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# Idiomatic Composition Practices for New Musical Instruments: Context, Background and Current Applications

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## ABSTRACT

One of the reasons of why some musical instruments more successfully continue their evolution and actively take part in the history of music is partially attributed to the existing compositions made specifically for them, pieces that remain and are still played over a long period of time. This is something we know, performing these compositions keeps the characteristics of the instruments alive and able to survive. This paper presents our contribution to this discussion with a context and historical background for idiomatic compositions. Looking beyond the classical era, we discuss how the concept of idiomatic music has influenced research and composition practices in the NIME community; drawing more attention in the way current idiomatic composition practices considered specific NIME affordances for sonic, social and spatial interaction. We present particular projects that establish idiomatic writing as a part of a new repertoire for new musical instruments. The idiomatic writing approach to composing music for NIME can shift the unique characteristics of new instruments to a more established musical identity, providing a shared understanding and a common literature to the community.

## Author Keywords

Idiomatic composition, repertoire for new musical instruments, NIME.

## ACM Classification

H.5.5 [Information Interfaces and Presentation] Sound and Music Computing, J.5 [Arts and Humanities] Performing Arts.

## 1. INTRODUCTION

Some musical instruments successfully continue their evolution in the history of music. Whereas social, technological, sonic, physical and tangible features could have equally important roles in the survival of musical instruments, building and maintaining a repertoire for them reflects a historical practice to make this happen. In accordance with the history of music, the ways and means of practicing music

compositions with an idiomatic approach have provided a ground for instruments to evolve in form and sound qualities as well as a mutual pedagogical method, a shared understanding and a common literature [29]. Moreover, these existing compositions made for them remain and are still performed over a long period of time allowing these idiomatic practices build up a shared performance practice and musical experience within a community, keeping the characteristics of the instruments alive, not disappearing in history [25]. Arriving at basic foundations of such *musical identity* that is more in line with the unique characteristics of new instruments is essential to the NIME community; as discussed in the NIME 2016 keynote, common practice is that new instruments often reflect “*short-lived expression of individualism*” rather than a design for a broader audience [18]. Idiomatic composition practice is an appropriate approach to develop dedicated repertoire for a NIME, reflecting the sonic and interaction affordances of new musical instrument and encouraging other practitioners to perform compositions written for that NIME.

In this paper we present a context and historical background for idiomatic writing as well as some grounds for interesting discussions regarding idiomatic writing practices in which a NIME’s affordances for interaction have been considered to be contextualised as part of idiomatic composition. In particular, we present three projects in detail that establish idiomatic writing as a part of new repertoire for new musical instrument.

## 2. IDIOMATIC WRITING AND ITS HISTORICAL BACKGROUND

The term ‘idiomatic’ or ‘idiomatic music’ rarely leaves room for interpretation. The largely accepted definition seems to be that a composition language defined as idiomatic is “a style appropriate for the instrument for which particular music is written,” as stated in the Harvard Dictionary of Music [20]. However, the further implications and cultural impact of idiomatic writing can be a controversial topic with divergent opinions. In the same dictionary definition, it is suggested that “the quality of (a) score is judged largely by the degree to which the various parts exploit the technical and sonorous resources of the instruments without exceeding them”. Nonetheless, it is also pointed out that a closer analysis of J.S. Bach’s music questions this affirmation. For instance, the E-major Fugue from *The Well Tempered Clavier, vol. ii* is not particularly suitable for the physical properties of the harpsichord nor the clavichord. It calls to the attention that Bach would write a non-idiomatic piece for harpsichord given his status as a recognised “concertising virtuoso” of keyboard music [33]. Moreover, if we



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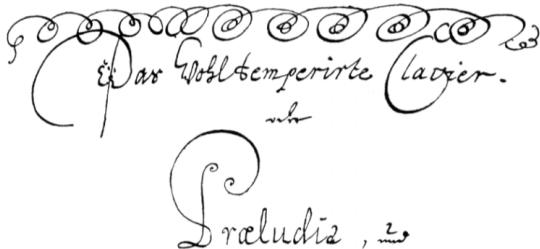


Figure 1: Manuscript of the Well-Tempered Clavier. Bradley Lehman conducted a study to determine whether the spiralling ornament on top of the page is in fact an schematic for Bach's own definition of 'well-temperament'[15]

approach ‘idiomatic style’ focusing on exploring a physical property of an particular instrument, The Well Tempered Clavier (WTC) is indeed a seminal example of idiomatic writing (Figure 1): The WTC was the first collection of pieces in history traversing all 24 keys in a single keyboard instrument, imposing a new milestone in the possibilities of the instrument [1].

Quite often in the past, idiomatic writing also pushed the boundaries on how a performer approaches an instrument. The idiomatic possibilities of a solo voice explored by composers in the early baroque ultimately “crystallised in the refined methods of the Italian *bel canto*”, introduced an entire new aesthetic approach to lyric singing [5]. Similarly, Paganini’s 24 *Caprices* encouraged new pedagogical methodologies to teach violin given the new limits imposed by the highly-challenging pieces [3]. At the same time, we could identify a concept of an ‘idiomatic performance’ as a desire to emulate as closely as possible the physical characteristics of the instruments for which a piece was composed. Paul Holland’s violin methodology describes how “students are taught to hold the bow farther up the stick toward the balance point”, in order to recreate the same sound produced by the characteristic Baroque bow when performing scores from that period of musical creation [10]. The aim to exploit new developments of the instruments played an important role for instrument standards also in the nineteenth century. Herbert Horn pointed out that new developments aimed towards technically improved instruments resulted in establishment of the piano as “the universal household instrument” [11]. The relationship between creation of idiomatic repertoire and the historical development of acoustic instruments is strong and can be traced in time as the former evolves symbiotically depending on the possibilities offered by the later [28].

## 2.1 Idiomatic Composition beyond the Classical Era

In contemporary music, the concept of ‘idiomaticism’ was challenged by the widespread use of extended techniques in acoustic instruments, considered precisely an extension of the idiom [28]. In a similar vein, the term ‘radically idiomatic’ was coined by Richard Barrett to describe an intense level of artistic physical dialogue with the instrument performed [9]. The main idea behind this method was to eliminate any sight of frontier between the composition and the physical dimension of the instrument, evolving from a symbiotic relationship into a indistinguishable monolithic aesthetic discourse. On the opposite side of the spectrum, intentionally non-idiomatic music for a non-conventional in-

strument, as an amplified/modified toy piano has also been implemented before [34].

Finally, some theorists use the term ‘idiomatic music’ and furthermore ‘idiomatic improvisation’ to define a set of characteristics of specific musical genre -or stylistic features- in the context of improvisation, rather to refer to specific instrument where the music is performed [6]. Using ‘idiomatic’ and ‘stylistic’ as exchangeable terms, is, however, less frequent practice, more common in genres with highly improvisatory structure, such as Jazz.

## 2.2 Theremin

Among the many attempts to create musical devices for musical expression using technology, some seemed to have resisted the test of the time relatively well. One of them is the Theremin, the well-known instrument invented by Leon Theremin in 1917 (patented in 1921 in Russia and filled for the US patent in Dec 5 of 1925) [16]. Leon Theremin - an exceptional performer himself- travelled extensively first through Russia and later in the United States demonstrating the capabilities of his invention. [8] The repertoire, however, was mainly adaptations of existing music from the common-practice period; Figure 2 shows the 1928 version of Rimsky-Korsakov’s Scheherazade for Theremin and Orchestra performed in New York. Theremin’s effort ensured a significant media attention, including high-profile concerts with top orchestras in the United States. As a result, a vast number of original, idiomatic music was created for the instrument by composers of the time. Warren Brodsky made a thorough catalog of works exclusively written for the Theremin, thanks to which he concludes that the instrument became responsible of “preempting all other electronic instruments and becoming the standard method of producing electronic sound until the advent of the transistor in the late 1960s” [4]. A similar example with substantial idiomatic works can be found in the “Ondes Martenot”, a keyboard-based instrument in which repertoire was expanded by some prominent composers, Olivier Messiaen among them [2].

## 3. COMPOSING MUSIC FOR NEW MUSICAL INSTRUMENTS

The concept of idiomatic music has influenced research in the field of music technology in various ways. Huron and Berec designed a systematic method to analyse Trumpet recordings and measured the level of difficulty and what was described as ‘idiomaticism’ -or level of suitability for the instrument-. In the study there is an association of idiomatic writing with lower levers of difficulty and the authors mention the importance of differentiating between performance difficulty and level of idiomaticism. The latter is relative, according to the conclusions, by such factors as tempo and key transposition [12]. Another attempt in analysis of idiomatic features in music can be found in the semi-automatic grammatical approach to analysis of chord

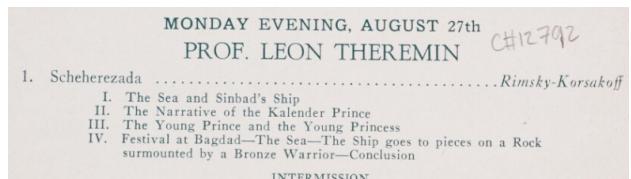


Figure 2: Programme from the concert of Leon Theremin with the New York Philharmonic Orchestra conducted by Willem Van Raten, in August 27th of 1928.



**Figure 3:** Tanaka performing live with BioMuse interface.

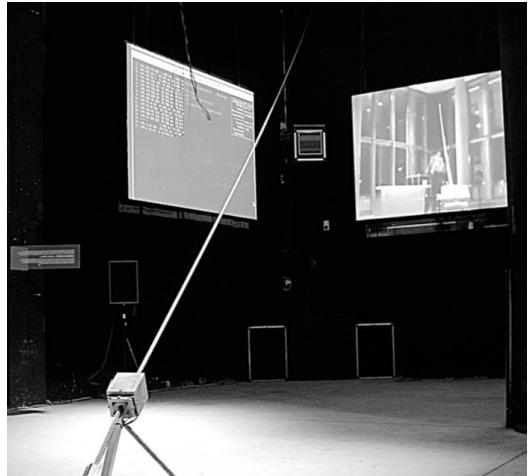
sequences by Keller et al. [13], in what they call ‘idiomatic analysis’. This methodology was released as a free, open-source software called Impro-Viso. However, once more, the concept of ‘idiomaticism’ is related here to genre, aka. the set of stylistic rules proper to Jazz [13].

Earlier in 1981, Rolnick advocated for a performance model that made full use of the physical characteristics of a synthesiser [21]. In 1986, Rolnick also addressed the issue of developing an idiom for computer music and performance with musical instruments developed with technology [22]. The lack of commonalities between technological interfaces has been seen as an impediment to build a common compositional framework that can define what is, or not idiomatic in a broader sense for computer music. Furthermore, the continuous advancement of technology presents a challenge in its own right: “If composition for synthesiser and computer performance is to develop in ways at all analogous to the development of music for other instruments, composers will have to figure out how to write for these systems in a way which takes into accounts the fact of constant changes in software and hardware” [22]. Similarly, Saariaho makes an reflection about considering computer music composition as an ‘idiom’ by itself. She defines the *Vers Le Blanc* as “Idiomatic to the computer medium (but) impossible to realise with traditional instruments.” [23].

However, currently in the field the most common application of idiomatic writing resides in the composition of music for new musical instruments. Pieces composed having in mind physical characteristics of a new musical instrument include the piece “Pico I for Seashells and Interactive Glove”, based in enhancing with sensors a hand gesture over a seashell perceived as idiomatic [7]. In user studies with the NIME “T-Stick”, the authors reported an effort to develop “notation standards and a vocabulary of gestures idiomatic to the interface” [17]. Some of those efforts were later incorporated as default setting of the instrument’s performance practice and learning. As another example, we can mention the application of idiomatic composition in a framework for locative media, or “Idiomatic Locative Media” in a research conducted by Atau Tanaka [31].

### 3.1 Bio Muse and Global String

Atau Tanaka has embraced idiomatic writing as a central part of his practice. Tanaka’s departure point has been establishing a parallelism between idiomatic music in the common-practice period and creation of new repertoire for



**Figure 4:** Global String explores ‘performative idiom’, reflecting the social interaction affordances of the installation piece.

new musical interfaces [28]. Nevertheless, the importance of idiomatic writing for Tanaka goes well beyond the mere physical development of the interface. He points out that a new definition of idiomatic has to be achieved for each new instrument built, due to having no “codified performance practice” yet developed for the new device. Tanaka leaves open the discussion if in this context the new idiom shall refer to a piece, or to a composers’ unique aesthetic language. [28]. Even though Tanaka was speaking specifically about sensor instruments, however, liberating and inspiring new framework of artistic expression can be applied to a much wider range of technologically enhanced musical interfaces.

In relation to the idiomatic practices, Tanaka introduces a summary of projects of a diverse nature involving musical interfaces with various types of sensors [28]. One of them is BioMuse, a controller that transforms bioelectric signals into MIDI data [14]. Tanaka was commissioned to create content and produce a concert premiere for this interface (Figure 3). Regarding BioMuse and the idiomatic approach that Tanaka took, an “extremely personal vocabulary” was constructed with the instrument, possible thanks to playing the double role of composer/performer. Tanaka considers the mapping of the information extracted from the biosignals as the “score” of the piece. He defines the composition as a process of sound organisation correlative to the interface’s output, or “the choice and combination of different biosignal post-processing techniques as connected to various synthesis articulations, placed in context of a musical structure over time” [28].

Furthermore, Tanaka makes allusions to the ‘multi-site network music installation’ called Global String [30]. He describes the term ‘performative idiom’, which is extracted from the interaction of multiple users with the installation, allowing to identify certain ‘common tendency’ on the exploration of possibilities with the system. Figure 4 shows the Global String installation that features a ‘concert mode’, allowing soloist to perform at distance communicating by visual and sonic cues, in the equivalent of a score.

### 3.2 No More Together

*No More Together* is a composition written as a part of repertoire for the PESI interactive performance system, exploring specific musical and expressive possibilities through the affordances of the system [19]. Figure 5 depicts the score that guides the musicians to choose from three given

## NO MORE TOGETHER

*For three performers and PESI system*

Choose one of the following three states, and remain in it until the music asks you to change. Performers need not aim to be in the same state as each other.

1. *Play a constant sound. Only move in the space when someone else is moving.*
2. *Investigate a point of change in the sound. Only move in the space when no-one else is moving.*
3. *Move and play freely.*

**Figure 5:** The composition score of No More Together

states with instruction to change the current state. Following the score, musicians remain listening and responding to overall collective sound. These three parts of the score keep the musicians in and out of synchrony, with the possibility of keeping them all in the same state (Figure 6). The score enables the musicians to explore the expressive, social, spatial and interactive affordances of the PESI interactive music system as well as providing alternative states on being able to specify on various levels how the composition develops during the performance. The main characteristic of the score is that it facilitates a dynamic social interaction among three musicians. At the same time, these three contradictory states in the score creates potential moments for accidental interactions to happen during the performance [19].

Coordination of the three musicians through their spatial location forms a social interaction that allows musicians to dynamically modify the control features of the sound synthesis module, simply by changing their distance from each other and their location in the performance space [24]. Space and social actions are deeply interconnected and reflect the unique characteristic of the system, bringing up new ways of musical exploration in group music activity. Social interaction in a shared performance spaces also makes musicians consciously aware of their presence as well as of others. The focus on the self and others awareness is reinforced in the composition by being able to control others' sounds through one's spatial relation to them. The conditions of such social interaction increase the musicians' mutual engagement during the performance of the piece.

### 3.3 NOISA Etude #1, #2 and #3

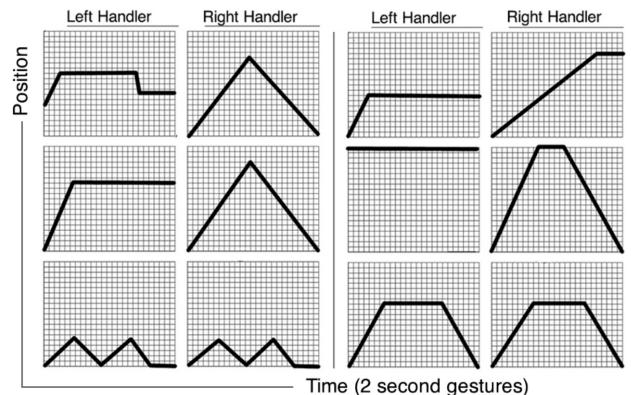


**Figure 6:** No More Together performance, Goldsmiths, London 2013

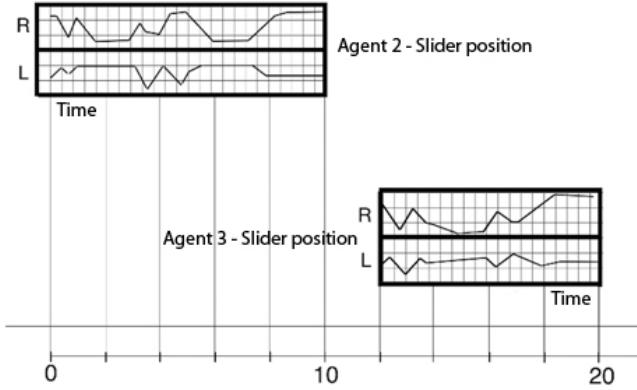
'NOISA Etude #1, #2 and #3' are music compositions that featured 'idiomaticsm' not only in the creation of the pieces, but also in the design of the instrument, *the Network of Intelligent Sonic Agents - NOISA*. NOISA is an interactive music system designed to monitor the performer's engagement and respond in autonomous ways in order to maintain it [26]. NOISA functions in three different stages: first, it monitors physical activity in the performer, then estimates the current level of engagement, and finally responds whenever it considers it is necessary to do so. To define what actions to consider in the response module, first the authors elaborated a portfolio of two second-long movements that were considered as idiomatic gestures, as shown in Figure 7. Once the performer is experiencing high levels of engagement, his/her actions are recorded in conformity with the overall properties that rule the portfolio of idiomatic gestures [27]. Afterwards, the gestures are labelled with handle data, current estimated engagement and audio properties of the event. NOISA retrieves these musical actions once the monitored engagement reaches low levels of attention. As the responses are based in rules of what we consider 'idiomatic' for our instrument, these counteractions will always comply with an style appropriate for the sonic and physical characteristics of NOISA instrument.

In relation to the composition process of NOISA Etude #1 and #2, the authors borrowed the motivic through-composition technique, which is a methodology of composition from the common-practice period, also known as *thematic development*. The authors crafted the pieces by expanding the small in-built idiomatic gestures into longer musical phrases and ultimately in various sections; guaranteeing cohesion, aesthetic interest and appropriateness of the writing for the NOISA instrument. Figure 8 illustrates the NOISA Etude #2 composition score. Both pieces have a detailed score, using a custom notation comprised of graphic boxes over a timeline, indicating position of each slider over time [32].

In the case of NOISA Etude #3 the exploration of idiomatic writing practice shifted the unique characteristics of NOISA instruments into a more established musical identity. The soundworld of the piece is determined by the individual characteristics of the NOISA, which are emerged from dynamic processing of musical timbre and mixed with live electronics. The real time performance of this idiomatic composition allows the musicians to blend the NOISA instruments and live-electronics, so that the sound of each instrument is merged together into a complex, but tightly mixed texture. In a performance situation, NOISA is treated as a solo instrument, amplified and processed in real time



**Figure 7:** Catalog of idiomatic gestures for the Network of Intelligent Sonic Agents



**Figure 8: The notation explained for the composition NOISA Etude #2**

by a MAX patch in a laptop computer. Figure 9 shows the studio-recording session of the piece Etude #3, which is executed as a manner of a musical *theme*. The piece is further developed into a ternary form A-B-A with contrasting character between the first two and a third section, comprising a recapitulation of the first. Having both NOISA and the live electronics communicating with variations of a theme in a larger-scale form, has been defined as *thematic dialogue* by the authors.

#### 4. DISCUSSION AND CONCLUSIONS

Even though idiomatic composition is a generally understood concept and a widely used idea, the research focusing exclusively on the topic and its implications is remarkably low in quantity. Rekindling a discussion about idiomatic writing for new instruments seems appropriate after examining the crucial impact of specific repertoire in the development of “old” instruments, such as the standard symphonic acoustic musical instruments. Furthermore, the wide array of current technological music interfaces provides a common ground for a compositional approach in capacity of helping these tools to have a meaning beyond a “short-lived expression of individualism” [18]. The construction of dedicated repertoire for an instrument makes tangible the possibilities of the device, encouraging other practitioners to perform it and expand it, thus generating a broader communal impact.

In this paper we presented *idiomatic composition practice* as an appropriate approach to develop dedicated repertoire for a NIME, in which compositions consider specific NIME



**Figure 9: Studio recordings of the third Etude for NOISA and live electronics**

affordances for sonic, social and spatial interaction. The works presented and discussed in this paper demonstrate that the potential of idiomatic composition in new musical instruments is a terrain fertile for further exploration, with enough historical precedents to make it a viable option for instrument development through repertoire. In order to create a more defined musical identity and enable a NIME to evolve in forms and sound qualities, it is necessary to consider building new repertoire for new musical instruments, guided by the design principles of the instruments as well as physical and sonic features.

Regarding the criteria to select the projects we presented as examples of idiomatic writing for particular NIMEs in this paper, it is important to clarify that these projects were chosen not as a mature finalised example of idiomatic composition, but rather as an initial demonstration of considering interaction affordances during the compositional process. It is perhaps too early to measure the amount of potential success of the projects explained, or if they will indeed promote the construction of a significant amount of repertoire for the instruments involved. A practice of composition that is based on what is idiosyncratic for the new instrument is not widespread in the NIME community so far, which is precisely what we have focused on promoting in this paper. We also believe that further encouragement is needed to shift the emergence of a repertoire for new instruments into a practice. As suggestion for promoting this practice, it is feasible to carry out *call for works* and even commissioned pieces featuring idiomatic writing for new musical instruments. A second suggestion would involve encouraging interface makers to release their projects with documentation aimed specifically to recreate the instrument in other contexts, facilitating the construction of new repertoire by other practitioners.

It is important to mention that in addition to serve as a compositional framework, an idiomatic approach can also be a design principle. New instruments for musical expression can be molded to respond sonically in various different ways, therefore multiplying the potential of a new sound outcome encloses closely the physical characteristics of a new device. In the Network of Intelligent Sonic Agents (NOISA), for example, the architecture of the instrument inspired the sound interaction, the response module (through idiomatic gesture storage and retrieval), and finally composition of the pieces themselves. It is up to discussion as well if applying idiomatic composition principles into new instruments can encourage a piece being judged by how the composition actually takes advantage of both the physical and sonic resources of the new device, as suggested by Randel in reference to the acoustic counterparts [20]. While an opinion on this issue can be formulated, only the observation and research through practice in a larger study can give a clear understanding on this matter.

A secondary discussion arises when wondering if the semiotic charge of the word *interface* shall be compared, or even replaced by the term *instrument* when referring to new music devices. Idiomatic writing has its take on this discussion by surrounding the term instrument with a tight instrument-outcome connection, going beyond the ideal of a considering the object as a tool for a particular function (musical expression, in this case). Idiomatic composition is impregnated into the evolution and standardisation of an instrument in such a way that poses new challenges that can potentially transform the performative approach and even expand the expressive dimensions of the entire instrument. Standardisation of new instruments, however, can be a controversial matter in its own right. A potential question arises when evaluating if the current pace of technological

development, capitalist modes of production, and a cultural affinity towards immediacy represent prohibitive factors towards the establishment of musical repertoires. Would this context represent a critical setback for a general model of idiomatic composition in NIME community? We believe that considering idiomatic practices means new possibilities could come into being in the NIME community. The whole historical course of idiomatic approach provides solid evidence that building and maintaining repertoire for new musical instruments is not only a feasible road for survival but also potentially crucial for shifting the implications of self-determinism into progressive and communal thinking.

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