Voices, windows, bubbles: notes from a vocal ensemble's continuing distanced experiments

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Abstract

This article shares the experiences of vocal ensemble HIVE Choir as it navigated the transition from in-person to online singing amidst social distancing measures imposed due to the COVID-19 pandemic. The article describes the rapid shift to online collaboration: the reconfiguring of practice rituals, technological adaptation amongst a group with unequal resources, and evolving conceptions of presence and participation. Two main methods emerged in HIVE's co-ordination of improvised network music for voice: (1) Real-time online performances and (2) Asynchronous remote recording collaborations. These include real-time online performances conducted over consumer web conferencing software and specialist audio streaming software, along with various layered ensemble and "exquisite corpse" style methods of asynchronous remote recording collaborations. These different methods present an opportunity to review the evolving nature of group engagement and participation through remote collaboration and raise questions about how these new working methods might be sustained or developed in the future.

Keywords: voice, ensemble, improvisation, network music

Biography

John D'Arcy's work involves live performance and technology, voice-based intermedia artwork, and site-specific storytelling and song-making. His work has been broadcast on BBC Radio Ulster and Resonance FM, and featured at NI Science Festival, The Science Museum, London; Belfast Festival at Queen's; Cathedral Quarter Arts Festival; Household Belfast; and Happy International Samuel Beckett Festival, Enniskillen. John directs HIVE Choir, an experimental vocal ensemble working with found texts and improvisation. He lectures in digital media at Queen's University Belfast.

Introduction

When HIVE Choir transitioned to online meetings in March 2020, we had just cancelled a live performance in Belfast's Sunflower bar (note 1). Shaken by the changes taking place in life outside HIVE, our online regrouping satisfied social need rather than artistic drive. We did not have immediate notions for exciting and experimental lockdown projects but we were soon bolstered by viral videos of people singing across balconies and Zoom choirs.

While the COVID-19 pandemic has affected music makers in all quarters, those working with voice have been particularly prominent in the media, both in good-news stories and in cautionary tales. A series of COVID-19 outbreaks were reportedly linked to choir rehearsals [Charlotte 2020; Hamner et al. 2020; Read 2020], and a reported super-spreader event in the Northwest of Ireland was allegedly traced to a microphone passed around at a karaoke party [Quinn 2020]. In mid-2020, Public Health England published a specific set of guidelines related to the risks of singing amidst the pandemic [PHE 2020], but a more recent study suggests that singing may not carry a more significant risk of virus transmission than speaking [University of Bristol 2020].

Amidst uncertainty around the safety of vocalisation, and with wider lockdown restrictions being implemented, HIVE re-configured its methods to make music online. This practice is typically referred to in literature as Networked Music Performance (NMP) (note 2). A special double-issue of *Contemporary Music Review* on the topic of NMP demonstrated a peak of interest in the topic during the late 2000's [Rebelo 2009a]. 2019 saw a resurgence, with the launch of the new *Journal of Network Music and Arts*, helpfully foreshadowing the massive pandemic-prompted boom of interest in NMP in 2020 [Weaver 2019].

Before addressing HIVE's methods for NMP, this article will briefly outline the group's activities before the COVID-19 pandemic. Then follows a summary of our changing rehearsal methods, followed by a closer look at the main types of NMP employed: (1) real-time online performances and (2) asynchronous remote recording collaborations.

The discussion of real-time online performances compares the group's experiments using both consumer web conferencing software and applications designed specifically for NMP. Key to this discussion is the aural experience of individual singers within these digital environments – both listening through these systems and singing into them. The discussion of asynchronous recording collaborations outlines the iterative and varying methods of video and audio file-sharing in both group fora and private chains informed by varying practices of montage and "exquisite corpse." This analysis brings attention to the residue of the recording processes – the sonic traces of contrasting acoustic spaces, the audible artefacts of smartphone microphones and signal processing, and the propagation of musical ideas.

Finally, two in-person activities that HIVE was able to carry out in late 2020 (due to the lifting of restrictions) are described, sharing how emergent safety procedures presented opportunities for the return of in-person collaboration. The changing working methods across HIVE's varying projects demonstrate an evolving nature of group engagement and participation in remote collaboration, raising questions about how these new working methods might sustain or evolve in the future, which may prove useful for other

practitioners working with voice and/or improvisation through the pandemic.

I write this article as the director and project lead of HIVE Choir. The other ensemble members who contributed to the projects mentioned in this article are Aisling McCormick, Andrew Kenny, Elen Flügge, Emily DeDakis, Eleni Kolliopoulou, Hanna Slattne, Janie Doherty, Marcella Walsh, Marty Byrne, Méabh Meir, Nollaig Molloy, Richard Davis, and Una Lee.

HIVE Choir prior to the pandemic

HIVE Choir was formed in Belfast in 2016 as a vocal ensemble for collaborative improvisation, composition and performance, with revolving membership of Irish traditional, pop, and experimental singers; as well as performers who more strongly root their practice in dance, theatre, and performance art. HIVE compositions and performances are typically based on scores that combine found text with verbal instructions, similar to Cornelius Cardew's *The Great Learning Paragraph 7* (1968-71) (note 3). In trying to continue the "decency" of Cardew's participatory practice [Taylor 1998], HIVE's verbal notation is typically written to invite interpretation by those unfamiliar with the ensemble, including those who might consider themselves "not musical," who can participate using songbooks distributed at performances.

Through 2017-19 our practice primarily focused on composing new music for live performance events coordinated in collaboration with local festivals, galleries, and other arts organisations. As the pandemic began to affect the arts sector as a whole, many of our typical routes to performance evaporated and our impetus to compose was reframed to produce and publish new work online.

A recurring aspect of HIVE's practice is the exploration of performance sites through lyrical content and musical strategies. Site-specific performances have included a series of activities at areas of architectural interest as "artist in *resonance*" at Open House Belfast (2018); and *Word on the Street* (2019), a promenade song-cycle based on Belfast's recent draft cultural strategy and prior reports on its cultural economy (Figure 1). The pandemic would limit HIVE's ability to meet in-person, though relaxed restrictions in late 2020 would allow a set of site-specific performances, discussed later.

Figure 1: HIVE Choir perform *Word on the Street Pt.5 Information*, Castle Pl. Belfast, August 2019.

Perhaps the aspect of HIVE's practice most affected by the pandemic has been the act of listening during ensemble improvisation. HIVE continually revisit the scores of Pauline Oliveros, particularly *The New Sound Meditation* (1989) and Deep Listening scores (1974, 2005), provoking individual exploration of one's place within the ensemble through listening. HIVE's score *Murmuration* (2017) relies on focused listening, with the overarching instruction for individuals to actively engage with the vocalisations of others within the group, seeking out fleeting opportunities for coordination and disconnection. Given this importance of hearing individuals with clarity, HIVE has been fortunate to rehearse in rooms at Sonic Arts Research Centre with ample space to sing and move within dry and isolated acoustics. However, amidst lock-down in mid-March 2020, HIVE's migration from this acoustically ideal rehearsal space to our new space of screens, software and headphones presented a new set of potential listening and collaboration issues.

Together apart: moving from in-person rehearsals with web conferencing

HIVE's in-person rehearsals were substituted with weekly online video calls through Skype. Composing together using printed copies of texts and marker-pen annotations was replaced by copy-pasting into chat boxes and Google Docs. Not so easily replaced by

web conferencing was the clarity and ease of in-person verbal and non-verbal communication. HIVE's scores are typically workshopped and reiterated based on group feedback, a fluid process in the rehearsal room. Web conferencing was subject to interference from housemates, partners and children, and the mediation through which the sounds of our voices were being processed: filtering, data compression, latency and loss.

HIVE has always had a somewhat relaxed approach to consistent participation, dependent on the changing availability and locations of group members. In 2020 this has relaxed further, accounting for the evolving routines of our members through the various lock-downs and re-openings. A positive aspect of online participation is that we have been able to welcome back members of the group who had moved from Belfast to other parts of the island and other countries.

Since March 2020, our usual two-hour session shrunk to ninety minutes, with the understanding that most of us are conducting many other activities on daily web conference calls. The social time at the start and end of meetings expands and contracts, as it did in-person, depending on the members of the group attending on a particular evening. Though Iorwerth and Knox [2019] posit these interactions are essential in building and managing interpersonal relationships they conflict with socially-isolated participants of network music performance.

Much of HIVE's working time in online meetings has been spent planning, rather than singing, with concepts and scores for particular projects typically developed over several weeks. It proved difficult to quickly switch between idea development and singing in the way we could in-person. For projects involving real-time ensemble singing, we typically had to schedule this for separate sessions using different software. Other projects have involved individuals making recordings asynchronously, making it difficult to test ideas during meetings. In both types of project, the workflow of creating scores without immediate feedback was slower and less straightforward than our former in-person rapid-prototyping of scores.

Window pains: singing together with Zoom

The grid video of the virtual choir became a trope of good-news media during the first lock-down of 2020 [O'Connor 2020; Murray 2020; Thompson 2020]. These videos typically involved an asynchronous production process in which singers record their parts whilst listening to a backing track and the recordings are mixed in post-production. Whilst HIVE would eventually adopt some asynchronous approaches (detailed later), in the first stages of lock-down we were yearning for live ensemble singing.

Numerous 'at-home' singalongs were created by plugging into popular web conferencing technology. Some were existing choirs and others were new online ensembles formed specifically for encouraging well-being during lock-down (note 4). However, these groups typically work with Western pop and classical repertoires, where rhythms and tempos would be adversely affected by the audio latency of standard conference calls. The acceptable threshold of delay for performing in sync is 25 to 50 milliseconds, not accommodated by common web conference software [Chew et al. 2004]. Thus, these

choirs typically don't sing in-sync and instead offer a sing-along experience with a guide-track or conductor while ensemble singers are muted [Cronie 2020] (note 5). Some take a less formal approach of passing around a melody, such as *Staying in Tune, An International Online Singing Circle* (2020) coordinated by Sholeh Asgary, Rachel Austin, Bérénice Toutant, and Una Ulla.

As we look to musical styles less dependent on rhythm and tempo synchronicity, there are examples of mainstream web conference software being used for live online performances of the work of Pauline Oliveros's *The World Wide Tuning Meditation* (2007), by Music on the Rebound and the International Contemporary Ensemble from March to April 2020. This is an apt repertoire choice given Oliveros's advocacy for telematic music [Oliveros 2010].

HIVE Choir's first instincts were to perform within the web conference space now inescapable in work and social life. We first tried singing on Skype with some simple exercises and scores such as our own *Murmuration* and Oliveros's *New Sound Meditation*. Whilst the audio latency wasn't a major issue given lack of set tempo in these improvised works, there were problems with the clarity of audio. The biggest problem was being unable to hear the individual voices of the group, making it hard to carry out many of the interactive performance strategies.

We thought Skype's audio processing algorithms might be outperformed by another platform, so we tested a few alternatives: Google Meet, Jitsi, Discord, and Zoom. We tested these across a few sessions and sometimes switched between different software within a single session. Anecdotally, we found Skype the easiest to set up calls and chat but Zoom "sounded" best. Indeed, Zoom became a recommended platform for musicians, due to control settings like the "Turn on Original Sound" option, as well as background noise and feedback suppression settings that are typically not customisable in other applications [Sound and Music 2020; Wardrobe 2020; MacDonald 2020].

However, with Zoom it was still difficult for HIVE to isolate specific voices through the mulch of audio feeds mediated by compression, filtering, noise-reduction, feedback suppression, and automated muting. We realised that Zoom's audio ecosystem would not accommodate our typically interactive improvisation style that relies on close listening to others in the ensemble.

We opted to work with a technique that wouldn't require such close listening amongst the group, but instead would focus on a shared visual stimulus. We looked to a technique often used in HIVE rehearsals as a warm-up exercise – hand signals that are interpreted by vocalists as changes in vowel sounds, pitch, intensity, etc. The hand-conducting technique was used in different ways, with some pieces developing specific mappings of hand-movement to sounds. An example is *Hand to Mouth* (2019), a performance video produced by Nollaig Molloy.

Responding to the spread of anti-viral hand hygiene infographics in early 2020, we modeled our hand conducting style on the movements of hand washing, creating *Guide to Hand Watching* (2020). One performer creates rinsing and washing hand gestures, while vocalists sing vowel sounds that track the opening and closing of a hand's grip as it comes into contact with the other hand.
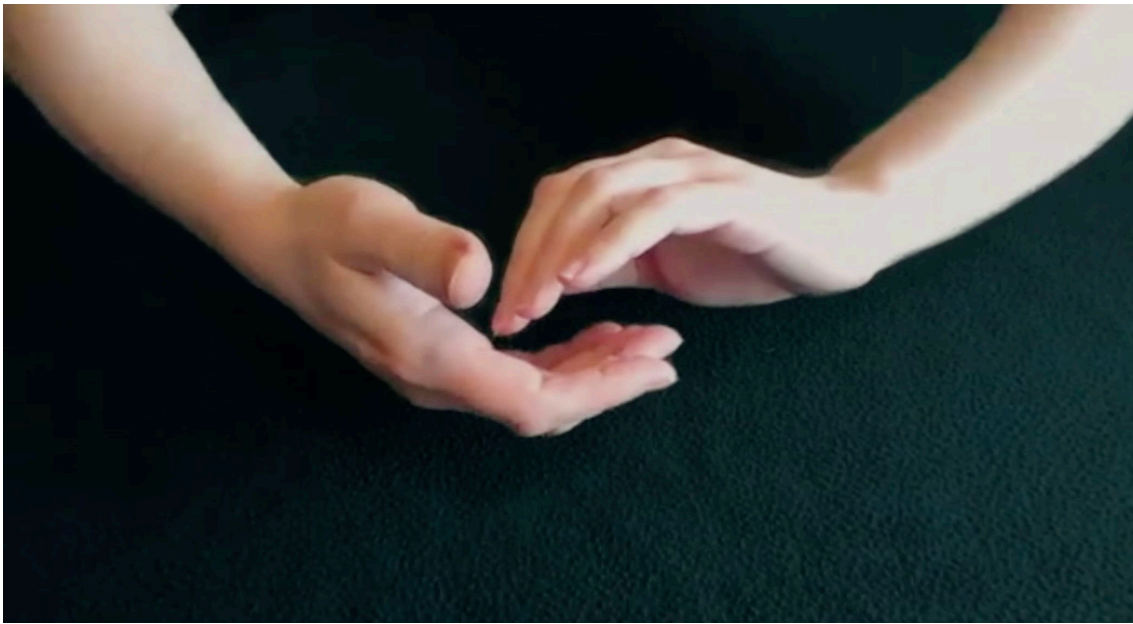
Figure 2: Still from HIVE Choir performance video *Guide to Hand Watching*. Available here.

Technically apt and conceptually timely, *Guide to Hand Watching* served as a suitable performance to test Zoom's capacity for ensemble performance with audio latency tied to the master source of a hand-wringing conductor's webcam. This approach to latency for network music could be categorised under Carôt & Werner's "Master-Slave Approach" (2009). With most performers in the group using built-in microphones on laptops and some on mobile devices or tablets, the audio quality is reflective of the disparity in audio quality across an average Zoom call. The recording made using Zoom's built-in recording functionality increases data compression of both video and audio (Figure 2).

The Zoom recording lacked dynamic interest. It was more difficult to pick out individual voices than during the call. Whilst ultimately dissatisfied with the compressed recording, HIVE was still invested in the work's concept and processes. We turned to the example of other ensembles carrying out production through individual remote offline recording. The video was shared amongst the performers, so that they could record themselves performing in response to the hands a second time. These recordings were then layered onto the original, adding texture and clarity. The final audio for *Guide to Hand Watching* blends the energy of the original live online performance and the "sound" of Zoom, with a degree of fidelity introduced by the additional voices.

More clarity, more… delay: singing with Jamtaba

Following the production of *Guide to Hand Watching*, we sought a solution to hear individual voices within the ensemble with more clarity, alongside the ability to mix and record these as multitrack stems. As discussed, for HIVE the key appeal of working with web conference applications was their accessibility. When looking into specialised music networking tools, things were not so simple.

Surveys of available tools in 2020 recommend longstanding NMP solution JackTrip for increasing audio quality and reduced latency [Alarcón 2020b; Xambo 2020]. However, JackTrip and similar solutions like Soundjack require extensive guided installation and setup on each computer. The technical requirements were a barrier to consistent accessibility, making low-latency audio a non-starter. However, given that our improvised music does not usually adopt a set tempo with beat and measures, a Latency Accepting Approach might hold potential [Carôt & Werner 2009].

A solution to accommodate the multi-track functionality we desired, with some musical strategies for dealing with latency, was found in NINJAM (Novel Intervallic Network Jamming Architecture for Music). This open-source software allows users to create and join public and private servers for multitrack networked audio streaming. A function automatically increase the audio latency on each user's end, so that the feeds synchronise at musical measures. This gives the effect of rhythmic synchronicity, albeit a full bar, or multiple bars "out of time," what Carôt & Werner term a Fake Time Approach.

In search of the best combination of functionality and ease, two members of HIVE tested three software clients for the NINJAM servers: Jamtaba, Jamulus, and Jammr. Jamtaba seemed to be the most feature-rich of the software clients, with more input settings, plug-in compatibility and useful multi-track recording with Reaper compatibility. Jamulus shared some of the features of Jamtaba, and was used successfully by C4 Vocal Ensemble in remote performances [Mountford 2020]. Jammr offered a fairly easy setup but with less mixing and recording functionality than the others.

Ultimately, HIVE chose Jamtaba for its overall functionality and relative ease of setup. Individual check-in calls helped members set up and learn the application, debugging specific problems. This time was described by some as being very stressful, with unsettling silence and loud unpredictable noises and feedback. The main barrier to accessibility was intermittent disconnection for various members of the group during times of poor network quality, related to WiFi signal strength, internet usage across the home, or issues with the network provider.

HIVE's first sessions on Jamtaba in August 2020 focused on simple listening and vocalisation exercises based on existing scores like *Murmuration*. New scores drafted by members of the group specifically for Jamtaba asked vocalists to simulate sonic textures like popping popcorn, or weather changes (mist, rain, storm) (note 6). An ad-hoc take on Cage's *Imaginary Landscape No.4* (1951) invited the ensemble to browse internet radio on their mobile device whilst moving and rotating their speaker relative to their microphone. Some scores notated increases in texture and intensity, with optimistic requests for a climax. The system's latency instead produced continual false endings. *Following Tune* attempted to sue this latency, asking individuals to selectively follow the pitch and vowel sound of a single singer, creating a chain of tuning and de-tuning sprawling across time.

In these early sessions it was soon evident that, although working with a prolonged delay between performers, it was much easier to hear and respond to individual voices. An excerpt recording of *Murmuration* performed on Jamtaba gives some impression of the software's sound world, with occasional dropout from some audio streams and background noise from people's homes (Figure 3).
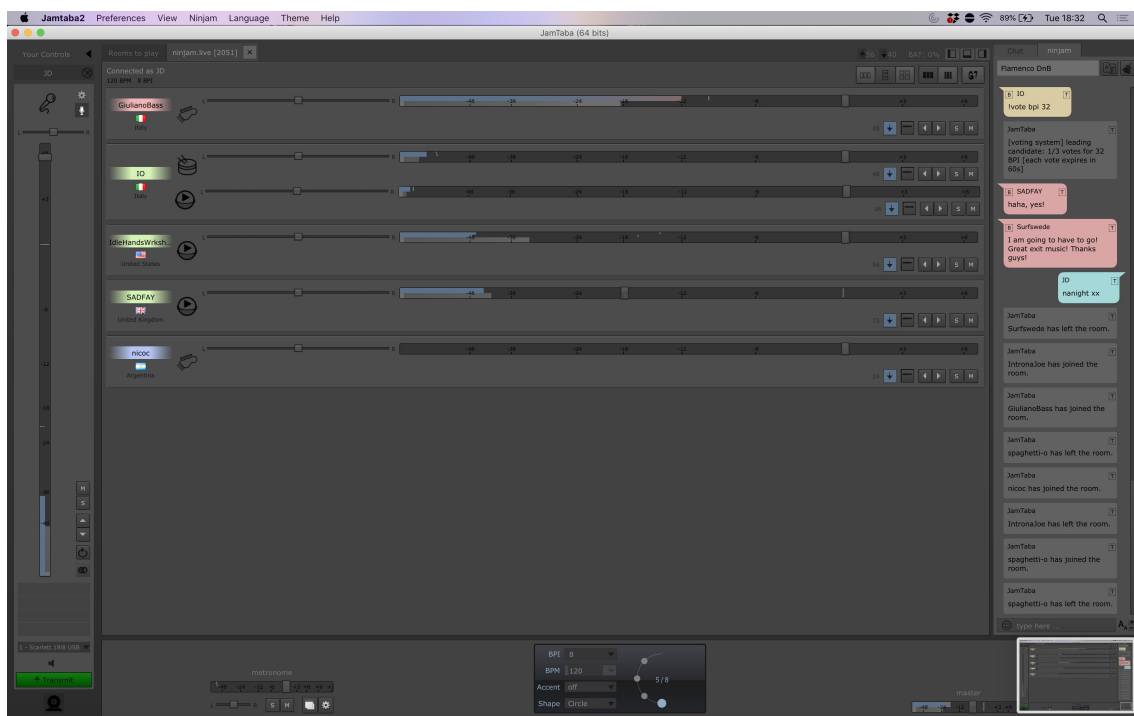
Figure 3: Jamtaba session showing four members of HIVE singing *Murmuration*. Hear an excerpt captured later in the session with more participants.

In the first half of the audio example in Figure 3 there is a clear tempo, since vocalists are listening to the software's metronome, which is linked to the automatic latency calculation. In the latter half, performers have muted the metronome and sing without adherence to tempo, though the ensemble's varying latencies are still being calculated and synced to the BPM. These latencies create an interesting listening experience for the individual. While performing, one's awareness of the time-delay on incoming signals would come and go. Often I found myself singing with the voices of others, convinced of our synchronicity. At particular junctures I'd be reminded of the delay when other singers would repeat musical ideas I had sung some time ago. For them it was probably an immediate echo. With no immediate feedback to confirm that one was being heard by others, it was sometimes difficult to get a sense of the ensemble. But sometimes the latency led to chance synchronicities, opportunities for harmonisation with someone's voice from the past.

Although we made an effort to communicate through text chat while using Jamtaba, it was natural to slip into verbal communication after singing. These instances were like talking into an abyss, since the audio is delayed both on the way to the ensemble and again on the way back. The result is that one waits for ages to hear a reply. Inevitably we would migrate to Skype as a preferred platform for real-time conversation.

Some ensembles enhance the collaborative connection by using video feeds alongside the audio software. HIVE avoided this, to protect the audio connection. Instead of the visual stimulus of one's collaborators, we typically viewed the screen landscape of the Jamtaba user interface: volume meters and fader, chatbox with the score. To focus on listening,

many individuals closed their eyes during performance. We moved between feelings of isolation and connection, distance and intimacy. One could feel strangely close to the distant voices in one's headphones. In those moments the technology invited us to withdraw from the vocal projection typically employed in-person, instead reducing expressions to a whisper. This echoed the stylistic changes in vocal technique that followed the birth of recorded music [Barrett 2005]. Perhaps this was related to individual factors such as insecurity, fluctuating enthusiasm for particular musical ideas, or engagement factors relating to the wider context of time and place. Future scores might employ strategies based on these factors.

Some of the scores produced for HIVE's Jamtaba singing attempted to attentively explore the performer's internal sensations and external stimulation through performance. *We Wish We Were Here* and *Irreconcilable Truths*, written by HIVE's Elen Flügge, asked performers to vocally respond to sensory stimulation in their real-world scenario, then to recall previous places where group members had been together. These activities promoted critical attention to the performer's space and related sensations.

We connected to public NINJAM servers, so other users outside the HIVE ensemble were able to join. The community on these servers in 2020 was mostly comprised of guitarists, bassists, and keyboardists playing genres like rock, blues, metal, and sometimes jazz. Occasionally these unknown instrumentalists would join our HIVE jam and leave immediately. Sometimes they would stay for a while, listen, and comment in the chat. Some of these comments were quoted by Flügge in a new score for Jamtaba, giving an insight into the strangers' impressions of HIVE's music: "This is where the ghosts come to rehearse," "Let the mermaids sing," "There's some girl screaming," and "Haunting Jam." This score by Flügge attempted to create more crosstalk and interactions, prompting singers to speak or sing comments found in the chatbox, with notes on how "HIVErs" might respond to the activity of "non-HIVErs."

Users who joined the server while we were working on a particular score, were sometimes invites to participate. On some occasions they did, interpreting our scores with their voices or instruments. HIVE members were very positive about these moments, excited that strangers were willing to participate in our jam, engaging with our scores.

Overall, HIVE's experience on Jamtaba, while fraught with technical difficulties for some group members, brought clarity to the ensemble's online vocalisation and resulted in some special moments of musical connection. Group members have described our Jamtaba soundscape with the phrases "electric ghosts," "spacey sea," "sonic pandemonium," "chain of rivers," and, perhaps most assuring, "normal HIVEy play." These Jamtaba sessions were arguably the closest we got to the listening and singing experience of an in-person HIVE session. There's great potential for new scores to be developed specifically for the platform, despite the nagging technical issues. Perhaps with more investment in time and equipment, with improved consistency in the network connection across the group, we can dig deeper into the possibilities of Jamtaba and emergent software with similar features, such as Sonobus (released late 2020).

Fix it in the mix: remote-recorded choruses

Having worked with methods of synchronous remote performance, we wanted to see what interesting projects might emerge from a remote recording approach [Carôt & Werner 2009]. As mentioned earlier, many lock-down choirs used this mode to create their chorus by mixing recordings of individual ensemble members singing along to backing tracks. Some examples of these are the Self Isolation Choir, the Stay at Home Choir, and (best pandemic choir name) Choirantine.

In early April 2020, looking out our respective windows, we looked for thematically relevant Irish traditional song that might serve as the basis for a remote recording project. *Craigie Hill* was identified, with it's opening line providing the title for our new project: *It Being in the Springtime.*

Hoping to avoid the sense of strained synchronicity a click-track creates, we defined instructions for individuals to record themselves singing the first verse of *Craigie Hill* in a shared key, but in their own relaxed tempo, where syllables could be stretched to a very slow pace. Similar styles of group improvisation adopted by HIVE in rehearsals have produced an improvised canon harmony, where the group would sing a line or phrase from a popular song in a loop, each individual speeding up and slowing down at will.

Reconfiguring this improvisation style from in-person singing to remote recording would remove the sense of live harmonising amongst singers and introduce a feeling of uncertainty for the individual singer during their recording process. Vocalists used a guide recording to learn the tune and find their starting note, but would make their recording in silence, just hearing their own voice. With vocalists unable to hear other members of the group whilst pacing their notes, they would rely on an inner sense of breath and timing. Ultimately these disparate improvisations would be brought together in post-production where the chance canon harmony and resultant chords would be revealed. To introduce some sense of togetherness, the group arranged to record their voices at an agreed time mid-morning, whilst also recording a video of their view looking out a window at their home.

The recorded audio and videos were collated and edited together, carrying the technological mediations heard in the varying microphone and file compression characteristics imprinted by the devices of the ensemble members. The edit arrangement staggers the vocal entries of different members of the ensemble so that voices with longer, slower recitations began first, with progressively faster, shorter vocalisations added in, building layers. In this edit, some synchronicity was introduced to align start and endpoints of the tune but between these, the individual timings of the singers created chance harmonies and dissonance. The window-view videos were arranged in a grid to evoke a Zoom gallery, though the flipped perspective of turning the camera from one's face to a view outside the home aimed to raise questions about the ways in which we were experiencing this emerging season of spring in our new lock-down modes of daily work and life (Figure 4).

The result work, *It Being in the Springtime (Craigie Hill for multiple windows)*, is a mixture of happy accidents and piercing tension, not totally dissimilar to the kinds of harmonies produced by the group when using the improvised canon style in person. However, key

differences lie in both the internal processes of the singers and in the resultant harmonies. For the individual singer, not hearing other voices (or any guide audio) whilst singing brought a level of uncertainty in how long individual notes should be held, how one's timings might be relating to others, and how well one is staying in tune with the predefined key. Inevitably, the resultant ensemble is less "in-tune," both in terms of tight pitch, and in the harmonies that are often subject to our musical tastes and contexts when we are hearing each other in the room.

Figure 4: Still from *It Being in the Springtime (Craigie Hill for multiple windows)*, available here.

Pleased with the results of our remote recording technique used in *It Being in the Springtime*, we used a similar method in October 2020 to create a new work. Having discussed the prior feelings of uncertainty with timing and tuning for individuals during the recording processes of *It Being in the Springtime*, we decided to use a guide-track for a remote-recording project. We decided to create a new work in response to composer Didem Coskunseven's instrumental drone piece *Home Within (music for a dance film)* (2020). Our new work *Home Within (for Didem)* (2020) would be created by layering recordings of individuals improvising along with the original track. We would each improvise a harmony for the entire duration of the song while listening on headphones. The recordings were synced by aligning the utterances of the phrase "playing now" said by each vocalist as they hit play on the original audio file during their recording. The final edit of *Home Within (for Didem)* retains the ensemble's varying utterances leading up to "now," speaking to the method of the work's making (Figure 5).

As with *It Being in the Springtime*, the remote improvisations recorded for *Home Within (for Didem)*, led to chance moments of harmony, dissonance, connection, and separation within the final mix. However, for most of the vocalists, the use of a guide track was a

welcome addition to the recording process and boosted their confidence whilst recording alone at home. Though we had previously avoided the ubiquitous guide-track usage of the lock-down choir, we could see now how useful it could be, even whilst still avoiding a set tempo and click track. Another departure was the use of effects processing on the voices. In post-production, the voices were effected with a build of reverberation, delay, and distortion effects. These eventually overpower the voices in the middle-section, alluding to and amplifying the artefacts and traces of audio technologies we had been subject to since working at home in isolation.

Figure 5: Mix and Edit view of layered voices in HIVE Choir – *Home Within (for Didem)*, available here.

Pass it on: voicemail songs

The final method of remote collaboration discussed here is the use of an alternative method of remote recording based on sequencing fragmented voice recordings into songs for our *Exquisite Songs* series May to June 2020. Whilst many celebrities collaborated on "smug," "awkward," and "distressing" line-by-line singalongs, we aimed to improvise songs collectively [Caramanica 2020]. Individuals sang one phrase at a time, in a method combining the Surrealist parlour game Exquisite Corpse with the playground game

Telephone.

This method for *Exquisite Songs* emerged from a desire to introduce a sense of interplay between the members of the group whilst asynchronously remote recording. Other remote recording projects relied on all vocalists responding to the same instruction or stimulus, albeit asynchronously. It was hoped that by taking turns and responding individually to different group members, each vocalist would have a distinctive prompt stimulus and thus a unique moment to create their part within the song.

Carrying out this concept required developing a method that would allow individuals to create their song fragments influenced only by the previous singer and without hearing the other members of the group. We planned creating one song each week and drew up a table that dictated the order in which performers would send and receive their lines for each song. We were interested in trying new ideas with each song and responding to different members of the group throughout the process. I created a matrix wherein each vocalist would receive their voicemail from a different person for each song, though Songs 6 and 7 created on the same week shared the same order with a different starting singer (Figure 6).

	Vocalists (A-M) in order of voice-message chain (left to right)												
Song 1	A	B	C	D	E	F	G	H	I	J			
Song 2	C	E	G	I	K	B	D	F	H	J	A		
Song 3	F	I	A	D	G	J	B	E	H	K	C	L	M
Song 4	H	A	E	I	B	F	J	C	G	K	D	M	L
Song 5	L	H	A	E	I	B	F	J	C	G	K	D	M
Song 6	J	D	I	C	H	B	G	A	F	L	K	M	
Song 7	E	J	D	I	C	H	B	G	A	F	L	K	M

Figure 6: Table showing order of vocalists (A-M) in order of voice-message chain (left to right), for HIVE's *Exquisite Songs*.

Whatsapp was chosen as the platform for sharing audio via voice messages, as it was already used for project coordination, gripes, groans, and friendly check-ins. With a range of different devices used across the ensemble, the recordings arrived in a range of file formats (mp3, mp4, aac, ogg, m4a), with a range of artefacts (wind pops, background sounds). Each vocalist would send their recording to the next vocalist in the voice-message chain, as well as sending to me. Once I had received all of recordings, I would edit these into a sequence and share with the group. After sequencing the recordings, we heard the divergent audio quality of individual devices and hints to the everyday sound worlds of the vocalists' domestic spaces. These sounds brought a sense of casual intimacy and connection and so we retained the relaxed approach rather than imposing a stricter, more consistent recording method.

For each song, we developed a different musical prompt for how individuals would

respond to the line they had received from the previous vocalist. *Song 1 - Anything goes!* initiated the project with a simple instruction, to continue the song "in whatever style you want." Likewise, *Song 5 – Get Creative* asked for a "creative" response to the previous line of the song. These loose instructions resulted in divergent styles of melodies and absurd lyrics. *Song 2 – Enjambment* asked vocalists to add a line that finished the sentence of the previous line and started a new sentence, attempting to encourage a sense of continuity of lyric and melodic style. In practice the results were still absurd and melodically divergent, though we could see potential for developing our improvisatory chops with this instruction.

More specific instructions were adopted for, *Song 3 - Mutation* and *Song 4 - Mutation 2.* These restricted vocalists to compose iterations of the previous line with slight changes: "add a word", "swap order", "make a riff from a previous phrase." Whilst some members of the group embraced these creative restrictions, others found the process to be less enjoyable and subsequently found the resultant song less satisfying. It would seem that these members of the group were more tied to the initial prospect of the project to create absurd Exquisite Corspe-like songs rather than veer into techniques such as reiteration. *Song 6 - Roll The Dice* was a gambit to see if a similar sense of fun and enthusiasm could be garnered from a more defined score with an aleatoric prompt: a 1 in 6 chance of receiving a particular instruction (Figure 7). *Song 6*'s chance operations were successful in encouraging more enthusiastic and playful responses than Songs 3 and 4, perhaps showing that the more specific scores could be effective, subject to buy-in from the group.

1. Respond to the previous line with ONE word (spoken or sung).
2. Repeat some or all of the previous line (melody and/or lyrics).
3. Respond with something grouped in threes (lyrical expression, melodic motif)
4. Respond with a chant on a single note.
5. Lyrics on the theme of distraction.
6. Respond without lyrics, just melody (la-la, shang-a-lang, nonsense is allowed).

If your place in the songline sequence is an ODD number and you...
- roll an EVEN number: Do 30 star jumps before you record.
- roll an ODD number: Record your line while doing housework.

If your order in the songline sequence is an EVEN number and you…
- roll an ODD number: Record your line while scrolling a Facebook feed.
- roll an EVEN number: Record your line after holding breath for 100 seconds.

Figure 7: Score for *Song 6 - Roll the Dice*.

We concluded the *Exquisite Songs* project with *Song 7 - Lyric Swaps.* Here, singers would set a lyric from a popular song to the melody of a different popular song. Whichever popular song was used for the melody of the previous song, would have its lyrics used for the next song. This task proved to be a brain teaser but engendered enthusiastic responses as vocalists took the chance to delve into some of their favourites and play with popular music tropes. For example, a pair who sang Beyoncé lyrics over a Metallica melody,

followed by Metallica lyrics over the melody of *Barbie Girl*.

Overall, the *Exquisite Songs* project served as a casual and creative way for the group to explore musical ideas whilst interacting directly with different members of the group each week. Rebelo describes three models of dramaturgy within network music, and although these were primarily defined in the context of live NMP, I feel these models might offer a way to reflect on the difference in interactivity between *Exquisite Songs* and HIVE's prior remote recording projects [2009b]. We could say that the prior remote recording projects like *It Being in the Springtime* are similar to Rebelo's "projected dramaturgy" model, with nodes (performers/contributors) all projecting to an author node, or in our receiving the same stimulus and responding with similar audio outputs to be synchronised in post-production. On the other hand, *Exquisite Songs* better reflects Rebelo's "directed dramaturgy" model, where individual nodes connect to each other in different ways that unseat the central hub node that characterises the "projected" model.

In viewing *Exquisite Songs* this way, we can consider how radically different the process was from HIVE's other work, in establishing unique connections across the ensemble. These offered a chance for individuals to make connections with other vocalists they might otherwise have not. The staggered composition created a mechanism by which we could hear more individual musical characteristics from each vocalist than we get to hear in a group setting (either in-person or online). Although we paused the project in late June 2020, we hope to return to this format in the future, creating more songs and further exploring unique opportunities for cross-ensemble interaction afforded by the method.

In-person after all: restrictions lifted, voices raised?

As some restrictions lifted in Autumn 2020, HIVE had the opportunity to regroup in-person. In October 2020 we conducted two in-person activities involving a small number of the ensemble: 1. a public workshop; and 2. two live performance recordings.

Figure 8: HIVE facilitate Listen to My Ears sound walk stopping at Victoria Square, Belfast. Image courtesy of Trevor Wilson.

The public workshop *Listen to My Ears* was produced in collaboration with Catalyst Arts at their gallery space in Belfast (note 7). The workshop invited members of the public to explore their hearing through a series of listening and sound-making activities, including a sound-walk (Figure 8), and creating a short series of vocal performances based on graphic notation of everyday sonic experiences (Figure 9).

Following available advice at the time, overall numbers of facilitators and participants were tightly limited and the activity took place in a large, ventilated space [ACNI 2020; PHE/EMG 2020]. Social distancing was observed between all facilitators and participants, and activities of vocalisation were limited to short periods. Hand hygiene was encouraged, and all participants and facilitators were provided with plastic visors to wear throughout. Face coverings were worn during the outdoor soundwalk and when participants were seated and moving around the gallery. Plastic visors were worn without face coverings when singing. This presented a distinct tonal characteristic whilst singing, with certain frequencies of the voice becoming particularly resonant due to reflections within one's own visor. As a singer participating in the ensemble, the overall listening experience was compromised due to the amplification of one's own voice caused by the visor and the slight dulling of the voices of the rest of the group caused by their visors.

Figure 9: HIVE facilitate Listen to My Ears workshop at Catalyst Arts, Belfast. Image courtesy of Trevor Wilson.

The workshop received positive feedback from participants concerning both the specific listening and sound-making exercises; and the more general positive feelings of being together in-person for these activities. Unfortunately, Belfast's period of lifted restrictions did not last long, as galleries were soon closed again, before reopening, then closing again just before the end of 2020. This period of time was highly unpredictable for artists practicing in Belfast, who relied on changing and sometimes seemingly inconsistent guidelines.

Later in October, HIVE coordinated two socially-distanced live performance recordings. These were staged in Belfast's Cathedral Quarter as lamentations over controversial plans to redevelop the area [Groogan 2020]. The two performances, *Rise (North Street Belfast),* and *In Agony O'er You* were developed as improvised canons drawn from traditional Irish melodies. The harsh singing style channeled old Irish keening, a traditional vocal performance ritual beside the corpse at a wake [McCoy 2012]. Socially distanced, we situated ourselves in spaces that have been earmarked for demolition and gentrification for more than a decade (Figure 10).

Rise (North Street Belfast), and *In Agony O'er You* were a welcome opportunity to re-engage with the site-specific performance activities that had been central to much of HIVE's practice before the pandemic. Here we reacquainted ourselves with the complexities of the vocal ensemble's sonorities in outdoor real-world acoustics, the contagion of strength and support amongst a group of singers; and the signal loss (for the first time in 2020, not digital) of voices getting caught up in the wind.

Figure 10: Still from HIVE performance video *Rise* (North Street, Belfast). Camera: Samuel Robinson and Cian Flanagan.

Bubbling over: what's next?

At the time of writing, December 2020, the future is uncertain. In November 2020, Public Health England released a set of principles for safer singing, but these suggestions for safe in-person practice will be superseded by wide-scale lock-down restrictions on public meetings in Northern Ireland heading into 2021 [PHE 2020]. As we face mounting virus cases it seems that restrictions will oscillate in severity. In-person activities will have to take place selectively, if at all. From HIVE's online activities thus far, we have made some observations that will inform our ongoing remote practice online and may prove useful to other vocal ensembles as we navigate 2021 and perhaps beyond. These come under three main categories that I will summarise below: 1. People; 2. Sound; and 3. Public.

1. People

As discussed throughout this article, the group communication amongst HIVE, along with the ideas generation and enthusiasm of the ensemble, has been an ongoing consideration throughout the production of varying online projects. HIVE's online projects during 2020 held the ensemble together through a feeling of group investment in the conceptual underpinning of the works, a sense of authorship in the collective improvisation space, pride in working against or despite the odds, and the sheer novelty of our working methods. Perhaps these are common traits for other ensembles working through 2020. However, moving forward there are legitimate concerns about the sustainability of this digital practice in relation to screen fatigue, lock-down fatigue, and exhaustion from the wider effects of the pandemic. It has become apparent within HIVE that we must respect and protect the time and space of the individuals in the group, foster personal connections to retain membership, and be ready to warmly welcome back

individuals who have disengaged whenever they are ready to take part again. Given the increasing likelihood of working online for a longer period than we initially expected, this may also be the time to reach out to invite more collaborations with international artists and to expand the core group of the ensemble.

2. Sound

Another thread of this discussion has been the audio quality of the live streams and recordings. Latency, filtering, distortion, background sounds, and other artefacts are heard throughout the documentation of our projects in 2020. In some of the works, this has captured and amplified the reality of divergent everyday technologies, as well as living and working conditions, amongst the ensemble. Perhaps we live with, or even accentuate, these artefacts to retain an expression of individuality within the group, or it might just have seemed appropriate to the ethos of these works created in 2020. As we move forward, we may look to provide consistent technologies for the ensemble, though this would require external funding and consideration of how and why these technologies may be applied to specific projects. When choosing technological solutions we must also begin to consider the wider sustainability and environmental cost of the technologies we use to collaborate online.

3. Public

What may not have been as evident within this discussion of HIVE's projects in 2020 is the relationship between the work and its publication, promotion, and public engagement. Some works, like videos *Guide to Hand Watching* and *It Being in the Springtime* were shared online, whilst others like the Jamtaba rehearsals and *Exquisite Songs* were documented but not published. This may speak to the differing natures of these projects: the focused and one-off nature of the videos in contrast with the iterative processes of scoring and re-scoring, trying and trying again, of the live network music performances and voice message songs. We may look to ways in which we can package the documentation of those latter projects or harness our learnings into new work that presents as more "publishable." We may also investigate ways of introducing participatory elements that have been key to in-person activities. A solution might lie in live streaming online network performances. This requires consideration of technologies, platforms, audience engagement, and interaction. As we explore, we must retain the iterative and trying-again nature of our work with technology, as Braasch suggests, telematic music systems should be treated as a new instrument in the ensemble, with appropriate new musical strategies deployed and ample rehearsal required [2009].

Looking to future lock-down music with equal parts excitement, unease and exhaustion, I return to one of HIVE's constant beacons, Pauline Oliveros, who gave a simple justification of *why* we should push forward and explore emergent network music technologies and strategies [2009, 434]:

This is the time to dream on. So we dream on!

Notes

1. For more context find an article about HIVE's practice composed via short testimonials from the group on a variety of aspects of their work [D'Arcy et al. 2019].

2. Lemmon [2019] gives an overview of the terminology, differentiating potential sociopolitical implications of the usage of "telematic music" verses NMP, whilst Alarcón [2020] provides two useful lists of first names (Telematic, Networked, Transmission, Relational, Distributed) and last names (Music, Sound, Sonic, Performance, New Media Performance Art, Listening) usually used to describe practices in this area.

3. Lely & Saunders [2012] term this text score format "material" and "performance notes".

4. Fancourt and Steptoe suggest that virtual choirs played a role in mental well-being during lock-downs [2019]. Some virtual choirs with an overarching goal of well-being are subscription-based, like the Got 2 Sing Choir (UK-based), whilst others are workplace sponsored, like the Light and Shade Virtual Workplace Choir (N.Ireland).

5. In 2020 choirmaster Jim Daus Hjernøe produced a series of tutorial videos for using Zoom in classical choral contexts.

6. Some of these performances based on vocalising natural soundscapes were recorded and remixed by HIVE's Marty Byrne for is Song A Day For A Year project in the song *Rain and Games* (2020). link.

7. *Listen to My Ears* was part of a series *Disappearing Wall,* a cross-European project initiated by Goethe-Institut London, coordinated in Belfast by Urban Scale Interventions and Catalyst Arts. More information here.

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Guide to Hand Watching link
Excerpt recording of HIVE session in Jamtaba link
It Being in the Springtime (Craigie Hill for multiple windows) link
Home Within (for Didem) link
Excerpt of *Song 1 – Anything Goes* link
Excerpt of *Song 3 - Mutation* link
Excerpt of *Song 5 – Get Creative* link
Excerpt of *Song 7 - Lyric Swaps* link
Rise (North Street Belfast) link
In Agony O'er You link

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