KEYNOTE ADDRESS

"DID SOMEONE SAY POST-SPECTRAL?" THE ORCHESTRAL IMAGERY IN MILLENIAL WORKS BY TULVE, DALBAVIE, AND HAAS

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In his keynote address to *Spectralisms: An International Conference* at Oxford in 2017, the composer and scholar Julian Anderson (2017) wistfully noted that he missed the music's early days, when this new school had yet to be defined, save in a rather vague, philosophical way, one that embraced a host of approaches united only by their focus on the quality of sound and the phenomenology of perception. From his vantage point, a variety of earlier works and traditions served as both conscious and unconscious influences on the primary French tradition, and many tributaries continue to flow outward from those works of the 1970s and 1980s that constitute a settled—if shifting—canon. As scholars, we are just beginning to come to terms with this canon and its contemporary successors. The analyst faces a host of challenges, foremost among them the fact that scores shaped by a spectral approach may only vaguely imply the actual sounds they engender. Furthermore, the aesthetic credo of the French spectral school rests on a dialectical foundation, insisting on its novelty while operating in secret collusion with the modernist repertoire it disavows. These difficulties are compounded when faced with the ever-expanding universe of the Post-Spectral, a term that functions less as a label than as the marker of fidelity to the centrality of sound, timbre, and the liminal—as Gérard Grisey once referred to his music—to that universe.[1]

The three one-movement orchestral works I will discuss below represent three alternate currents of post-spectral music in the 21st century, composed at the turn of the millennium by Estonian, French and Austrian composers. *Sula* (1999) by Helena Tulve, *Color* (2001) by the second generation spectralist Marc-André Dalbavie, and *in vain* (2000) by Georg Friedrich Haas are vastly different in conception and forces, yet all display

the three qualities Joshua Fineberg associated with spectral music: sound color as a central element of musical discourse, the subsumption of individual voices into a rich texture, and a vibrant sonic image notable for a kind of "acoustic glow" (2000, 3). Although each is characterized by a distinct harmonic palette and formal design, all feature an intense focus on timbre, underlined by the slow, measured unfolding of resonant harmonies. This temporal dimension was raised to a founding principle in Grisey's famous "Did You Say Spectral?" (see Grisey 2000, 1-3). But Tulve, Dalbavie, and Haas distance themselves from the scientific project of early Grisey and Murail, in which the computer analysis of particular sounds became a mathematical model for harmony and form. Their compositional procedures often marry the procedures of earlier music with new material, in service to an individual aesthetic goal for which spectral techniques are but one element.

As large acoustic works, they are intimately tied to the concrete, particular qualities of the modern orchestra, and to the space and context of orchestral performance. Opposed to earlier approaches to spectral composition in a more formalist context, these composers embrace the full power and sensuality of the post-Romantic orchestra. But rather than express the abstract profundity of symphonic forms, they align themselves with visual concepts: with corollaries of light, color, and darkness that entrain our focus on the quality of sound and its preeminence over abstract formal considerations, even where signposts to form are obvious. Hence, each work invites an analytic treatment sensitive to its particular goal, as well as to the conflicts created when different materials clash or fuse in the course of the work. I will begin with an outline of the conceit central to each composition, before an analysis intended to reveal how that conceit manifests—or not—in each of the three orchestral works.

Sula

Like all of the Estonian composer Helena Tulve's compositions, the one-movement *Sula* was informed by natural patterns and processes. The only student of Erkki Sven-Tüür, Tulve shares his eclecticism and love for nature. Yet, her music eschews expressionist drama, reflecting more keenly the influence of French spectralism and her studies at IRCAM. As in *Sula*, her compositions often begin with one or two central pitches or intervals, whose constant timbral transformation sustains a taut structural tension until resolved. Premiered at the festival Hyyd I Tallinn in 1999, the award-winning *Sula* appears to set subjectivity aside, to record a crystalline, organic world in constant change, traveling at its own speed. Yet, Tulve has

been equally inspired by Gregorian chant, folk instruments, and Mediterranean vocal traditions. Her vocal compositions incorporate texts from various spiritual backgrounds, within ensembles that blend instruments associated with contemporary, early music and indigenous music. My analysis will draw on ideas from ecological theory, timbral analysis, and speculative aesthetics to show how *Sula,* in particular, expresses form through timbre and its expression in space, reflecting an ecological aesthetic of listening.

Sula premiered at the festival Hyyd in Tallinn in 1999, and brought Tulve's music to the attention of both her countrymen and the new music community. The title means to thaw or melt, and has both a literal and allegorical resonance, expressing the gradual erosion of an iceberg by global warming through the subtle transformation of musical ideas, sound colors, articulations and dynamics. We can hear *Sula* programmatically—a sharp crack in the iceberg's crust here, drops forming rivulets there, leading to a quake that allows torrents of roaring water to gush forth. But this representation of nature is hardly abstract. We feel as well as hear viscerally every transformation in time and energy: the destructive power finally unleashed feels less like a metaphor for floodwaters and more like the natural power of the contemporary orchestra unleashed, free from external restrictions on form or harmonic logic.

Wolfgang Sandner notes that much of Tulve's music:

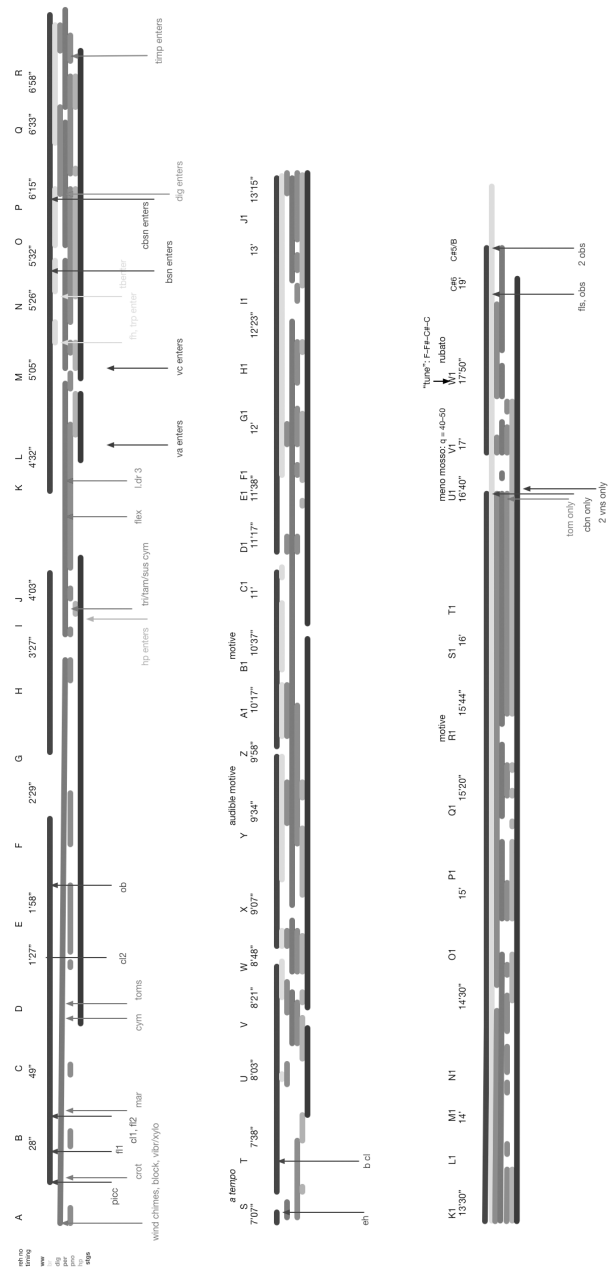
> "…works as if it were not composed, as if it just happened, as if the instrument were playing itself rather than being played, as if the music were emanating from a set of wind chimes. In her music, forms do not jostle their way into the foreground. Their structures are like rocks or trees: everything is self-evident; much is gnarled, much is beautiful; some things are mysterious, others plain as day. It begins, it develops, and at the end it possesses consistency – in memory. Hers is a music that could be installed in a landscape. Not only would it not protrude, it would be subsumed."[2]

But what does it mean to compose a thaw, or a landscape, or a climate crisis? Bernd Herzogenrath identifies an American modernist tradition of "weather" music, from the representation of nature in the music of Charles Ives, to John Luther Adams' "sonic geography," which relies on natural processes themselves to generate sound and light, using site-specific installations that map meteorological information into sound (see Herzogenrath 2009). Ives' representational approach was conditioned by Transcendentalist philosophy, and operated in a subjective mode: tonality used to represent a positive, idealized view of nature as it relates to human experience. Adams, by contrast, wishes to compose works that "resonate

with the world around us," and increase our understanding and awareness of nature, with work that is heavily mediated by the computer (*Ibid.*, 226). *Sula* may seem to fall on a spectrum between these approaches, but I argue that it offers us a different sonic understanding of nature.

Sounds, like many natural objects, are temporal rather than static events, whose identity usually survives changes to their qualities. As Casey O'Callaghan reminds us, sounds are not bound to their sources as properties, but escape those sources with their ontological particulars intact (see O'Callaghan 2007, in particular pp. 13–28). Although *Sula* can be understood programmatically, it stands apart from both glacier imagery and the global climate crisis, which the object-oriented ontologist Timothy Morton calls a "hyperobject," too massively distributed in time and space for humans to grasp as a whole (Morton 2011, 207). *Sula* doesn't so much represent an object as offer up the sounds of an orchestra as a collection of natural processes: cracking, melting, dissipation, roaring, treating sonic objects large and small as both visceral and mysterious in their impact. Far from drawing away from engagement, such music preserves what Graham Harmon has called the "allure" of the object (2005, 142–44). It resonates as well with ecological theory, in which the relationship between a perceiver and her environment is spurred by perceptions rather than preconceived notions of source and meaning, to promote an active engagement with the object. *Sula* transcribes the chaotic, asignifying noise of nature, the very act of translation acknowledging the inherent resistance of the natural object, neither solid nor liquid, beyond the visibly sensible, but not the audible, the perceptible.

Sula begins with a sharp crack followed by a hushed sonority in sustained vibraphone and glockenspiel, gliding in and out of the pitches C6 and C7.[3] The spare frequencies of this bare octave are gradually augmented by winds, piano, and percussion, ranging in dynamics from triple piano to mezzo-forte. Violins join, and the single tone expands: as more pitches are added, we experience the sonority not as harmony but as a slowly-changing oscillation of color and light. The tones melt into one another for minutes on end, in constant transformation. The following chart illustrates the slow growth of *Sula's* form as instrumental groups enter and sustain tones for long stretches, and period breaks that create a masking effect (Example 1). The harp enters after 3 1/2 minutes, followed by scattered percussion. Violas enter at 4 1/2 minutes, cellos at 5. The low rumble of a didgeridoo more than a third of the way galvanizes the instrumental fabric, which continues to expand until the ferocious climax; only scattered elements that could be remotely perceived as a motive, much less a melody.

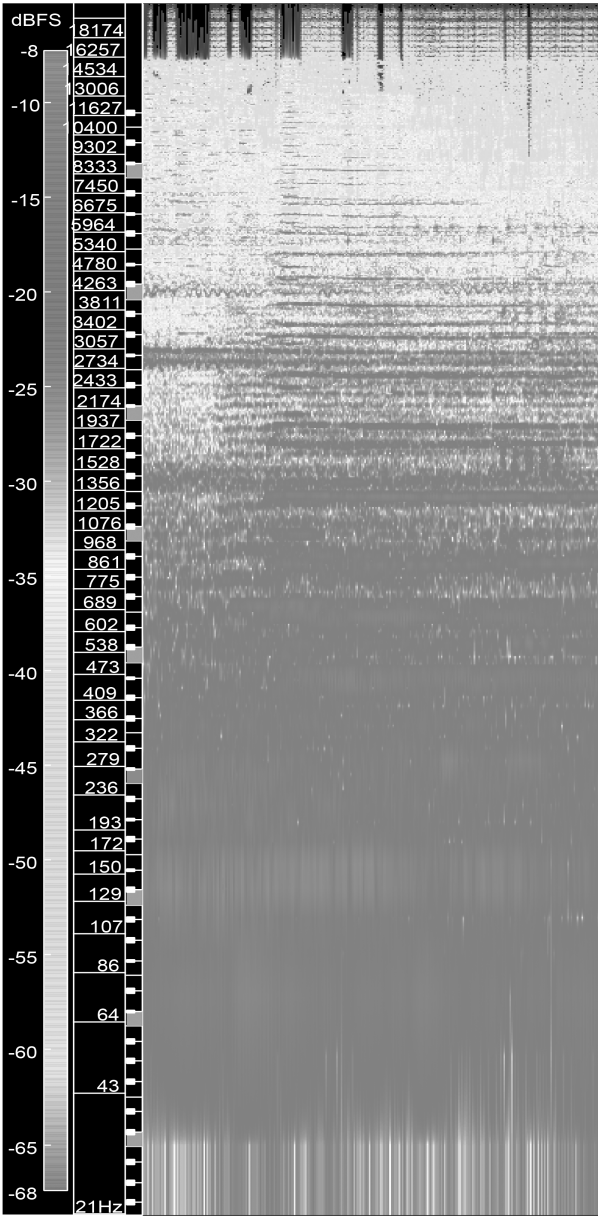


Example 1, formal chart of orchestration in *Sula*

The delayed climax of *Sula* comes after a slow, sustained build-up, when the noise elements and growing inharmonicity seem to finally overtake the resonant expansion around C when the didgeridoo reenters. Although the harmonic frequencies of a didgeridoo are unique to a performance situation (depending on the construction of the instrument and its interaction with the vocal tract), its formants are similar to that of human vowel formants. Hence when played with circular breathing, they produce a rhythmic pulsation, which introduces the climax as a new space, one full of non-pitched color and ceaseless motion. Here and there, we can hear distinct instruments peek through the curtain, but as a spectral snapshot of the climax reveals, the loudest elements of the sound are low in the frequency band, evincing extreme inharmonicity and no clear onsets, much less periodic rhythms (Example 2). Denis Smalley called such a band of sound a "nodal spectrum": massed sound that contains pitched elements bound to noise to resist a clear pitch identification (Smalley 1996). Clarke, Depalle, and MacAdams would speak of timbral-emergence here, whereas Albert Bregman might term the climax a "chimeric percept," a sound with multiple sources that fuse to create an entirely new entity (McAdams, Depalle, and Clarke 2004, 185). This massed sound continues only subsides reluctantly in the final two minutes of the 20-minute work, letting the barest hint of a motive peek through.

Color

Marc-André Dalbavie encountered the work of the founding spectral composers—Grisey, Murail, Dufourt, and Levinas, while still a student at the Paris *Conservatoire*. His early works show a direct application of spectral techniques, as well as the influence of Boulez, Ligeti, and Messiaen. But he soon became known for exploring the dynamics of acoustic space through tone color, resonant "poles," and perceptual streaming via the use of timbral layers, all united through a process in continual transformation. In the 1990s, Dalbavie began integrating traditional elements—chords, modes, twelve-tone rows—with spectral techniques, within a context that exploits their coloristic and timbral potentials. *Color* boasts a clear ternary form marked by clearly-stated fundamental tones. Yet, the construct built on that framework employs amplitude modulation, echo and reverberation effects, microtonal harmonies, and rhythms employed to alternately promote timbral fusion and dissolution. These hybrid techniques support a virtual spatialization; Dalbavie calls this "perspectival orchestration," which creates the impression of space through written-in resonance and reverberation (Dalbavie and Lelong 2005, 94–95).



Example 2, spectrogram of *Sula*'s climax ca. J1[4]

The title of *Color* thereby accesses the Ars Nova tradition in two ways: 1) through a ground melody as the basis for a narrative of orchestral color; and 2), via an expression within a virtual space.

My brief sketch of the work surveys the interpenetration of these traditional and spectral resources, following the model of Sergiu Rosca, who attributes spectral functions to Dalbavie's use of equal-tempered cluster chords, 12-tone rows, and minimalist techniques (see Rosca 2013). Table 1 is a sketch of *Color's* 3-part overall form. The three primary divisions are clearly audible, marked by shifting textures, pedal tones, and rhythmic effects. But *Color* also shares a more organic, respiratory quality that follows Gerard Grisey's famous prescription, in "Tempus ex machina," of a form based on the gradual, idealized transition from periodic sounds to white noise.[5] In his keynote, Anderson proposed an amendment to that model encompassing rhythmic-metric features, one that accommodates even better Dalbavie's approach. My revised formal sketch in Table 2 draws from Anderson's example. My premise is that the tripartite division between aperiodicity and periodicity so important to Grisey and Anderson's conception can be located in *Color* on the level of harmonic structure, rhythm, and spectral content. The first two formal divisions map the growth from periodicity to dynamic consonance and dissonance. This harmonic transformation is reflected on the rhythmic level by a shift from neutral to pulsed, metric, and additive rhythmic events, and on the spectral level by the motion from an initial large-scale modeling of harmonic spectra to the gradual incursion of inharmonic and noise elements. But *Color* incorporates a more traditional sense of formal closure. Rather than culminate— as did Grisey's earlier model—in noise and aperiodicity, *Color* includes a recapitulation with its own arc that revisits earlier material only to dissolve it. I will look closely at Part I, after which I highlight select moments in the form where its traditional elements fade into the spectral, and its spectral elements transition into spatial effects.

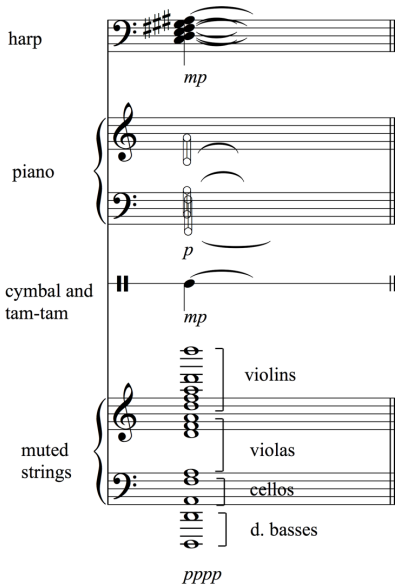
Part I (A)	Part II (B)	Part III (A')
mm. 1–80	mm. 80–235	mm. 235–375

Table 1, formal sketch for *Color*[6]

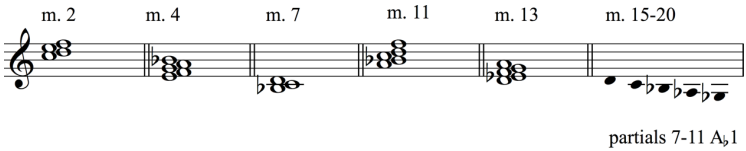
Form	Anderson categories			mm. time	Primary events
I	periodic	neutral rhythm	sine	1-8 :55	Sustained D minor pedal
	dynamic consonance		harmonic spectra	9–30 :56-3:19	Presentation of D minor/modal clusters Gradual expansion/dissipation process of D-A 5th
				30–9 3:19-4:31	The exposition of the color line
		pulsed		39–80 4:31-6:56	Repetitive clusters and presentation of 12-tone row forms
II	dynamic dissonance	metric	inharmonic spectra	80–117 6:56-8:08	Expansion of G, intensification of echo effect and of the "color" line
				117–25 8:08-8:36	Piano chords reminiscent of Messiaen
				125-204 8:36-11:08	Ascending "inhalation"
		metric ('additive')		204–35 11:08-11:55	Culmination and dissipation of echo effect, "Rite" rhythms
III	aperiodic	pause; no pulse	noise	235–56 11:56-13:07	Repetitions of C, A, B, C# in different groups
			harmonic	256–73 13:07-14:02	Ascending harmonic progression and textural motion recalls D-A interval as distant echo
			inharmonic–noise	273–89 14:02-15:13	Concluding C# repetition and sonority comprising Messiaen's Mode III
				289–98 15:13-15:44	Descending "Messiaen" chords
	dynamic consonance followed by dissonance	pulsed, ametric alternates with additive rhythms	harmonic–inharmonic	298-314 15:44-16:32	Alternation of A minor/D major; last restatement of the color line
	aperiodic	suspended rhythm	inharmonic	315–62 16:33–19:36	Gradual dissipation of Db whole-tone cluster repetition, rhythmic displacement of Eb partials and later E-F-G-A-Bb
			noise	363–75 19:37-21:16	Dissolution of the D, E, F, G, A pitches

Table 2, Formal chart of *Color*, incorporating aspects of Rosca, my own analysis, and Julian Anderson's revision of Grisey's categories of formal and temporal process in spectral music.

Color opens with a low, muted cluster in harp and piano, underlined by resonant strokes in cymbal and tam-tam that veil an even softer, sustained D minor chord that spans six octaves, as shown in Example 3. This sonority pits a whole-tone 0 cluster in harp against the D minor chord in muted strings, which represent even-toned approximations of the harmonics 1–13 (with the exception of F). A sense of anticipation attaches to that series of aimless clusters that follow this sonority, and which travel through winds, harp, and brass as they undergo temporal and timbral variation, aided by plunger mutes, tremolo, and flutter-tonguing. Yet, all of these sound blocks are related to the D or G harmonic spectrum, as well as to various modes on D. These static harmonies are overlaid by horn calls in brass, which evolve into ascending scales: whole-tone 1, which can be seen as representing harmonics 7–11 over an A♭1 fundamental (Example 4). These harmonics gradually replace chord tones in the D minor background, which remains diatonic until the entrance of a microtonal harmony; its prevailing dissonance thickens the texture and brings the tension to the surface to burst forth in a brass statement of the pitch cycle—three minutes into the work—that gives the work its name.

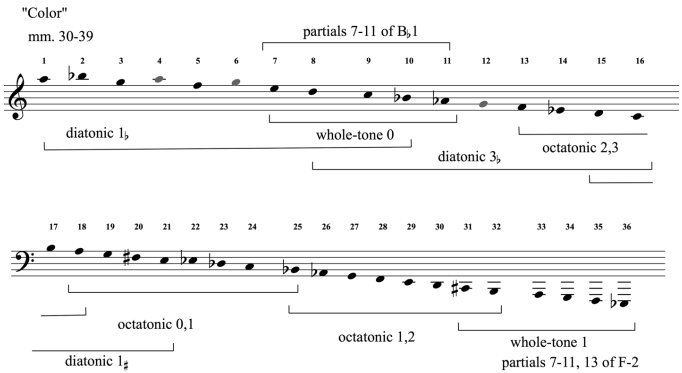


Example 3, Harmonic reduction of the opening sonority in *Color*

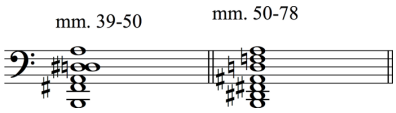


Example 4, Sound blocks and scale segments that succeed the opening sonority in *Color*, mm. 2–20

This "color" seems to bloom from the background, expressing several diatonic and symmetrical modes as it descends, as indicated in Example 5. The color concludes with the whole-tone 1 collection, which may represent harmonics 7–13 (omitting 12) over a hypothetical F-2. The color's end is met by a B major-minor 7th chord chromaticized further in piano and harp: a metallic pulse that will accompany altered forms of the color as well as a resonant pedal on G, introduced in m. 9 (Example 6). Further repetitions of the color line in Part I shorten and alter the color, but remain rhythmically neutral. Although the work began on D minor, and an oscillating D–A interval, this resonant G serves a more critical function in the work. Near the end of Part I, twelve-tone rows beginning on G are introduced to serve as pulsing, inharmonic echoes of the quiescent color line. As the second part opens, a repetition of G is surrounded by chromatic and rhythmic halos, to serve as a ground against which the growing inharmonicity and metric activity of the section can be measured. In this sense and others, there is a raga-like quality to Dalbavie's treatment of the color line and its progress, from an *Alapana*-like beginning that gradually accrues a pulse and, finally, a metric profile.

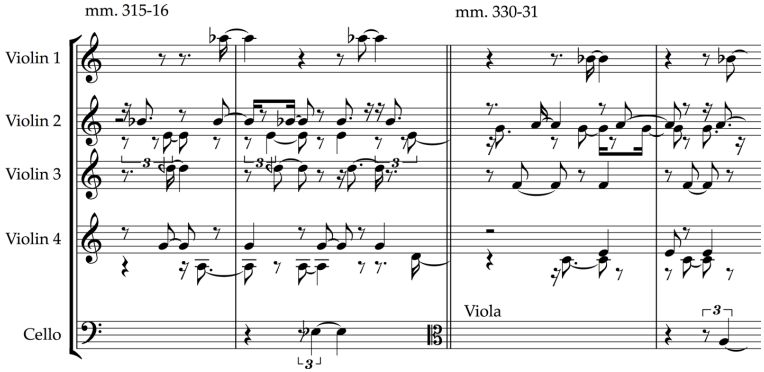


Example 5, the color line in *Color*; grey notes are lowered in some repetitions of the color



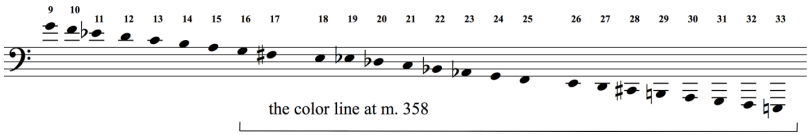
Example 6, clusters constructed on B1 in mm. 39–78 of *Color*

A dramatic B section is structured by rhythmic and spatial oppositions—both "real" and virtual—before returning to the contemplative hush of the beginning. The twelve-tone rows introduced at the end of Part I as verticalized, spectral elements return as linear, metered layers, orchestrated to move around the hall (*Color* was composed explicitly for the acoustics of Carnegie Hall, where it was premiered). There is a sudden lacuna in this texture—8 minutes into the piece—where piano harmonies formed from Messiaen's modes of limited transposition peek briefly through the texture. The orchestral veil lifts completely at the 15-minute mark, where the Messiaen chords return to announce a fermata before Part II, and the final, majestic repetition of the color line. The material immediacy of this multi-dimensional orchestration of registral and timbral space envelops the listener; its spell is broken by the symbolic weight of the Messiaen progression. The stark piano chords lift us momentarily out of the texture, much like the color chords of Messiaen's late music floated above their isorhythmic grounds. And they evoke a French lineage knotted by that moment that Messiaen—a *sui generis* figure both entirely of and apart from pivotal movements in French music—entered to mentor a second generation of composers. Oscillating whole-tone collections and a chord constructed of partials over an E♭ fundamental prepare the 11th and final statement of the color line (Examples 7 and 8).



Example 7, rhythmic displacement of E♭ partial chord, and chord from m. 4

Although the partial and whole-tone chords continue past the ground, their rhythmic and spatial displacement complicates any clear resolution on D, in favor of the poignant dissipation of sharply-delineated timbral layers in strings, winds, and harp.



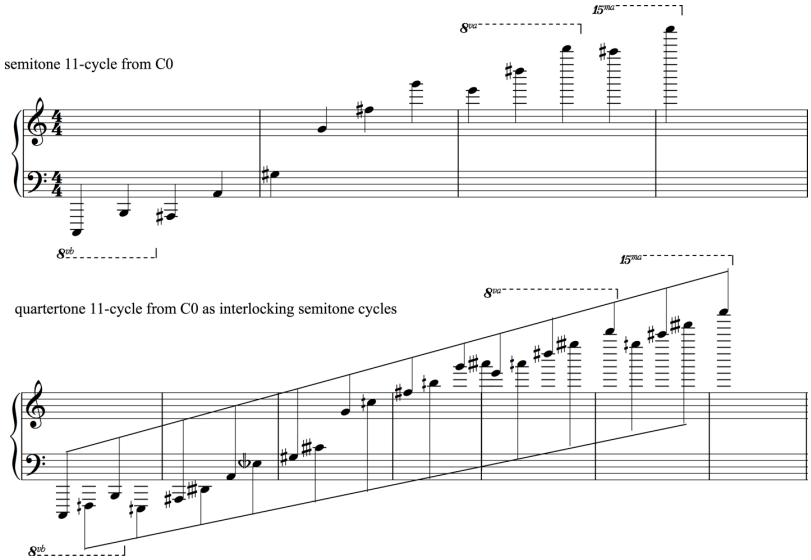
Example 8, the final statement of the color line in Part III—from G4 to E1—as it deviates from the original at m. 30

in vain

Although the sound and associations of his works identify Georg Friedrich Haas as a spectralist, he self-identifies as a microtonal composer whose compositional concerns are focused on harmonic alternatives to–rather than extensions of–the equal-tempered system. Hence the writings of Haas focus on microtonal events, and on the ad hoc constructions that feed his creative process. As with the spectralists, Haas begins with his material: "The love of sound elements, attention to the sounds, like living things unfolding in space and time, is for me one of the basic requirements of my work" (Haas 2004, 115). As Lisa Farthofer notes, Haas assigns very complex inner life and narrative to sounds. This narrative begins with the conviction that micro intervals represent neither a distortion nor embellishment of equal-temperament, but "a basic human need," one whose necessity we take for granted as a mundane feature of everyday life, in the squeak of a door or a bird's song (Farthofer 2007, 8–9). Early in his career, Haas was exposed to non-tempered tunings, and the work of microtonal composers. Although attracted to the formal procedures of Hába and the tuning experiments of Tenney and Partch, Haas was directly influenced by three of Wyschnegradsky's key concepts: the "sound continuum," ultrachromaticism, and non-octaviant tonal collections and cycles (see Wynschnegradsky, 1972). In *La loi de la pansonorité,* Wyschnegradsky introduced the 'total sound continuum' as an "operational limit" for the constitution of ultrachromaticism (Wynschnegradsky, 1996).

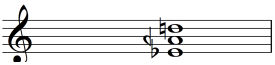
This relative sound continuum divides the audible spectrum into 144 sounds per octave, as 12ths of a whole tone. Non-octaviant frequency spaces were those formed by substituting a contracted or expanded interval for the

traditional octave equivalence. Wyshnegradsky's favorite semitonal intervals—the major seventh and minor ninth—theoretically unfold over 11 and 13 octaves respectively: beyond the audible range as shown in the top stave of Example 9. Semitonal cycles generated by the major seventh and minor ninth, of course, generate the twelve-note scale of the total chromatic. But this cycle can also be thought of as two independent cycles of 11 semitones, interlocked at the distance of a major fourth, as shown in the bottom stave of Example 9. The internal structure of this periodic unit may be further subdivided by perfect (equidistant) or imperfect (non-equidistant) intervals. Thus the span 11 in semitonal space may be divided imperfectly into a tritone and perfect fourth, or perfectly with a bisection by 11 quartertones, to produce the interval pair Wyschnegradsky labeled major fourth/minor fifth. The major fourth was important because its equal-tempered interval—550 cents—approximates the ratio of 11:8 (551.28 cents) found in the harmonic series (Example 9).

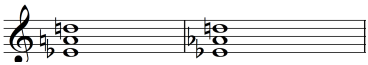


Example 9, Wyschnegradsky's 11-cycle in semitonal (top) and quartertone (bottom) space

Perfect binary chord division consisting of two 11 quartertone intervals



Imperfect binary chord divisions consisting of a 6 semitone and 5 semitone intervals or vice versa



Example 10, the major fourth division of the quartertone 11-cycle, against the tritone/perfect fourth division of the semitonal cycle

Haas employs Wyschnegradsky chords, especially those of the "imperfect" variety as a unit, as part of his aesthetics as set out in *Five Theses on Microtonal Music,* philosophical statements about our general conception of music in the West (see Haas 2001). The partial series stands as one of the fundamentals of microtonal harmony, even if the terms "harmonic series" and "pure temperament" are loaded with ideology. Actual instrumental sounds are always slightly changing, their higher partials shifting as the physical mass of their sound source and surroundings shifts. Haas declares that "any attempt to precisely grasp this overtone series is doomed to failure"; yet this very striving after an impossible ideal seems to characterize Haas' compositional process, and his aesthetics as a whole, down to the motivation behind *in vain*.

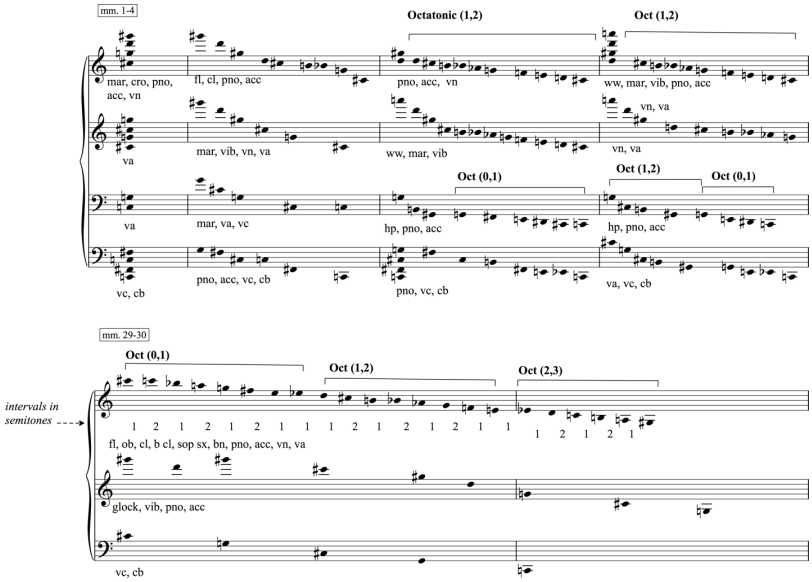
Thesis 2—the basic human need for beats in music—serves as a further illustration of the difference between abstract models and the messiness of actual sounds. Augmented or diminished octaves, "slightly detuned" unisons, and other examples of "friction, not fusion" proliferate across musical cultures, and embrace the beat-rich major and dominant seventh chords. We often treat the registral placement of pitch as incidental. But each partial tone is bound to an octave position, as well as to a neighborhood of intervals around it. The final two theses directly concern the composition, performance, and perception of explicitly microtonal music. The greatest challenge lies with the perceptual difficulties of working with small intervals. The smaller the interval difference, the more time it takes the human perceptual apparatus to distinguish it. Rapid movements within microtonal systems will simply neutralize pitch differences, as both performers and listeners need time to hear out slow beats and the upper proportions of the partial series. Thus, microtonal music needs more space, more time, and more opportunities for development.

Haas began his career working in a more serial, abstract manner, hence his concept of projection: the realization of any abstract model within a given compositional system. In a 1996/1997 article, he lists three forms of projection: spectrographic sound models as an aid to composition, the

projection of complex frequencies on a given microtonal grid (e.g., a sixth-tone system), and projection as a harmonic-theoretical concept (e.g., a dominant seventh chord as a projection of the 4th, 5th, 6th and 7th partials to tempered twelve-tone space). Those models used in *in vain* include the "super slow motion" intimated in the fifth thesis, composed-out acoustic beats, sound splitting, or microtonal frequency compaction around a pitch as in the music of Scelsi, a musical-thematic approach to the Shepard scale effect, and combination tones. All of these techniques appear in the hour-long single movement *in vain,* written for 24 instruments and a "spotlight," a visual feature that puts unique demands on performer, listener, and conductor.

The absence of light changes both audience and performer's perception of sounds and space in *in vain*. In the best known of its two versions, concert lights on the rostrum and desk fade to full darkness at m. 70. The shift from light to darkness accompanies and intensifies metaphorical gradations of light in the harmonic language of the work: combinations of–and transitions between–vastly different harmonic collections, and strategic juxtapositions of tempered and non-tempered harmonies that generate auditory illusions. Wyschnegradsky's notion of cycles feeds into certain pitch paradoxes that Haas favors, such as the Shepard scale effect that serves as the work's thematic backbone. Haas's chord voicings seem to reflect William Sethares's demonstrations of the relation between "sensory consonance and dissonance" and timbre and tuning; that is, tritone-based chords which sound consonant, and which function differently in an inharmonic musical universe (see Sethares Chap. 6, 97–130).

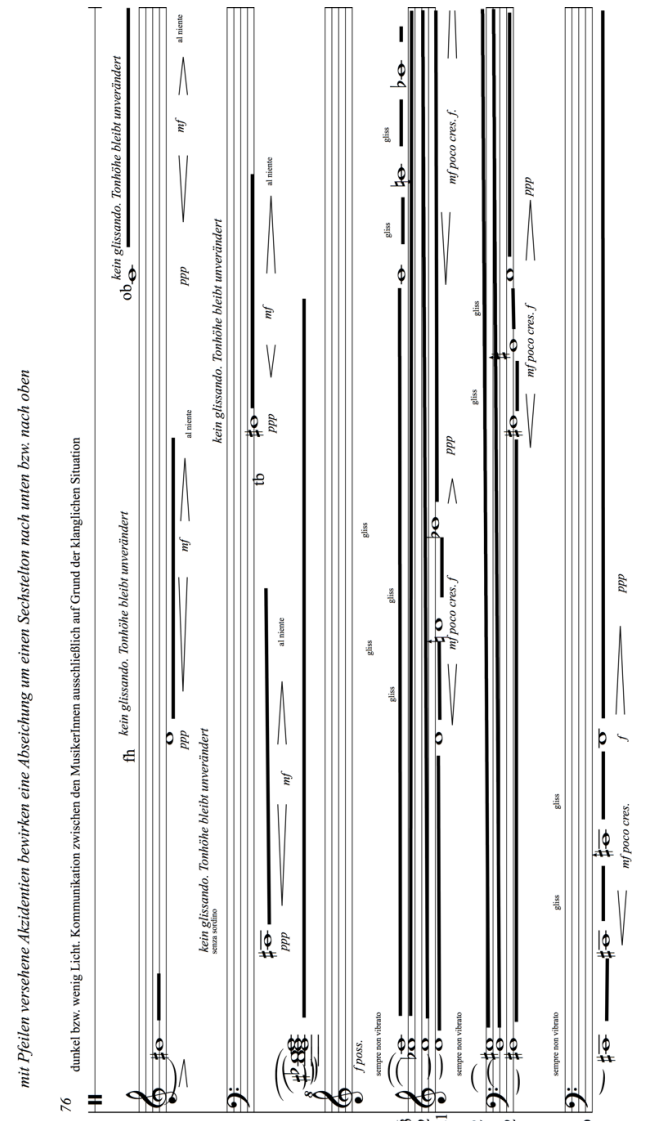
In vain begins with descending Wyschnegradsky tritone/fifth chords voiced as a whole-tone French augmented sixth chord, with interlocking tritones over C2 in the bass, in marimba, crotales, piano, accordion, strings and winds in a heterophonic, descending cascade. In measure 2, the upper voices are further subdivided to form an octatonic (1,2) collection—still symmetrical, but with gaps of a third in the lower voices, as seen in Example 10. These circle back to rise ever higher, with instrumental groups ebbing like waves. In measure 18, a new harmonic phase subdivides one whole-tone of the octatonic to form non-octaviant scales which descend from C♯6 from measure 29.



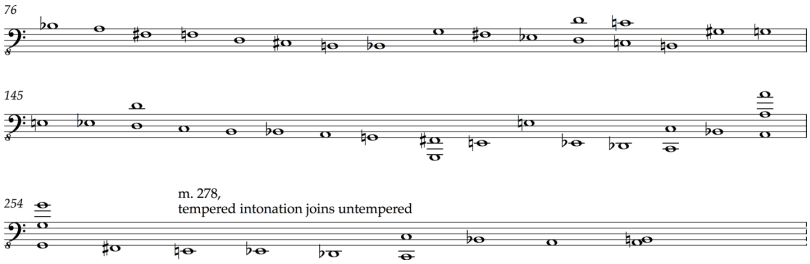
Example 11, pitch reduction of mm. 1–4 and 29–39 of *in vain*, showing diatonic scales superimposed over Wyschnegradkyan superposed fifths and tritones and non-octaviant descending scale

The light dramatically dims in measures 70-78, and the scale fragments wane in winds, glockenspiel, piano, and accordion, while—beginning in the bass—staggered lines rise in sustained ascents of semi- and sixth-tones. By measure 76, the auditorium is completely dark, and the harmonic cast shifts from tritone/fifth chords to those built on non-tempered partials, as shown in a reduction of the score in measure 76 (Example 12). The harp enters at rehearsal E (9' 17") with partials of B♭, followed by the strings with partial chords related to B♭2 and A2. Bar numbers resume in measure 77 along with a hesitant march back into light, accompanied by what is essentially an extremely-slowed down version of the initial ascending descent, conducted as a progression of spectra based on virtual fundamentals, as shown by the reduction in Example 13. During the transition to a final dark phase, combinations of different overtone spectra emerge like sparks: for instance, in m. 483, trombones play partials 6 and 7 of F♯1, while horns play partials 5 and 6 of A1, to produce two C♯4's a 12th tone apart and two E4s a 6th tone apart.

The end of *in vain* returns to the beginning in a direct representation of its title, with a nod to the tradition of still life painting known as "vanitas."



Example 12, pitch reduction in m. 76



Example 13, progression of "virtual" fundamentals in mm. 76–326[7]

The bright, untempered, asymmetrical harmonies of the work's middle section are eventually absorbed into an equal-tempered, symmetrical, dark torrent of eternal descent. Haas wrote the work in response to the formation of the black-blue government coalition between the Austrian People's Party and the right-wing Freedom Party in 1999. While audiences are often thrilled by the traditional recapitulation that closes *in vain*, Haas remarks: "I still cannot imagine that anybody can perceive (the recap) as anything but oppressive. That's enough. You don't need any more" (2013, 13).

In "Heard Utopia vs. Utopian Hearing: Haas's *in vain* and Political Ambivalence in New Music," Max Silva (2018) makes five hermeneutic passes through *in vain*, trying to understand Haas' ambivalence regarding the political valence and ethics of the work.[8] Silva pits the formal aspects of *in vain* against its ethics of intonation. "Hearing utopia" represents one narrative, in which utopia—represented by the spectral, just-intoned, slow aspects of *in vain*, heard in the dark—are defeated by the Shepard-scale vortex formed by equal-tempered, Wyschnedgradsky and octatonic harmonies, in the light. "Utopian hearing," on the other hand, presents the work as an ethics of intonation, one that trains us, during those dark passages, to hear microtonal and just-intoned harmonies as distinct sonic objects, rather than as dissonant accidents or threats to equal temperament. Such a reading presumes that by the time the final vortex returns, we hear that passage differently; we may even perceive the non-octaviant scales as approximations of real spectral harmony. I would add that, whichever reading we choose, *in vain* alters what Cornelia Fales (2002) calls our perceptualization of sound: our use of parameters outside of the actual acoustic elements of a signal to determine its source and location. It disorients the listener by manipulating several fundamental paradoxes of auditory perception, paramount among those our dependence on auditory images to orient our musical perception, and our unconscious use of timbre to map an acoustic environment.

Dalbavie has aligned the origin of modernity in music not with the liberation of tonality but with Debussy's emancipation of timbre relative to the instrument. Thus, the composer cedes his role as "creator" for one of mediator—reacting to the properties of the sound phenomenon he explores. When asked about whether he is a politically engaged artist, his answer suggests that he falls on the "hearing utopia" side of that debate:

> "The mere fact of conceiving of music in the way that I practice it is surely more subversive than putting one's self at the service of an ideology, whatever it may be" (Dalbavie and LeLong 2005, 42).

I read Dalbavie's answer as confirmation that he, like Tulve and Haas, works directly with the materiality of orchestral sound as color and texture. In all three works—*Color*, *Sula*, and *in vain*—timbre, temperament, and representations of depth and shade take precedence over the abstract, even when traditional harmonic and formal conceits are used. As Dalbavie notes, the orchestra played a central position in the formation of spectral music, in which methodologies such as spectral fusion, and resonant and delay effects codify time-honored orchestration techniques, and computer-aided methodologies such as frequency and amplitude modulation return full circle to their acoustic origins (Dalbavie and LeLong 2005, 88–103).

In Tulve's works for orchestra, sonic transformations resist simple representational narratives in favor of sustained, ecological listening that attends to music as natural process and event. Dalbavie defines orchestration as writing a "fictional acoustic," designed for the perception of the listener who builds a fictional sound from real instruments. Similarly, *in vain* challenges and rewards the listener, juxtaposing microtonal harmonies with equal-temperament, light with dark, and dizzying acoustic illusions with a clear formal design. In *Haydn's Orchestral Revolution*, Emily Dolan states her goal as more than a historiography of orchestral practice. Rather, it is "paradoxically, music's perceived immateriality and absoluteness" that depended upon concrete, material changes in that practice (2013, 7). The orchestra fueled this reevaluation by altering the basic conception of instruments: only after the orchestra could be taken for granted could scholars of music ignore music's materiality and imagine that music existed in an ideal realm as some sort of ineffable "absolute" object. If our concepts of absolute music take it for granted, nevertheless much of our subsequent progress in electronic music, chamber composition, and formal design are rooted in an orchestral imaginary and its conceptual position as, in Dalbavie's words, the basic unit of music in the twentieth century (2005, 96).

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Notes

[1] In a letter addressed to Dufourt, Grisey claimed to use the adjective liminal rather than spectral (Gérard Grisey, "Lettre à Hugues Dufourt" [5 July 1980], in *Écrits ou l'invention de la musique spectrale,* ed. Guy Lelong with Anne-Larie Réby (Paris: Éditions MF, 2008), 281–82). I thank François-Xavier Féron for this information.
[2] Wolfgang Sandner, "The New Day Dawns," booklet accompanying *Helena Tulve: Lijnen*, ECM CD 1955, 2008.
[3] Readers are encouraged to listen to *Sula* via Helena Tulve's Soundcloud page: https://soundcloud.com/helena_tulve/helena-tulve-sula-thaw, accessed 3 April 2020. My analysis was based on the unpublished score and *Helena Tulve – Sula*, East Raadio ERCD 050 2005.
[4] All spectrographs produced with Sonic Visualizer, Queen Mary University, although the programs SPEAR and E-analyse were used to verify perceptual observations.
[5] Gérard Grisey, "Tempus ex Machina: A Composer's Reflections on Musical Time," *Contemporary Music Review* 2:1 (1987): 239–75. Originally published as "Réflexions sur le temps" in Grisey 2008, 39–44.
[6] After the example in Rosca, "Traditional Elements and Spectral Content," p. 13.
[7] The astute reader will note that these fundamentals transition from the collection $HEX_{1,2}$ to $HEX_{2,3}$ and $HEX_{3,4}$ (mm. 76–145), before settling in $OCT_{0,1}$.
[8] For a more traditional, apolitical reading of *in vain*, see Mark Hutchison, "Stairways in the Dark: Sound, Syntax and the Sublime in Haas's *in vain*," *Tempo* 73/288 (2019): 7–25.