adjusted) SONOMES*” The course emphasized exploring the beauty of music and encouraged exploration of words and discovery of neologisms, which played a role in the titling of the project. My experience in the NAIP course Leading and Guiding encouraged experimentation with different audience interactions. Additionally, throughout the NAIP Mentor classes observing the final NAIP performances of Stijn Brinkman and Bergþóra Ægisdóttir influenced my decisions related to the venue, ensemble formation, and programming. Inspired by Stijn’s successful

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<sup>3</sup> The Laban notation was developed for dance choreography and has four main components: Body, Effort, Shape and Space. Effort is described using energy along the dimensions of Weight, Time, Space and Flow (Samadani et al 2013, 343-344).

performance at Harpa Concert Hall, I opted for the same venue to create a similarly positive experience for my project.

## Strategic Initiatives

Strategic Initiatives are external planned influences. The next section summarizes how these external influences are developed and used in the final performance, research and projects. I took the Symbolic Sound Producing Gesture course at Sibelius Academy in November 2022, and found myself “amplifying my practice.” In the process of experimentation, I was playing around with contact mics that were still plugged in and programmed for the student who was using them before me. I placed the contact mics on my baton and within a few gestures, I was blown away and realized this idea may work. I performed the work against Tchaikovsky’s “Finale” from the *1812 Overture* to mimic the cannons with strong amplified gestures. When I returned to Iceland, I visited the Intelligent Instruments Lab and asked if they could help make my conducting batons sonic. We started playing around with different sensors and sound data on them and— thrilled we had discovered a new intelligent instrument - we decided to collaborate. I worked with Sean Patrick O’Brien to build the batons with the sensors, Nicola Privato to set up the Max patches and wireless signals and Victor Shepardson to refine and develop audio data sets that would give the batons their sonic abilities. Dr Jack Armitage performed with me in my final performance with the sonic baton, and Dr Thor Magnusson provided comments on the draft article I sent for publishing. A historical timeline of the development of the sonic baton is presented in Figure 6.

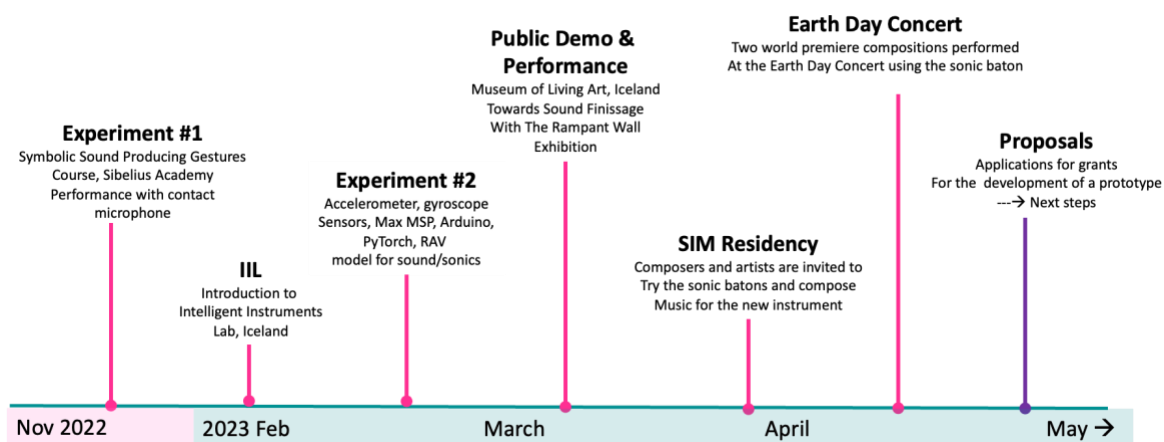


Figure 6: Timeline of the Sonic Baton Development

This collaboration also led to **internal and external unplanned influences**. In January 2023, Sigurður Halldórsson (known as Siggi) circulated an opportunity within the NAIP student email list regarding the option to submit graphic scores to The Rampant Wall exhibition at the Living Art Museum. I took contact with the organizers, submitted two graphic scores (*Chromesthesia I* and *II*) and shared information about the sonic baton I was developing. This led to a discussion on whether we could perform with, and facilitate public demonstration of, three sonic batons for the finissage at the museum to close the exhibition. The experience was a success and led to a fruitful connection with Towards Sound composer Ruth Wiesenfeld, whose curated graphic score collection was exhibited. Discussion to premiere her graphic score called TONOS has commenced.

### **Random Factors**

For some of the unplanned influences that were internal to the program, the next section summarizes how these random factors are developed and used in my final performance (*Seasonally Adjusted*) SONOMES and the project. The unexpected but delightful discovery of "May The Whole Universe" (Ægisdóttir 2023) has had a significant impact on the project. Program notes for the performance and the score are available in the Appendix II of this thesis. This composition, characterized by its strong connections with conducting from its spoken text, has been performed on multiple occasions. It showcases the versatility of performance possibilities, including instrumental renditions, performances with sonic batons and collaborations with other performers with the sonic baton. Notably, the latter configuration, involving sonic batons and additional performers, achieved remarkable success at the Earth Day Concert. As a result, this rendition has been thoughtfully incorporated into the program for (*Seasonally Adjusted*) SONOMES.

The integration of the Camerata program into the Earth Day Concert represented a pivotal moment in the project's development. Prior to this integration, the Earth Day Concert predominantly featured contemporary music. However, the Earth Day Concert demonstrated that, while transitioning between modern and period instruments can be somewhat intricate, early music harmoniously complements a contemporary music program, and vice versa. This

experience subsequently influenced program direction for *(Seasonally Adjusted) SONOMES*.

Finally, taking baroque oboe lessons has played a crucial role in establishing connections with early music, enriching my project's depth and my musical understanding of historical practices. It was completely unforeseen at the outset of the NAIP program and arose when having discussions with professional conductors who had been in a similar situation of being cornered into contemporary ensemble performance, later leading to challenges in gaining professional assignments with symphony orchestras and classical repertoire. Furthermore, I must admit curiosity played an important part in trying the baroque oboe, coinciding with the Sibelius Academy's course Introduction to Baroque Oboe. The experience opened many revelations on tempi, timbre, ensemble balance and ensemble formation with respect to the performance of early music. Since taking the course, additional studies have been taken in early music through the Sibelius Academy's Baroque Academy and on the Baroque Oboe.

### **Wildcards**

The wildcards are external unplanned influences and I personally find these aspects the most connected and developed in *(Seasonally Adjusted) SONOMES* alongside the managed elements. Juan Bermúdez composition *Through Stillness I Found Death*, created for the sonic baton and string orchestra, premiered at the Earth Day Concert and found its place in the program for *(Seasonally Adjusted) SONOMES*.

The Living Art Museum's engaging performance featuring the sonic batons revealed a positive reception from the public, highlighting the appeal of this concept. As a result, two works incorporating the sonic baton have been thoughtfully integrated into the final performance. Valuable lessons on how to avoid the disruption to the flow of the performance coming from technology risks in performance were drawn from the Earth Day concert and have influenced the order of the *(Seasonally Adjusted) SONOMES* program, with the decision to commence the concert with the sonic baton compositions to provide a seamless transition and avoid frequent shifts between technologies and audio requirements.

The unexpected privilege of cover-conducting for Justin Doyle's Sibelius Academy's Seconda Pratica Concert with the performance of two Claudio Monteverdi compositions provided invaluable insights into conducting early music. This experience emphasized the importance of maintaining tactus and ensuring tempo unification, the very early roles associated with that of what would evolve into conducting. Inspired by this, the inclusion of the *Christmas Coventry Carol*, dating back to the 16<sup>th</sup> century, has been incorporated into *(Seasonally Adjusted) SONOMES*.

The Earth Day Concert is an example of an external unplanned influence – it led to a series of “wildcards” that are worth examining, because there are many lessons to be learnt from the concert. In March 2023, a fellow conductor from the USA, Dr Suzanne Rome, wanted to come to Iceland and conduct a concert with me, to celebrate Earth Day<sup>4</sup>. I agreed to see if there would be interest in holding an Earth Day concert. At the same time as preparing for the Earth Day Concert, I was participating in the SIM artist residency and met with Colombian sound artist and composer Juan Bermúdez, who attended the sonic baton demo at the finissage. We started talking about a collaboration, and he agreed to write a graphic score composition for instruments and sonic baton. Santiago Garcia, a fellow IUA composition student, was also at the finissage performance and our paths crossed again at the Intelligent Instruments Lab where he agreed to write a composition for instruments and sonic baton. Both commissions were scheduled for premiere at the Earth Day Concert.

The Earth Day concert brought many unplanned external influences together including:

- A collaboration with Dr Suzanne Rome from USA who made a trip to Iceland and conducted in the Earth Day Concert;
- The integration of the Camerata group into the concert to accommodate changes in the scheduled dates for that group's concert;
- The performance of several compositions utilizing the sonic baton in different ways;
- Constrained resources, including an organized ensemble/orchestra with regular rehearsal times at the department of music. This later point required all organization and sourcing of musicians was carried by myself with support from Siggi.

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<sup>4</sup> Earth Day is an annual event on April 22 to demonstrate support for environmental protection.

When reflecting, the Earth Day Concert was prepared with a condensed planning horizon – nonetheless, there was an audience, and the concert was a success only made possible by the nature of agile collaboration between all performers in the concert. The Earth Day Concert gave me insight into what I need to plan and have ready going into my NAIP final performance for *(Seasonally Adjusted) SONOMES*.

## **Final Performance Reflections**

The artistic intentions of the *(Seasonally Adjusted) SONOMES* performative installation were achieved, as the performance showcased an innovative approach to conducting ensembles on several fronts. The first part of the program performed two scores with the sonic baton, which is novel as the conductor is typically moving in silence in performance. I found meeting the challenge of curating graphic and visual music that spanned a millennium and that applied different conducting techniques that had also evolved across a millennium was an important part of being able to reflect and write about the innovative practice of conducting, as it required extensive research that might not be evident in the performance.

The World Premiere of a nature-based graphic score composed by Dr Mareike Dobewall called *Receptaculum* (Dobewall 2023), for open ensemble and conductor required direct collaboration with the composer over the span of several months. The performance of *Receptaculum* was unexpectedly applauded mid-performance by the audience at the point where the score requires the conductor to initially face the audience and conduct in silence. The gestures align with the visuals projected and durations under each visual. The second and third iteration spatially distribute the sound within the ensemble around the performance space and has the conductor facing the musicians. The score itself is innovative conceptually and musically in its visuals for conductor gesture inspired by nature. The rehearsals required time for musicians to contemplate their approach to the performance, and during the dress rehearsal, the musicians struggled with the spatial aspect of the performance. The spatial sonic patterns were resolved in the performance as the spatial distances between the players were much more pronounced than in the dress rehearsal space. The score is presented in its full visual aspect in the program notes in the Appendix II.

Reflecting on the performance, some elements that would have benefited from additional rehearsal in the performance space, and where documentation of the performance may be weak. This becomes a challenge as the space in the Harpa Concert Hall is public. The performance of *Visible Music I* (Schnebel 1962) would have benefited if I as the conductor had been facing the audience, as the gestures would have made more sense for the audience to see their alignment with the sound and the visual projections. The performance of the arrangement of the sound picture *10 Most Important Words* inspired by Stockhausen and *From the Other Place* (Guðnadóttir 2014) would have also, in my opinion, benefited from the conductor facing the audience, as there is choreographic aesthetics in the performance that may be enjoyed by the audience.

The challenges to the performance came from the few minutes before the start, when we were placing too many signals and interfaces through my laptop. It crashed the projections and the signal to the sonic batons was lost when we attempted to integrate the speaker. The issue was quickly solved when another laptop was lent to facilitate the performance with the sonic batons. The experience reinforces my learnings from the development of the sonic baton, that we have signal technology that does not need a router, and therefore the next iteration of the sonic baton will remove the router.

To conclude, the performance provided the audience and the ensemble with a unique experience of music curated over a millennium that had accompanying visuals to provide each composition with additional context and connection with the music.

## 6. *Findings and Discussion*

The conducting of graphic scores, irrespective of whether they include a sonic technology or not, subverts the current view of a traditional role of the conductor, and may require the conductor to justify their relevance to the orchestra or ensemble with which they are collaborating. If a conductor is exploring such an area of music deeply and approaching professional ensembles for proposals to collaborate, it can be foresightful to be ready to explain why a conductor is needed and the different roles that a conductor may perform in the performance of graphic scores and open notations. As my late Kung-fu Sifu Blackburn would say “*Better to know and not need, then to need and not know*”.

Based on my experience in extensively curating, reviewing, and performing, graphic scores and open notations as a conductor, I assert that there are multiple and different roles that a conductor may be required to perform, some of these roles are very familiar to the traditional practice of orchestral and choral conducting. Some of the roles are unique to leading experimental music with ensembles. Where relevant, I include references to graphic scores, visual music, sound pictures and open notations that utilize a conductor to support such a position. The significance of the assertion comes from a place of evidence, research and reviewing more than fifty graphic scores that require a conductor. The reference list for this chapter also serves as a repository for graphic scores that use a conductor under different ensemble formulations.

**Assertion 1:** A conductor can be used **to structure a composition** of a graphic score and provide linearity to the composition by establishing the duration of an ensemble’s performance, and when specified, gesture changes in structure that the ensemble should adhered to. Graphic Score Examples: *From the Other Place* (Hildur Guðnadóttir 2014), Ravon Chacon’s *...lahgo adil’i dine doo yeehosinilgii yidaaghi* (Chacon 2004) Pauline Oliveros’ *To Valerie Solanas and Marilyn Monroe in Recognition of Their Desperation* (Oliveros 1968).

**Assertion 2:** A conductor can be used to instruct and gesture **changes in color, timbre, and texture**, according to a determined duration, or in combination with point 1 above. Examples



include Alexandra Fol's *SICS* (Fol 2009) and Ravon Chacon's *American Ledger No. 1* (Chacon 2018).

**Assertion 3:** A conductor can be used to choreograph gesture and **unify the visual with instrumental** sonics. In these cases, typically composers provide instructions to the conductor on the expected presentation of the ensemble and the style of conducting. Unifying the visual aspect with the instrumental sonics through gesture requires rigorous experimentation with the musicians and devised performance practice will likely dominate in the rehearsal. In cases where rehearsal time is not enough, the conductor may be required to decipher and arrange parts in musical notation, text instruction or simplified visual (see assertion 9). Examples include Dieter Schnebel's *Visible Music I* (Schnebel 1962), and Mareike Dobewall's *Receptaculum* (Dobewall 2023).

**Assertion 4:** A conductor can be used to **create efficiency in rehearsal** and would therefore plan the rehearsals and produce the concert with the players. This is a traditional role, but it maintains its importance also in the rehearsal and performance of graphic scores and open notation. Example: *SICS* (Fol 2009) Baude Cordier's *Rondeau upon a Heart: Belle, Bonne, Sage* (Apel 1972) and *From the Other Place* (Hildur Guðnadóttir 2014).

**Assertion 5:** A conductor can be used to **take artistic decisions** on instrumentation, musical interpretation and include the establishment of tempi, instrumentation, and open ensemble direction. This is often a role a conductor will be also required when performing a large work, such as an opera or ballet, from early music. Examples include Eliza Brown's *Masque Rondeau* (Brown 2018), *SICS* (Fol 2009), Ruth Wiesenfeld's *TONOS* (Wiesenfeld 2023), Robert Ashley's *Crazy Horse Symphony* (Ashley 1963).

**Assertion 6:** A conductor can be used as a **teacher, facilitator, performance coach and mentor** to musicians to elevate their collective musical experience and maintain creative intention when performing open and visual notation collectively. Graphic Score Example: Cornelius Cardew's *Treatise* (Cardew 1971), Ruth Wiesenfeld's *TONOS* (Wiesenfeld 2023).

**Assertion 7:** A conductor can be used to **research, curate and plan programs** that adhere to principles and/or themes of a performance program for graphic scores, visual music, or new media. Examples include, Iannis Xenakis' *Metastasis* (Xenakis 1953-54), Karl Jenkins' *Palladio* (Jenkins 1995), Karlheinz Stockhausen's *Mikrofonie I* (Stockhausen 1964), Tan Dun's *Peony Pavilion* (Dun 1998).

**Assertion 8:** The conductor should, by default and tradition, **unify performers with the music** and is therefore an important position of leadership and responsibility for the performance. Graphic Score Examples: Pauline Oliveros' *Tashi Gomang* (Oliveros 1981), Theodore Antoniou's *Cheironomies Conductors Improvisation* (Antoniou 1971).

**Assertion 9:** In some cases, the conductor is necessary to **decrypt, decipher and decode** the complexity or novelty of the music. Examples include: Eliza Brown's *Masque Rondeau* (Brown 2018), Baude Cordier's *Rondeau upon a Heart: Belle, Bonne, Sage* (Apel 1972), Ruth Wiesenfeld's *TONOS* (Wiesenfeld 2023), Mareike Dobewall's *Receptaculum* (Dobewall 2023).

**Assertion 10:** Through graphic scores, open notations and alternative performance formats, the role of **the conductor can be used to explore new performance formats** and further open new styles and ways of experiencing music to both musicians and audiences. Examples include performance formats where the conductor may face the audience, Mareike Dobewall's *Receptaculum* (Dobewall 2023), Pauline Oliveros' *Two Double Basses at Twenty Paces* (Oliveros 1968), and *Visible Music I* (Schnebel 1962), or the utilization of technology within practice, such as the sonic baton in Juan David Bermúdez' *Through Stillness I Found Death* (Bermúdez 2023).

Some of the more interesting contributions to orchestral repertoire have been made in the exploration of new performance formats, however they are rarely performed either due to their complexity or because they depart from convention that their performance is placed with orchestras specializing in contemporary practice. For examples of compositions with

complex visual scores that have not been performed since their world premiere, I refer to Iannis Xenakis' *Strategie* (1959-1962) and *Dual* (1959) (Xenakis 1959-1962; Xenakis 1959).

Ultimately, whether exploring experimental music with a large ensemble and innovating the practice, or performing traditional music, the role of the conductor is to **communicate music** with inspiration and passion, not just to ensemble musicians, but to audiences, composers, students, scholars, orchestral managers, sponsors, technologists – essentially to everyone.

## ***7. Conclusion***

To conclude, this thesis and exegesis discuss what it means to explore the innovative practice of conducting within graphic scores and open notations, sonic batons, and new performance formats. The practice-based research revealed that conducting as a practice has evolved for more than a millennium, and that through its dynamic evolution, each innovation in practice, often responding to a socio-cultural or technology shift, becomes traditional practice over a longer time horizon.

Through examination of historical scholarship, it becomes evident that the construction of musical notation systems, changes in musical performance formats and developments in collective ensemble formulation, over the centuries and millennium, have played an important role in evolving the practice of conducting. From the leaders of ancient music that used Chironomy, that was refined by Guido of Arezzo, that would eventually evolve into solfège. Or the French Baroque composer Jean Baptist Lully that had grand ideas of large stage productions and that used the first “Baton” to beat the pulse for the ensemble, these incremental changes have shaped more recent choral and orchestral conducting practices requiring the conductor to be adaptive in their leadership and practice.

Technology and socio-cultural shifts are the drivers of change in the audience experience of music and have transformative potential when looking forward and asking what the future means for conductors. The concept of the sonic baton, while novel, is still in its infancy in what it can bring to the innovation of conducting practice and opening sonic possibilities for compositions. However, further design iteration and technology upgrade may see this intelligent instrument integrated into performance more so in the future. New performance formats are also emerging alongside the technology and socio-cultural shifts and should not be neglected when exploring the innovative practice of conducting.

The thesis and exegesis contribute to musical scholarship with the development of two analytical frameworks; The Musical Chairs Framework provides a good tool for conductors, orchestras, composers, and musicians to reflect on to understand where they are placed in their practice and the types of audiences they aim to reach. When reflecting on the

framework, ask questions like: Am I where I want to be with my practice? Do I need to reorient? Adapt? Or pivot to remain relevant?

The Crazy Horses Framework can support a pivot or reorientation when aiming to understand the convergence of planning and influence within the innovation and experimentation process. There are patterns that lead to musical and creative breakthroughs, and this framework can help identify and distinguish the elements of planning and influence on the creative process that yield the most impactful results. The next steps for these frameworks will be to get them published in international peer-review journals.

The exegesis and assertions underscore that there are many different roles a conductor can assume when conducting graphic scores, open notations, and new performance formats with ensembles and orchestras. From structuring compositions, to deciphering and arranging music, or making artistic decisions or inviting the musicians to improvise through conduction, graphic scores, and open notations challenge conductors to embrace innovation while upholding the traditional leadership roles associated with the performance of classical music.

Looking forward and the implications for future research, the transformational role that artificial intelligence is currently having on society and in music, and the emergence of extended realities, Web3, and Metaverse, may provide a new frontier for the orchestral and musical experience, and a range of new performance formats that can be explored. These technologies pose fundamental questions for the future of classical music. At the same time, it presents an opportunity to renew our historical knowledge of classical music, increasing accessibility and explainability of music from around the world and through time. Such technologies could potentially unite multisensorial elements to transform music knowledge, music education and pedagogy, and provide a deeper and more insightful musical experience. Future research questions and performance experiments are orienting towards how can orchestras, venues, and musicians, rebuild the classical music experience of the future, whilst ensuring inclusivity and accessibility? What adjustments will conductors need to make to their conducting practice in such a future? Future potential performance experiments require thinking beyond the current limits and could include commissioning

works and building an ensemble of intelligent instruments within the conventional orchestra and bringing augmented reality into the musical experience. While these ideas may seem far-fetched from our current concert experience, to quote Leslie Shannon, Head of Nokia's Trend and Innovation Scouting, and Co-Author of *Virtual Natives* (Henry and Shannon 2023), "it is predicted that the Metaverse will become the new Internet." In embracing such a vision where the music-science paradigm converges with tradition, one must think towards a future where the only limit is the imagination.

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## Documentation

Documentation of the development of the sonic baton and the performance of graphic scores, open notations, and new performance formats, including links to social media documentation, continues to evolve and is available on the artist’s website:

[www.majella-clarke.com](http://www.majella-clarke.com)

## **Appendix I**

Appendix I

**Sonic experimentalism in the practice of conducting: sound sticks and magic wands, or the emergence of a new music science paradigm?**

By Majella Clarke

**IMPORTANT:** The article is under preparation for submission to an internationally peer reviewed journal. It is not for citation. Authorship may expand. Findings may change.

## **Appendix II**

Appendix II Program notes

### Appendix III

Performance Details for *The Ten Most Important Words* arranged for Flute/Piccolo, Bass Clarinet, Voice and Conductor by Majella Clarke inspired by Stockhausen's sound picture *Die 10 wichtigsten Wörter*<sup>5</sup>.

A handwritten musical score in blue ink on a white background. The score is written on five staves, each with a treble clef and a key signature of one sharp (F#). The music is written in a style that combines traditional notation with abstract, rhythmic patterns. The lyrics are written in German and are: "GOTT", "GEIST LICHT", "SIK MU- b", "HIM- MEL MI-CHA- EL", "EN- GEL", "DER LIE- BE", "U- NI- VER- SUM". The score includes various musical notations such as notes, rests, and dynamic markings (ppp, mp, mf). There are also tempo markings like "rit.---" and "SUM". The number "1=60" is written at the top. The name "Stockhausen" is written in cursive at the bottom of the page.

<sup>5</sup> <https://onlinemerker.com/bergisch-gladbach-bei-koeln-ausstellung-karlheinz-stockhausen-klang-bilder/>