Maria Sappho

Virtualities. Virtues of an Expanded Socio-Creative World in Experimental Improvised Music Communities

Beth Coleman posits that we now live in the 'X-reality', a place which has demolished the divide between the virtual and the physical binary. This is the new contemporary landscape in which we build our communities, document our lives, and develop our identities. Most recently, there has been an insurgence of contemporary improvised practices which heavily utilise the digital/physical hybrid realm as a creative agent within art. By tracking the socio-creative processes emergent in the Glasgow Improvisers Orchestra's development of an international telematic orchestra, the case for a post-genre, post-nationality and post-human reality of improvised music is presented. A practice which is exhibiting flourishing new approaches to improvised language and skillsets which this paper proposes can be used to counter, critique, and re-think existing hegemonic narratives around technique, mastery and membership and present new possibilities for socio-creative communities. This is a paper investigating how technology might help us, in the words of George Lewis, to "improvise tomorrow's bodies".

This paper deals with the expansion of technology in improvised practice, specifically within the underground spaces of experimental communities. It will tease apart a relationship between niche creative practices and the empowerment offered by new technologies, which will in various ways be seen to afford alternative avenues for claiming space for marginalised bodies and for expanding communities. The empowerment of the digital in improvised practices will be seen to assist in building new forms of communities and the development of socio-creative spaces that are flourishing with experiments in new social orders – places where hierarchies and hegemonic logics are disbalanced and where post-human sentiments abound.

To talk about these new social settings, this paper relies on concepts arising in Beth Coleman's theory of the x-reality, a term that she proposes using to consider contemporary experience that no longer has a clear divide between virtual and physical realities (online and off). This is the new contemporary landscape in which we build our communities, document our lives, and develop our identities: "With the concept of X-reality, I see an end of the virtual or more precisely an end of the binary logic of virtual and real."[1]

Coleman posits that with the influx of digitality and the internet within daily life, 'the real' has expanded and merged with the possibilities of technology. That is, the kinds of 'reality' – the version of reality we might acknowledge, operate, and in which we might be politically active – has multiplied. Put simply, there are more forms of reality for us to engage with that we can modify to make our own. Rather than having online and off-line 'selves', we are now

1 Coleman 2011, p. 20.

hybrid social beings that can perform elements of our identity across both digital and non-digital spaces. This allows the 'digital' self to expand and critique wider 'physical world' restrictions and marginalisations. This is the process of using technology as a vehicle for social change – something that Legacy Russell further proposes can actively be used as a mode of empowerment:

> […] our digital avatars and AFK selves can be suspended in an eternal kiss. A land where we do not wait to be welcomed by those forces that essentialize or reject us but rather create safety *for* ourselves in ritualizing the celebration *of* ourselves. With this, the digital becomes the catalyst to a variance of seldom. […] and through today's Internet, we can find ways to hold those mirrors up for one another. Thus, we are empowered via the liberatory task of seizing the digital imaginary as an opportunity, a site to build on and material to build with.[2]

This paper considers a new, speculative expansion of these ideas, pondering how we might be operating now with 'x-artistic' practices that are in turn also seizing the opportunities afforded by technologies, in particular those that come from niche and rarefied fields such as free improvisation. In x-artistic practices, players no longer define themselves by genre or practice but are rather galvanised by a shared commitment to explore across styles, musical languages and even disciplines within the expanded digital and physical divide. In these ways they represent a contemporary form of socio-creative community that is experimenting in the celebration of niche, abjection, and the diverse new relationships that can be built from human-machine interactions on an individual and community level.

A brief history of human-machine relationships

To contextualise the contemporary use of technology within a brief history of practice, George Lewis reports that free improvisers have been using digital conferencing software (CU-seeme) for networked music meetings since the early 2000s.[3] The community is populated by many forums and groups for telematic improvisation (improvisation made utilising the internet to link distant players in 'real time', see Fig. 1), including Pauline Oliveros's Telematic Circle,[4] the Telematic Improvisation Resources on The Improvisers Network,[5] the Avatar Orchestra Metaverse[6] (a group that meets entirely digitally, forming their own characters/instruments/identity within the video game *Second Life*) and the iconic ensemble The Hub, one of the first networked music groups.

The human-machine improvising relationship also has its own rich history, particularly in explorations of improvising computer programs. Depending on how a system is designed, the affordances given to human and machine variably impact the setup (Fig. 2): Lewis's pioneering *Voyager* system (1986) was specially designed to produce a non-hierarchical relationship between "human leader/computer follower" where the machine might make independent decisions without any human input at all.[7] Other systems offer players more direct agency or control over the machine presence in the improvisation, such as Robert Rowe's *Cypher*,[8] while yet others are designed to recycle performer-based phrases and practices to generate a notion of

2 Russell 2020, p. 27.
3 Lewis 2020.
4 Oliveros 2020.
5 Improvisers' Network 2020.
6 AOM n.d.
7 Lewis 2000, p. 36.
8 Rowe 1992.

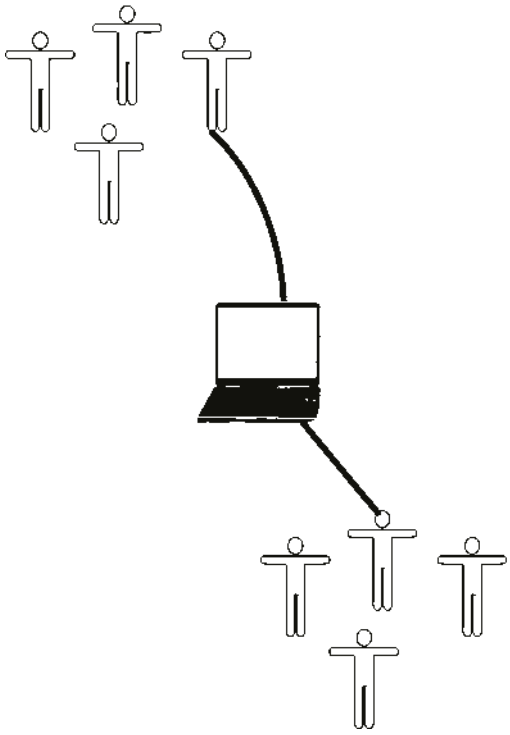

Fig. 1 Telematic music practice, internet-networked performance between distanced players.

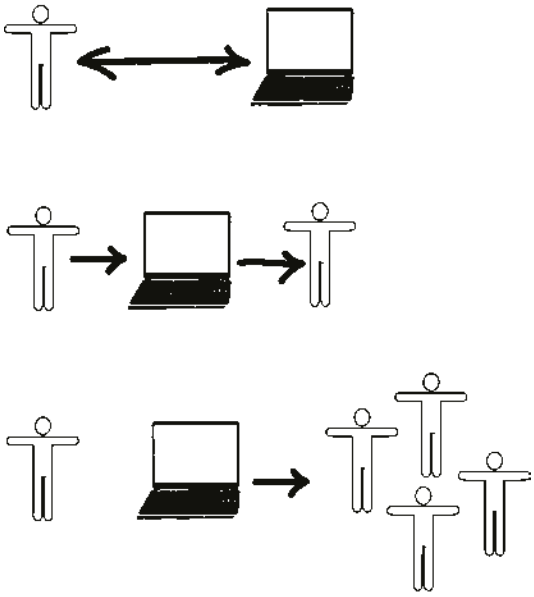

Fig. 2 Human-machine improvising relationships.

expanded self-ensemble, as in Ben Carey's *_derivations*, IRCAM's *OMax* and the present author's own work in developing the *Donohue+* system in collaboration with Samuel Gillies.[9] These are all examples of the curation of relationship: what is being explored, what the hierarchies are, and what outcomes are expected between human and machine actants.

eXtra-musicality

While the advent of new technologies helps mediate, transmit and produce new practices for music, making it also highlights a core element of sonic practices which can often be overlooked, namely the more-than-musical elements of a sonic practice. For example, musicians contributing in the Avatar Orchestra must consider much further-ranging creative questions outside the music they make alone – what kind of body the avatar has, the clothing, as also the kinds of instruments and performance spaces that will be digitally built. And yet these choices are not inherent alone to the practices of technology-assisted art, and the wider history of the practitioner's use of what is often called the 'extra-musical' is a narrative which further centralises this paper's interest in questioning the state of dominant logics and aesthetics.[10]

It is thus useful to have a broader view of the longer history of the 'stuff' 'outside' music, given the biases that contribute towards contemporary logics and further exemplify the artistic example presented later in this paper. For example, both the Feminist Improvising Group (FIG) and Sun Ra and his Arkestra are critically important figures who have contributed a range of mythologised, extra-musical and identity-centred artistic practices. FIG aired the 'hidden' by

9 Gillies/Sappho Donohue 2021.
10 Sappho Donohue 2020, 2021 and 2022.

dressing in drag, personifying gender roles, bringing the domestic to the stage, and they based their practice on living politics and tensions.[11] This is something Maggie Nicols calls a practice steeped in "social virtuosity":

> Within FIG too, there was a range of approaches in the band – even as basic as divisions between the musicians' different class, race and educational backgrounds. But also a range of musical technique, and expectations of what we might do: we were a mix. The politics of FIG were in our social and physical relationships. We were comfortable with physical intimacy. What we had was a *social virtuosity,* a way of being different, and I think we developed a confidence in that.[12]

Sun Ra intentionally expanded and mythologised the casting of self and community: "I'm not real, I'm just like you. You don't exist in this society. If you did, your people wouldn't be seeking equal rights."[13] The Arkestra's practice was one of re-making perceptions of identity as a vessel for nevertheless very real-world politics. Through their musical choices, costumes and stage aesthetics, the Arkestra presented a music of Afrofuturist commentary towards an identity of 'space jazz'. Ra and his Arkestra wore elaborate costumes which enmixed ancient Egyptian and African themes with galactic aesthetics, producing music which was both visually and sonically a representation of a life lived in otherness and erasure. If alienation is a very pressing living experience, then interstellar travel is the place to confront this.[14]

And yet these elements of both groups have often been sidelined, both academically and in their wider public recognition. It was common for European perspectives to trivialise the 'spiritual' and fantastical elements of practices such as those of the Arkestra, considering these as 'escapist', additive, and ultimately 'meaningless' to the music.[15] These sentiments, if seen from the perspective of the Arkestra, only further acknowledged the Black experience of exclusion. Maggie Nicols reflects on similar experiences of trivialisation, commenting on how FIG were shunned from 'music spaces' as their practice was deemed 'performance art' and too political, and they often had their legitimacy as musicians undermined:

> We would play at parodying men, totally improvised, and some couldn't take it, felt threatened. The most notorious was Alex von Slippenbach [sic]. We did our set and the audience loved it, but he complained about 'these women who can't play their instruments, etc'.[16]

I offer these examples in order to draw a line between experiences of precarity and extra-musical virtuosities and to highlight the contributing history when looking at the more contemporary realm of technology-assisted practices. This is in line with the post-human philosophy which has continued to assert the relationship between the 'more-than-human' machine and the parallel narratives of humans who have been marginalised and considered less than human due to wider hegemonic social biases.[17] In other words, when tied into the use and augmentation of artistic practice, technology can be a tool which both assists in experimentation and also offers new approaches for extra-musical expressions which empower underrepresented (and under-respected) perspectives.[18] This paper proposes that it is useful to consider what

11 Smith 2001.
12 McKay 2002b.
13 Sun Ra in Coney 1974.
14 Szwed 1997.
15 See Koopmans 1969.
16 McKay 2002b.
17 Braidotti/Drage 2021.
18 Smith 2015; Krekels 2018; Reardon-Smith et al. 2020; Reardon-Smith 2021.

is 'at stake' when we look at artistic practice, and to do so we must consider the wider socio-cultural contexts. By proxy we begin to unpick the role of artistic practice in the development of our social worlds, a subject all the more prescient as we enter new stages of the human-machine era. In what follows, we turn to an example of socially motivated artistic practices which operate with new forms of technology, extramusical and hybrid practices.

Creating a Global Improvising Orchestra

The Glasgow Improvisers Orchestra is a large ensemble group that has been playing as a band for over 20 years.[19] During the COVID-19 (2020) pandemic, the ensemble was faced with a new challenge in figuring out a way to continue their practice through periods of forced isolation. This was a moment in time when what was previously a niche musical approach, 'telematic music', became a primary source of music-making and a practice which the orchestra has continued to use today. The group have now developed over four years of practice in utilising the digital conferencing software Zoom to host their weekly online music sessions. In this time, more than 150 improvisers have joined from countries around the world, and the online 'global' improvising orchestra now performs at international festivals and events.[20]

By developing a new practice which operates in various ways across physical and digital 'spaces', and due to the longevity of the group's exploration of the medium, it is possible to track the development of new forms of social and hybrid styles of telematic music practices, and how these shifts benefit the community.

The GIO global practice works in adaptable contexts, ranging from entirely internalised Zoom meetings (with no audience present) to complex, hybrid, livestreamed performances with mixed digital and physical players and audiences. Due to this expanded space in which to make music, the identity of the orchestra has also shifted, changing the ways in which the group is able to collaborate, and expanding the possibilities of the music which they present. This is evident in a range of ways. I shall here outline the ways in which players reflect on their relationship with the technology that mediates their expanded membership and creative approaches, and then turn to a specific example of my own work from the 2022 GIO festival which presented the *Concerto for Virtualities and Orchestra* exploring these various post-human practices.

Creating a relationship with a new machine member

Zoom is the central technology which enables the GIO global practice, acting as the performance space, a compositional device, and the social vehicle for the group to expand into international participation.[21] During the process of developing a relationship with Zoom, players in the ensemble acknowledged that this new tool was more than just a platform for making music. They also began to recognise Zoom as a further 'participant' or 'conductor' that in its own way had an influential presence in the improvisations: "Zoom is somehow almost like the final par-

19 GIO n.d.

20 MacDonald/Birrell 2021; MacDonald et al. 2021; Sappho Donohue 2021.

21 While overviewing the complexities of capitalistic influence amidst socio-technical shifts is beyond the scope of this paper, it is of note that the ensemble discussed utilising other software including open access options, but Zoom was ultimately decided as the best current option for widest community access. Discussion surrounding the drawbacks, particularly those for artists in countries where Zoom is banned are discussed in Sappho Donohue 2022, p. 99, and with further reference regarding surveillance culture and shifts in private/public spaces in MacDonald et al. 2025.

ticipant or the kind of the moderator of the improvisation… Zoom is like an additional player or conductor or something that's choosing what we all hear".[22]

In a Zoom-networked music setting, everyone joins from their own physical context. In the early lockdown days these were often domestic settings, intimate spaces of the home. After lockdown eased these became mixed settings, as players began to join from a wider range of locations including inside planes as they landed or took off, the beach, train rides, taxi rides and concert venues. The notion therefore of where improvisation can happen, and who it can happen with, was infinitised, as the practice could now be conducted on a phone kept in one's pocket.[23]

We consider this new form of improvisation as engaging with what we call the 'theatre of home': a new creative setting which allows players to draw upon a vibrant new possibility of 'stuff' to bring into an improvisation. This includes physical contexts (the presence of family members, friends and pets), showing things at hand to the camera (pictures, leaves from the garden, toys), or visual augmentations of self and space which fictionalise or expand the reality of physical locations. We note that this newly flourishing practice assists in new experiments with identity and self-building, and also contributes to a future practice that can be drawn from the digital into the physical when 'real world' practice resumes:

> The virtual/real metamorphosis allowed players to try out new visual/virtual selves in ways that included contemplating new forms of self-presentation/being, one that when they eventually returned to physical venues might be sustainable there. This contemplation was associated with a sense of empowerment. The "theatre of home" afforded, in other words, a "safe space" in which to try out new selves – and to grow […].[24]

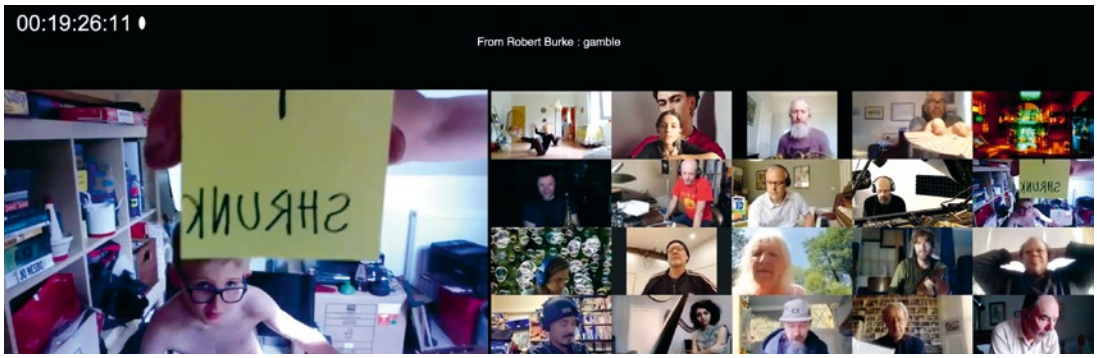

Fig. 3 Still from *Chat Piece,* 9 May 2020, reproduced with permission from the Glasgow Improvisers Orchestra research group (GIO 2021).

The empowering effect of this new practice is exhibited in a number of ways. Individuals began self-reporting a confidence in exploring new activities, whether these were visual, movement-based, or simply an act of stepping away from primary instruments. Within this, a new understanding of physicality and the body in practice has developed, both because we often play at a distance from physical touch, but also because the form of the body easily becomes a vibrant and very present new element of practice (in particular when working in hybrid settings where hospitality must be found between digital and physical bodies).

22 MacDonald et al. 2021, p. 11.
23 Cf. Sappho Donohue 2022, p. 88.
24 MacDonald et al. 2021, p. 13.

> I really embraced the fact that the software was being so selective but it was random… I felt that that was almost like a true free improvisation… (Participant 29).
>
> So in a sense, it's a little utopia that we enter in from time to time… in a way that may sound a little bit corny. That's a world we want to live [in]. We don't want to spend 24 h a day making music on Zoom, but we want to be in a world that everybody has support for each other, everybody is equal, and they respect everybody for what they do (Participant 18).
>
> There's something very intimate about the fact that we are using our devices. We are using our phones. We are using our laptops: it's something that is ours. So we have a kind of attachment to it to this, it's an object, but it's our object. So we are objectivizing the object itself. And we are seeing through our lens, something that is outside. So it's like there's something very rationalism like kind of approach of, you know, not even Cartesian approach but you know, just kind of an idea of the consciousness, like we are here and we are actually observing ourselves all the time. […] (Participant 14).[25]

It is important to note from the above reflections that the players recognise the homogenising effect of the telematic space, one where all players are closer to equal and one in which they are also freer to explore and experiment. In many ways, the shifts in practice found in the digital work of GIO revolutionises many stereotypes of experimental music communities. For example, this is a contemporary era for networked music practice, a practice which was often accessed more commonly by electronic music players – a subgenre that has historically been heavily male dominated.[26] GIO's work in contrast is diverse in gender and age, international, and requires no specialist knowledge for taking part. It now has a history that has been co-developed and is furthermore contributing towards an emergent tradition – a self-sustaining new form of hybrid, improvised, techno-creative culture.

The *Concerto for Virtualities and Orchestra*

The GIO festival in 2022 marked a milestone for the ensemble, its 20th anniversary as a band. The festival celebrated a range of practices from the ensemble's long history, including the presentation of the newly commissioned *Concerto for Virtualities and Orchestra* which presented a large-scale hybrid celebration of the expanded ensemble and newfound post-human relationships.

As the composer of the work, I set out to follow a traditional large ensemble style – the concerto – as a means to explore the various kinds of performing partners that are now possible in an expanded techno-assisted musical practice. The work consists of three movements, each with a separate concerto soloist which emerges from the post-human perspective. The first movement centred Yasuko Kaneko (trombone), one of the GIO global regulars who was attending the festival in person for the first time, coming from Japan. The second movement centred mushrooms (yes, live mushrooms) which emerge from my own practice in making improvised music with the fungal world through custom-built mushroom instruments.[27] And the third movement centred an AI soloist, the AI Chimère, with which the orchestra has previously worked, through my having been involved in the Swiss-based AiiA festival (for experimental art and AI).[28]

25 All interview quotes taken from MacDonald et al. 2021, pp. 11, 6, 10.
26 Rodgers 2010.
27 MacGlone 2023.
28 AiiA n.d.; Chimère n.d.

Fig. 4 Still from the Concerto for Virtualities and Orchestra teaser film (GIO 2024), featuring the first movement with soloist Yasuko Kaneko.

Beyond the three multi-species soloists of the concerto, the piece also included a wider celebration of the expanded practice of the orchestra. This included an entirely hybrid, telematic performance from both physical GIO members and the online Global orchestra, who were projected in space with the band, as well as contributions from members of the Australian Art Orchestra who were invited guests for this year's festival, including Daniel and David Wilfred – the keepers of the Yolgnu manikay (song cycles), a 40,000+ year-old oral tradition from South East Arnhem Land in Northern Australia. As a result of the wider elements of the players involved in this showing of the work, the *Concerto for Virtualities and Orchestra* became a vast celebration of themes including the pairing of ancient and indigenous traditions with contemporary modern technologies as well as central ecological issues, proposing new methodologies for global participation without air travel (Zoom players) and the speculative practice of post-human performance with more-than-human collaborators (mushrooms).

The Concerto is written without a text score. All instructions were given verbally by me, and I also acted as the conductor of the work. My job was to act as the facilitator between the various contributing artists, assisting in the more-than-human collaborations necessary for mushrooms and AI contributions, while also mediating the performances between the physical and digital players. This is a role that I have previously held in works with the orchestra, where I discovered the important role that a physical human body can play when working in these kinds of hybrid and mixed-media contexts.[29] My role as the conductor was therefore a useful tool for mediating between the various kinds of players in this work and towards achieving what the work's title declared, namely a work for 'virtualities' of many kinds. My conducting style roughly followed existing traditions within the free practice of Conduction[30] – a process wherein a series of predetermined hand signals is used to develop shifts in the music, while also operating with new approaches to conducted mediation developed within the Zoom practices of the orchestra – utilising chat functions to signal further information to the digital players online.

29 Sappho Donohue 2022; Argo 2022.
30 Morris 2017.

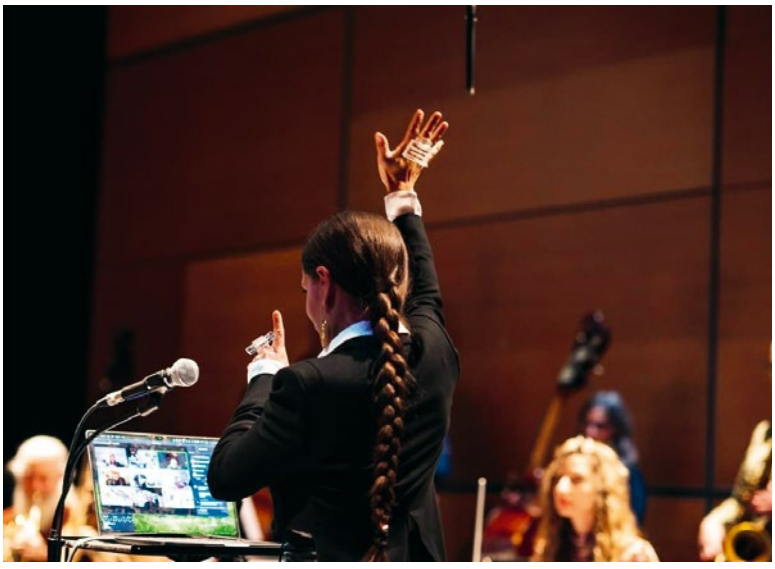

Fig. 5 Sappho conducting GIO (photo by Brian Hartley, stillmotionarts).

Virtualities: The virtues of expanded spaces

While we use the Concerto as a case study here, this piece is in and of itself only an example of the new space that GIO finds itself in after the seismic shifts that occurred as a result of the pandemic's influence on the Orchestra's use of new technologies. As a placeholder for this vast practice shift, the Concerto used the term 'virtualities' in an attempt to encompass all of these lessons learnt over this period – the normalisation of technology at the heart of a creative practice, the involvement of mixed reality performance options, and the acceptance of more-than-human actants contributing within the group itself. The previous years of telematic music practice had encouraged further experimentation with new technologies including AI, meaning that a community practice had taken hold that gave sense to a piece such as the *Concerto for Virtualities and Orchestra*. In fact, the notion of playing with mushroom and AI soloists as part of a huge hybrid orchestra came as no surprise at all to the group. The orchestra had been solidly developing these new skills for exploring hybrid contexts and post-human practices, and did so in line with the group's existing, innately social practices for collaborating in immensely diverse contexts.

This is an example of the way technology is not just an influencing factor but also an element embedded in existing identity. GIO did not figure out a way to accept technology in its practice, but instead applied its existing practices that had been developed over 20 years of work by extending them into making hybrid, multi-virtuality music. Returning again to Coleman: this is an example of the x-reality at play, as physical identities converge seamlessly with the digital to produce an x-artistic practice during moments of new creative experiments.

To the credit of GIO, this process relies on the identity of the ensemble to succeed. In other words, the Concerto was written with the specifics of GIO and its unique social fabric in mind. These are elements of the network behind a group that are imperceptible from the outside but are nevertheless deeply influential and fortify its possibilities for experimenting in new social spaces. Some members of the physical GIO have played together for over 20 years, while others worked with those online for over three years in particularly intimate spaces over the course of the pandemic. Aspects of the performance of this work brought many of the social stories of GIO to life. Kaneko's arrival in person in Glasgow marked a major moment of meet-

ing with those who had grown to know her well online. The choice of her as a soloist in the Concerto was a nod towards her previously digital-only role, something rather dramatically enacted during performance as she hid under the stage, only emerging for her solo after the opening overture of the work – a semi-surprise for many. And Daniel and David's return with members of the Australian Art Orchestra reflects both previous joint concerts with the groups and also the longstanding creative exchange between them, as GIO has sent numerous players (myself included) to an intensive residency to study with Daniel and David and learn elements of their song cycle tradition. Even the more abstract mushroom and AI involvement was intrinsic to the fabric of the GIO community, given MacDonald's involvement in the wider AiiA project and ongoing experiments with the AI Chimère in various GIO settings.

As the composer, but also as a member of the ensemble, these are the themes that mattered to me about this group, and which I feel are critical for us to share with audiences and with the wider field. As the conductor, I am enacting these social bonds, considering the relationships, performance practices and histories of those playing, allowing me to conduct the ensemble (human and otherwise) not only in sonic aesthetics but also informed by a much wider knowledge of the identity and 'stuff' behind a group practice.

With regard to the notion of social virtuosity, it is an enactment of the extra-musical in all of its many forms. It is a process which relies on the skills of the group, the social fabric of the stories behind the individuals in the ensemble, and the shared history of exploration that allows a piece like the Concerto and a hybrid, multi-media, multi-species event to take form. In fact, my choice of the soloists themselves mirrored this, reflecting both the ways in which mushrooms communicate and build social worlds through mycorrhizal networks under the forest floors,[31] and the notion of the neural network which trains an AI like Chimère, which is an amalgamated database of human history, biases, stories and practices. These practices celebrate the social fabric of collaborative work and highlight the new perspectives which might be achieved through experimenting with new mediums (technology and otherwise) and which ultimately, when attended to carefully, are capable of developing immensely diverse forms of practice. These can expand the membership, allowing wider casts of players to be involved, and can present soft but philosophically charged narratives of multi-generational, international, ecological and socio-political works to audiences in a room and beyond.

Conclusions

The concept of the *Concerto for Virtualities and Orchestra* may seem strange. This is partly because our existing canonical approaches for talking about art are not yet well-enough equipped to contend with the shifts emerging from new developments in experimental practice. What is happening now, both within GIO and beyond, has slipped between the cracks of our traditional analytical logic. It is similarly difficult to conceptualise the artistic practices taking place in something like the Avatar Orchestra, or in the new field of AI artistic practice, and increasing attention is being given to new forms of scholarship, musicology, and industry behind these new practices.[32] In this new frontier of technology-enhanced, socio-creative work there is a primacy of new techniques, new virtuosities and real-time work towards developing new forms of community and creative practices in post-human social living.

31 Simard et al. 1997.

32 E. g. the MusAI project researching cultural elements of art and AI (MusAI n.d.), the MUSAiC research project developing new forms of AI musicology (MUSAiC n.d.), and initiatives like the AI song contest for presenting these new forms of music within traditional competition settings (AISC n.d.).

This paper relies on theory emerging from post-human thought which assists in understanding how human-machine relationships are empowering artists with the ability to reinvent the realities of creative practice – where it happens, who it happens with, and why it happens. And yet, if we are to keep up with our developing artistic world, we need to develop new logics to contend with the emerging ideas and practices that are capable of embracing the notions of de-categorisation of artistic genre, the individuation of bodies, or at the very least a greater focus on the social functions of artistic groups and experiments with these new cyborg and hybrid post-human relationships. We are going to need artists, researchers and audiences who are able to translate the x-practices and are able to help tease out what socio-creative shifts are emerging in this quickly developing technological revolution. We will need artists at the forefront of these new inventions to disrupt and question 'progress'.

As we are now more commonly acknowledging, our documents have been biased by a wider systemic exclusion of diverse creative bodies and practices, but we are also now being provided with a very tangible place to tackle these issues within technology. As the practice described here centralises the role of AI, it is possible to raise some of the wider techno-moral and ethical problems of our day, namely that the datasets that we feed these machines to develop their knowledge are biased, have dominant Western/Anglocentric perspectives and challenge our notions of intellectual property. We might therefore seize this as an opportunity, as an analogy, and as a place for experiment. What we have gathered so far as a 'representation of the past' is not enough to draw on for contemporary needs. So much of what we will need for living and dying on our planet is going to involve what has previously fallen between the cracks.[33] This is a call for a more general re-evaluation of the stories, voices and practices that we use for future logic-building and that will greatly benefit from a focus on the fringe, the post-human and the previously peripheral.

To conclude in an open-ended manner: there is great agency to be harnessed for the roles that machines can play in contributing towards diversifying, empowering and re-situating perspectives that have previously been considered rarified.[34] In a tangible way this includes expanding a notion of legitimate practice with regards to merit, mastery of craft, and access to socio-creative space. As with the example of GIO, the diversification of music does not take place only in the use of new methodologies, but also relies on the social network and shared practice logic of the group itself. Technology is poised to be able to assist us in these efforts, as George Lewis states: "The network is the site of the production of knowledge, and the body animates that network. That makes living with creative machines an epistemological practice/project".[35] This is therefore an opportunity to make tangible our ongoing questions surrounding post-genre, post-nationality, and post-human realities, so that we might amend previous exclusions, marginalisations and biases from our past. We live in an age quickly emerging into a vibrant and complex multi-verse – with social realties, creative practices and tools that are x-panded and powerful, offering us a host of new opportunities where we might mediate our contemporary artistic practices and our collective social futures.

33 See e.g. Haraway 2016.

34 See Coleman 2011; Haraway 2006; Russell 2020.

35 Lewis 2007.

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