

Synthesis: Works of Sarah Weaver and Collaborations (2020-2022)

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Synthesis: Works of Sarah Weaver and Collaborations (2020-2022)

SARAH WEAVER¹

Abstract

Synthesis Series² is a set of contemplative contemporary network arts works for solo, chamber, and large ensemble performance. The works are my compositions and collaborations from the years 2020 to 2022. The concept of synthesis is conceived as an activation of synchrony. Synthesis Series follows my prior works in Synchrony Series³ and Source Series⁴ as sequences of compositions since 1998 proliferating into a networked system of artistic realization. In Synchrony Series I defined synchrony as the perceptual alignment of distributed time and space components. Synthesis builds on this to activate the alignment as a networked state of composite resultants, networked synchrony across realities, transformation of distance, and synthesis activation for healing and transcendence. Synthesis is expressed through the pieces “Integral Infinity” (2021) for large ensemble, “At the Intersection of Eternity and Time” (2021) for solo percussion (collaborative composition with Gerry Hemingway), “Isomorphic Now” (2021) and “Interpolation Space” (2021) for chamber ensembles, and “Duplexity State” (2020) for audiovisual duo (collaborative composition with Daniel Pinheiro).

The artistic and technological strategies for Synthesis Series utilize network arts in concept and in practice. Artistically, the pieces apply composition, improvisation, gestures, and individual performer artistic languages for virtual, hybrid, and in-person settings. The technology strategies for network performance, streaming, and recording include usages of open source technologies JackTrip,⁵ Pretty Good JackTrip Toolkit (PGJTT),⁶ and Open Broadcaster Software (OBS),⁷ together with commercial technologies Zoom, Vimeo, and Squarespace.

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² Sarah Weaver, “SyncSource Label,” accessed January 15, 2023, <https://www.sarahweaver.org/syncsource/label>.

³ Sarah Weaver, “Synchrony: Music of Sarah Weaver and Collaborations (2006–2019),” *Journal of Network Music and Arts* 2, 1 (2020), <https://commons.library.stonybrook.edu/jonma/vol2/iss1/6>.

⁴ Sarah Weaver, “SyncSource Label,” accessed January 15, 2023, <https://www.sarahweaver.org/syncsource/label>.

⁵ Chris Chafe et al., “JackTrip,” accessed January 15, 2023, <https://jacktrip.github.io/jacktrip>.

⁶ Mike O’Connor, “Pretty Good JackTrip Toolkit,” accessed January 15, 2023, <https://www.pgitt.com>.

⁷ Hugh “Jim” Bailey et al., “Open Broadcaster Software,” accessed January 15, 2023, <https://obsproject.com>.

This essay outlines the Synthesis Series technological context, artistic strategies for the series, details and excerpts for each piece, and new directions for the work, from my perspective as a composer.

Technological Context

Synthesis Series was composed and performed in 2020 to 2022 during the COVID-19 pandemic and the social unrest locally and abroad. The work began in early 2020 before the quarantines, so the series was not originally initiated in this context, but rather as the crises unfolded the series evolved into practical responses in the technology and vibrational responses in the artistic realm. The developments, performances, and recordings of the pieces took place in virtual, hybrid, and in-person settings throughout these years.

The premiere of the first piece of the series, “Duplexity State” by Daniel Pinheiro (visual artist) and myself (computer music), was March 10, 2020, in a hybrid format. I was located in-person at Experimental Intermedia in New York and Pinheiro was located in his private studio in Portugal. The network arts technology was designed for the public internet connection between these two spaces, rather than the high bandwidth configurable research networks and audiovisual technologies for those settings I had been working with for 15 years. We worked with Zoom videoconferencing. Since I was in the same physical location as the audience, I could send my audio both locally to the speakers and remotely to Pinheiro via Zoom. Pinheiro sent video via Zoom to the New York venue. This degree of transmission was a successful technical model for the performance.

Soon after the first quarantine began in New York on March 20, 2020, “Duplexity State” was performed a second time on March 28, 2020, virtually for the NowNet Arts series. This performance was entirely on Zoom for audio, video, and audience. The technology transition to performing the piece virtually on Zoom was relatively seamless since the piece was already set up for this platform. The main challenge was to help the audience technically to attend on Zoom. The “Duplexity State” excerpts included with this essay were made March 26, 2020, in a dedicated Zoom recording session between Pinheiro and myself.

The premieres of the rest of the pieces took place in the virtual medium. During the years of these works, 2020–2022, the JackTrip community adapted the network audio technology to run on public internet incorporating utilization of cloud servers. I was able to functionally use JackTrip for audio in the virtual projects starting in Fall 2020. In addition, PGJTT has been in development since 2021 and put to use in the projects for virtual multichannel mixing and multichannel recording. The audio latency components included the standard JackTrip latency of approximately 5ms per 1000km, added buffers for quality of service on public internet across the many locations, and the geographic locations of the cloud servers. The video platform was Zoom Webinar as this remained the best option for large group videoconferencing on public internet. The audience view of Zoom Webinar was sent to the streaming platform OBS. In OBS, the Zoom video and JackTrip audio were combined as the stream to the audience.

An audio delay of 250ms was added in OBS in order to synchronize the audio and the video since JackTrip ran faster than Zoom. The stream was sent to Vimeo. The Vimeo stream was embedded into the NowNet Arts website in Squarespace as a virtual venue. The audience viewed the live performances in the virtual venue with the program listed below the stream. Post-performance videoconference discussions followed in Zoom with the project participants and the audience.

The virtual network audio technology worked at a professional quality. The videoconferencing was presentable but the highest quality platforms for large groups in contemporary arts performance are still in development for public internet due to bandwidth, CPU, and mixing limitations.

Performances of the pieces continued in the virtual venue throughout these years. In addition, in 2021 many in-person outdoor performances were happening in New York as a safer environment in the pandemic compared to indoor in-person performance. On September 21, 2021 we had an in-person outdoor performance of the chamber pieces “Interpolation Space” and “Isomorphic Now” in Washington Square Park, along with a piece from the Synchrony Series titled “Sound in Peace” (2016), organized by Zürcher Gallery. I utilized a battery-powered Bose speaker for amplification of my speaking voice to host the program and for the computer music elements. Rehearsal for the in-person performance was held virtually. Another in-person outdoor performance was scheduled for October 16, 2021 at the Harvestworks Digital Media Arts Center outpost lawn on Governors Island, but the performance was rained out. Instead, the musicians performed virtually, and the audience could attend either in the virtual venue or in-person at the Harvestworks indoor space on Governors Island where they projected the virtual venue onto a large screen and audio speakers as a watch party.

Performances in 2020–2022 were supported by the City Artist Corps Grants program, presented by The New York Foundation for the Arts (NYFA) and the New York City Department of Cultural Affairs (DCLA), with support from the Mayor’s Office of Media and Entertainment (MOME) as well as Queens Theatre; Foundation for Contemporary Arts Emergency Grant; and Creative Engagement, supported by the New York City Department of Cultural Affairs in partnership with the City Council and administered by Lower Manhattan Cultural Council. The support for specific projects is listed in the appendix.

The recordings of the music pieces in the Synthesis Series were made in 2022. “Integral Infinity”, “At the Intersection of Eternity and Time”, and “Isomorphic Now” were recorded as live performances on May 8, 2022, in multichannel audio utilizing the virtual network arts technology. “Interpolation Space” was recorded in-person at Mirrortone Studios in New York on October 27, 2022.

The post-production was multifaceted. For the virtual recordings of “Integral Infinity,” “At the Intersection of Eternity and Time,” and “Isomorphic Now,” Mike O’Connor removed incidental audio dropouts, reconstructed approximately two seconds of audio that had a major dropout, and touched up the tracks. Gerry Hemingway edited and mixed “At the Intersection of Eternity and Time.” I edited

“Integral Infinity,” “Isomorphic Now,” and “Interpolation Space.” Peter Karl mixed the recordings of these pieces. Then Karl mastered all of the tracks. The music pieces are released as audio recordings on the SyncSource Label.

The pieces were designed to work across these technology settings of virtual, hybrid, in-person, and recorded work through the artistic concepts of networks. Synthesis Series evolved both through the emerging necessities of these settings and the choices between options that became available throughout 2020-2022. The efforts, creativity, and human connections to manifest the series under the circumstances became another core layer of its synthesis.

Artistic Strategies

The artistic strategies for Synthesis Series incorporate concepts of network on many levels and the activation of these elements together for synthesis. The music scores contain staff notation, graphic notation, text notation, structured improvisation, and gestures to make a network of creative elements for synthesis. The modalities have different degrees of macro and micro emphasis throughout, from being a prominent lens to utilization in more structural capacities. The materials are scored with the modalities most appropriate to the realization, whether this is through full or partial notation, structured improvisations, and/or gestural motion. Complexity of intuition is a performance practice of the scores to navigate these planes and progressions. The pieces are through-composed with the elements since the forms are conceived for resultant synthesis. The forms are sequences of events as the dimensional networks of the pieces.

The performers are pioneering improvisers with individual artistic languages they utilize in the pieces together with interpreting the composed notation, structures, and gestures. This creates an ensemble concept as resonance of a network of individuals and a network of materials. The same core of renowned artists and artistic circles have been performing and collaborating in this era of my work for the past 16 years and many have performed together for much longer throughout the history of their work. These relationships are also key components and influences in Synthesis Series.

The music performers-improvisers in Synthesis Series are Yoon Sun Choi (voice), Robert Dick (flutes), Julie Ferrara (oboe), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (woodwinds), Ned Rothenberg (woodwinds), James Zollar (trumpet), Ray Anderson (trombone), David Taylor (bass trombone), Mark Helias (bass), Stephen Rust (bass), Gerry Hemingway (percussion), and myself (conductor, computer music, composer). Recent artists and collaborators outside of these pieces that have also influenced this work include Chris Chafe, Mark Dresser, Denman Maroney, Joe McPhee, Min Xiao-Fen, and Matthias Ziegler.

“Duplexity State,” the audiovisual duo with Daniel Pinheiro (visual artist) and myself (computer music), is in another format. This piece is a collaborative composition created through concept-sharing

and file-sharing based on the title metaphor related to network arts experience. The piece has 4 sections working with elements such as layering, mirroring, alternations, composites, and resultants. The focus on synthesis between duple realms such as two entities, two sides, and polarities brought out this format in the work. The visuals and the audio each expressed duplexity concepts individually and in composite, like a double solo in duo, to create the conceptual network.

These artistic strategies in the music and audiovisual pieces are a continuation and expansion of prior work. Synthesis Series is a solidification of trends in my work moving from emphasis in the past on live composing structures into the present full integrations of composed notations, structured improvisations, and gestures. The audiovisual duo is the first collaboration I have done of that kind, though conceptually Pinheiro and I are connected through our histories in the medium. Intuitively I sense a relationship between the network of strategies in Synthesis Series with the mixed realities of network arts.

The artistic materials in Synthesis Series are multifaceted. The pitch, time, and form elements are designed for widening the scope to facilitate networked synthesis. Constructs based on sequences of sets of pitch frequencies and pitch states allow for flexibility of pitch dimensions and associations that create a network of the frequency synthesis over time. Similarly, progressions of time framings, time harmonies, and time textures make spatial networks out of the element continuums. Most of the materials are given a tempo range, stagger indication, or length of time to complete the event, rather than a meter for steady beat. The relationship between the materials involves multiplicity layers, intersections, alignments, phasing, and extensions to create nodes for synthesis. The forms consist of sequences of sections that network through dimensions of the concepts and have resultant synthesis. The gestures in the large ensemble work contain Soundpainting⁸ developed by Walter Thompson and original gestures that I created specific to the pieces and the medium. The gestures are mainly conceived in sets that are processing and extending the materials. In specific sections the gestures also become their own creative modality. The structured improvisations extend the materials to facilitate intuitive processes for synthesis and individual perceptual expressions. There are varying degrees in these sections that range from narrow expansion of staff notation to open interpretation of text notation influenced by the Deep Listening⁹ pieces of Pauline Oliveros. The network of performers-improvisers' individual musical languages interacting in the pieces creates layers of innovative resonances in synthesis.

The shift into virtual performance was another factor in artistic strategies for the Synthesis Series. My prior work was designed for local and hybrid settings. As this series progressed into fully virtual performances, location fluidity introduced new levels of networking and synthesis. The pieces had to

⁸ Walter Thompson, "Soundpainting: Introduction," Soundpainting, accessed January 7, 2023, <http://www.soundpainting.com/soundpainting>.

⁹ Pauline Oliveros, *Deep Listening: A Composer's Sound Practice* (Lincoln, NE: iUniverse/Deep Listening Publications, 2005).

work for performers in a spectrum of individual locations rather than in-person performance or hybrid performance sub-groupings. This led to more usage of elements such as heterophony, multiplicity, layering, intersections, and alignments. At the same time though, the situation created a stronger pull to also incorporate sections of widening time to play in unison time and/or unison pitch. This was possible with slow tempos, heightened listening by the performers, and adjustments to the timing of gestural cues. The location fluidity brought out array aesthetics in the materials that implied new usages of sets and form in the compositions. Intuition was affected as well by having all of the performers and audience in remote physical locations while perceptually the group was synchronously together. There was an intuitive evenness to having everyone remote compared to hovering attention in hybrid settings between in-person and remote participants. Yet being fully remote required a different stretch of intuition to connect and perform. When limited in-person and hybrid options were reintroduced after the initial quarantines, the artistic strategies did hold in the pieces that were performed in-person and hybrid, pointing to the strategies functioning as conceptual networking besides adapting to mediums. On the whole though, the performances remained mostly virtual during this period. This was due to practical factors such as the ongoing risks of the pandemic and the ability to work with non-local performers, as well as artistic factors including the viability of the pieces in the virtual medium and the ongoing technical advancements for virtual performance.

The artistic strategies will be detailed for each piece of the series.

“Integral Infinity” (2021) is a large ensemble piece on concepts of infinity as a networked body of vital components synthesizing to transcend finite domains. The piece is approximately 45 minutes in length with eleven sections that I refer to as dimensions. The instrumentation is for 4-12 open instruments plus bass, percussion, and conductor. The number of instruments has a wide range since the materials can be expressed with the smaller size through detailed individual interpretations or through the multiplicity of the larger size as group interpretations. The piece utilizes composition, improvisation, and gesture.

The materials use structures for pitch axis, time harmony, alignments, intersections, multiplicity layers, and extensions. The pitch axis in the composed materials is centered around pitch E with multiple approaches in pitch sets, chromaticism, and tonal inferences. Dimension 9 is an exception with a shift to a different pitch axis set based on pitches A-D. This section is highly chromatic so it functions as an associative pitch area, though with the start on pitch axis A there is a subdominant implication in reference to pitch axis E. Dimension 11 is another exception with a shift to pitch axis B with more of an intention to end on an implied dominant motion. With the pitch axis utilization, structured improvisation components that do not have specified pitches, and extended techniques, there is large scale tonal progression inference while having networks of pitch styles and dimensions taking place within the form.

Time harmony refers to the layering and alignments of time planes throughout the piece for resultant synthesis. There are sections with slow unison time components, sets of pulse structures, resultant time through sub and super pulses, composite pulses, staggered layers of time frames, acceleration and deceleration waves, and intuitive time. Throughout the piece there are rests and holds between phrases to further the widening of the time. Sections with pulse implications are given a metronome range rather than one steady pulse, intended for heterophony of pulses of individuals rather than a group pulse. The piece starts and ends with slow unison timings while the complex time layers happen in between. This creates a perceptual time pedal while the more abstract time networks flourish.

The form is a progression of events together with the throughlines of the pitch and time strategies. Each section is its own dimension of the networked body of the piece. The sequence of the sections is designed to result in a large-scale synthesis in addition to synthesis happening within the sections.

Dimensions 1-3

The first three dimensions move from slow flexible time with pitch phrases that shift between close and unison intervals, to percussion pulse structures that emulate the interval movement through time development, to a soloist extending the percussion sub pulses and super pulses while the rest of the ensemble is conducted with an interspersed sequence of chromatic pitch sets that further extend the first dimension. These are defined sections that relate to each other and expand as a sequence.

This score excerpt shows the second half of Dimension 1. The tempo indication at the start of the section is “Slow Flexible Time” to allow for the instruments to stagger across the latencies and arrive together on the fermata unisons.

Figure 1: Score excerpt from “Integral Infinity,” Dimension 1.

The audio excerpt is a recording of this music with performers/improvisers Jane Ira Bloom (soprano saxophone), Marty Ehrlich (clarinet), and Ned Rothenberg (clarinet).

Audio 1: 1_integral infinity_excerpt_1.wav¹⁰

Dimension 2 has percussion time structures reflecting and expanding Dimension 1. The set of structures include interpulsation, composite pulse, simultaneous pulse, super pulse, sub pulse, and sustain. The percussionist improvises phrases of this set that each end on sustain. The time structures relate in a larger sense to the intervals of Dimension 1 that include unison, difference tones, closed intervals, and open intervals, while also having a resultant effect.

The audio excerpt is an example from Dimension 2 with performer/improviser Gerry Hemingway (percussion).

Audio 2: 2_integral infinity_excerpt_2.wav

¹⁰ The audio excerpts listed in the essay can be found on the article home page under “Additional Files.”

Dimension 3 combines the continuation of percussion pulse structures from Dimension 2 into resultant super pulse and sub pulse occurrences, a soloist expanding on these occurrences, and the rest of the ensemble on conducted gestures inter-pulsating with this while utilizing sequential pitch sets abstracting Dimension 1 with chromatic elements.

The audio excerpt takes place in the middle of Dimension 3 to show these interactions. The performers/improvisers are Gerry Hemingway (percussion), soloist David Taylor (bass trombone), Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (woodwinds), Ned Rothenberg (woodwinds), Ray Anderson (trombone), Mark Helias (bass), and myself (conductor).

Audio 3: 3_integral infinity_excerpt_3.wav

Dimensions 4–5

Dimensions 4 and 5 are built on simultaneity layers, intersections of materials, shifts of the pitch axis, and more gestural involvement. These are expansions of materials from Dimensions 1–3 into different forms.

Dimension 4 is in four segments, the first of which is shown in Figure 2. The other 3 segments utilize the same format on different pitch axes. The four segments move the pitch axis from F# to G# to G to E, similar to the chromatic pitch sets of Dimension 3, now as axes. This first segment on pitch axis F# shows the format of three choices for the performer (m. 1, m. 2, mm. 3–6) to play in any order in staggered timing, until the intersection improvisation is cued in m. 7. The tempo range is indicated as 88–120 BPM. Dimension 4 continues this format across the next three segments.

$\text{♩} = 88-120$ **Play the three sections in any order. Stagger timing.**
Continue until improvisation is cued.

The score is written for two staves per system. The first system is marked [1] and [2] with a mezzo-forte (mf) dynamic. The second system is marked [3] and has a 3-measure rest. The third system has a 5-measure rest. The fourth system has a 5-measure rest and ends with a diamond-shaped cue symbol labeled 'on cue' and 'intersection improvisation'.

Figure 2: Score excerpt from “Integral Infinity,” Dimension 4.

The audio excerpt shows this segment with performers/improvisers Yoon Sun Choi (voice), Marty Ehrlich (bass clarinet), Ray Anderson (trombone), and David Taylor (bass trombone). The lower-pitched instruments transposed the written octave to their range.

Audio 4: 4_integral_infinity_excerpt_4.wav

Dimension 5 is a sequence of six small groups of performers playing intersection improvisations. The term ‘intersection’ indicates to performers to alternate unison and independent improvised material within the group. The instrumentation of each small group is pre-assigned and rotates so every performer is in one or two of the small groups. The rest of the ensemble plays the interspersed conducted gestures on cue when they are not in the small group. The gestures include Shapeline, Resonate, Interpulsate, and Resultant Pulse, expanding on the time domains of Dimensions 1–3, in gesture form.

These gestures and the gestures for the whole piece are defined in a lexicon as part of the performance notes. To summarize, Shapeline is to respond musically to shapes shown by the conductor, comparable to live graphic notation. Resonate is to expand the current material through adding fullness of pitch, timbre, and sustain. Interpulsate is to create composite pulses in relationship to the current material. Resultant Pulse is to play a pulse that intuitively emerges from the current

material (i.e. sub pulse, super pulse). The usage of these gestures during the small group intersection improvisations is a macro realm of creating synthesis.

The audio excerpt shows one of the small groups with the rest of the ensemble interspersed through gestures. The small group is Ned Rothenberg (alto saxophone), David Taylor (bass trombone), and Gerry Hemingway (percussion). The ensemble is Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (woodwinds), Ray Anderson (trombone), Mark Helias (bass), and myself (conductor).

Audio 5: 5_integral infinity_excerpt_5.wav

Dimensions 6–8

Dimensions 6–8 integrate the elements into a high-energy threshold chart with five layers of materials in staggered time with accelerations and decelerations. The parts are written to work together simultaneously with generous stagger while maintaining the notation sequence. The pitch axis alternates between pitch E and pitch F#, creating the first oscillation between 2 axes in the piece. This contributes to the threshold energies of the section. The form is a bass and percussion introduction, the chart as written, the chart with solo improvisation, and an ensemble improvisation relating to the soloist that incorporates the Shapeline gesture. The build creates synthesis as a resultant peak energy culmination.

The score excerpts show the opening measures of Dimension 7 and the shifted axis later in the chart.

Stagger Timing
 ♩ = 68-84 on cue shapeline speed

Open *mf*

Open Soloist *mf* 1x as written, 2x solo

Open *mf* stagger entrance of each phrase

Bass *mf*

Perc. *mf*

Figure 4: Score excerpt from “Integral Infinity,” Dimension 7, mm. 1–2.

shapeline speed

Open *mf*

Open Soloist *mf* 1x as written, 2x solo

Open *mf* stagger entrance of each phrase

Bass *mf*

Perc. *mf*

Figure 5: Score excerpt from “Integral Infinity,” Dimension 7, mm. 13–14.

The audio excerpt has part of the introduction with performers/improvisers Mark Helias (bass) and Gerry Hemingway (percussion), followed by the chart with soloist Ned Rothenberg (alto saxophone), and part of the chart improvisations with the ensemble Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (woodwinds), Ray Anderson (trombone), David Taylor (bass trombone), and myself (conductor).

Audio 6: 6_integral_infinity_excerpt_6.wav

Dimension 9

After this build in the piece, Dimension 9 is a sub resultant concept with slow meditative sequences of pitch axes utilizing heterophony, drones, and soloists with group intersections. There are six notated segments that all start on a unison pitch, move into a heterophonic pitch axis line at BPM 72-92, and culminate in an improvisation on the pitch axis with a soloist and intersecting ensemble. The soloists are pre-assigned as a rotation within the performers/improvisers designated for Dimension 9. The sequence of pitch axes is A-G-C-G#-B-D. As noted earlier, starting on pitch axis A has a subdominant implication to the prevalence of pitch axis E in the piece, but the sequence of axes in Dimension 9 subsequently shifts away from tonality. The sequence was intuited as shifts in frequency tunings.

This score example shows the first line on pitch axis A.

♩ = 72-92 Start each line in unison, then stagger. Time: 30"

mf

soloist: pitch "A" axis
rest of instruments:
improvise with pitch "A" axis

Figure 6: Score excerpt from “Integral Infinity,” Dimension 9, Line 1.

The audio excerpt is the 5th line on pitch axis B with performers/improvisers Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (bass clarinet), Ray Anderson (trombone), and Dave Taylor (bass trombone). The lower pitched instruments play the notation transposed down to their range. The soloist is Ray Anderson (trombone).

Audio 7: 7_integral_infinity_excerpt_7.wav

Dimensions 10–11

Dimensions 10–11 are conceived as expansions. Dimension 10 has slow moving lines extending from pitch E, reminiscent of Dimension 1, now with melodic intervals up to a 9th. The lines are the

basis of a trio improvisation while the rest of the ensemble intersperses the composed lines on cue in stagger, creating multiple layers within the material. The percussionist in the trio utilizes time structures including interpulsation, multiple pulse frames, acceleration waves, and sustains, expanding these elements of the piece. The layers work together to both solidify and expand the synthesis of the piece.

The score excerpt shows two of the lines. (Each line is repeated once in the notation, totaling four lines.)



Figure 7: Score excerpt from “Integral Infinity,” Dimension 10, Lines 1 and 3.

The audio excerpt from the middle of the section shows the staggering of composed lines while the trio improvises extensions. The trio is Jane Ira Bloom (soprano saxophone), Mark Helias (bass), Gerry Hemingway (percussion). The ensemble is Yoon Sun Choi (voice), Marty Ehrlich (woodwinds), Ned Rothenberg (alto saxophone), Ray Anderson (trombone), David Taylor (bass trombone), and myself (conductor).

Audio 8: 8_integral_infinity_excerpt_8.wav

Dimension 11 shifts to ethereal textures. This section features the cymbals on harmonics, difference tones, and resultant pulses, while the ensemble is conducted on pitch axis B with gestures Shapeline and Split Body Pitch Fader (Long Tone, Vibrato, Resonance, Timbre, Harmonics/Multiphonics). The split body indicates that half the ensemble follows the left side, and the other half follows the right side, allowing the conductor to layer the faders and timings into two planes. The expansions of pitch B together with the cymbal spectra culminate the sequence of resultant vibrational shifts that take place in the piece and the transcendence expression of “Integral Infinity” as a whole.

The audio excerpt is the end of the piece showing the cymbals and the ensemble layers in the gestures. The performers/improvisers are Gerry Hemingway (cymbals), Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (woodwinds), Ned Rothenberg (alto saxophone), Ray Anderson (trombone), David Taylor (bass trombone), Mark Helias (bass), and myself (conductor).

Audio 9: 9_integral_infinity_excerpt_9.wav

“At the Intersection of Eternity and Time” (2021) is a collaborative piece between Gerry Hemingway as percussionist/improviser/composer and me as composer. The piece is inspired by fountains as representations of the vibrational flow that occurs as a result of this intersection. The piece is dedicated to William Jastrow, my high school band director, conductor/percussionist, who inspired me to pursue music professionally. At our annual visits in adult life we meet at fountains as a symbol. The music collaboration between Hemingway and me over many years represents the flow of fountains in collaboration form, along with the influence of his music since my early professional years. In the extreme circumstances of the pandemic, these concepts and experiences synthesized for hope and transcendence.

The score of this piece utilizes text notation and graphic notation. Hemingway developed a percussion instrument of stacked custom cymbals on a hi-hat stand with resonators, bows, mallets, and handheld cymbals for the piece. The total length of the piece is approximately 15 minutes.

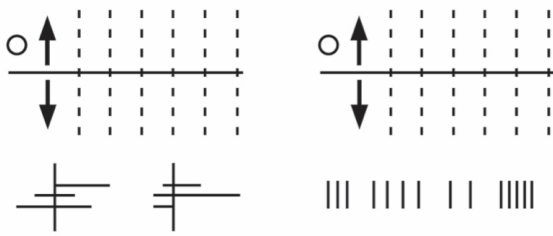
The composition is written for Hemingway’s pioneering musical language. The piece builds on our collaboration since 2011 on solo pieces, including the album *Reality Axis* (SyncSource Label, 2018). As primarily an ensemble composer, I have been inspired to write solo pieces for Hemingway’s language, his ability to play multiple layers of materials that interact, and his intuitions. The pieces are sculptural structures for these realms. I consider the pieces to be a form of inner network arts.

The elements of the piece “At the Intersection of Eternity and Time” include time multiplicities, time framings, generative time, timbral axis, harmonics, phasing, nodes, and the instrument itself as an intersection. The metaphorical fountains are realized through layers of resultant synthesis.

The piece is in three dimensions. Dimension 1 is a structure that builds on layers of gradient time multiplicities and sounds the resultant nodes. This is played on a handheld cymbal with bowing, soft mallet, and mouth resonator for these planes. The multiplicity widens the time, the phasing activates networked layers, and the nodes sound perceptual intersections. Then intuited resultant nodes are played as vibrational synthesis.

The score excerpt shows two segments from the middle of Dimension 1. The graphic notation is a representation of the text notation.

Integrate cymbal phasing alternating a multiplicity of rhythmic phrases and multiple pulse frames.



Shift to soft mallet and mouth movement as cymbal resonator. With soft mallet, play the multiplicity of rhythmic phrases and multiple pulse frames faster. With mouth movement, open and close at the rate of the nodes of the phrases.



Figure 8: Score excerpt from “At the Intersection of Eternity and Time,” Dimension 1.

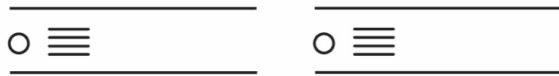
The audio excerpt from Dimension 1 shows these segments.

Audio 10: 10_at the intersection_excerpt_1.wav

Dimension 2 builds to nodes through harmonic spectrum, difference tones, generative rhythms, and waves of acceleration/deceleration. The handheld cymbal is attached to the entire percussion instrument constructed by Hemingway and the full instrument is utilized in Dimension 2 with two bows. The expanse is more focused on timbral openings while underlying pulses are phased through the acceleration/deceleration. The use of 2 bows brings out composite layers. Nodes are articulated with the foot pedal of the instrument. At the end of Dimension 2 there is an improvisation on the intuited resultants of Dimensions 1-2.

The score excerpt shows the first two segments of Dimension 2.

Long tones with two bows, maximizing harmonic spectrum and difference tones.



Shift to bowing with rhythms generated from the difference tones and intervallic spaces of the harmonics. Integrate waves of acceleration and deceleration of the pulse of these rhythms.

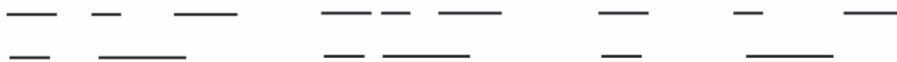


Figure 9: Score excerpt from “At the Intersection of Eternity and Time,” Dimension 2.

The audio excerpt from Dimension 2 shows these segments.

Audio 11: 11_at the intersection_excerpt_2.wav

This is a second audio excerpt from Dimension 2 to show resultant improvisation.

Audio 12: 12_at the intersection_excerpt_3.wav

Dimension 3 adds rolls, polyrhythms, multiplicity axis, and soft mallets. This grounds the materials and creates an axis out of prior elements to modulate the energy for super resultants. The nodes are played with the mallets and bows. Then a doubletime sub multipulse emerges with gradual acceleration and bowed high cymbal harmonics to open the improvisation for the super-resultants synthesis. The piece ends as it started with long tones on cymbals, now on the full instrument with two bows, pulsed, and with resultant rhythms.

The score excerpt shows segments 2 and 3 of Dimension 3.

With mallet heads, launch sequences these elements: rolls, multiplicity of rhythmic phrases, multiple pulse frames, polyrhythms.



Create a multiplicity axis of these elements. Interlocutate the elements. Accent the nodes with mallets or one bow.

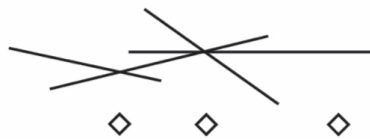


Figure 10: Score excerpt from “At the Intersection of Eternity and Time,” Dimension 3.

The audio excerpt from Dimension 3 shows these segments.

Audio 13: 13_at the intersection_excerpt_4.wav

“**Isomorphic Now**” (2021) is a quartet for open instrumentation in pitch range D4–G5. The concept of “Isomorphic Now” is the present as a shared network of now realities, synchronized and activated through alignment and synthesis, to express composite resonance and resultant energies. The total piece length is approximately 20 minutes.

The form consists of eight Dimensions with similar structures. This form departs from prior pieces to create networks through alignments. The piece is conceived as a synthesis state with resonance in each section. Each Dimension has simultaneous¹¹ staggered composed lines built on pitch and rhythm axes. The quartet starts each measure together on the same pitch, staggers the timing of the four different lines that grow through the pitch/rhythm axis, arrives on the fermata vibrato, and ends the measure together. At the end of each section there is a structured improvisation using a pitch set derived from the whole section featuring a soloist and the rest of the performers staggering intersection phrases. The soloist rotates in each Dimension so every performer has two solos in the piece. The end of the piece is a different intuited pitch set for performers to use while freely alternating between soloing and intersecting within the quartet.

The progressions become longer and evolve throughout the eight Dimensions. The pitch sets progress as intuited frequency shifts. The rhythm axis shifts have a linear development for shaping. They start out moderately, become denser, stretch out into lengthened augmentation, and then reach

¹¹ I use the term “simultaneous” to mean concurrent in this context.

fuller density with longer phrases. This is contrasted by the fermatas at the end of each phrase creating sustained harmonies in vibrato. The harmonies become their own intuited progression and contribute to the alignments for synthesis.

Here are three score excerpts and audio excerpts to show the structure. The audio excerpts feature Robert Dick (flute), Marty Ehrlich (clarinet), Jane Ira Bloom (soprano saxophone), and Ned Rothenberg (alto saxophone).

♩ = 60 Flexible: Start Measure Together, Stagger Timing,
Arrive on Fermata Vibrato, End Measure Together

The musical score consists of four staves, numbered 1 to 4. Each staff begins with a treble clef and a 4/4 time signature. The tempo is marked as ♩ = 60. The score includes the following elements:

- Staff 1:** Starts with a half note G4, followed by a quarter note A4, a quarter note B4, and a quarter note C5. A triplet of eighth notes (D5, E5, F5) is marked with a '3' above it. The phrase ends with a fermata over a half note G4, with a wavy line indicating vibrato.
- Staff 2:** Starts with a half note G4, followed by a quarter note A4, a quarter note B4, and a quarter note C5. A triplet of eighth notes (D5, E5, F5) is marked with a '3' below it. The phrase ends with a fermata over a half note G4, with a wavy line indicating vibrato.
- Staff 3:** Starts with a half note G4, followed by a quarter note A4, a quarter note B4, and a quarter note C5. A triplet of eighth notes (D5, E5, F5) is marked with a '3' below it. The phrase ends with a fermata over a half note G4, with a wavy line indicating vibrato.
- Staff 4:** Starts with a half note G4, followed by a quarter note A4, a quarter note B4, and a quarter note C5. A triplet of eighth notes (D5, E5, F5) is marked with a '3' below it. The phrase ends with a fermata over a half note G4, with a wavy line indicating vibrato.

Dynamic markings (*mf*) and articulation (*legato*) are present throughout the score.

Figure 11: Score excerpt from “Isomorphic Now,” mm. 1–2.

Audio 14: 14_isomorphic now_excerpt_1.wav

trio: stagger improvised breath-length phrases, intersecting with the soloist material

trio: stagger improvised breath-length phrases, intersecting with the soloist material

solo improvisation

trio: stagger improvised breath-length phrases, intersecting with the soloist material

Figure 12: Score excerpt from “Isomorphic Now,” mm. 17–18.

Audio 15: 15_isomorphic now_excerpt_2.wav

6 6 3 3

3

3

6 6 6

Figure 13: Score excerpt from “Isomorphic Now,” mm. 36–37.

Audio 16: 16_isomorphic now_excerpt_3.wav

“Interpolation Space” (2021) is a trio for two instruments in pitch range E1–G4 and computer music. The concept of “Interpolation Space” is to contemplate in-between spaces that derive meaning from surrounding spaces. This engages a liminal network for synthesis. “Interpolation Space” is a concept of synthesis in relief. The length of the piece is approximately 25 minutes.

The form of “Interpolation Space” relates to the form of “Isomorphic Now” with a sequence of Dimensions that have similar structure and subtly shift the internal elements. While “Isomorphic Now” pauses at the end of each phrase on fermatas with harmonies and degrees of vibrato, “Interpolation Space” features pauses that are silences for the interpolation process to unfold in this spatial state. The form of “Interpolation Space” is in four Dimensions. Each Dimension has a section for the two instruments on long tones, timbral shifts, and silences in between notes. At the end of each section, the third performer alternates evolutions of computer music difference tones with silences while the duo improvises with resonance and extensions.

The elements subtly shift during the four Dimensions. The pitches function as frequencies in this slow-moving piece. They shift around pitch centers that mix during the piece between pitches A, E, D, G. The octaves of the pitch centers alternate per Dimension between a lower octave and a higher octave. The length of the tones are generally whole notes and tied whole notes. Dimensions 2 and 4 incorporate a few phrases of half notes for slightly increased motion. The computer music tones have more active internal timing undulating difference tones with difference time that slightly widens throughout the piece while maintaining the perception of long tones. Timbre is a defining element throughout with indications for mutes, multiphonics, and trills/glisses. The trills/glisses appear halfway through Dimension 2 for slightly increased motion, similar to the addition of half notes for time motion.

The audio excerpts feature performers/improvisers Robert Dick (contrabass flute) and David Taylor (bass trombone). The computer music is fixed media I created, performed with intermittent live processing for shaping within the group.

The first score excerpt is from the beginning of the piece to show the opening statement and style. The diamond shapes in the second line indicate muted notes. The circles in the third line specify multiphonics.

Figure 14: Score excerpt from “Interpolation Space,” Dimension 1, mm. 1–29.

Audio 17: 17_interpolation space_excerpt_1.wav

The second score excerpt is at the end of Dimension 1. This shows the transition into the section with computer music. The audio excerpt continues through half of the computer music section.

Figure 15: Score excerpt from “Interpolation Space,” Dimension 1, mm. 41–47.

Audio 18: 18_interpolation space_excerpt_2.wav

The third score excerpt is from the end of the piece in Dimension 4. This shows the addition of trills/glisses and more frequent use of mutes and multiphonics. The computer music section has the

“sim.” indication since the instructions are the same as the initial computer music section from Dimension 1, while the computer music itself is different. The audio excerpt plays through the beginning phrases of the computer music section.

Time: 2'
Trio with Electronics

sim.

Figure 16: Score excerpt from “Interpolation Space,” Dimension 4, mm. 141–163.

Audio 19: 19_interpolation space_excerpt_3.wav

“**Duplexity State**” (2020) is the audiovisual collaboration between Daniel Pinheiro (visual artist) and myself (computer music). “Duplexity State” explores synthesis between duple realms such as two entities, two sides, polarities, and mirroring. The term “duplexity” is conceived as complexity within duple realms and the multiplicity of two performers expressing duple realms simultaneously for composite resultants. This creates a network based on two cores, related to the binary star system sonifications in my piece “Universal Synchrony Music” (2019) from Synchrony Series. “Duplexity State” focuses more specifically on the continuum of duple within the network in addition to the cores. The length of the piece is approximately 20 minutes.

The materials of the piece were created together through concept sharing and file sharing. In performance, the visuals were performed live based on prepared materials. The computer music was

performed as playback of fixed media. The materials are based on layering, mirroring, alternations, and composites.

“Duplexity State” is in a form of four Dimensions progressing as events that synthesize as a whole. Dimension 1 combines visual layering of the two performers and sonic layering of difference tones with intuitive movement. Dimension 2 works with visual mirroring of self and sonic alternations/simultaneities of two tones. Dimension 3 shows visual alternations and combining of 2 selves utilizing split screen. The sound splits with a high pitch drone and a low pitch undulating pulsation that phases between the left and right sides of the stereo field. Dimension 4 has visual mirroring of self with the environment. The sound has a threshold texture of difference tones together with undulating upper register long tones. These configurations of Dimensions have resultants internally and as an aggregate to express “Duplexity State.”

This is a collection of audiovisual excerpts from each of the four Dimensions.

Audiovisual 20: 20_duplexity state_excerpts.mp4

New Directions

New directions in the work include the Transmission Series and intermedia developments.

Transmission Series is my next set of works and collaborations. This builds on Synthesis Series contemplative concepts to expand synthesis through interconnection, new pathways, modes of presence, and resonance for transmission. Similar to the prior sets of series, the Transmission Series will contain solo, chamber, and large ensemble pieces for virtual, hybrid, and in-person settings. The works so far include “Here Mirror” for bass trombone and computer music duo, “Sub Way” for contrabass flute, bass trombone, and percussion, “Transcendence Transmission” for large ensemble, and “Interloculation Flow” for intermedia large ensemble. More pieces will be added to the series. The artistic developments continue the full integrations of composed notations, structured improvisations, gestures, and the performers/improvisers individual artistic languages. The series will be realized over the next 2–3 years.

The intermedia work has been in development since 2020 through the NowNet Arts Lab and the NowNet Arts Hub. I started the NowNet Arts Lab in March 2020 in response to the COVID-19 quarantines as an open call group to contemporary artists and technologists for virtual network arts. The Lab had participants from twenty countries including musicians, sound artists, actors, dancers, visual artists, and video artists. This evolved into the NowNet Arts Hub, a virtual International audiovisual performance group that I direct in partnership with Experimental Intermedia and Harvestworks Digital Media Arts Center in New York. Mike O’Connor is audio technologist and Katherine Liberovskaya is visual director. The Lab and the Hub gave a total of 38 performance

demonstrations during the years 2020–2022 to develop the work, open source technologies, and many more groups the participants created for their work. My pieces for the Hub expand my artistic strategies into large ensemble intermedia scores. The instrumentation is currently musicians, sound artists, and visual/video artists with 16–20 performers/improvisers in each project. This is both a new direction and a reintegration of creative roots as my earliest works were in the multidisciplinary live composing language Soundpainting.

The intermedia work has also emphasized the longtime technical need of a videoconferencing video mixer for contemporary network arts large ensemble. This is currently in development with Mike O'Connor and collaborators.

The new directions in the work will continue to respond to the evolving context regarding virtual, hybrid, and in-person performance with a technological and energy focus on transmission through the works. As the sequence of Source Series, Synchrony Series, Synthesis Series, and Transmission Series continues to unfold, the form of the sequence is clearly paralleling forms in the works, pointing to large-scale systems to define in future writing.

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Appendix: Synthesis Series Performances and Recordings (2020–2022)

May 2022-February 2023: Post-Production for Synthesis Series

Audio Engineers: Peter Karl (New York), Mike O'Connor (Wisconsin)

October 27, 2022: Recording Session for "Interpolation Space"

Mirrortone Studios, New York City

Audio Engineer: James Quesada

Composer: Sarah Weaver

Performers/Improvisers: Robert Dick (contrabass flute), David Taylor (bass trombone), Sarah Weaver (computer music)

September 27, 2022: Recording Session for "At the Intersection of Eternity and Time"

Gerry Hemingway Private Studio, Lucerne

Composers: Gerry Hemingway and Sarah Weaver

Performer/Improviser: Gerry Hemingway (percussion) (Lucerne)

May 8, 2022 2:00 p.m. EDT: Performance and Recording

NowNet Arts Virtual Venue

Audio Engineer: Mike O'Connor (Wisconsin)

Program

"Integral Infinity"

Composer: Sarah Weaver

Performers/Improvisers: Yoon Sun Choi (voice) (New York), Jane Ira Bloom (soprano saxophone) (New York), Marty Ehrlich (woodwinds) (New York), Ned Rothenberg (woodwinds) (New York), Ray Anderson (trombone) (New York), David Taylor (bass trombone) (New York), Mark Helias (bass) (New York), Gerry Hemingway (percussion) (Lucerne), Sarah Weaver (conductor) (New York)

"At the Intersection of Eternity and Time"

Composers: Gerry Hemingway and Sarah Weaver

Performer/Improviser: Gerry Hemingway (percussion) (Lucerne)

“Interdimensional Interconnection” dedicated to Daniel Barritt-Levine

Composer: Sarah Weaver

Performers/Improvisers: Yoon Sun Choi (voice) (New York), Ned Rothenberg (alto saxophone) (New York), Ray Anderson (trombone) (New York), Mark Helias (bass) (New York), Gerry Hemingway (percussion) (Lucerne)

“Isomorphic Now”

Composer: Sarah Weaver

Performers/Improvisers: Robert Dick (flute) (New York), Marty Ehrlich (clarinet) (New York), Jane Ira Bloom (soprano saxophone) (New York), Ned Rothenberg (alto saxophone) (New York)

“Interpolation Space”

Composer: Sarah Weaver

Performers/Improvisers: Robert Dick (contrabass flute) (New York), David Taylor (bass trombone) (New York), Sarah Weaver (computer music) (New York)

December 12, 2021 2:00 p.m. EST: Performance

NowNet Arts Festival, NowNet Arts Virtual Venue

Program

Set 1—

“At the Intersection of Eternity and Time”

Composers: Gerry Hemingway and Sarah Weaver

Performer/Improviser: Gerry Hemingway (percussion) (Lucerne)

“Integral Infinity”

Composer: Sarah Weaver

Performers/Improvisers: Yoon Sun Choi (voice) (New York), Jane Ira Bloom (soprano saxophone) (New York), Marty Ehrlich (woodwinds) (New York), Ned Rothenberg (woodwinds) (New York), James Zollar (trumpet) (New York), Ray Anderson (trombone) (New York), David Taylor (bass trombone) (New York), Stephen Rust (bass) (New York), Gerry Hemingway (percussion) (Lucerne), Sarah Weaver (conductor) (New York)

Audio Engineer: Mike O’Connor (Wisconsin)

Set 2—

“Three States of Wax”

Jonathan Impett (trumpet, electronics) (Ghent), Juan Parra (guitar, electronics) (Ghent)

Audio Engineer: Juan Parra (Ghent)

Set 3—

“I am not where I am?”

Daniel Pinheiro (visual artist) (Portugal)

NowNet Arts Festival 2021 was made possible in part with public funds from Creative Engagement, supported by the New York City Department of Cultural Affairs in partnership with the City Council and administered by LMCC. LMCC serves, connects, and makes space for artists and community.

October 16, 2021 3:30 p.m. EDT: Performance

Outdoor Concert at Harvestworks Art and Technology Building 10a, Nolan Park, Governors Island
New York City

*Rained out, moved to NowNet Arts Virtual Venue, and watch party at Harvestworks

Program

“Sound in Peace”

Composer/Performer/Improviser: Sarah Weaver (spoken voice, computer music)

“Interpolation Space”

Composer: Sarah Weaver

Performers/Improvisers: Jen Baker (trombone), David Taylor (bass trombone), Sarah Weaver (computer music)

“Isomorphic Now”

Composer: Sarah Weaver

Performers/Improvisers: Yoon Sun Choi (voice), Robert Dick (flute), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (saxophone)

This concert was supported by the City Artist Corps Grants program, presented by The New York Foundation for the Arts (NYFA) and the New York City Department of Cultural Affairs (DCLA), with support from the Mayor’s Office of Media and Entertainment (MOME) as well as Queens Theatre.

September 21, 2021 7:00 p.m. EDT: Performance

Outdoor Concert at Washington Square Park, New York City

Organized by Zürcher Gallery

Program

“Sound in Peace”

Composer/Performer/Improviser: Sarah Weaver (spoken voice, computer music)

“Interpolation Space”

Composer: Sarah Weaver**Performers/Improvisers:** Jen Baker (trombone), David Taylor (bass trombone), Sarah Weaver (computer music)

“Isomorphic Now”

Composer: Sarah Weaver**Performers/Improvisers:** Yoon Sun Choi (voice), Jane Ira Bloom (soprano saxophone), Marty Ehrlich (saxophone), Ned Rothenberg (saxophone), James Zollar (trumpet)

This concert was supported by the City Artist Corps Grants program, presented by The New York Foundation for the Arts (NYFA) and the New York City Department of Cultural Affairs (DCLA), with support from the Mayor’s Office of Media and Entertainment (MOME) as well as Queens Theatre.

May 23, 2021 2:00 p.m. EDT: Performance

NowNet Arts Virtual Venue

Program

“Infinite Beauty”

Composers: Mark Dresser, Sarah Weaver**Performer/Improviser:** Mark Dresser (bass) (San Diego)

“Isomorphic Now” (Premiere)

Composer: Sarah Weaver**Performers/Improvisers:** Yoon Sun Choi (voice) (New York), Julie Ferrara (oboe) (New York), Marty Ehrlich (clarinet) (New York), Jane Ira Bloom (soprano saxophone) (New York), Ned Rothenberg (alto saxophone) (New York), James Zollar (trumpet) (New York)

“Interpolation Space” (Premiere)

Composer: Sarah Weaver**Performers/Improvisers:** Ray Anderson (trombone) (New York), David Taylor (bass trombone) (New York), Sarah Weaver (computer music) (New York)

“At the Intersection of Eternity and Time” (Premiere)

Composers: Gerry Hemingway and Sarah Weaver**Performer/Improviser:** Gerry Hemingway (percussion) (Lucerne)

“Integral Infinity” (Premiere)

Composer: Sarah Weaver

Performers/Improvisers: Yoon Sun Choi (voice) (New York), Julie Ferrara (oboe) (New York), Jane Ira Bloom (soprano saxophone) (New York), Marty Ehrlich (woodwinds) (New York), Ned Rothenberg (woodwinds) (New York), James Zollar (trumpet) (New York), Ray Anderson (trombone) (New York), David Taylor (bass trombone) (New York), Mark Dresser (bass) (San Diego), Gerry Hemingway (percussion) (Lucerne), Sarah Weaver (conductor) (New York)

April 2020: Post-Production for “Duplexity State”

Engineer: Daniel Pinheiro (Portugal)

March 28, 2020 2:00 p.m. EDT: Performance

NowNet Arts Virtual Venue

Program

“Duplexity State”

Composers/Performers: Daniel Pinheiro (visual artist) (Portugal), Sarah Weaver (computer music) (New York)

“NowNet Arts Lab Jam”

Open Forum for Soundpainting and Improvisation by any artists in attendance

“TN_World20”

Led by Juan Parra (Ghent)

March 26, 2020: Recording Session for “Duplexity State”

Private Studios of Daniel Pinheiro (Portugal), Sarah Weaver (New York)

Composers/Performers: Daniel Pinheiro (visual artist) (Portugal), Sarah Weaver (computer music) (New York)

March 20, 2020 8:30 p.m. EDT: Performance

Experimental Intermedia, New York City

Sarah Weaver with David Taylor and Daniel Pinheiro: Synchrony Series, Duplexity State

Program

“Sound in Peace”

Composer/Performer/Improviser: Sarah Weaver (spoken voice, computer music)

“Symmetry of Presence”

Composer: Sarah Weaver

Performers/Improvisers: David Taylor (bass trombone), Sarah Weaver (computer music)

“Duplexity State”

Composers/Performers: Daniel Pinheiro (visual artist) (Portugal), Sarah Weaver (computer music) (New York)