Technical Commentary

PhD Submission Portfolio

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Some ten years ago, in 2005, I was fortunate enough to meet the French composer and conductor Pierre Boulez. This brief encounter set me on a path of discovery, fuelled by the desire to understand what motivated him as a composer and as a musician generally. After much research into Boulez’s works and writings, including his texts published as Penser la musique aujourd’hui (Boulez, 1963), I – perhaps inevitably – found my way to the pedagogy of Boulez’s principal teacher, Olivier Messiaen, whose influence on my subsequent work has been of a profound order.

I knew Messiaen’s music both as a listener and as a performer, having played the piccolo trumpet part in his Turangalîla-symphonie (Messiaen, 1949) some years earlier. Nevertheless, my in-depth study of his Traité de Rythme, de Couleur et d’Ornithologie (Messiaen, 1994–2002), which in a sense summarises the courses which he gave during his career as Professor at the Conservatoire de Paris, deepened my knowledge of his music in welcome, but unanticipated, ways.

For some years I therefore oscillated between the parallel worlds of Boulezian post-serialism and Messiaen’s modal and rhythmic thinking, without feeling entirely comfortable in either camp. It was therefore with much excitement that I discovered the work of the French Spectral School, and chiefly, the composer Gérard Grisey.

In many respects Grisey’s approach offered me the means to tread a middle path between Boulez and Messiaen. Spectral composition seemed to me to be capable of embracing the urge for continual discovery and renewal of the former whilst offering the means to create harmonies related closely to the chordal language of the latter, presenting a wide range of possibilities for future research and innovation.

I felt immediately comfortable with this attitude to composition, and pieces for saxophone quartet and for solo trumpet with string quartet followed quickly. My work since this point, represented by the present submission portfolio, has been underpinned by a spectrally-influenced approach, which coexists with a number of other techniques.

The accompanying thesis addresses a similar preoccupation with post-spectral composition as manifested in the works of the French composers Marc-André Dalbavie and Bruno Mantovani, and
the Finn Kaija Saariaho. Each of them, like me, employs spectral principles to a greater or a lesser degree, alongside chosen techniques that allow them to articulate their music. It is therefore with reference to these and other selected composers that I propose to discuss the music contained within the present portfolio.

The pieces contained herein range from solo pieces (...à côté... for solo alto flute and Sentiment(s) d’abandon II for solo violin), to chamber works (Duet² for trumpet and trombone (with piano resonance) and my string quartet movement) and finally to larger-scale works for ensemble and for chamber orchestra (Carillons et Mélodies, Sentiment(s) d’abandon III and my Chamber Symphony). The techniques in evidence are centred on what Grisey alluded to as the ‘spectral attitude’¹, or in the words of Dalbavie, la pensée spectrale (‘spectral thought’),² and yet as mentioned above none of the present works are examples of ‘pure’ spectral composition. Instead, spectral methodology coexists with a range of other techniques, resulting in what may be described as a ‘post-spectral’ approach to composition.

Note

All musical examples are in C unless otherwise stated. All translations are the author’s own. Microtonal notations are clarified in Appendix 1.

¹ ‘Spectralism is not a system... it's an attitude. We consider sounds, not as dead objects that you can easily and arbitrarily permutate in all directions, but as though they were living objects which are born, live and die.’ [“Le spectralisme n’est pas un système... c’est une attitude. Nous considérons les sons non comme des objets morts que l’on peut aisément et arbitrairement permuter dans toutes les directions, mais comme des objets vivants qui naissent, vivent et meurent.”]. (Grisey, 2008: 265-266).

² ’...in a way I wanted to expand spectral music into spectral thought!’ [“...j’ai en quelque sort voulu élargir la musique spectrale à la pensée spectrale!”]. (Dalbavie, 2005b : 25).
The Ideal versus the Practical

Certain elements of the included pieces make reference in one or more respects to the Western Classical Tradition. For example, all are scored for conventional acoustic instruments, and I refer consciously to idioms such as the string quartet and the symphony, as well as to the genre of the concerto. Conversely, some of these works employ procedures and methods which are less orthodox and I am aware that, at times, the notational demands that I make on the performer might suggest a utopian attitude on my part.

A good example of this is in a microtonally-notated work such as the quarter-tone version of ...à côté... for solo alto flute. At the notated speed, for example, the microtonal intervals are likely to be challenging for inexperienced performers, bringing into question the practicality of such a piece and the consequence that this notation might put the piece beyond the reach of some players. There is therefore a need for the composer to consider his position with regard to the use of quarter-tones for the work’s harmonic and melodic articulation.

I have therefore found that it is necessary to consider carefully the implications of my notational decisions when composing a work. Whilst I am interested in the use of microtonal notation as a means to control the harmony that I employ, I do accept that an expectation of perfectly accurate reproduction may sometimes be unrealistic. This may be due to inexperience on the part of the performers, or to the impracticality of producing certain pitches at speed on instruments which were simply not designed to do so.

Ultimately it is important to accept a certain measure of pragmatism with regard to the microtonal notation of a work. If one is composing for a specialist ensemble, comprising performers whose expertise includes the use of extended techniques and unconventional tuning systems, it may be reasonable to demand a high level of intervallic complexity. Under such conditions, the use of microtonal intervals will allow the composer to aim for a more precisely defined result. Furthermore, the chance of a successful outcome will be increased if one includes information (such as the microtonal flute fingerings in the preface of the ‘quarter tone’ version of ...à côté...) to assist the performer in their preparation. Whilst microtonal notation risks putting a given piece beyond the reach of non-expert performers this may, if the desired results warrant the greater demands, be deemed acceptable.

Conversely, when writing for non-specialist performers it seems reasonable in certain contexts either to request quarter- or sixth-tone intervals, whilst accepting a measure of inaccuracy, or even to prepare an alternative version of a piece, such as the ‘semitone’ version of ...à côté... in the
present portfolio. In this manner a compromise may be reached which allows for the pursuit of one’s compositional ideals whilst remaining realistic with regard to the performer’s engagement with the piece. The results obtained in either case may come acceptably close to the spirit of the work, and the ‘compromise’ version in semitones still stands a good chance of achieving something close to the desired effect.
**Harmony/Harmonicity**

One of the most attractive aspects of spectral composition for my work lies in the dimension of harmony. The discoveries of the Spectralists resulted in a greatly expanded range of possibilities and I have found it essential to consider these and to aim to arrive at a position where my harmonic language combines coherence with expressive potential.

In the earliest work in the present portfolio, my string quartet movement from May 2013, I relied to a high degree on what might be described as ‘pure’ spectral harmonies. For example, the first fully-defined harmonic area of the piece, at figure [B], comprises notes relating to the third, fourth, fifth and seventh partials of a fundamental F natural (87.31 Hz). These are approximated to the nearest sixth-tone and played by the second violin and ‘cello, whilst the first violin and viola play descending lines on pitches drawn from the harmonic series. These descending lines are employed horizontally, which is to say, modally (Ex.1). 

![Ex.1 String Quartet (i), letter [B]](image)

Similarly, in my Chamber Symphony harmonic constructions are frequently analogous to the harmonic series, such as the chord heard at figure [2] (Ex.2a), which corresponds closely to a harmonic series with a fundamental G (24.5 Hertz) approximated to the nearest semitone (Ex. 2b).

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3 In equal temperament, respectively, C₄, F₄, A₄ and E-flat₅ lowered by a sixth of a tone.

4 The derivation of modal materials from the harmonic series is discussed below.
Both of these examples demonstrate the generation of harmonic materials based on approximations of the natural overtone series and, by implication, chords which contain a high degree of harmonicity. Elsewhere in my work there are vertical objects which contain ‘inharmonic’ elements. An extreme example may be found at bar 39 of Carillons et Mélodies, in the form of a chromatic cluster in the bass register. Due to the natural overtone series’s construction (larger intervals in the low register, becoming progressively smaller with increasing frequency), this cluster negates any potential reference to a harmonic spectrum by the upper-register chord against which it sounds. The effect, therefore, tends towards inharmonicity (Ex.3).

The term harmonicity, as discussed in the opening chapter of the accompanying thesis, describes the degree to which a harmonic object conforms to the natural overtone series. Thus a chord with component pitches whose frequencies are all exact multiples of a given fundamental may be said to be harmonic, and is likely to be perceived by a listener as essentially consonant. Conversely, a chord with at least one pitch whose frequency is not an exact multiple of a given fundamental may be said to be inharmonic and is likely to be perceived as (to some degree) dissonant. In each of the present examples, it should be understood that the harmony can only ever claim to be an approximation of perfect harmonicity. Firstly, musical notation in semitones, quarter tones or sixth tones claims only to approximate the harmonic frequencies concerned, and secondly each instrument of the ensemble possesses its own harmonic overtone spectrum, making the result much more complex than the notated music. Nevertheless, as a compositional conceit which permits the generation of chordal objects, and within the boundaries of the above caveat, the notion of harmonicity remains valuable.
The potential to create a wide range of vertical objects, as demonstrated by the above examples, offers a nuanced expressive palette, and increases the possibilities for the articulation of a work’s form through its harmonic language. As the accompanying thesis demonstrates, this is a preoccupation shared by a number of post-spectral composers. It is also one which, despite certain differences of approach, has been enriched to a high degree for my own work by my study of the music of Dalbavie and Saariaho.  

**Harmonic Functionality**

The functionality of the harmony which I employ is also of great importance to my work. Without wishing to rely on common-practice tonality, there is generally a prevailing axial pitch or surrogate tonic present during a passage, section or even an entire piece. This might take the form of a recurring idea, or of a sustained pitch or harmonic area. Once more, there are parallels here between my own compositions and the works of Marc-André Dalbavie. As he puts it:

...one can hear very clearly in my music zones of sonic polarity, which function a little like centres of gravity for resonance. These poles are in fact notes, pitches, which serve as the basis for the construction of harmonic fields, textures and melodies.  


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6 Saariaho’s *Laterna Magica* (Saariaho, 2008), analysed in the accompanying thesis, offers a good example of a work whose form is articulated by a range of sophisticated harmonic constructs. Likewise, Dalbavie’s *Sinfonietta* (Dalbavie, 2005a) demonstrates a complex attitude to harmony which has informed my own practice.

7 “[...‘on entend très nettement dans ma musique des zones de polarité sonore, qui fonctionnent un peu comme des centres de gravité de résonance. Ces pôles sont en fait des notes, des hauteurs, qui servent de base à la construction des champs harmoniques, des textures et des mélodies.’].”
In my string quartet movement, for example, there are three main harmonic centres which are juxtaposed. These are again derived from the harmonic series, and rest upon implied fundamentals of F natural (87.31Hz), B natural (61.74Hz) and D natural (36.71Hz) (Ex.4).

![Diagram of harmonics]

Ex.4 String Quartet (i), bars 2-4: Juxtaposed harmonic centres on implied fundamentals F, B and D natural.

This juxtaposition, when allied to the repetition of harmony built upon an overtone spectrum on F (see Ex.1) at strategic points within the work lends this passage the function of a ‘tonic’, and creates a kind of functionality within the piece. This occurs in a manner similar to Saariaho’s use of certain harmonic materials as surrogate tonic chords, serving to anchor the music on a given area as discussed in the accompanying thesis.

Likewise, in Carillons et Mélodies the pitch G natural is frequently reinforced as a pitch axis not unlike one of Dalbavie’s ‘centres of gravity of of resonance’ (see above). The piece opens and closes on this pitch, and certain passages introduce a varied harmonic discourse which nevertheless pivots around material rooted on fundamental G naturals. An example occurs at the beginning of the fast central section. At bar 43 the music reaffirms the G natural of the opening section, before moving to E flat at 46 for four bars. At bar 50 there is then a return to G (Ex.5).
It is, however, in my Chamber Symphony that I found the means to create the harmonic language for which I had been aiming. More specifically, for the first time I found a way to create a bridge between the functionality of common-practice tonal harmony and the harmonic richness of spectrally-generated materials. The piece’s seven sections are based on the fundamental pitches shown below, creating a harmonic progression which, in its downward tertiary steps and its return to an axial G natural before the final tritone descent to D flat contributes to the articulation of the work (Fig.1).

<table>
<thead>
<tr>
<th>Section</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar number</td>
<td>1</td>
<td>16</td>
<td>55</td>
<td>95</td>
<td>109</td>
<td>207</td>
<td>215</td>
</tr>
<tr>
<td>Fundamental pitch</td>
<td>G</td>
<td>G</td>
<td>Eb</td>
<td>B</td>
<td>Ab</td>
<td>-</td>
<td>G→Db</td>
</tr>
</tbody>
</table>

Fig.1 Chamber Symphony: Fundamental pitches in sections 1-7

On a more detailed level, such as in the Chamber Symphony’s fifth section, there are passages where harmonic areas are heard in quick succession. Despite their spectrally-generated pitch content, these chords interact in a manner analogous to a common-practice chordal progression. Between bars 134 and 142, for example, the harmony moves from an implied fundamental A flat, to E natural, to C natural, before returning to A flat. These chords, with their tertiary relationships,
generate what might be termed a ‘cycle of thirds’ which returns to, and therefore serves to reinforce A flat as the axial pitch for this section of the piece (Ex.6).

Combination Tone Harmony

Another method which the Spectralists employed for the generation of harmonic materials involved so-called sum- and difference-tones. These are produced through the addition and subtraction of the frequencies of selected generative pitches, as discussed in the introduction to the accompanying thesis. In other words, when at least two pitches are sounded simultaneously there appear, theoretically, further frequencies which are caused by the addition and subtraction of the frequencies of the two generative pitches. Whilst this is not a technique which I have chosen to employ extensively, it is particularly significant for one of the works in the present submission. Duet² is, in many ways, a study in combination tones, since the two instruments, a trumpet and a trombone, are employed both as solo instruments and as generators of combination tones.

As an example, at the opening of the piece the two instruments are in unison on a B flat₃, before the trombone moves to an A flat₃ inflected downwards by a sixth-tone. The intended theoretical implication in the second bar is therefore of a spectrum with a fundamental B flat₀ (29.14Hz) (Ex.7).⁹

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⁸ As described in Part 1 of the accompanying thesis, Gérard Grisey and Tristan Murail developed this technique to a high degree of complexity in their ‘pure’ spectral works of the early 1980s.
⁹ The trumpet part in Ex.7 is transposed.
Later the solo instruments perform lip glissandi which aim to imply the presence of harmonic spectra. In bars 21-23, for example, the implied spectrum has a fundamental of G flat. (Ex.8).  

As well as the solo trumpet and trombone, the piece includes a part for a piano, shown above, which is employed as a ‘resonator’ in a manner similar to the piano resonance in Berio’s *Sequenza X* for

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10 The trumpet part in Ex.8 is transposed.
trumpet (Berio, 1984). This is achieved by the silent depression of selected keys, or the sustain pedal, allowing some of the strings of the instrument to vibrate in sympathy with the pitches produced by the trumpet and trombone. The intention is therefore that this will prolong the resonance of pitches sounded by the soloists, whilst potentially rendering some combination tones, and harmonic fundamentals, more audible via sympathetic resonance. Whilst the microtonal pitches notated in the brass parts cannot of course be produced on the piano, an effect of sympathetic resonance may still be caused in undampened strings, creating what Grisey called ‘shadows’: ‘I propose to name the combination of differential and additive sounds...: the shadow of sound’ (Grisey, 2008: 103).  

Whilst Duet² has proved successful in performance, the technique of combination tone generation is not one which I have since felt useful to pursue further. The experience gained from the results obtained in this piece remain valuable for my continued work, but I have become rather more interested in the construction of a functional, quasi-tonal harmonic language, as discussed above.

Register/Density

It might be daunting, as a spectrally-influenced composer, to be faced with the possibilities for the creation of instrumental textures. In theory, if not in practice, there is an infinite range of outcomes and, even discounting impractical solutions, the number of available harmonic objects can be overwhelming.

There is therefore a need for the composer to address the density of a work in order that a high level of coherence may be achieved. In what may be considered a ‘post-spectral’ aesthetic, there is a danger of too little variety in the texture of a given work. One of the guiding principles of spectral composition was that the form of a work should be conceived as a unified whole and, as a consequence, there exists the necessity for a high degree of continuity. It is therefore unusual for a spectral composition to feature ruptures in its discourse, and such a piece will, in general, proceed smoothly from section to section.

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11 ["je propose de nommer l’ensemble des sons différentiels et additionnels... l’ombre du son."]
12 It is interesting to note that I am not alone in leaving this technique aside: Saariaho, Dalbavie and Magnus Lindberg seem, likewise, to have moved away from its use in favour of alternative methods of chord generation. It would appear that (in acoustical composition at any rate) the generation of harmonies by means of combination-tone calculation is a technique which has remained firmly within the ‘pure’ spectral approach to composition.
A good example is given by Saariaho’s *Laterna Magica*, examined in detail in the accompanying thesis. The work, which lasts approximately twenty minutes, is theoretically divisible into constituent sections, and yet a listener is much more likely to perceive the work as a single unified whole. It is also unusual to find an overtly expressed regular pulse governing large sections of a piece. It is therefore important for the composer to create a variety of textures so that the work’s forward progress may be assured.

In my own case, I have found it useful to juxtapose harmonic and textural elements to aim for a varied discourse, controlling these by means of orchestration and dynamics. As an example, the third section of my Chamber Symphony features a continuous ‘carillon’ on the resonating instruments, against which the wind, brass and strings perform a variety of gestures which explore contrasted registers (Ex.9).
Ex. 3 Chamber Symphony, bars 62-65: 'Resonant carillon' and wind, brass and string gestures
A more complex textural discourse is in evidence in *Sentiment(s) d’abandon III*, where the tendency is towards modernist – one might even say Boulezian – dialectics. This juxtaposes, on the one hand, the solo violin and the ensemble, and on the other, sustaining instruments and resonating instruments to create the interplay of registers and densities of harmony which animates the piece. Arguably, therefore, despite its reliance on spectrally-derived pitch material, this piece is perhaps less typically ‘spectral’ in its surface detail and in a generalised sense may call to mind the often complex textures of later works of Boulez such as ...explosante-fixe... (Boulez, 1991/1993) or *Dérive 2* (Boulez, 1988-2006/2009) (Ex.10).
There are also passages in my music where a given register is purposefully excluded, such as in my string quartet movement. In bars 2-3 (figure [B]) the lowest sounding pitch is C₄, for example. Here the music, due to its lack of bass frequencies, takes on a suspended quality, in contrast with the following passage which is pulled into the low register by the *scordatura* E ⅓ flat, on the ‘cello (Ex.11).

One of the most arresting passages from any of the works in the submitted portfolio occurs at bar 178 of my Chamber Symphony. This takes the form of a unison melody, certain sustained pitches of which are harmonised. After the harmonic richness of much of the work to this point, the change in texture at this point is striking, and the new declamatory style serves to underline this passage’s importance as the climax of the entire work (Ex.12).
Structure

In a post-tonal context, outside the paradigm of common practice tonal harmony, it is necessary for the composer to find the means to articulate a work’s structure in alternative ways. For example, as discussed in the accompanying thesis, Marc-André Dalbavie relies on what he describes as a ‘polyphony of process’ in his Sinfonietta (Dalbavie, 2005a), whilst in Laterna Magica (Saariaho, 2008) Kaija Saariaho adopts a quasi-cinematographic approach with surrogate ‘tonic’ chords. In my music, in tandem with my similar interest in the creation of a type of harmonic functionality, I have sought to employ texture and register, as well as tempo, to achieve this.

In my string quartet movement, for example, the repeated return to the harmonic area on F, discussed above, reinforces the work’s refrain-like formal structure and effects a sense of arrival on a tonicised harmonic region. Meanwhile, in Sentiment(s) d’abandon II and III there are gestures, such as the jeté figures of the central section, which are heard on several occasions, and which often serve as formal markers to introduce new phases in the work’s progress (Ex.13a, b and c).

Ex.13a Sentiment(s) d’abandon II and III: jeté figure introducing beginning of fast central section [bar 21].

Ex.13b Sentiment(s) d’abandon II and III: jeté figures marking a tempo [bar 49].

Ex.13c Sentiment(s) d’abandon II and III: jeté figure at a tempo after cadenza [bar 70].

13 Boulez, borrowing from acoustical terminology, would call these ‘signals’. For a fuller discussion of Boulezian terminology, see Goldman (2011).
The structure of my Chamber Symphony is rather more complex. There are seven sections at varied tempi, each of which relies, as discussed above, on a given fundamental as its axial pitch or ‘tonic’ (Fig.2).

<table>
<thead>
<tr>
<th>Section</th>
<th>Axial pitch</th>
<th>Tempo (crotchet pulse in bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>G</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>E flat</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>A flat</td>
<td>120</td>
</tr>
<tr>
<td>6</td>
<td>A flat - G</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>G - (F-E flat-D) - D flat</td>
<td>30</td>
</tr>
</tbody>
</table>

Fig.2: Chamber Symphony: Tempi and axial pitches in sections 1-7

As the above table shows, each tempo is related via simple ratios to the others, facilitating metric modulation across the sectional boundaries, and as discussed above there is a formal arch in terms of the harmony. In addition there are frequent returns to selected material which lend the work a degree of coherence in terms of its formal structure. An example is the first violin melody from bars 8-10 of Section 1, which reappears, modified yet retaining the same basic contour, at various points throughout the work, creating a heightened sense of unity between discrete sections (Ex.14a, b, c and d).
Rhythm

Much spectrally-influenced music aims to explore harmonic areas in detail, often requiring that a chord be heard over an extended period of time. This can therefore lead to a sense of stasis which risks impeding the forward motion of the work.

It is for this reason that it has been vital for me to consider my approach to rhythm, and to create a range of possibilities for the temporal aspect of my music. Whilst there are passages of a high degree of stasis, such as at the opening of my Chamber Symphony, I have sought to contrast these with music displaying a greater level of rhythmic complexity. Certain passages of Section 2 of the same piece demonstrate this in their simultaneous employment of several types of durations, such as the string gesture from bar 30, shown in Ex.15.
Musicologist Célestin Deliège notes, ‘If [...] spectral music] lends itself marvellously to the treatment of chords..., it fails where counterpoint is concerned. It is perhaps difficult to create true polyphony whilst retaining the morphology of harmonic entities.’ (Deliège, 2011: 883). It is with the intention of addressing this difficulty that passages such as the above appear in my work. It is, however, interesting that, due to the frequent extended harmonic areas in my music, there may often remain a general impression of slowness in a given piece. Passages of greater rhythmic complexity might therefore give the impression of elements of the harmony being brought to the fore, rather than of a rapid overall pulse. This is a trait that is notable in much spectrally-influenced music, such as in Saariaho’s *Laterna Magica* (Saariaho, 2008), examined in the accompanying thesis. This provides an excellent example of a work whose surface detail is of a highly complex rhythmic order but whose global impression is of gradually shifting textures.

**Melody**

Melodic writing was an area which the Spectralists of the 1970s and 1980s were largely trying to circumvent in their work. Grisey and Murail were rather more concerned with the generation of musical narratives through the manipulation of, for example, harmonicity and timbre. Nevertheless, by the end of his life Grisey for one was beginning to consider the matter somewhat differently. In his final article ‘Did You Say Spectral?’ he listed a series of potential areas for future exploration,

\[14\] "Si [...] la musique Spectrale] se prête à merveille au traitement de l’accord..., elle ne parvient pas à l’étalement contrapuntique... [I]l est peut-être difficile de créer une vraie polyphonie en sauvegardant les morphologies des entités harmoniques.".
including, as he put it, ‘The establishment of new scales and – eventually – melodic reinvention.’\(^{15}\) (Grisey 2008: 123). As discussed in the accompanying thesis, post-spectral composers are therefore required to consider carefully their relationship with melody. The music of each of the composers chosen as case studies contains melodic writing, and each has evolved a personal approach to the subject. Likewise I have found it essential to arrive at a personal standpoint on the matter, since the notion of melody, potentially embracing both the concept of a linear musical object and the principle of thematic statement, remains of great significance for my work. This occurs both locally, exploiting the expressive potential of melody, and at the structural level, articulating a musical discourse through melodic repetition and thematic development as discussed above (see Ex.14a-d).

I therefore derived a ‘harmonic mode’ from the natural overtone series in a manner similar to that employed by Grisey in his later works, including L’icône paradoxe (Grisey, 1996) and Quatre chants pour franchir le seuil (Grisey, 1998). By extracting odd-numbered partials from the spectrum and collecting them into a horizontal mode I was able to generate a chromatic ‘pool’ of available pitches. This would permit the creation of melodies and counterpoint whilst acknowledging the harmonic function of each member of the mode. Thus, when sounded above a given fundamental, even disregarding the octave in which it appears each pitch/partial retains its character to a large degree, whilst the music gains greater melodic freedom and flexibility (Ex.16a and b).

![Ex.16a Harmonic spectrum on C (32.7Hz) (to 32 partials, approximated to the quarter tone).](image)

![Ex.16b Odd-numbered partials of harmonic spectrum on C, rearranged and collected within one octave.](image)

\(^{15}\) [“Etablissement de nouvelles échelles et – à terme – réinvention mélodique.”]
This approach is in evidence in each of the works in the present portfolio. It is demonstrated clearly, for example, by the trumpet melody which appears at bar 23 in Section 2 of my Chamber Symphony. Each pitch in this melody corresponds to a harmonic series with fundamental G (49 Hz) approximated to the nearest semitone (Ex.17 a and b).

Furthermore, in Section 2 of my Chamber Symphony, the woodwind often perform in five-part polyphony, which acknowledges the prevailing spectrum in its pitch content. Thus in bar 27, for example, the harmony is represented by a spectrum with a fundamental G natural, sustained by the strings and brass. The bassoon, meanwhile, is assigned B, C sharp, D and F natural (analogous to octave transpositions of partials 5, 11, 3 and 7 respectively of a spectrum on G) and the bass clarinet the same pitches plus G natural (partial 1, or the fundamental). The clarinet adds an E flat (approximating the 13th partial) and the oboe an A natural (the 9th partial). Finally, the flute is given an F sharp, which implies the 15th partial (Ex.18).
It may be noticed that the flute ends bar 27 with a collection of harmonically ambiguous pitches which, taken collectively, appear ‘foreign’ to the prevailing G spectrum. In fact, although the pitches E flat, D flat and B flat could arguably be viewed at partials 13, 11 and 19 of a spectrum on G, the succeeding chord on a fundamental E flat qualifies these rather as octave transpositions of partials 1, 7 and 3 of this new harmony. Therefore these pitches serve to draw the music forward in a manner similar to anticipations in common-practice tonal harmony.

I have also taken great care to notate melodic notes so as to emphasise significant pitches. In the unison melody which closes Section 5 of my Chamber Symphony, there occur several B double-flats, such as in the trombone part in bar 182. My intention here is to privilege A flat as this section’s axial pitch, or ‘tonic’, and therefore to employ these B double-flats as ‘flattened supertonics’ in a manner implying a relationship with Neapolitan chords in tonal theory, or with tritone-substituted dominant chords in jazz harmony (Ex.19).
Whilst each might have been feasibly notated as an A natural, their appearance as B double-flats makes clear their actual harmonic and melodic identity, reinforcing A flat as the prevailing ‘tonic’ and contributing to the harmonic articulation of the work.

**Liminality, Process (and Serialism) – a personal view**

As a composer who acknowledges a spectral influence on my work it is important that I consider my relationship to certain techniques and principles which were significant elements of, in particular, Grisey’s approach.

As noted in the accompanying thesis, Grisey was dissatisfied with the very term ‘spectral’, and proposed several alternatives. One of these was the term ‘Liminal’ music. The notion of liminality, derived from the Latin ‘Limén’, or ‘threshold’, concerns itself with the boundaries between objects. Thus, for Grisey, the transition between two harmonic areas, or spectra, creates an interim state in which, he hoped, the listener would discover what lay between the two principal objects.

In a sense, this concept may be applied to nearly any work of art in which two discrete elements are juxtaposed. In musical terms, whenever a composer moves from one chord to another, or notates two contrasting rhythms, a liminal region is created by the difference between the two. In this manner there must exist some level of liminality within my own work, as there must in the music of any other composer.

For my work, however, this approach to understanding the narrative of a work remains purely of musicological interest. In contrast to Grisey’s methodology, I do not find myself concerned with the deliberate creation of liminal spaces as a compositional principle or technique, but rather as a consequence of the compositional process.

Likewise, the notion of process as a compositional technique is not one which forms a major part of my compositional methodology. As with liminality, all composers must engage with the actual process of composition, and in a sense all works create processes as they are performed. However, the spectral aesthetic is determined to a large degree by its processual element, such as the opening passage of Grisey’s *Partiels* (Grisey, 1976) with its increasing inharmonicity.¹⁶ It is therefore important that a spectrally-influenced composer should consider the notion of musical process, and its significance for their own music. In my case, in general the music which I write is not concerned with the deliberate setting in motion of processes, but rather with the juxtaposition of elements to create a narrative.

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¹⁶ Described in the accompanying thesis.
This is in stark contrast to the approach of Marc-André Dalbavie, whose work is based upon a foundation of processual thought. As noted above, Dalbavie has coined the term ‘polyphony of process’ to describe his method, which is exemplified by his *Sinfonietta* (Dalbavie, 2005a), discussed at length in the accompanying thesis.

Perhaps the closest that my own work comes to the deliberate use of a musical process for the generation of material is in the ‘resonant carillon’ in Section 3 of my Chamber Symphony, discussed above (see Ex.9). Here the harmonic background is expressed as a ‘carillon’ on the piano, harp and percussion, cycling through prime values which augment and diminish over a range of 1 to 7 quavers (Fig.3)\(^\text{17}\)

\[\begin{array}{|c|c|c|c|c|c|c|c|c|}
\hline
& 1 & 2 & 3 & 5 & 7 & 5 & 3 & 2 \\
\hline
Glockenspiel & 1 & 2 & 3 & 5 & 7 & 5 & 3 & 2 \\
\hline
Harp (R.H.) & 2 & 3 & 5 & 7 & 5 & 3 & 2 & 1 \\
\hline
Harp (L.H.) & 3 & 5 & 7 & 5 & 3 & 2 & 1 & 2 \\
\hline
Piano (R.H.) & 5 & 7 & 5 & 3 & 2 & 1 & 2 & 3 \\
\hline
Piano (L.H.) & 7 & 5 & 3 & 2 & 1 & 2 & 3 & 5 \\
\hline
\end{array}\]

Fig.3 Chamber Symphony: Piano, harp and percussion ‘carillon’: prime value duration cycles

Despite the processual aspect of this passage however, such an approach remains rare in my work to date. Whilst the processes at work in the music of Murail and, especially, Grisey are of great interest to me as a musicologist, as the present portfolio demonstrates, I prefer to employ alternative means in order to animate my work.

Finally, it is worth noting that as a composer who considers himself to have been influenced by Pierre Boulez, it is perhaps surprising that my music relies so little on the techniques, such as pitch-class multiplication, that define his aesthetic. Aside from in the cadenza-like solo passages in my string quartet movement, which employ a limited number of permutations of a four-note set, I make

\(^{17}\) See also Ex.9 above, which shows the carillon in context, alongside wind, brass and string gestures.
no use of post-serial procedures for pitch generation in any of the works included in the present portfolio.

This is not to say that I have not considered the options offered by these methods, but rather that I have found it possible to compose via alternative means as discussed above. For the works included in the present submission, the hierarchical approach offered by a post-spectral harmonic language has enabled the construction of coherent harmonic and melodic objects without recourse to a generative, serial methodology.
**Conclusion**

As discussed at length in the accompanying thesis, there are multiple avenues open to today’s composer wishing to build upon the discoveries of L’École Spectrale. Marc-André Dalbavie, Kaija Saariaho and Bruno Mantovani, whose work is examined in depth in the case studies, are three examples of composers who have done precisely this, each selecting the principles and techniques which they have found most pertinent to their compositional objectives. In addition there are others, such as Magnus Lindberg, whose work it was not possible to examine to the same extent, due to the need to select of a limited number of works for in-depth analysis.

As mentioned above, one of the most useful indications as to the intent of so-called ‘post-spectral’ composers may be found in the writings of Gérard Grisey himself, when he states that:

‘Spectralism is not a system... it’s an attitude. We consider sounds, not as dead objects that you can easily and arbitrarily permutate in all directions, but as though they were living objects which are born, live and die.’ (Grisey, 2008: 265-266).\(^\text{18}\)

The greatest implication of this statement for posterity is surely that the Spectralists’ value for subsequent generations of composers lies chiefly in their forging of an alternative path with regard to the manipulation of musical materials. After the common-practice tonal period of the seventeenth, eighteenth and nineteenth centuries, and the wide range of possibilities opened up by the first seven decades of the twentieth, spectralism – and post-spectralism – might perhaps be viewed, in time, as a renewed means of approaching the composition, and potentially even the hearing of music itself.

As discussed above, and in the accompanying thesis, there is no obligation for a Post-Spectralist to adhere to any system or to employ any given technique or compositional methodology. Rather, to embrace the ‘Spectral attitude’ is to apply an alternative approach to the sounds that one notates, however these might have originated.

For my own work, as the present commentary aims to demonstrate, there are certain aspects of spectral composition that I have found useful to explore – and conversely, others which have so far seemed less appropriate to the music that I wish to write. In any case, each of the works included in

\(^{18}\) [“Le spectralisme n’est pas un système... c’est une attitude. Nous considérons les sons non comme des objets morts que l’on peut aisément et arbitrairement permuter dans toutes les directions, mais comme des objets vivants qui naissent, vivent et meurent.”]. Once again, it is important to remember that, as discussed in the accompanying thesis, Grisey and Murail were uncomfortable with the term ‘Spectral’. It is interesting to wonder how they might therefore view the term ‘post-spectral’.
the present portfolio has been informed to some extent by spectralism, whilst permitting the influence of a range of other technical and stylistic possibilities.
Appendix: Microtonal notation

Since there is no absolute convention on the notation of micro-intervals, the following diagram serves to clarify the use of quarter-tone accidentals in the present works.

Where microtonal notation is employed, the seventh partial of the harmonic series (approximately a sixth of a tone below the equal-tempered pitch) is notated with a downward-facing arrow attached to a conventional accidental:
BIBLIOGRAPHY


DISCOGRAPHY


