Taking back control: Taming the Feral Cello

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ABSTRACT

Whilst there is a large body of NIME papers that concentrate on the presentation of new technologies there are fewer papers that have focused on a longitudinal understanding of NIMEs in practice. This paper embodies the more recent acknowledgement of the importance of practice-based methods of evaluation [1,2,3,4] concerning the use of NIMEs within performance and the recognition that it is only within the situation of practice that the context is available to actually interpret and evaluate the instrument [2]. Within this context this paper revisits the *Feral Cello* performance system that was first presented at NIME 2017 [5]. This paper explores what has been learned through the artistic practice of performing and workshopping in this context by drawing heavily on the experiences of the performer/composer who has become an integral part of this project and co-author of this paper. The original philosophical context is also revisited and reflections are made on the tensions between this position and the need to 'get something to work'. The authors feel the presentation of the semi-structured interview within the paper is the best method of staying truthful to Hayes understanding of musical improvisation as an enactive framework 'in its ability to demonstrate the importance of participatory, relational, emergent, and embodied musical activities and processes' [4].

Author Keywords

NIME, practice-led research, actuated cello

CCS Concepts

• **Applied computing → Sound and music computing**; Performing arts;

1. INTRODUCTION

This paper revisits the *Feral Cello* which was first presented to NIME to 2017 [5]. Whilst the first paper was presented at the start of the development of the system this paper re-examines this instrument following a prolonged (four year) period of engagement and development that has incorporated over five performances in an international context [NIME2017, SMC2017, Noisefloor2017, BEAF2018, TIMP2019] and over 125 hours of collaborative practice with performer/composer Laura Reid. With the constant need to publish the new, and with some obvious exceptions [6, 7, 8, 9] it is still a rarity for a paper at NIME to present a longer term study of instrument development and its effect on performance practice. In Cannon & Favilla's 2012 [6] paper about their sixteen year development of the Bent Leather Band's instruments they write negatively of

a common culture in digital musical instruments' (DMI) development of '*disposable* instruments' that are discarded before any long-term '*play is invested'*. As Cannon & Favilla argue a significant investment of play is needed to develop the deeper relationship with the instrument such that the performances can go beyond the 'technological ghetto', and not be 'focused solely on technological innovation' [6].

More recently there has been a growing recognition in the NIME community for the need to recognise and hear the voices of performers and to take into account the act of performance as an active site of research investigation. As Scharcher writes '[w]hen considering this performance mode as a topic for investigation, it becomes evident that in order to be based on practice, research in this field needs a definition and differentiation that helps to identify the specific perspectives that are only made possible through application in an actual artistic practice' [3]. And also Dahl '[t]he NIME designer (and practice-based researcher) is situated within the practice of musical performance, which provides the context within which to interpret the new instrument. The design problem and its solution become gradually more specific through a conversation between the designer and his/her interpretation of the instrument within this context' [2]. A recognition of the specificity of performance as a site of research is also evident in work by Green [1] and Hayes [4] . Green [1] in particular outlines practice-based methods as a way of moving beyond technical concerns to develop "a firmer, more nuanced grasp on complex, vexatious questions of musicality. ' Where as Hayes draws on the fields of enactive cognition to understand music making 'which offers an anti-representational framework for understanding musical activity as both corporeal and culturally-situated action'[4]. Hayes, thus draws on the embodied activity of music making as the site for enquiry within a cultural context.

This paper seeks to draw on these approaches by revisiting the *Feral Cello* after an extended development period that has also encompassed a body of performance practice. We feel it is important that artists working outside of academia who have a contribution to this discussion are able to get their voices heard. As such this article strives to include the voice of the performer/composer that has worked on this project hence the dual authorship of this paper. The authors are aware of discussion around evaluation of NIMEs [for example 10, 11, 12, 13, 14]. However this paper does not conform to a standard user experience study; rather, testimony is presented here directly in a semi-structured interview form. Whilst not bearing the hallmarks of a traditional qualitative methodology of analysis and coding we feel this best addresses the 'complex vexatious questions' [1]. By way of reflection the authors have drawn on the notion of an 'annotated portfolio' [15] to present some of the salient themes in the interview and their relation to ongoing NIME discussion.

2. REVISITING THE FERAL CELLO

This section of the paper seeks to re-present the *Feral Cello* just in enough detail to inform the discussion that is to follow. [A full description of the *Feral Cello* is available here [5] and a deeper reflection on issues of mediated intentionality can be found here [16].
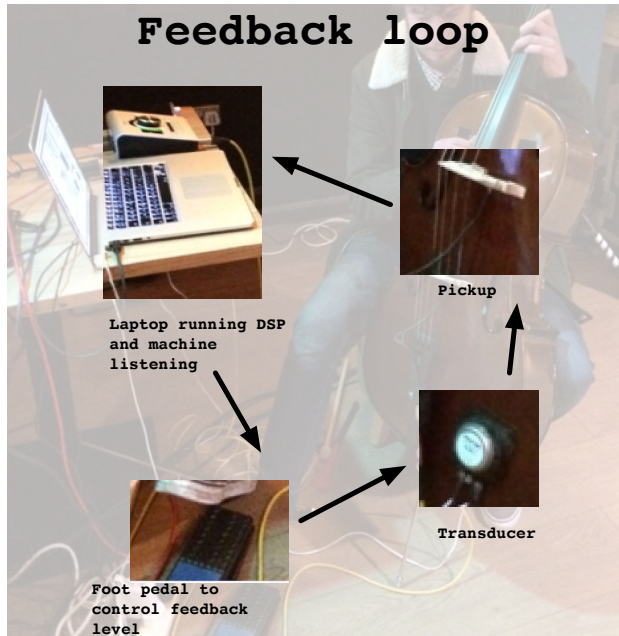

Figure 1. The Feedback Loop.

The *Feral Cello* can be described as a machine-listening-led, actuated feedback instrument. It was first conceived in Jan 2016 as a solo development project by Davis. Its construction was particularly informed by an interest in notions of technological agency in performance practice, particularly post-phenomenological [17] and post-human [18, 19] understandings of our relationships with technology. It is informed by concepts of mediated intentionality [20] and issues around where and how we draw boundaries between ourselves and technologies [21, 22] as we use them live in the act of musiking [23]. The *Feral Cello* was designed to foreground these issues of technological agency by being disruptive technological partner within the performance. The system features a feedback chain which passes the cello's sound from an acoustic pickup, modified by a selection of digital signal processing algorithms back through a transducer on the cello's body.
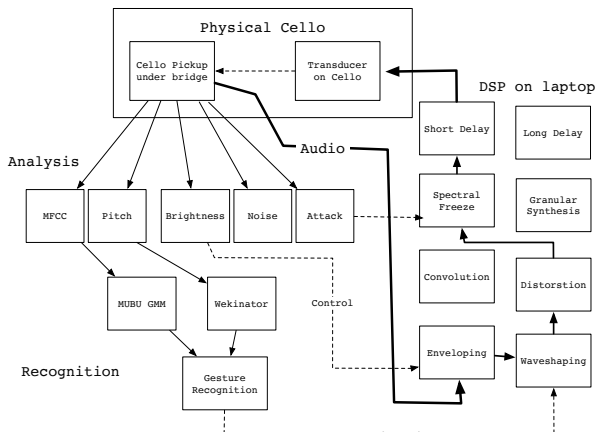

Figure 2. Signal Processing Flow.

It achieves performative disruption by having the ability to re-configure its sonic output, through a change of the DSP feedback chain live in the moment of performance. This change of sound can to some extent be controlled through a process of machine learning of musical cues trained into the system by the performer. However, due to inherent instabilities in the system and errors in the machine learning the cello can switch its operating mode real time in the mode of performance with a variety of reliability of cue recognition. The idea being that this unpredictability then provides a spring board for improvisational performance by not letting the performer settle into consistent mode of operation. A design decision was taken by Davis to develop the system for a cello, an instrument which he does not play. This was to help separate out the roles of developer/performer/composer. Not because there is anything wrong with overlapping of these roles, which is often found in a NIME perspective, but rather that it was thought that more could be learned through collaboration with an external partner that was not focused on the technological development.

3. A WORKING PROCESS

The below details outline the time spent in development of the project to date as well as the public performances and the conceptual talks that have happened alongside this development. They are shown here to show the depth of engagement over the four year period of the project. Plus they highlight the intertwining of hardware, compositional (Reid composed a piece for the *Feral Cello* entitled *Gemmeleg)* and theoretical development that has fed into the development of a performance practice.
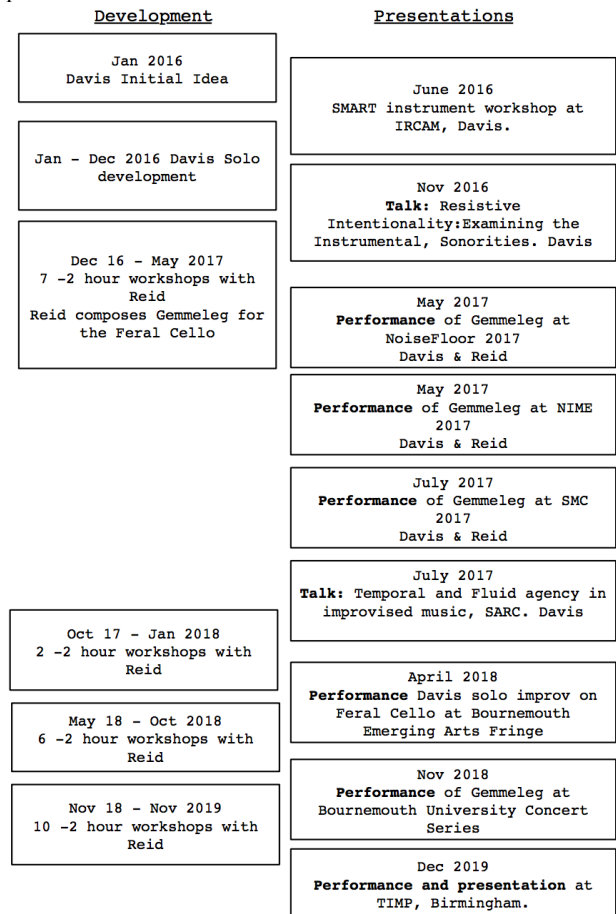

Figure 4. Development timeline.

4. REFLECTION ON PRACTICE

4.1 Interview between Tom Davis and Laura Reid, January 2019.

T– What is your relationship like with your normal cello?

L– It was like a friend. I see it as part of me. It was therapeutic for me growing up. But then I had an injury in my late 20s having toured a lot and I felt like playing the cello was no longer enjoyable for many reasons. I went back for cello lessons. My teacher at the time said she had noticed that for a lot of people who have learnt an instrument from a young age there is this strange psychological thing that happens when you stop it, a part of you goes. I was very depressed, and found other outlets like composing. It is weird, now I am back playing I feel more like my true self. I see it as part of my identity, but through a different perspective. I often see the physical object of the cello as part of my body. It is not always separate, even though it is, and this helps with the ergonomics of playing. If you are performing a lot it becomes part of who you are. Definitely embodied.

As an adult I had to re-learn to play from the beginning

T– Why was that?

L– When I was 28 I got an RSI shoulder problem, which meant my left side just went. It's as if the decision to stop touring and performing froze everything up. I've had 10 years of acupuncture and physiotherapy. It was physically hurting me to play, and it was kind of psychosomatic, both physical and mental. My teacher, Sue Lowe, then taught me technically how to play. Now I know how to make a good sound on the cello technically and physically. Which is about the contact, and the freedom of movement and relaxation of parts of the body ...

I was so much more aware of this, how as a kid I did sport and dance and my teacher once said, you seem to play quite easily, and I took that for granted, but it must have been because I did lots of dance, and my body was quite flexible. But, I never really new the basics of how to make a free sound, or how to hold the bow with ease. I feel a huge amount of control now that I have had to learn again. I'd say that the process of not being able to play and then having to learn to play again, gives a more in depth knowledge of how it works both physically and intelectually. Having had that experience of hurting my body, I am very careful of what situations I put myself in. I used to play lots of experimental music in my early 20s in noisy environments. But the experience of having damaged myself, nerve damage as well as physical and emotional damage, does make me more wary about the risks I take. So whilst on the one hand I'm excited to work with new technologies, I am not prepared to put my body through a physical sensation of pain.

T– How would you define virtuosity on a standard cello?

L– They (the performers) have mastered it. They play with ease.

T– Do you think in that situation the physicality of the cello stops becoming a barrier?

L– I think it is always there for people, but they just work at it constantly. Most people have a practice routine a study or piece they need to get to by next week.

T– You play standard traditional classical music and folk music how does improvisation come into your performance practice?

L– I've always done improvisation. There was also improvisation at home even though my parents weren't competent musicians themselves. To be able to play at home and make mistakes in a home environment can be freeing, and perhaps not everyone has that. It meant that when I went to

Newcastle University, I played with my friend John Ayers, and others who were DJ's and musicians and performed in settings, like nightclubs, cinemas and galleries. I still work with a wide range of musicians and artists and improvisation is just part of the process.

T– How do *you* improvise?

L– It's freeing the mind, not being scared. You don't get session work if you can't improvise. If you turn up to a session in pop music, they tend not to have dots. So you just play along with the track, you just do it. But you do have to be free. You bring your personality and you bring your previous history. Most of my improvisations come from an idea or source that I may have previously played at some point, in my subconscious, but it's a culmination of things. I'm most comfortable in alternative settings. I grew up on a diet of The Specials, Dave Brubeck, John Coltrane and Blondie, along with classical music. That's the sort of sound world I've existed in.

T– You said it's not about being scared. Scared of what?

L– Scared of failure.

T– In the performance?

L– Being judged. It depends on the performance. For me, I wouldn't turn up to a traditional jazz improvisation thing because I don't really know the rules there. I prefer to be in free impovisation settings where there aren't as many rules. There will be implied rules. But they are not rules that you have to follow. I like to be able to go along and then make my own rules up. Sometimes others make the rules and there are too many. So it is about who owns the rules are there who has control. A lot of people say it's free improvisation, yes but if somebody is controlling the rules, it's not actually shared, or it's not obvious.

T– How do you measure success in that scenario then? What is a good improv?

L– Success for me .. a good improvisation, is where I am free and I am not worried about the co-audience or my co-members. I am just connecting with people. So the judgement is taken away.

T– Almost like a mental state you get in whilst improvising, and you feel a sense of flow perhaps?

L– Absolutely, and that could be in the kitchen or in the concert hall. I don't see a difference.

T– You don't mind where the venue is?

L– I do and I don't. It does matter what the context is. I was in a band for a long time. And there was a point at which performing in that band, a lot of it was improvised, if we were in the biggest venue in the world it wouldn't matter because we were in that state. So yes, the venue matters, but you have to be ready for the venue. Or you have to be with people that you have that connection with.

T– That you trust?

L– Yes complete trust. To be yourself, and if you make a mistake they accept it.

T– The Feral cello – I imposed some rules. How did you feel at the start playing with that system.

L– Quite excited and open. Because I knew you already, and there is an implied level of trust that you're going to knowingly push me but not take advantage for me. So there's a difference. I felt the project was about pushing the boundaries of what an instrument could do. There were moments when I didn't take risks, because of my previous injury, and it didn't feel right, but I was happy to keep on going with the project. My noise thresholds were lower than yours, which was fine. It did feel

exciting, as we got further through the process. I did question some things.

T– What bits did you feel you needed to question?

L– The feedback elements. It is an important part of what you are doing and I totally get that. But I did question the placement of the transducers. Eventually I wanted them lower down in the body. I didn't want them near my shoulder or near my ear.

T– And that's because they were too present?

L– Yes and too high up the body. I couldn't handle the instrument vibrating on its own. Thinking about it now, the concept of an independently vibrating cello is weird. Who would want that? You're not making the vibrations. Something else is. It felt invasive. Because, if you think about a cello, it is really within your body. I have worked with students with PTSD / trauma, and the sound the cello makes is often used as a therapeutic tool, I have seen very strong reactions in some of my students. So if you are used to that thing being part of you. You don't want something else invading your space. Or if you do you have to be careful how you manage that. I did find moments when we went to Staffordshire. (the first public performance of the work) where I was nervous. It went quite well. But it was a risk. I thought, what on earth are we doing here? I remember the rehearsal being good and thinking oh this actually works!

T– That's good to know! It affected your ability to relax?

How did it change your relationship .. you weren't playing your cello any more.

L– It had become my cello.

T– Had you by then re-embodied it as an instrument?

L– Yes

T– By the time you did the first gig?

L– I was getting there. Because I didn't want anybody else to borrow it, did I? There's a sense of shared ownership with you that it's our cello. We don't want anyone to mess it up.

T– Did you feel comfortable enough that you could relax into the performance.

L– Still a bit weird. I wasn't totally relaxed.

T– No, I can remember.

L– Nor were you Tom.

T– For me, my role is quite different. If I am doing the computer thing. It's 'does the software run properly' and then that's the success. Because it didn't crash. Which is like stage one in trying to make something. But then you have got to deliver a performance that has performative value. All the emphasis is on you. Did you feel you could do that in gig one?

L– No, not in gig one.

T– At what stage, or have you got to a stage where you can really relax in a performance.

L– I enjoyed the SMC gig, Helsinki. (the 3rd gig in the series)

T– What had changed?

L– We had done it a few times. It was still daunting. But at least we gave it a good shot and there was more… I can now go out on stage whether it be with the *Feral Cello* or another cello and electronics and just play for ½ hour and not worry about it. The process has been definitely easier each time.

T– The idea of success was quite different?

L– Personally I am more interested in what I think. Anybody can have an opinion on anything. It's more important that you are comfortable with what you are doing. Maybe you never like it, but if you are comfortable that you have done what you wanted to do. That is a good result. Regardless of how other people receive it.

T– What about the intrinsic lack of control? How did you feel about that?

L– At the time absolutely petrified. But now I can see it a thing and that is OK. If it's a performance piece, like a more artistic performance piece, that is meant to go wrong, in a gallery space for instance. It's all about the context. If you put yourself in an international conference setting, you want it to go right..

This is what we came to do and we delivered.. I know failure is fine, but I aim to succeed.

T– You obviously composed the piece for it. (*Gemmeleg*) How did you go about it?

L– It began as a sketch really. Trying to work out the parameters. Something that could enable other things to work, like a study a technical exercise. To create different types of cello playing that you could improvise around that you could try and trigger the listening algorithms. It has 5 sections based on the 5 different machine listening triggers. Ideally it would have more structured form like a mobile. For me it felt like the machine listening had to come first and the composition processes had to come second. Music and machine listening are a lovely combination and they vie for importance and there is a tension between the two.

T– In some ways the machine listening is getting in the way of your intentionality which was a philosophical starting point for the project. And you got around that in way by writing a piece where you said, screw you, I'm going to make it do what I want when I want it to do it. And then I've got a safe space to perform in, which gives me the security on stage to do something. And I see that as a way that you managed the ambiguity of the system. Which made it work musically. And this is why we got selected for these performances. I feel it's important that for these conferences that the pieces work musically and are not just a technical demonstration of a system . So I think that it is good that that happened.

T– You were acting as a composer and a performer. Did you feel you wanted to shape it a little bit. Did you want some control?

L– Yeah a little bit. For me, when I've seen you adding the foot controller. (Volume fader for the feedback). That is a welcome addition, and I am relishing using that in the future, playing with feedback is cool, but not if you can't control the feedback. I don't want to deafen myself or another person.

T– So we have extended the sound world of the cello through this process. How do you see the relationship between the electronic and acoustic sound of the cello?

L– I think they are part of it, for the *Feral Cello*. Because the transducers that produce the sound are on the body of the instrument. I want to monitor them closely. I am coming to terms with the sound coming back though the body of the cello more. Realising that it is not going to deafen me, we have set limiters now. Having done years of gigs with potential feedback issues I have been on the receiving end of a bad sound-check. It has to be controlled

T– It is about setting boundaries for settings for things to be unpredictable within. And you need to know what the boundaries are as a performer so you can push them?

L– Absolutely, you do yes. There is no point in having no limits. Or else it would be just a load of scribbles on a wall. There has to be an edge to the wall.

T– Is the *Feral Cello* more expressive or less expressive than a traditional acoustic cello?

L– Expressive in a different way.

T– There is a different or larger array of sounds you can make with it. But there is perhaps less control over the quality of those sounds?

L– There are far more sounds. But they are different sounds. I don't think it is better or worse.

T– How would you talk about virtuosity on the *Feral Cello*?

L– I think you can be quite virtuosic on it.

T– Even if it is unpredictable?

L– I think somebody could come and take it and smash it to bits "cellistically". But, a lot of people doing augmented instruments are not musically hacking them to bits, it's often very minimal playing. I'm interested in being able to play and have the extension of sound.

T– So the extension doesn't take over?

L– You don't spend all that time learning an instrument to then play a harmonic and for it to not sound cool. It's nice to do a bit of both.

T– If you've got a good technique it opens a different world of sounds. Say if I play the *Feral Cello* there are some things I can't do because I'm not a trained cellist, but then again there are some things I would do because I'm not a trained cellist.

L– Exactly. And that is cool to. And that is what is interesting.

T– How did you find your role in the development process?

L– Initially, I was quite detached and just coming in as a cello player. I still haven't really come to terms with the fact that I haven't engaged fully with the technology. Just having an awareness of what the technology can do in the box is good. So you can have an awareness of what you are doing. So I became more interested with it. You were also trying to get me engaged with it.

L– Did it challenge you?

T– I've tried performing with it and it's not that easy to make it do what you want.

L– You found playing it quite useful?

T– I found it useful. I think it makes lovely sounds. The problem is you can't guarantee it's going to do it on the day. It's slightly too unpredictable to be replicable. Which is annoying from a performance point of view. As every time you play it you have to explore the performance possibilities on that day. Some of that is because the feedback is so sensitive to the environment, the setup of the room, the physical space of the room. Sometimes it is to do with the quality of recorded cues. Some elements don't seem to work on stage. I learnt all that going through that process (preparing to perform at TIMP) and the pressure of doing a gig. Until you are actually doing it solo where that is the only sound generating source you feel more responsible that you have to do something, which I found quite constraining actually. I thought I would be more relaxed than I was. That might affect how I change it in the future to make it more usable. For example, if you could morph rather than switch between sound worlds, it becomes more mutable and more like a real instrument. So you can actually bend the sound and then take it back. The switching is actually quite difficult to make music with. I discovered that having actually tried to make music with it. Having relied on you to do that for three years!

4.2 An Annotated Interview

Rather than provide a full analysis of the interview here, we follow a methodology inspired by Gaver and Bowers' concept of an 'annotated portfolio' [15] by attempting to draw together some of the themes of the interview and relate them to issues in the NIME community.

4.2.1 A dialogic practice

The development of the *Feral Cello* is a collaboration between two parties and consequently its development has been very much been formed by the dialogue between Davis and Reid. We feel that the interview format of this article invokes the dialogic nature of the collaboration, both in terms of a discourse between a researcher and a practitioner; but also more broadly it reflects on a relationship between theory and practice in creation of the work. Initially, the roles were very delineated with Davis as designer/maker and Reid as performer/composer. As the project progressed these roles became more mutable and intertwined. We feel this delineation of roles at the start of the project has let us examine more clearly how these tensions have affected its development and in so doing, the relationship between theory (in this case a philosophical position) and the practice, a creation of meaningful music. We think this relationship speaks to the nature of collaborative practice but also similarly to the dialogic relationships between theory and practice found more generally within practice research.

4.2.2 Separation of roles

This separation of roles was an intentional position Davis specifically took at the outset of the project. Although Davis has been involved in a number of solo projects and collaborations in which he has taken a designer/performer role, he decided on this occasion to develop the system for an instrument that he was not trained to play so that he would be forced to collaborate with an instrumentalist. This division of designer/performer roles is one that is not so common within NIME based research, (Morreale et. al. [14] report that 78% of NIME performers are also builders of their systems). The rationale for the separation of roles was to disentangle the concerns of the designer and the performer, to allow a conceptual distance between these positions, to setup a situation that would allow tensions to grow, develop and hopefully resolve. This separation of roles afforded the artists to take quite fixed theoretical positions and push from these positions in the creation of the work.

4.2.3 Ambiguity of control

The underlying philosophy of the *Feral Cello* is to disrupt the performer by physically altering the acoustic response of the instrument in real time so they can't develop and embodied relationship with it [17]. This pushes the performer to always approach it afresh and theoretically helps them reach new ways of making music [16]. The *Feral Cello* also employs a feedback system which itself is designed to exist on the edge of controllability and can be understood as part of the growing body of feedback based instruments (for example [24 & 25]). This project challenged Reid to come to terms with these instabilities as part of her performance practice. Although an experienced improviser, the unpredictability of the setup manifested itself in a desire to exert some control, and hence some structure was imposed through the creation of a semi-structured piece for performance. This could be interpreted as a methodology to obtain some certainty in an uncertain landscape.

4.2.4 Getting the thing to work.

Although the project started from a strong philosophical position of willingly antagonising a performer, certain compromises and adjustments were made in the name of 'getting the thing to work'. Very quickly we had to present a performance in an international festival setting and we very much wanted to present something that not only worked theoretically and technically but also had merit musically. As discussed in the interview, it is not always clear how to make value judgements about how we are measuring the success of a performance and sometimes there is a balance between the success of a theoretical project and success as a musical instrument. We are not sure that these

need to always be aligned, but we do feel there is an imperative if presenting these works in concerts that there is a level of musicality achieved, a musical success, which we feel the *Feral Cello* has. To this end the improvisational nature of the system was somewhat lost and certain elements of the machine listening and the feedback were 'tamed'. Also, towards the end of the project, against his previous judgment, Davis performed with the system in a number of contexts and experienced first-hand the responsibility of trying to create a successful performance with a very unstable system. In this case a reintegration of roles of designer/performer was very useful. However, the main thing to highlight is the importance of performances with the instrument as part of the developmental process, rather than the end point of a design process. Too often in a strive for something new, the presentation of the work is seen as the destination, rather than a moment for reflection and refinement.

4.2.5 *Exploiting technique, exploiting naivety.*
Davis taking on a performative role with the *Feral Cello* highlighted interesting differences in approaches between skilled and unskilled performers with the system. Reid, as a trained cellist has a lot of transferable instrumental skill and fundamentally approaches the system as an extended cello which in some ways is more frustrating than her existing cello, but in others offers exciting possibilities for the creation of new sound worlds. For Davis, who has no skills in the cello, the *Feral Cello* is approached in a more naive way. However, there is no instrumental baggage here in terms of correct technique which means that in some ways the approach can be more free. Leading to a different exploration of the available interactions.

5. DISCUSSION
This paper has attempted to present a reflection on practice that is authentic and true to its temporal and dialogic nature. This is reflected in the form of the paper as well as the nature of thematic outcomes which in parts are contradictory. We feel this contribution has something to add to the NIME community in exploring means of presenting outcomes of practice which are themselves messy and inconsistent.

6. ACKNOWLEDGMENT

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