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Unconventional sound production on the xylophone: outcomes of an artistic research collaboration

Produção sonora não convencional no xilofone: resultados de uma colaboração em investigação artística

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ABSTRACT: The xylophone's timbral resources have been little explored. Despite recent efforts to promote the solo xylophone, conventional sound production prevails in most of the compositions reviewed by the authors. The first author contributed to an investigation of the second author, exploring with him sound production on the xylophone through practice-based research oriented to art music creation. Entering each other's domains, the authors ended up arriving at instrumental and compositional gestures almost certainly unheard of in the instrument until then. In the musical work, these are juxtaposed with conventional gestures in a varied and predominantly discontinuous compositional flow, counteracting the tendency in many of the compositions reviewed by the authors.
KEYWORDS: Practice-based research; Composer–performer working relationship; Creative process; Musical gestures; Performative gestures.

RESUMO: Os recursos tímbricos do xilofone têm sido pouco explorados. Apesar dos esforços recentes para promover o xilofone solo, na maioria das composições revistas pelos autores predomina a produção sonora convencional. A primeira autora contribuiu para uma investigação do segundo autor, explorando com ele a produção sonora no xilofone através de investigação baseada na prática orientada para a criação musical erudita. Entrando nos domínios um do outro, os autores acabaram por chegar a gestos instrumentais e composicionais quase certamente inéditos no instrumento até então. Na obra musical, estes são justapostos com gestos convencionais num fluxo composicional variado e predominantemente descontínuo, contrariando a tendência em muitas das composições revistas pelos autores.
PALAVRAS-CHAVE: Investigação baseada na prática; Relação de trabalho compositor–performer; Processo criativo; Gestos musicais; Gestos performativos.

1. Introduction[1]

The xylophone was the first mallet instrument to have a soloistic role in the era of acoustic recording (Moersch, 2016). Most of the pieces were then transcriptions and continued to be so after the decline of the instrument's popularity in the 1940s and 1950s in favor of the vibraphone and marimba (Moersch, 2016). The panorama changed from 1960 onwards, when initiatives to promote the xylophone as a soloistic instrument began to emerge, as Table 1 shows. Still, there is little interest in the xylophone: in 2023, at one of the world's largest percussion conventions, the xylophone was only present in one instrument show (apart from a Gyil concert, the xylophone from Ghana) (see Percussive Arts Society 2023).

Tab. 1 – Initiatives to promote the xylophone as a soloistic instrument after its popularity fell in favor of the vibraphone and the marimba

Year(s)	Promotor	Initiative	Results
1960s and 1970s	Yoichi Hirakoa (1907-1981) [xylophonist]	Commissioning of compositions for xylophone and orchestra	Five compositions for xylophone and orchestra; edition of Pitfield's *Sonata* for solo xylophone, considered by some authors as a commission of Hirakoa (Goto 2013).
1970s	NEXUS members [percussion ensemble]	Revival of ragtime music for xylophone	Concerts and album *Nexus Ragtime Concert* (1976) (Moersch 2016)
2010	Samuel Solomon [percussionist]	Call for solo xylophone works	*The MassChap 2010 Xylophone Collection*. New short works for solo xylophone by 46 composers (guests and competition winners) (Solomon *et al.* 2010)
2014	Samuel Stokes [percussionist]	Call for solo xylophone works	Five compositions selected and recorded by Stokes (s.d.)

Reference: by authors

But the concert repertoire for xylophone is not only limited in quantity. The characteristics of most of the pieces of the last 50 years are the same as those that preceded them. According to Brindle in 1970,

> the somewhat inexpressive tonal character of the instrument has perhaps encouraged a type of virtuosity which is not always deeply musical. Perhaps too, composers have been at fault in writing brilliant banalities, which though highly suited to the instrument, have only a superficial emotive significance. (Brindle 1970, 37)

In fact, Schutz *et al.* (2008, 130) showed that when composers write for the xylophone, they implicitly acknowledge that the high-pitched sounds, essentially of short duration and with bright timbres, which are characteristic of the instrument, "are inconsistent with the acoustic cues used to convey sadness", leading to the xylophone being considered a *happy instrument*. It is possible that the composers in this study were unaware of less orthodox resources. Because, despite all efforts, works with conventional sound production and a monotonous compositional flow prevail. Moreover, they are disregarded in favor of ragtime compositions – as Schutz *et al.* (2008) point out, these are the most popular choice of pieces for xylophone in percussion recitals. By promoting other approaches to sound production and composition, the xylophone

[1] This section uses material from a paper in Portuguese published in the proceedings of the 4th Brazilian Percussion Congress (Torres and Mendes 2024).

could perhaps be held in more consideration by composers and percussionists, especially those interested in a more exploratory repertoire. After all, it was a

> constant search in the vibraphone for a greater technical and musical versatility explored by [jazz] instrumentalists, combined with the great possibility of timbral exploration, [which] caught the attention of several composers of classical music in the first half of the twentieth century. (Chaib 2008, 57; our translation)[2]

The second author of this article has been collaboratively looking for new forms of resonance and timbral variation in the xylophone. His work has led to innovative ways of producing sound on the instrument and the dissolution of the boundaries between art, music and technology. He has also contributed to the expansion of the instrument's repertoire, giving rise to works that explore the potential of the xylophone sound matrix through hybrid narratives (see Mendes 2019; Mendes *et al*. 2018a, 2018b; Mendes and Vieira 2024). The first author of this article contributed to the second author's endeavor, basing the exploration of the instrument on her compositional ideas. Until then, she had focused her exploration of an instrument's timbral resources on the guitar (see Torres 2015, 2020; Torres and Ferreira-Lopes 2018), having developed through practice-based research an innovative way of using the technique of multiphonics (Torres 2020).

We begin this article by briefly and systematically presenting how the soloistic xylophone has been explored since the second half of the twentieth century in terms of sound production and compositional flow. Then we discuss different kinds of musical gestures and composer–performer working relationships. It follows a summary of our creative process, in which we point out its most relevant aspects and classify our working relationship. An overview of our results precedes our final remarks on the collaboration.

2. Composing for xylophone as a soloistic instrument: state of the art

We reviewed 89 works for solo or soloistic xylophone by 85 authors. These are works of which we had access to the complete score or a complete recording among those which came to our knowledge through internet searches, either directly or cited in scientific publications. Among these works, 59 did not introduce much novelty concerning the production of sound or the compositional flow (Adam Lenhart Music 2022; calan video 2016; Dos Santos n.d.; Hasper n.d.; Hovhaness 1965; Koors 2021; Láng 1969; Marimba Duo 2024; Mayuzumi 1965; MichaelShingoComposer 2020; Ohenoja 2022, 122–130; Pocket Publications 2020; Redshift Music Society 2022; Rhythmscape Publishing 2015; Solomon *et al.* 2010 [38 compositions]; Sommerfeldt n.d.; Stokes n.d. [4 compositions]; Tortiller 2002). The compositions that did introduce novelty concerning those two aspects are mostly for solo xylophone or xylophone and fixed media or live electronics, and are listed in Tables 2 and 3. These works present unconventional sound production or a compositional flow containing predominantly varied and flexible beat divisions or that is not metered (hereafter referred to as an *irregular compositional flow*; the unusual employment of glissandi is common to many of them), but the compositional flow of most of them is (predominantly) continuous. Although this might be necessary to create tension, it does not always allow to fruition the results of less conventional playing and understand how they arise.

[2] Original version: *"A constante busca no vibrafone por uma maior versatilidade técnica e musical explorada por instrumentistas, aliada à grande possibilidade de exploração tímbrica, chamou a atenção de diversos compositores da música erudita ainda na primeira metade do século XX."*

Tab. 2 – Works for solo xylophone reviewed by the authors in which there is unconventional sound production on the xylophone and/or an irregular compositional flow (i.e., a varied or non-metric flow). Chronological organization by year of composition

Year	Author, *Title of the work*	Description
1967	Thomas Pitfield, *Sonata*	Striking the bars with different kinds of mallets in each hand; regular and continuous flow
1987	Carlos Stasi, *Mapselpha 4r*	Irregular and continuous flow
2009	Roberto Victorio, *Tetragrammaton X*	Irregular and continuous flow
2010	Andrew Allen, *Rats*	Four kinds of sonorities produced *ad libitum* on the bars (mostly pitch, e.g., medium mallets; half-pitched, e.g., strike the bar shaft; mostly noise, e.g., percussion with mallet shafts; entirely noise, e.g. scratching a bar with a mallet shaft); rattle mallet shafts against each other in a specified way; irregular and discontinuous flow
2010	Lou Bunk, *Etude: Being and Becoming*	Possibility of using unconventional mallets, "particularly if they make an interesting sound"; irregular and discontinuous flow
2010	James Charrette, *Aristotle’s Lantern*	Dead stroke; irregular and predominantly continuous flow
2010	Marti Epstein, *Etude Estinto*	Irregular and discontinuous flow
2010	Peter Gilbert, *Etude for Xylophone*	Striking the bars with mallet shafts; regular and continuous flow
2010	Fusun Koksal, *Etude No. 1*	Irregular and predominantly continuous flow
2010	Joseph Pereira, *Oiseaux de Messiaen*	Dead stroke; Irregular and continuous flow
2010	Rudolf Rojahn, *Azraeel*	Irregular and predominantly continuous flow
2010	Samuel Solomon, *Gliss Ditty*	Interjections of short and fast glissandi between conventionally played notes in a regular and continuous flow
2010	Ken Ueno, *Three Xylotudes*	Striking mallet shafts against each other in a specified way; irregular and discontinuous flow; theatrical elements
2014	Gregory Pfeiffer, *The Nine Members of the Asian Dawn*	Irregular and discontinuous flow
2015	Cesar Traldi, *Kunai*	Bar striking and glissandi with a marble in each hand or mallet butt ends; dropping several marbles on the bar; predominantly regular, continuous flow
2017	Matthew Curley, *Catapult*	Short, fast and repeated glissandi; regular and continuous flow
2019	Jean François de Guise, *Arrangement*	Irregular and discontinuous flow
2019	Jean François de Guise, *Four Bagatelles*	Irregular and discontinuous flow
2021	Jean François de Guise, *Attempt*	Bowing bars. Irregular and discontinuous flow
2025	Madalena Rato & Luis F. Amaya, *un breve alarido*	Rubbing/striking bars [by two players] with metallic chains and threads of small bells. Irregular and discontinuous flow

References: M. Curley, *Catapult*, s.d.; G. Pfeiffer, “The Nine Members of the Asian Dawn,” 2015; T. Pittfield, *Sonata*, 1967; M. Rato and L. F. Amaya, “un breve alarido”, 2025; S. Solomon *et al.*, *The Masschap 2010 Xylophone Collection*, 2010, pp. 5–8, 12–14, 20–21, 26, 34–35, 47, 74–76, 82–83, 90–91, 98–101; C. Stasi, *Maselpha 4r*, 1987; C. Traldi, *Kunai*, 2015; R. Victorio, *Tetragrammaton X*, 2009; 西方古典音乐Lu, “Jean François de Guise - arrangement for xylophone,” “Jean François de Guise - Four Bagatelles for Xylophone alone,” 2019; 西方古典音乐Lu, ”Jean François de Guise - Attempt for xylophone solo,” 2021

Tab. 3 – Works for xylophone and fixed media or live electronics reviewed by the authors in which there is unconventional sound production on the xylophone and/or an irregular compositional flow (i.e., a varied or non-metric flow). Chronological organization by year of composition

Year	Author, *Title of the work*	Description
1975	William Cahn, *The Recital Piece: A Drama for Solo Xylophonist and Tape*	Simultaneous striking at the bar's nodes; scratching a bar with a mallet shaft; short glissandi; predominantly regular, discontinuous flow
1986	Joseph Celli, *8 Mallets Four Brian* [xylophone and 3 video channels]	Continuous flow of glissando tremoli.
1987	Gustavo Matamoros, *Truly Yours* [xylophone and taped ensemble]	Irregular and discontinuous flow
2015	Red Wierenga, *Xylocybin* [xylophone and live electronics]	Bowing bars; clusters with prepared mallets; irregular and discontinuous flow
2018	Weston Olencki, *For Xylophone* [xylophone and electronics]	Clusters by slapping bars with a long dowel; excitation on the bars' outer edges with small fans; dead stroke; percussion with mallet shafts; short and repeated glissandi; irregular and discontinuous flow
2018	Helvio Mendes, Alexsander Duarte & Cesar Traldi, *Xyloops* [xylophone and electronics]	Dead stroke; percussion with mallet shafts; short and repeated glissandi; predominantly regular and continuous flow
2018	Daniel Barreiro & Cesar Traldi, *Rastros #2* [xylophone, cello ensemble and electronics]	Striking bars with mallet butt ends; short, fast and repeated glissandi; dead stroke; predominantly irregular and continuous flow.
2019	Michel Soto, *Malware II* [xylophone, video and electronics]	Dead stroke; striking the bars with mallet shafts and with marbles; bowing bars; predominantly irregular and continuous flow
2020	Cesar Traldi, *Ressonâncias #5* [xylophone and tape]	Predominantly irregular and continuous flow
2021	Samuel Vieira, *Quasitude* [xylophone and live loop]	Scraping a bar with a corrugated tube; glissandi on the resonators with mallet shafts; dropping ping-pong balls on the instrument; predominantly irregular and continuous flow

References: J. Barudin, "The Recital Piece (Bill Cahn)," 2013; C. Traldi, "Rastros #2 (2018) – Daniel Barreiro e Cesar Traldi," 2020; D. Bathory-Kitsz, "Brian Johnson plays Eight Mallets for Brian by Joseph Celli." 2011; DrFaustusMusic, "Red Wierenga – Xylocybin (2015)," 2015; G. Matamoros, *Truly Yours*, 1991; H. Mendes *et al.,* "Xyloops," 2018b; W. Olencki, "for xylophone [2018]," 2019; M. Soto, *Malware II*, 2019; C. Traldi, *Ressonâncias #5*, 2020 S. Vieira, *Quasitude*, 2021

Tables 4 and 5 show the unconventional sound production we encountered in the reviewed literature. This includes the possibilities in 17 of the 30 works featured in Tables 2 and 3 and those disseminated in scientific publications. Of the books dedicated to contemporary percussion playing and composing (Brindle 1970; Dierstein *et al*. 2018; Solomon 2002/20216), only Solomon introduces novelty in xylophone sound production.[3] Although the first edition of this book precedes most compositions, we hardly found in these earlier compositions the possibilities mentioned in the book.[4] A book chapter by this article's second author in co-authorship with a composer concerns an artistic research endeavor of both (Mendes & Vieira, 2024), which introduced novel ways of playing the xylophone.

[3] See Solomon (2016, 112–115 and Appendix C).

[4] A couple of differences between the section on unconventional sound production in keyboard instruments in the two editions of Solomon's (2002, 2016) book are worth pointing out. In the first edition, he calls this section "Special effects" and includes the glissando. In the second edition he calls it "Extended techniques," and the topic *Glissandi* can be found in another section dedicated to composing for those kinds of instruments, thus showing that the glissando has become a well-established gesture on these instruments.

Tab. 4 – Unconventional mallet usage, unconventional bar spots and preparations on the xylophone in the literature reviewed by the authors

Category	Description	Work(s)
Unconventional mallet usage	Striking bars with different kinds of mallets in each hand	Pitfield, *Sonata*, 1967
	Scraping a bar with the butt end of a mallet	Cahn, *The Recital Piece*, 1975 Allen, *Rats*, 2010
	Glissando tremolo	Celli, *8 Mallets Four Brian*, 1986
	Striking bars with mallet butt ends	Allen, *Rats*, 2010 Gilbert, *Etude for Xylophone*, 2010 Traldi, *Kunai*, 2015 Mendes, Duarte & Traldi, *Xyloops*, 2018 Barreiro & Traldi, *Rastros #2*, 2018 Olencki, *For Xylophone*, 2018 Soto, *Malware II*, 2019
	Striking a bar's outer edge with a mallet shaft	Solomon, *How to write for percussion*, 2016
	Marimshot (i.e., simultaneous striking of a bar's outer edge with the mallet's shaft and the bar's center with the head)	
	Pitch bend (i.e., dragging a mallet from a node to the center of a bar after the bar is struck with another mallet)	
	Striking mallet shafts against each other	Ueno, *Three Xylotudes*, 2010
	Rattle mallet shafts against each other	Allen, *Rats*, 2010
	Dead stroke	Charrette, *Aristotle's Lantern*, 2010 Pereira, *Oiseaux de Messiaen*, 2010 Mendes, Duarte & Traldi, *Xyloops*, 2018 Barreiro & Traldi, *Rastros #2*, 2018 Soto, *Malware II*, 2019
Unconventional bar spots	Striking on one or both nodes of a bar (i.e., at the nodes of its first vibrational mode, where the bars are perforated)	Cahn, *The Recital Piece*, 1975 [both spots] Solomon, *How to write for percussion*, 2016
	Striking a side of a bar	Allen, *Rats*, 2010
Preparations	Striking a bar, to which plasticine is stuck	Solomon, *How to write for percussion*, 2016
	Striking a bar that has aluminum foil between it and the resonator	

References: J. Barudin, "The Recital Piece (Bill Cahn)," 2013; C. Traldi, "Rastros #2 (2018) – Daniel Barreiro e C. Traldi," 2020; D. Bathory-Kitsz, "Brian Johnson plays Eight Mallets for Brian by Joseph Celli." 2011; H. Mendes *et al*., "Xyloops," 2018b; W. Olencki, "for xylophone [2018]," 2019; T. Pittfield, *Sonata*, 1967; C. Traldi, *Kunai*, 2015; S. Solomon, *How to Write for Percussion*: *A Comprehensive Guide to Percussion Composition*, 2016, pp. 112–115 and Appendix C; S. Solomon *et al., The Masschap 2010 Xylophone Collection*, 2010, pp. 5–8, 12–14, 20–21, 34–35, 74–76, 90–91, 98–101; M. Soto, *Malware II*, 2019

Tab. 5 – Unconventional exciters and parts of the xylophone in the literature reviewed by the authors

Category	Description		Work(s)
Unconventional exciters and respective usage	Marbles	Striking the bars	Traldi, *Kunai*, 2015 Soto, *Malware II*, 2019
		Dropping on the bars	Traldi, *Kunai*, 2015
		Scraping along the bars (glissando)	
		Rubbing the bars	Mendes & Vieira, "Quasitude," 2024
	Dowel	Striking the bars lengthwise (clusters)	Solomon, *How to write for percussion*, 2016
		Slapping the bars (clusters)	Olencki, *For Xylophone*, 2018
	Small fan	Striking a bar's outer edge with the fan's blades	
	Bow	Drawing the bow vertically across the bar's outer edge	Wierenga, *Xylocybin*, 2015 Soto, *Malware II*, 2019 De Guise, *Attempt*, 2021
	Corrugated tube	Scraping the outer edge of a bar	Vieira, *Quasitude*, 2021 Wierenga, *Xylocybin*, 2015 Mendes & Vieira, "Quasitude," 2024
	Ping-pong balls	Dropping on the bars	
	Straw broom	Dragging along the bars (glissando)	Mendes & Vieira, "Quasitude," 2024
	Chain	Simultaneous rubbing / dragging on several bars; laying/pulling one ring after the other on/from a bar	Rato & Amaya, *un breve alarido*, 2025[5]
	Thread of small metal bells	Dragging on a bar's outer edge; rubbing a bar (straight/tremolo) with one bell while holding the rest; laying/pulling one bell after the other on/from a bar	
	Thread of very small plastic bells	Rubbing a bar	
Unconventional parts of the instrument	Striking an edge of the frame		Solomon, *How to write for percussion*, 2016
	Dragging a mallet along the resonators		
	Dragging a mallet's butt end along the resonators		Vieira, *Quasitude*, 2021 Mendes & Vieira, "Quasitude," 2024

References: DrFaustusMusic, "Red Wierenga – Xylocybin (2015),"2015; H. Mendes *et al.*, "Xyloops," 2018b; H. Mendes and S. Vieira. "Quasitude: The Processes and Methods of the Composition Work for Xylophone and Live Looping," 2024; W. Olencki, "for xylophone [2018]," 2019; M. Rato and L. F. Amaya, "un breve alarido", 2025; S. Solomon, *How to Write for Percussion*: *A Comprehensive Guide to Percussion Composition*, 2016, pp. 112–115 and Appendix C; M. Soto, *Malware II*, 2019; C. Traldi, *Kunai*, 2015; S. Vieira, *Quasitude*, 2021**;** 西方古典音乐 Lu," Jean François de Guise - Attempt for xylophone solo," 2021

3. Musical gestures

In our research, we arrived at different kinds of musical gestures. A musical gesture is "an action pattern that produces music, is encoded in music, or is made in response to music", the term being therefore usable to refer to the body movements of an action or "to describe some emergent qualities in musical sound

[5] This work is scored for one keyboard percussion instrument (and two percussionists) but according to Rato (personal communication), it was initially conceived for xylophone.

(Jensenius *et al.* 2010, 19). “Genuine gestures,” however, are movements that “carry expression and meaning” (Leman and Godøy 2010, 5). That is, they are “physical displacement[s] of an object in space” that are mentally activated (Jensenius *et al*. 2010, 13) after being “imagined and anticipated” (Leman and Godøy 2010, 5). Their primary intention in music is to control an instrument or coordinate actions among musicians (conducting gestures).

An instrumental gesture – or “effective gesture” for Delalande (1988 *apud* Cadoz and Wanderley 2000, 78) – is a genuine gesture that controls an instrument. For Cadoz and Wanderley (2000. 79),

> it is applied to a material object and there exists physical interaction with it; in this physical interaction, specific (physical) phenomena are produced, whose forms and dynamic evolution can be mastered by the subject; these phenomena may then become the support for communicational messages and/or be the basis for the production of a material action.

Table 6 presents Cadoz’s classification of instrumental gestures, which is based on their function. An excitation gesture employs a sound production mode in a certain way – for example, dropping a marble on a bar is an instantaneous excitation gesture that involves striking the bar using the force of gravity. Rubbing a marble or the butt end of a mallet on the surface of a bar is a continuous excitation gesture with continuous excitation, but if the bar is scraped with the mallet’s butt end, there may be a sequence of discrete excitations. An excitation gesture may be interrupted after its “prefix”, before its “excitation phase” and “suffix” take place (see Godøy 2008 *apud* Jensenius *et al.* 2010, 22), thus ending in silence – a “disjointed attack” for Tolentino (n.d. *apud* Aroso 2020, 87), which is mainly visual and acquires full significance in a performative context, as we shall discuss below.

Modification and selection gestures are the other gestures involved in sound production. For example, the pitch bend (dragging a mallet from a node to its center after the bar is struck with another mallet) is a parametric modification gesture with a continuous variation of the parameter pitch. An example of a structural modification gesture is sticking plasticine to a bar, which changes its pitch, its resonance and its timbre. If we consider the object that excites the bars a part of the instrument, the choice of using different mallets in each hand to play single notes is an example of a sequential selection gesture. A parallel selection gesture is for example choosing to play at a bar’s outer edge and center at the same time, as in the marimshot. In many cases, two or more of the proposed functions combine in different degrees giving rise to another [higher-level] instrumental gesture, as Cadoz and Wanderley (2000, 79) point out. For example, rubbing the surface of a bar transversally with a mallet and continuing to the neighboring bar leads to striking the latter on its lateral edge; continuing this gesture along several bars results in a glissando. Combined within a musical context, instrumental gestures give rise to "a series of pitches, timbres, durations, and other musical parameters,” thus making up compositional gestures (Baschet 2013, 24).

The secondary intention of gesture is a subjective and context-dependent aspect: the meaning beyond that of the primary intention (Leman and Godøy 2010). As Aroso (2020) stresses, a performative gesture “presupposes significance of a meaning that involves more than just a physical movement” (83). That is, the performative gesture is “closely tied to the display of meaningful energetic shaping” (Bertinetto 2025, 12). The secondary intention of a gesture is imbued in the movement by what Delalande (1988 *apud* Cadoz and Wanderley 2000, 78) calls a “figurative gesture”. This is a gesture that is “perceived by the audience but without a clear correspondence to a physical movement”. It may stem from the performer during the

preparation of a performance, or in real time during a performance; or be prescribed in the score by the composer, as for example in *Sen VI* for solo percussion by Toshio Hosokawa when he asks for "a motion of drawing a big circle", which precedes an attack, to be performed "*con tensione*" (Hosokawa 1993 reproduced in Aroso 2020, 88).[6]

Tab. 6 – Classification of instrumental gestures by Claude Cadoz

Category	Definition	Sub-categories
Excitation gesture	Provides the energy that will eventually be present in the perceived phenomena	*Instantaneous*: the sound starts when the gesture finishes
		Continuous: both gesture and sound co-exist. The gesture leads either to a continuous excitation or a sequence of discrete excitations.
Modification gesture	Is related to the modification of the instrument's properties and affects the relation between the excitation gesture and the sound	*Parametric or continuous*: a continuous gesture varies a parameter continuously or discretely
		Structural: when the modification is related to categorical differences, such as the insertion/removal of an extra part
Selection gesture	Consists of a choice among multiple similar elements in an instrument. It neither provides energy to the resulting sound nor modification of any of the instrument's properties.	*Sequential* [choice of one element at a time]
		Parallel [more than one element chosen at the same time]

Reference: C. Cadoz and M. Wanderley. "Gesture – Music," 2000, pp. 79–80

4. Composer–performer working relationships

We classified our working relationship according to different frameworks. These are systematized in Table 7 and classify the working relationship between a composer and a performer according to the way ideation and decision-making occur. While Taylor (2016) only distinguishes the parties' involvement in ideation, Torrence (2018) – who classifies the performer's role and not the working relationship – also considers the creative level at which the parties interact in this stage. Hayden and Windsor (2007) only go into detail regarding the "interactive" type of relationship, clarifying that the performer, in addition to clarifying technical issues, puts creative ideas to the composer's consideration, to which he/she is open, but still has the final say on their inclusion, remaining, therefore, as the author of the work.

[6] This visual information might change the subsequent perception of the auditory information (Aroso 2020).

Tab. 7 – Classifications of the role of the performer and of the composer–performer working relationship according to their involvement in ideation and decision-making

Performer's role denomination	Composer–performer working relationship denomination		Involvement of collaborators in the creative process (C: Composer; P: Performer; ||: in parallel; +: together; ±: partially together)			
			Ideation		Decision-making	
*	**	***	***	* (interaction level of P)		
Interpreter	Closed loop / Directive	–	C	C (none)	C	
				C (final score)		
				C (sketches)		
Adviser	Open loop / Interactive	Hierarchical	C || P	C (materials)	C*	C** / C or P***
		Consultative	C + P	C ± P (composition)	C ± P*	
Deviser	Collaborative	Co-operative	C || P	C + P	C + P	
		Collaborative	C + P			

References: * J. Torrence, "Rethinking the Performer: Towards a Devising Performance Practice", 2018, section II; ** S. Hayden and L. Windsor, "Collaboration and the Composer: Case Studies from the End of the 20th Century," 2007, p. 33; A. *** Taylor, "'Collaboration' in Contemporary Music: A Theoretical View," 2016, p. 570

5. Creative process

5.1 Background

When we started our collaboration, the composer had experience in composing for percussion instruments. She had first used percussion in two pieces for small ensemble.[7] A work for percussion ensemble followed,[8] in which she used the xylophone but only for its high register. In fact, the incisiveness of this register is something of which she is quite fond – after all, as Brindle (1970, 37) points out, "the xylophone's genius does lie in its brilliance, its vitality in tone and movement." In her two other percussion works[9] the xylophone is absent, but they have in common with the sextet:

- the very beginning: three isolated loud attacks on a high-pitched wood block; and
- the way the title arose: letters from the title of the main source of inspiration for the piece – in one case, the first letter of each word in the title; and in two others, all the letters that are read as consonants (Torres 2023).

The composer, however, had no knowledge related to unconventional sound production on the xylophone. This was actually advantageous for the creative process because, as pointed out by several authors regarding the guitar, having a certain distance to the instrument puts a composer in a better position to discover new possibilities (see Torres 2015). The composer also had no experience in collaborating with performers. Her creative processes up to then had taken place in the usual way, in which the composer works essentially alone until the rehearsal period that precedes the premiere.

[7] *Cyrano-Szenen II*, 2006; *um Lieder herum...*, 2007.
[8] *SMPG* for six percussionists, 2005–2008/2009, rev. 2009.
[9] *MSTRG* for one percussionist, 2008–2009, rev. 2010/2014; *MSTRG-TRLD* for seven percussionists, 2020.

When we started our collaboration, the performer was unaware of the composer's music and way of working. He had, however, collaborated with composers and performers, having even taken on the co-authorship of a piece.

5.2 Methodology

Our approach to explore sound production on the xylophone was through the creative process of an art music composition for the solo instrument. From the beginning, the composer had clear that the work would have a varied compositional flow with meaningful pauses. But we did not have plans concerning the exploration of sound or how the process would unfold. After a preliminary session, in which the performer showed the composer several unconventional ways of producing sound on the xylophone, we ended up engaging in a repetitive process with the following steps: 1. solo ideation by the composer; 2. work session in which the performer played the composer's ideas and made suggestions and we explored compositional and performative ideas that came to both of us during the session; 3. solo decision-making by the composer. From early on, the process involved working back and forth on a draft of the whole composition. Each work session lasted between 20 and 60 minutes and all took place at the University of Aveiro on a 4-octave (C_4–C_8)[10] ADAMS Alpha Series xylophone, except for one session, in which we worked at the performer's home on his study xylophone because the University's xylophone was unavailable. Nevertheless, during the compositional process, the composer had always in mind a 3½ octave xylophone (F_4–C_8), to guarantee that the piece would always be performable. Usually within three days of a session, the composer sketched an account of its most relevant aspects of the sessions.[11] She also kept the score sketches that she annotated during the sessions and those she sent per email to the performer.

5.3 Working relationship

We set out for the creative process in the roles we usually play and remained in them throughout the process. Nevertheless, we entered each other's domains: the composer introduced performative ideas (e.g., muffle bars with the fingers; strike the instrument's frame), whereas the performer introduced compositional ideas arising from the composer's initial ideas (e.g., change rhythms/durations; vary the height of the noise resulting from striking the instrument's frame; change the order of material). But the decisions about the inclusion of the performer's suggestions were always of the composer. Therefore, according to the classifications discussed in the introduction of this article, the performer acted as an Adviser (Torrence 2018) in an interactive working relationship (Hayden and Windsor 2007) of a consultative nature (Taylor 2016).

5.4 Timeline

The process took place over three periods: one during the first half of 2024 and the other two during 2025. In the first period, there were five work sessions, and we premiered the work at our university (July 5, 2024).[12] Before the premiere, the composer had felt it was necessary to expand some moments, which she confirmed while listening to the general rehearsal and the concert, and we agreed the piece needed a

[10] Scientific pitch notation.

[11] See Torres and Mendes (2024) for an account up to the premiere of the work based on those initial writings.

[12] A videorecording of the premiere is available at http://youtu.be/CdGuh_Jg39k.

revision. When listening to those performances’ recordings, the composer realized that there were other moments that also needed more space. The revision started half a year later – there were then six work sessions, we recorded the work in the studio, and the performer premiered the revised version in Brazil (July 1, 2025).[13] Figures 1 to 3 give an account of our interactions in each period, respectively.

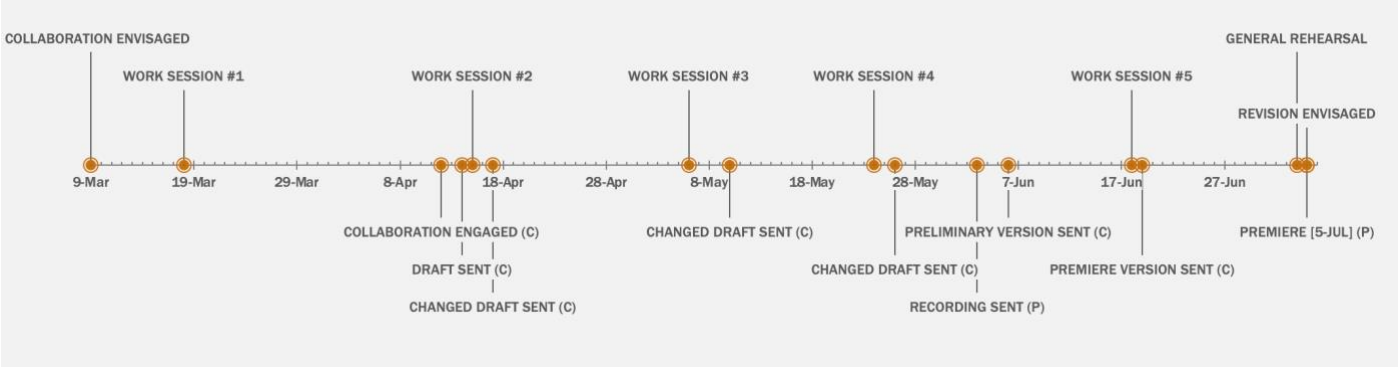


Figure 1 – Timeline of the composer–performer interactions up to the premiere of the work in 2024. Above the line: bidirectional interactions; below the line: unidirectional interactions departing from composer (C) or performer (P)
Reference: by authors

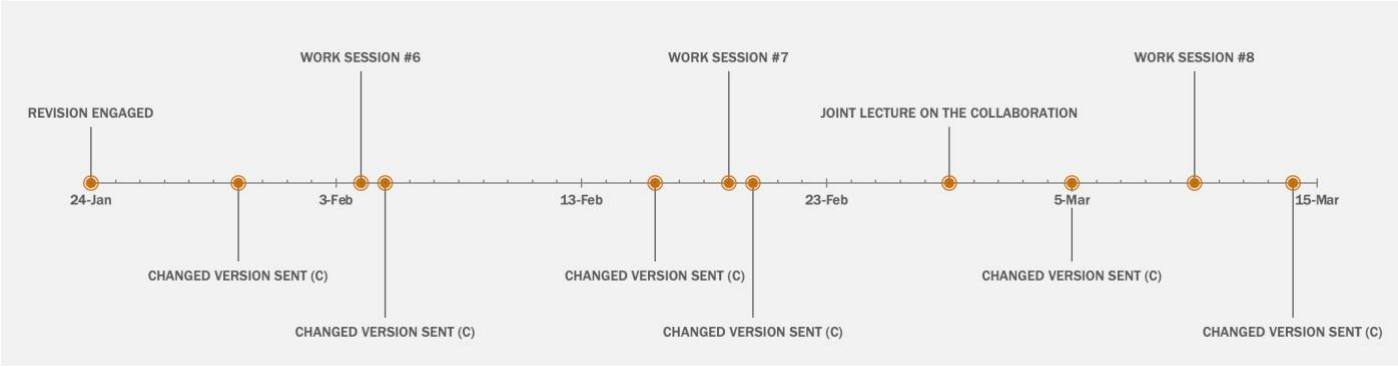


Figure 2 – Timeline of the composer–performer interactions during the revision of the work in the first period of 2025. Above the line: bidirectional interactions; below the line: unidirectional interactions departing from composer (C)
Reference: by authors

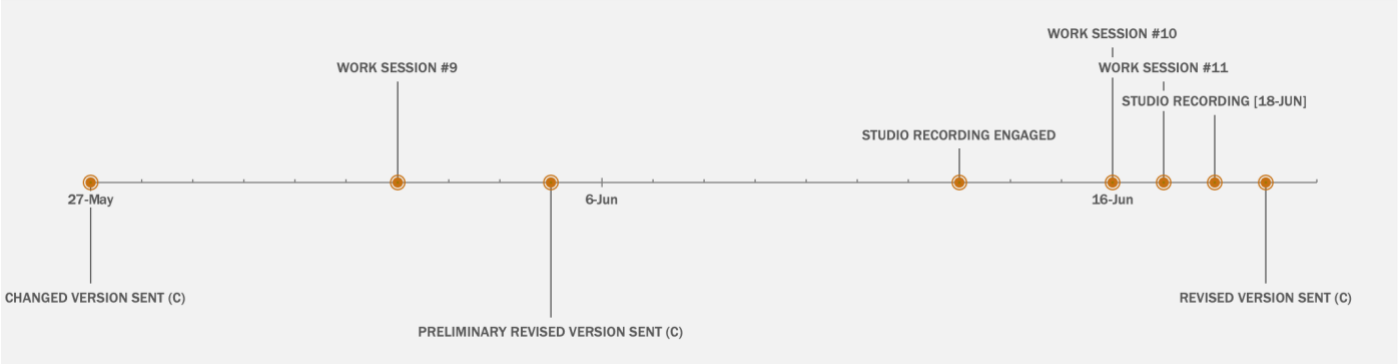


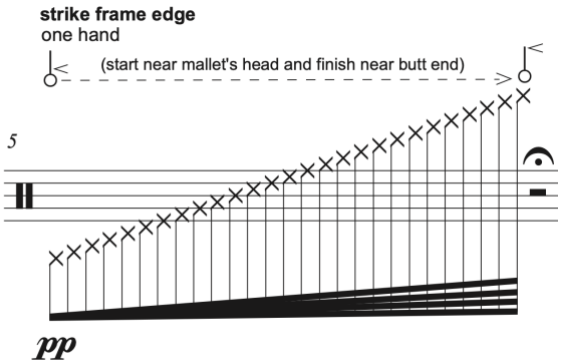
Figure 3 – Timeline of the composer–performer interactions during the revision of the work in the second period of 2025. Above the line: bidirectional interactions; below the line: unidirectional interactions departing from composer (C)
Reference: by authors

[13] See Torres (2025) for the revised work and its studio recording.

5.5 Highlights

From the whole process, four compositional gestures and the way we arrived at them stand out. All gestures consist of repeated attacks. Three gestures are timbral transitions; one of them contains a timbral crossover.

Compositional Gesture 1. This gesture’s excitation consists in striking the instrument's frame. The composer thought first on repeatedly striking the frame’s surface with the butt end of a mallet (a gesture which she still used in the work). But the performer suggested striking instead an edge of the frame with the mallet’s shaft, varying the contact spot on the shaft (as suggested by Solomon 2016, 242) and the frequency of the attacks. Varying the contact spot varies the (undefined) pitch of the sound: when the spot is close to the mallet’s head (see Fig. 4a), the pitch is lower than when the contact is near the mallet’s butt end (see Fig. 4b). The composer decided to go from low to high and increase the frequency of the attacks, as shown in Musical Example 1.



Musical Example 1 – Notation of Compositional Gesture 1 in *CS/uLh* for solo xylophone (2024, rev. 2025) by Rita Torres
Reference: R. Torres, *CS/uLh*, 2025, score, p. 1

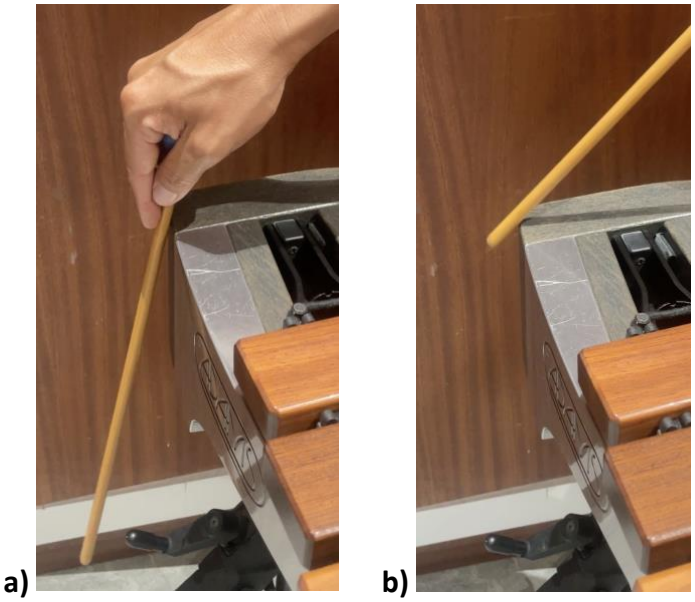
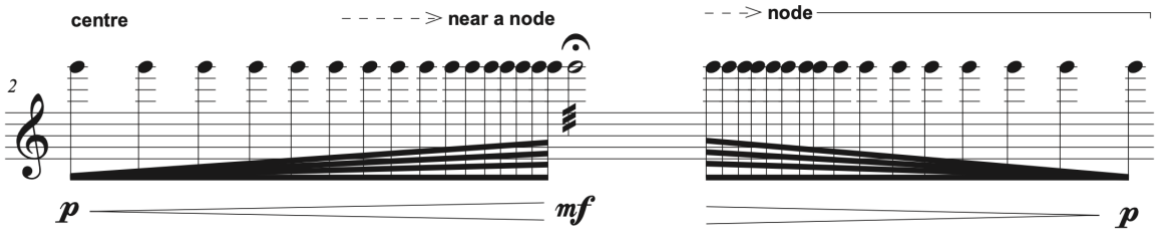


Figure 4 – a) Beginning and b) end of Compositional Gesture 1
Reference: by authors

Compositional Gesture 2. This gesture consists of a timbral transition along a bar through repeated attacks. Initially, the idea was to gradually increase their frequency and force while altering the timbre; and then reverse the process when the attack’s peak frequency and force were reached. When testing a timbre

variation from a node (see Fig. 5b) to the center (see Fig. 5a) of the bar and back, we noticed that there was an exaggerated increase in the sound volume during the *crescendo* (especially evident in the small room where we were).[14] The composer decided to invert the directions of the movements, but had to make changes to the overall gesture due to the void in the sound when striking occurs at the node. Therefore, the peak frequency and force of the attacks occurs near the node,[15] and then the attacks move to the node, remaining there, while their frequency and force decreases, as shown in Musical Example 2.



Musical Example 2 – Notation of Compositional Gesture 2 in *CS/uLh* for solo xylophone (2024, rev. 2025) by Rita Torres
Reference: R. Torres, *CS/uLh*, 2025, score, p. 1

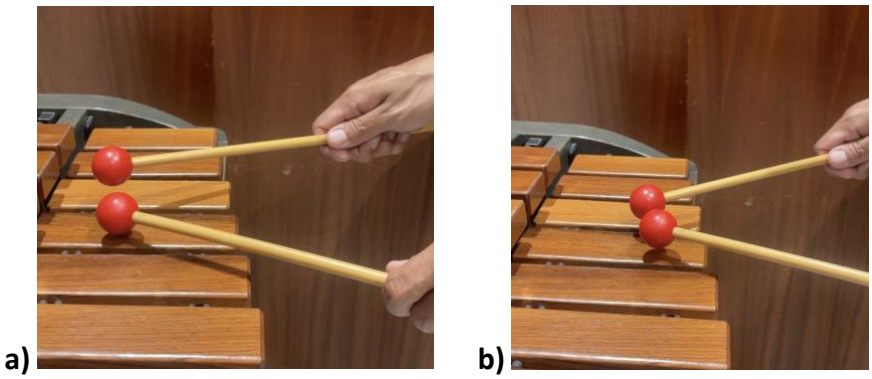
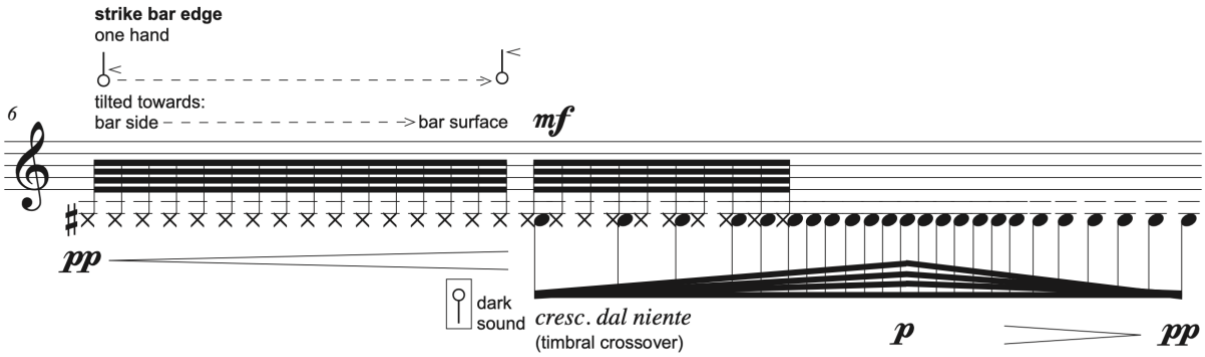


Figure 5 – a) Beginning and b) end of Compositional Gesture 2
Reference: by authors

Compositional Gestures 3 and 4. These gestures arose when we were trying to find a transition between two moments with very distinct timbres, both produced through striking the surface of a bar. The first, with the butt end of a mallet; and the second, with a medium-hard yarn mallet, muffling the bar with the fingers. The performer suggested striking the outer edge of the bar with the shaft of the mallet, varying the contact spot from near the mallet's head to its butt end, because this gradually increases the presence of the lower partials of the bar's response.[16] The composer then thought of a transition in stages over the three repetitions of a motif that she had already written. This consequently gave her the idea of making a crossover of timbres after those repetitions: when, at the edge of the bar, the butt end of the mallet is reached, the other hand begins to strike the bar with the medium-hard yarn mallet, producing a similar sound. Then the attacks at the edge of the bar stop and the other continue. The performer then suggested that the left hand

[14] This is because the gesture promotes at the same time a greater excitation of the first vibrational mode – which reaches its maximum amplitude at the center of the bar (see Dierstein *et al*. 2018, 74; Walter 2001) – and of many other modes, due to increased strength of the attacks.
[15] When striking occurs near a node of the bar's first vibrational mode, the excitation of this mode decreases, but that of many other modes is ensured.
[16] One can also hear a sound like that of Compositional Gesture 1.

starts more slowly and *dal niente,* for a smoother crossover, to which the composer agreed. When trying out the gesture, we realized that, by tilting the mallet towards the surface of the bar, the lower partials were even more present.[17] The timbral transition and crossover are therefore improved when the mallet tilting changes progressively along Compositional Gesture 3 (see Fig. 6). Musical Example 3 shows the complete transition with Compositional Gestures 3 and 4 and the end chosen for the latter.



Musical Example 3 – Notation of Compositional Gestures 3 and 4 in *CS/uLh* for solo xylophone (2024, rev. 2025) by Rita Torres
Reference: R. Torres, *CS/uLh*, 2025, score, p. 2

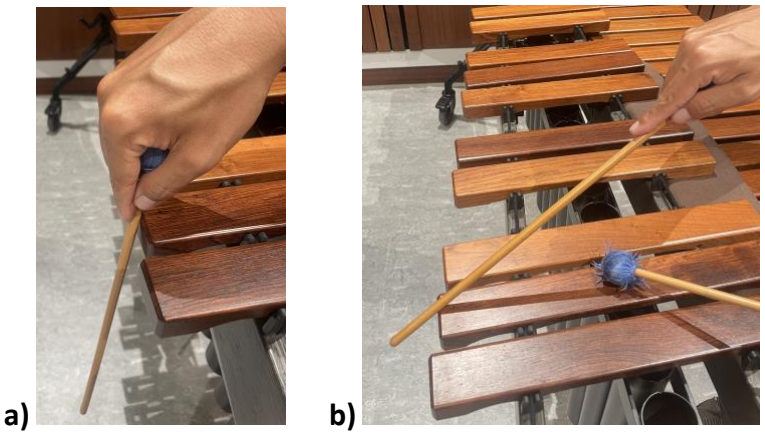


Figure 6 – a) Beginning and b) end of Compositional Gesture 3; beginning of Compositional Gesture 4
Reference: by authors

Another highlight of the process is a secondary intention prescribed by the composer. The composition starts like all other percussion works of hers: three isolated loud attacks on a high pitch on wood. This is in fact reminiscent of a guitar composition,[18] in which most parts begin with three attacks, and of which she appropriated a section in the xylophone work. Wanting the composer more intention in each attack, as well as in the following gestures, the performer suggested the inclusion of a verbal indication. The composer agreed and wrote “Grave / Assertivo” as the character of the music. Sometime later, she was still not satisfied with the level of intention with which the performer attacked the bars in the beginning of the work. She then realized that all occurrences of the three attacks in the guitar piece are reminiscent of the Molière strokes (i.e., the strokes that announce the beginning of a theatrical performance), to which she alludes in that work (see Torres 2023). She therefore decided to write a verbal indication that reinforces the intention of the

[17] The more the mallet is tilted towards the surface of the bar, the easier it is to excite the bar’s vibrational modes that are transverse to its length (see e.g., Rossing 2007).
[18] *Cyrano-Szenen* for guitar, 2004.

figurative gesture: "Think of the imposing Molière strokes, which announce the beginning of a theatrical performance; through your assertiveness, lead the public to be attentive" (Torres 2025, 01).

6. Results

6.1 Unconventional sound production

The innovative gestures on the xylophone at which we arrived are described in Table 8. Instrumental Gesture 2 (which was not used in the composition) and Compositional Gestures 3 and 4 are possibly original. The other gestures either depart from gestures mentioned in Table 4 and 5 or are reminiscent of gestures employed on other instruments (see Solomon 2016, Appendix C).

Tab. 8 – Unconventional sound production resulting from the author's creative process (U: undefined; D: defined)

Gestures' categories (see Tab. 6)		Description	Pitch	Other sonic features
Instrumental	Instantaneous excitation	Dead strike the surface of the frame with the butt end of a mallet, pressing it with the index finger (**Instrumental Gesture 1**).	U	Weak resonance
		Drop a mallet vertically on a bar and pick it up again after one or more strokes (**Instrumental Gesture 2**).	D	Short attack
	Structural modification & Instantaneous excitation	Strike a bar muffled with a towel placed between the top and bottom bars (**Instrumental Gesture 3**).		Weak resonance
		Strike a bar muffled with fingers (**Instrumental Gesture 4**).		
Compositional	Sequential selection & Instantaneous excitation	Repeatedly strike an edge of the frame with the shaft of a mallet, varying the frequency of the attacks and the spot of the shaft that contacts with the frame (**Compositional Gesture 1**).	U	Height transition
		Repeatedly strike a bar, varying the contact spot from the center of the bar to near one of the bar's nodes, gradually increasing the force and frequency of attacks, then reducing both while advancing to the node, where the attacks gradually stop (**Compositional Gesture 2**).	D	Timbral transition
		Repeatedly strike the outer edge of a bar with the shaft of a mallet, varying the mallet's attack spot from near the head to the butt end, and its tilting from the bar's side to its surface (**Compositional Gesture 3**).		Timbral (& height) transition
	Parallel selection & Instantaneous excitation	Repeatedly strike the outer edge of a bar with the shaft of a mallet near its butt end and tilted towards the surface of the bar while the other hand starts imperceptibly striking the bar with a medium-hard yarn mallet, slowly in increasing the dynamics. When these sounds are established, the other hand stops (**Compositional Gesture 4**).		Timbral crossover

Reference: by authors

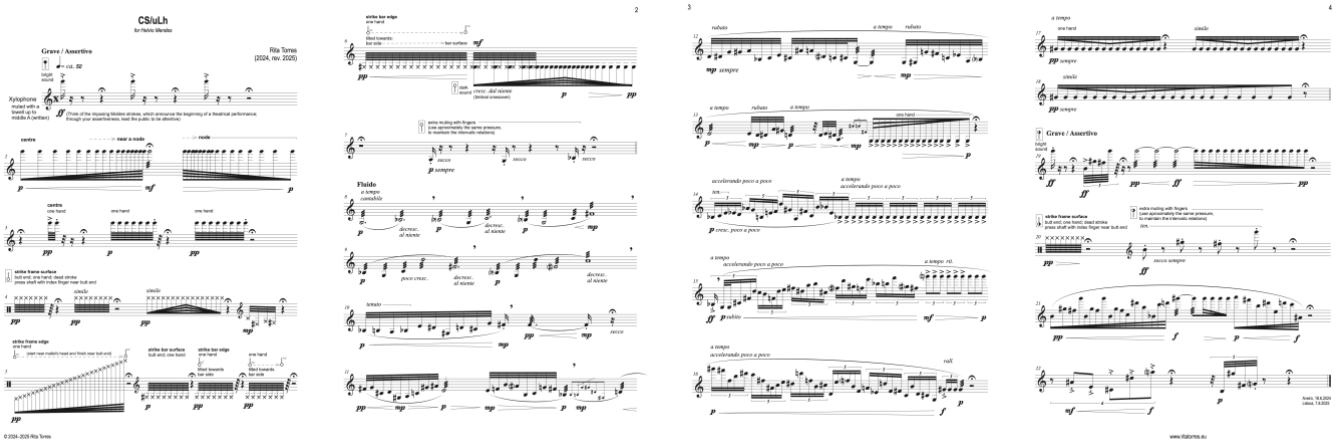
6.2 Musical work

The composition that resulted from our collaboration lasts about five minutes and is titled *CS/uLh*. As with the composer's other percussion pieces, this title contains letters from the titles of the work's main sources

of inspiration (in this case, the first letter of each word): her compositions *Cyrano-Szenen* for guitar (2004) and *um Lieder herum...* for small ensemble (2007), both of which she appropriated.

CS/uLh requires almost all gestures mentioned in Table 8. These dialogue and intertwine with conventional sound production in a predominantly irregular compositional flow. In the central section of the piece the flow is essentially continuous, while in the first and third/last sections of the piece it is discontinuous. The compositional approach in the central and last sections was essentially self-appropriation, both in the form of quotation and paraphrase. As far as the generation of original material is concerned, this was sometimes based on the timbres of the sounds and sometimes based on their pitches.

The score miniatures in Musical Example 4 give an overview of the work. Throughout it, the low register and part of the middle register of the xylophone are muffled by means of a towel placed between the upper and lower bars. The above-mentioned beginning (see end of section 5) is followed by Compositional Gesture 2 and a persistent motif of repeated notes, first twice in the same high-pitched note, then twice with Instrumental Gesture 1, and – after a variation of this, a four-note motif from the guitar piece and Compositional Gesture 1 – with a low-pitched note produced with the shaft of a mallet. This is followed by Compositional Gestures 3 and 4 and the section ends with three isolated notes produced while muffling each bar with fingers. The second/middle section of the piece begins with original material followed by a paraphrase of the material appropriated from the guitar piece, and ends with a quote of one of the marimba moments of *um Lieder herum...* The end of this section recalls the repeated notes in the end of the first section of the piece, but now an octave higher. The last section quotes another marimba moment from *um Lieder herum...*, which focuses on a four-note motive reminiscent of the guitar piece's motif in the first section.



Musical Example 4 – Thumbnails of the score of *CS/uLh* for solo xylophone (2024, rev. 2025) by Rita Torres
Reference: R. Torres, *CS/uLh*, 2025, score, pp. 1–4

Regarding the mallets' specifications, at the suggestion of the performer, the composer used the terms *bright sound* and *dark sound* next to the symbol that specifies the mallet's hardness. In the beginning of the first section, the composer asks for a hard mallet and a bright sound – we chose for the performances a hard plastic mallet. From the end of the first section, medium hard or soft mallets are required. To obtain a clear sound response, especially in the higher register of the instrument, it was necessary to resort to yarn mallets (usually used in the vibraphone). In the end of the first section and in the central section, the composer asks

for a soft mallet and a dark sound – we chose a medium-hard yarn mallet. In the last section, the composer asks for a medium-hard mallet and a bright sound – we chose a hard yarn mallet.

7. Conclusion

In the preceding sections we presented the results of a creative process of a composition for solo xylophone. This process was carried out with the purpose of conducting practice-based research to arrive at innovative ways of producing sound on the instrument – an instrument which apparently does not present this potential. Without collaboration and recursive experimentation, we would not have arrived as far as we did. The interactive working relationship is not surprising, since it was the composer's first collaboration. The fact that she did not play the instrument, nor had previous knowledge about unconventional sound production on it, was also important to arrive at the innovative results, as she could give free rein to her imagination without idiomatic idiosyncrasies. Her previous compositional experience for percussion contributed to the process from the point of view of appropriation – she quoted one of her works with percussion – and from being already acquainted with certain aspects, such as percussive articulations (e.g., *dead stroke*; repeated one-handed attacks). Although most gestures at which we arrived arose as solutions for a specific context, they are of generalizable use in other contexts. We hope that they are useful to other composers and performers and/or entice them to use the instrument in a soloistic context and carry out further research. We do not exclude the possibility of continuing to collaborate to explore another kind of working relationship and to unravel further timbral resources of the xylophone.

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