ATINER CONFERENCE PAPER SERIES No: ART2013-0450

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ART2013-0450

The Instrument as a Roughened Canvas:Embracing Timbral Indeterminacy in Composition and Performance

Emma Lloyd
PhD Student
University of Edinburgh
UK

Matthew Sergeant
PhD Student
University of Huddersfield
UK

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Athens Institute for Education and Research
8 Valaoritou Street, Kolonaki, 10671 Athens, Greece
Tel: + 30 210 3634210 Fax: + 30 210 3634209
Email: info@atiner.gr URL: www.atiner.gr
URL Conference Papers Series: www.atiner.gr/papers.htm

ISSN **2241-2891**
25/07/2013

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This paper should be cited as follows:

Lloyd, E. and Sergeant, M. (2013) "**The Instrument as a Roughened Canvas: Embracing Timbral Indeterminacy in Composition and Performance**" Athens: ATINER'S Conference Paper Series, No: ART2013-0450.

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Emma Lloyd
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Matthew Sergeant
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Abstract

In a metaphorical sense, the relationship between a musical composition and a musical instrument could be likened to that of a canvas and any marks it bears. This relationship is both multifaceted and causal: for example, the textured surface of a canvas can affect the *nature* of the material it exposits (cf. the pencil-on-canvas work of Agnes Martin). The musical instrument offers the same function to a composition; the relationship between the body of the performer and their instrument defines an ecology with which the musical work necessarily interacts. This interaction could be one of compliance – the idiomatic writing of a Paganini caprice – or subversion - the impossible glissandi employed within Xenakis's *Mikka* (1971).

Between these two extremes is a music that sets out to exploit the aberrant characteristics of an instrument. In the case of the baroque violin, extreme bow pressure or severe detuning (amongst other techniques) will produce unpredictable sonic responses to otherwise identical physical impetuses.

This paper documents collaborative research undertaken by violinist Emma Lloyd and composer Matthew Sergeant exploring the compositional manipulation and performative execution of such musical materials. Integral to the trajectory of our research is the creation of a new musical work, *bet denagel*, which brings to life the materiality of the baroque violin via aspects of timbral indeterminacy. Our collaboration pushes these elements to the forefront of the new piece's soundscape in a manner underdeveloped in existent repertoire for the instrument.

The trajectory of our research follows the creation a new musical work, *bet denagel*, which enlivens the materiality of the baroque violin via elements of timbral indeterminacy. In doing so, this approach makes visible forces not activated in the existent repertoire for this instrument. Reflecting on these issues from our complimentary perspectives, we will examine how our collaboration enabled us both to explore the creative potential of the instrument

in these terms and to address the following questions: how does a composer manipulate musical materials that have partially undefined timbral identities? How does one prepare and execute a musical work whose sonic surface is ultimately indeterminate?

Keywords: Composition; collaboration; indeterminacy; performance; baroque violin
Corresponding Author:

This paper outlines the compositional and performative exploration of a musical space – which we will term a *canvas*.

So often, the visual artist's canvas is made analogous to music's temporal dimension: large canvases map on to longer durational spans and vice versa. But what if this analogy were to be reimagined? What if the canvas occupied by a musical work could be considered as the instrument on which the composition is to be performed? Just as the canvas acts as a vehicle for the artist's marks to be viewed, so too the instrument acts as the vessel by which the iterations of a composer are heard.

Such a conceptual transposition opens a wider creative realm, allowing for the *instrument* and the composition's *material* to be considered as entwined, yet separate, operational planes. The delineation permits a dialogue or behavioural ecology to be formed between the two strata, the *instrument* affected by the *material* (its demand for performative execution) and, potentially, the *material* to be affected by the *instrument* itself.

Such thinking prompted an additional dialogue to be forged, between composer Matthew Sergeant and violinist Emma Lloyd. Together, we speculated how this metaphorical ecology might be explored; how a new composition may be created to exploit this conceptual territory, and the nature of the emerging performance practice it requires.

Through collaborative exchange, a new composition was created: *bet denagel*, for solo baroque violin. Here, the material and its instrument are placed in a discourse of timbral affectation. A zone of operation is created where the instrument itself is permitted to manipulate the material that is placed upon it.

Using the new score as a conduit for discussion, the potential feedback loop between instrument and material can be illustrated as a creative mechanism for innovative musical thinking, both at the composer's desk and in the concert hall itself.

bet denagel (2013), for solo baroque violin, is part of an ongoing series of interrelated compositions by the composer Matthew Sergeant, collectively entitled *the eleven churches of lalibela* (2011-). The series explores strategies of controlled disruption as a methodology for the transformation of musical materials. The baroque violin composition can be understood as an attempt to harness timbre as a functional operation within such a methodology.

Defining the space in which *bet denagel* operates timbrally is initially a process of exclusion. Despite the numerous authors who suggest timbre either acts as a dominant/independent component of the recognition of a given sound (e.g. Clarke, 2012; Bregman, 1995; Wishart, 1996 &c.), *bet denagel* does not employ wholly timbrally defined musical objects. Instead, the timbral methodology developed in this composition emerges from a reading of the work of American visual artist Agnes Martin.

Martin's earlier work consists of tight pencil-drawn grids on unprepared canvases. The movement of the pencil over the rough fabric surface causes small imperfections in the geometry of the lines left behind. It is an imperfection that Martin acknowledges.

> *'I hope I have made it clear that it is about perfection as we are aware of it in our minds but that the paintings are very far from being perfect – completely removed in fact – even as we ourselves are'.* (Martin, 1991, pp.15)

My perspective on Martin's work (as a composer) can be further elaborated by considering it part of an artistic practice that embraces the transformative potential of such operational 'glitches' – for example, the *post-digital* or *glitch aesthetic* observed in music by commentator Kim Cascone:

> *'The "post-digital" aesthetic was developed in part as a result of the immersive experience of working in environments suffused with digital technology: computer fans whirring, laser printers churning out documents, the sonification of user-interfaces, and the muffled noise of hard drives. But more specifically, it is from the "failure" of digital technology that this new work has emerged: glitches, bugs, application errors, system crashes, clipping, aliasing, distortion, quantization noise, and even the noise floor of computer sound cards are the raw materials composers seek to incorporate into their music.'* (Cascone, 2000, pp.12-13)

In both examples, the material of the art object(s) (the perfect line, the binary code of a data file) is involuntarily transformed by the space (physical or digital) in which it is placed.

bet denagel places its material in/on to the canvas of the baroque violin, an instrument rich with potential for the involuntary transformation of sound, or *glitches*. An 'inappropriate' combination of lateral bow position (relative to the bridge), vertical bow pressure, bow speed and left-hand finger pressure can all cause unpredictable falters/deviations-from the score material in a manner directly resembling Cascone's 'application errors, system crashes, clipping [and] distortion' (ibid). Interestingly, the performance parameters here outlined as most conducive to such glitches are those actions conventionally considered as the instrument's primary timbral modifiers. As a result, glitches can in some senses be seen as the result of timbral activity.

Other factors contribute to the instrument's applicability to this creative space: (for example) the instrument's strings are of unwound gut[1], which provide a coarser interface between bow and string. On a baroque instrument, there is a choice between using a wound or unwound G string: to a certain extent, this depends on the repertoire being performed, but also personal choice. The wound G is much thinner than the unwound string, giving a quicker articulation response to the bow stroke, and making it easier to depress the string with the fingers of the left-hand.

[1]These are strings made purely of gut, without the metal winding found on (more) modern strings.

Oliver Webber explains the transformation of the instrument throughout the baroque era and the accompanying advances in repertoire. Particularly in relation to the G-string he notes: 'we know that the wound G string became increasingly common on violins towards the middle of the 18th century, and we find that in the second half of the 18th century, composers were writing music that could ONLY be played with a wound G string' (Webber, 2013). For clear and consistent pitch-content for articulations executed on this string, one must move the bow especially slowly (due to the slower response-time of the thicker string) with neither too much nor too little pressure: any deviation from this will result in a high noise-to-pitch ratio. As we set out to explore the timbral characteristics of the instrument and all of its foibles, the exacting personality of this particular string was important. The extreme detuning intensified these aberrations, thus providing us with our 'roughened canvas'.

In preparation for a performance of *bet denagel*, the instrument is further fertilised for the germination of glitches via a severe scordatura (shown in figure 1), which is then exaggerated by the following indication from the score:

> *[…] all four strings should be tuned down additionally (retaining their intervallic relationship in minor 6ths) to the lowest pitches possible on the instrument (i.e. the lowest possible pitches that maintain 'safe' tensional support of the bridge). The score is then read as if the pitches above were employed, the sonic result being automatically transposed.'* (performance instructions to *bet denagel*, pp.iv)

To avoid confusion, given the extreme scordatura and the necessary notational solution (as detailed in the above quotation from the performance directions), henceforth, roman numerals I - IV from highest to lowest in pitch will be used to refer to the strings of the violin.

When severely detuned in this way, the strings fail to hold stable pitch events, causing (for example) highly affective pitch deviations (essentially glissandi) away from the frequency notated in the score. In its detuned state, string-IV particularly exhibits quite severe pitch instability, meaning that an increase in bow pressure and speed results in the pitch being raised by up to approximately three quarters of a tone. As the string is shortened by the left-hand stopping the string in higher positions, this effect is actually lessened: the sonic result is thus not consistent throughout the instrument. In contrast, extremely quiet dynamics require such little pressure that the string will not be set into vibration, resulting in the predominance of the noise of the bow hair against the string, the pitch is only barely audible beneath it. In the case of passages to be performed entirely on the fourth string (figure 2) the dynamic behaviour also imposes an additional layer of pitch distortion, affecting the written pitches of the lower stave in an indeterminate manner. Practical considerations of this effect include the difficulty of practising this section 'in tune'. For the natural pitch affectation of the instrument to be structurally effective, the left-hand must obviously stop the indicated pitches accurately,

yet without a clear audible result, this is particularly difficult to monitor! One solution to this is to first prepare without the second layer of scordatura (i.e. with the violin tuned in 6ths, but without the overall detuning). From a practical perspective, this enables me to hear the pitches more clearly and to 'calibrate' my left-hand before introducing the additional disruptive layers.

In the same passage (figure 2), the tempo changes add their own layer of timbral manipulation. At slower speeds there is time to use the bow in such a way as to allow the string to 'speak' clearly (provided the dynamic allows for enough bow pressure). Faster speeds result in the pitch-to-noise ratio shifting in favour of the latter, resulting in the indeterminate array of squeaks and scratches or *performative glitches* desired in the composition's intension. The overall effect in this district allows for moments of lucidity within an environment of persistent disruption and subversion.

An additional facet regarding the disruptive potential of the ecological feedback from the instrument occurred when experimenting with passages of quadruple-stops (figure 3). It became apparent that certain left-hand configurations enabled all four strings to be bowed simultaneously, but only when in agreement with a correct lateral bow position, due to this and the innate curvature of the bridge. The left-hand hand-placement alters the angle of the string between the finger and the bridge, each chord requiring a different lateral placing of the bow for the quadruple-stop to sound cleanly. It became an interesting question as to how this facet might encorporated into the compositional methodology of the piece. The outcome was to allow consistent horizontal movement of the bow to 'search' for the optimal position, resulting in a different arpeggiation pattern for each chord.

It is from this perspective that timbral operation can begin to be applied as a potentially *destructive* force on the material to which it is imposed. It is a force defined by two dimensions, *erosion* (pitch-content omitted via pitch falters) and *accrual* (deviations, ornamental alterations to pitch content). In either direction, inconsistencies are introduced into the score object, damaging the internal coherence the original material may have held.

To that end, in its composition, the materials of *bet denagel* were created to hold extreme internal consistency. Whilst it is beyond the scope of this paper to detail the compositional mechanisms at play here, such consistency was achieved via statistically controlled processes, executed via computer software. As such, the materials can be considered to be internally consistent on a number of different parametric planes, including pitch and rhythmic content, alongside textural behaviours. Such statistically controlled approaches to consistency are henceforth referred to as *comportments* – and are applied to a number of layers in the composition here discussed.

A distinct attribute of *bet denagel* is the layout of the score: the composition can be considered as being constructed from twelve[1] individual panels of

[1]In addition, a single panel – referred to as the *landmark* - is boxed with dotted red lines. Whilst all districts may be executed multiple times in a performance of *bet denagel*, the

comportmental materials, referred to as *districts* (each delineated by a character from the Amharic alphabet). In performance, the following principal governs movement between districts:

> *'The twelve districts are interconnected via a network of lines (henceforth referred-to as 'paths'), colour coded for ease of reading. Once a given district is performed, the performer must move immediately to any district conjoined to it via a path of any colour. (For ease of reading, the available network paths are doubled at the beginning and end of the stave-notation to allow quick/efficient visual transition between districts)'*. (*bet denagel* performance instructions, pp. iv)

The resulting network of seven paths can be clarified by removing the musical material itself, simplifying the structure as a schematic (Figure 4). As such, a 4x3 grid emerges.

The terminologies of paths and districts are appropriated from the work of architectural psychologist David Lynch (Lynch 1960). Of particular interest was Lynch's notion of paths, defined as 'channels along which the observer customarily, occasionally or potentially moves, [such as] streets, walkways, transit lines, canals, railroads' (Lynch 1960 pp.47). Lynch proposes that paths carry a sense of individual identity or character, independent of that which surrounds them (districts, landmarks, etc.):

> *'That paths, once identifiable, have continuity as well, is an important obvious functional necessity. People regularly depended upon this quality. The fundamental requirement is that the actual track, or bed or the pavement, go through; the continuity of other characteristics is less important.'* (Lynch, 1960, pp.52)

The continuous identity of paths, perceived distinctly from their surrounding phenomena, is utilized as a structural grouping mechanism in *bet denagel*.

Each of the seven colour-coded paths (figure 4) (labeled with lower-case roman numerals) corresponds to a comportment of timbre or tempo, which is superimposed upon all districts through which the given paths traverse.

Vertical paths (i, ii, iii, iv) are defined by superimposition of four timbral comportments, each occupying one of four timbral modifiers possible on the instrument: (i) bow pressure – 'dynamics'; (ii) bow space – literarily the area of the bow allowed to be operative; (iii) lateral bow position, relative to the bridge; (iv) bow material – transitions between wood and hair.

Horizontal paths (v, vi and vii) are defined by comparable comportmental behaviors, now existing within the parameter of tempo-fluctuation. Three

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landmark may only be performed once. This serves a structural function within the composition, although its discussion is beyond the scope of this short paper.

comportments of tempo-fluctuation are used: the basic tempo (e = c.66) is either stable (vi), in a constant state of acceleration/deceleration (v) or effectively operating as abruptly terraced tempo changes (vii).

It will thus be noted that two path comportments, one timbral and the other tempo-based, affect each district. It is from this position of duality that the function of the tempo-fluctuations can be further understood. As well as providing a strand of comportmental material to group materials into discrete 'horizontal' paths, the tempo changes also interact with the timbral environments with which they intersect, as has already been discussed.

The issue of duality continues at a deeper compositional level. Just as the tempo/timbre comportments act as a grouping mechanism for the materials they conjoin, they also provide particular violences against those materials by invoking various glitch-*tropes*. Each timbral operand is conducive to different classes of glitch-trope: extremes of bow pressure can cause articulations to scratch or squeak whereas frequent changes of bow material affect on the audible spectrum of the sound (for example).

The particular use of tempo as a timbral modifier has two key implications for the performer. Firstly, as for the composer, knowing *what* sonic response the combined layers of disturbance will have, but not *when* leads to a constant state of exploration. This can be compared to a more typical approach where physical gestures are developed and practiced to achieve the desired/expected/located sounds (a more detailed discussion of this hierarchical reversal is reserved for the end of the paper). Another emergent issue concerns a conflict between the score and the performer herself. In order to amplify the destabilising effect of the instrument's timbral affects, the tempo deliberately pushes the material past the point where the sonic response is stable. Unlike the other comportments, such as the lateral bow position, where the timbral modification is implicit, extreme tempo indications are not normally associated in such a deliberate way with timbre. There are also consequences for the notion of performance as 'perfection' (the reference to Martin is deliberate). For a classically trained performer there is a constant pursuit of a 'perfect' result, whereas the space induced by *bet denagel* is deliberately designed to induce performative outcomes normally considered as faults.

An additional output of this scenario also provokes the performer into asking the following questions: where is the boundary between the difficult and the impossible? How close can I get to what is asked for in the notation: what are the limitations of the instrument and what are the limitations of my technique? As the material is contorted by its tempo fluctuations, the music-in-performance begins to push at the threshold of impossibility. As a result, the performer will get closer to the notated ideal but never reach it, as the restrictions imposed by the instrument and the physical capabilities of the human body prevail. A full discussion of this issue of impossibility is beyond the scope of this paper but it is central to the layer of indeterminacy introduced by the tempo changes.

In a paper detailing their collaboration, Fabrice Fitch and Neil Heyde identify '[t]he authority of the composer…so firmly rooted in the culture of Western art

music…' (Fitch and Heyde, 2007 pp.73). A typical trajectory for the composition and performance of a piece of music would be for the composer to 'hand over' the score. With such a handover, the responsibility of interpretation and finding physical solutions to notated musical ideas falls to the performer. What then is the course of action when the notation does not fully describe the sound outcome of the piece, but prescribes actions that create additional sound layers (cracks, squeaks, falters, glitches) not present in the score? (See Kanno, 2007 for a full explanation of descriptive versus prescriptive notation) As a performer, what is my role in the performance of such a piece?

I (as the performer) have found that a typical interpretative approach (where physical gestures are developed to achieve specific sounds) does not work as a strategy with regard to this piece. My ingrained classical training, which leads me to try to find solutions to conflicting notational directions, is now rendered inappropriate, as the instigation of timbral glitches (the direct result of such a conflict) is integral to this work as a whole. Rather I must step back and allow the instrument to become a protagonist. My role as the performer is not one of control but subservience: I am a listener, a member of the audience. I provide the physical impetus as directed in the score, and listen to how the instrument responds. The challenge is to prevent myself from interfering. As the performer, I am an observer of an unfamiliar space working my way arbitrarily through the architecture of the score. I am disorientated, fully engulfed in my surroundings. The microstructure - the exploration of the timbre - reflects this.

The collaborative work in the creation and performance of *bet denagel* has involved the exploration of the instrument as a metaphorical canvas. It is an exploration that embraces the likeness of the physical texture and operative function of a literal 'visual' canvas and applies this model to the gut strings of the violin. Understood in this way, the canvas may now be prepared - detuned - enhancing the timbral characteristics already present in the instrument.

In a sense, the relationship between the instrument and the performer now becomes an ecology into which musical material can be introduced and manipulated by its instrumental environment. The performer's role is not to perfect the sounds but to provide a physical context for the instrument itself. Our collaborative process involved an exploration of this environment, allowing the composer to test the reaction of different music materials in these conditions, in order to understand how these could be successfully manipulated in the piece. The process allowed the performer to become more familiar with the sonic responses of various physical gestures and to become comfortable with an explorational performative approach which involved both the movement through an indeterminate structure and the discovery of undefined timbral identities.

Like Agnes Martin's pencil-on-canvas work, *bet denagel* calls into question the very definition of 'perfection'. The exploration of the sonic unpredictability inherent in the instrument resembles the description of a painting as "far from being perfect" (Martin, 1991, pp.15). The nature of perfection itself takes on a new meaning in this environment: the normative roles of cracks, squeaks and pitch falters as 'error' are now re-appropriated as central and necessary

concerns of the compositional mechanism. In a sense, imperfection is the perfection of this environment. This itself is mirrored in the learning process: the performer is in constant pursuit of 'perfection' which can never truly be achieved. The introduction of timbral indeterminacy forces us to question the musical role of the performer: as a supporter to the instrument-as-protagonist and as a listener.

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Figure 1. *Matthew Sergeant; bet denagel (2013); scordatura*

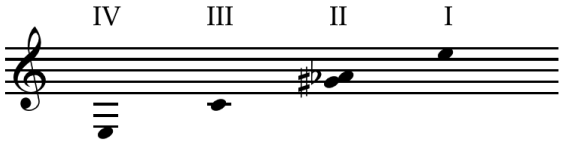

Figure 2. *Matthew Sergeant: bet denagel, ʊ -district, bar 1 (excerpt)*

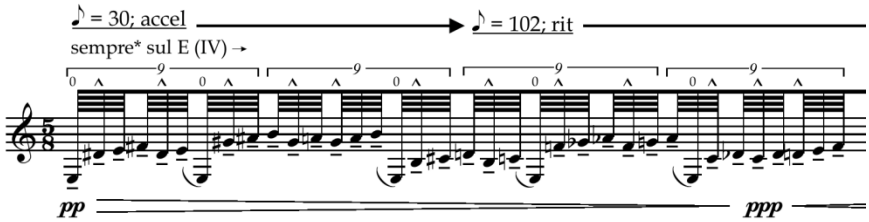

Figure 3. *Matthew Sergeant; bet denagel (2013); ñ -district; bars 1-2*

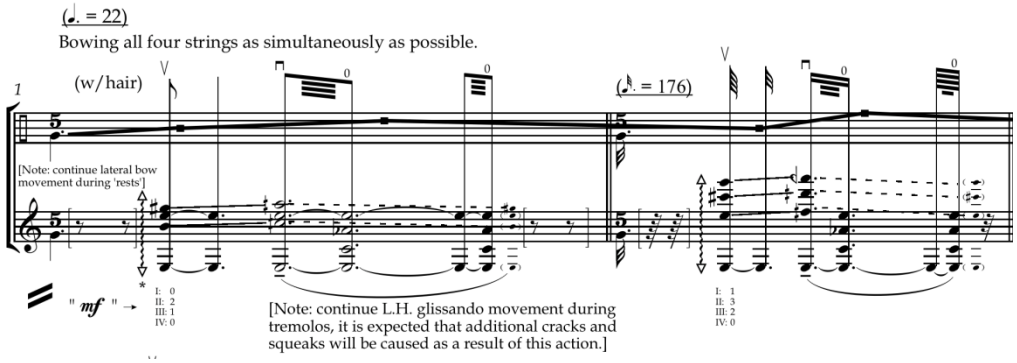

Figure 4. *Matthew Sergeant: bet denagel (2013): Diagram of score-design and structural paths*