**Patterns in Practice Podcast, Episode 1: Craig Scott, Transcript**

**Speakers on Episode 1:**



**Samborne Bush (host)**

**Craig Scott**

**Transcript:**

*Guitar music plays. The music sounds unfamiliar with high-pitched guitar notes falling in a frequent and unordered fashion. Among the guitar sounds there is a faint and ongoing mechanical clicking. Whilst there is no particular order to the notes, it sounds as if there are certain patterns which repeat.*

*The music fades and Samborne’s voice speaks over the top.*

**Samborne:** The peculiar and curious sounds you’re hearing are coming from a guitar. But as your ears may have told you, this isn’t any ordinary instrument. This guitar is being played by both human and machine.

My name is Samborne and this podcast is the first in a series by Patterns in Practice, a research project which explores how beliefs, feelings, and values shape engagement with data mining and machine learning, or use a different term - artificial intelligence. I’ll tell you more about this project towards the end of the podcast.

Let’s go back to the guitar. In this episode, I speak to Craig Scott - improvising musician, composer, sound artist, and the maker of the guitar you just heard. Craig develops all sorts of inventive musical ideas from a house-music producing autonomous kick drum, to an ensemble obsolete, which uses an old reel to reel tape machine combined with speakers and amplifiers - all automated to malfunction musically.

Alongside his instrument building, Craig is involved with several other musical projects such as Leeds-based quintet Shatner’s bassoon, and solo project Craig Scott’s Lobotomy. He is not only massively talented and wildly creative, but Craig also happens to be a very lovely person.

He has developed this human and machine-controlled guitar as part of an artist residency in collaboration with Patterns in Practice and the Pervasive Media Studio at Watershed, Bristol. You can see photos of Craig’s guitar, and they are definitely worth checking out, alongside the episode transcript on the Patterns in Practice website: www.[lifeofdata.org/site/patterns-in-practice/](https://lifeofdata.org/site/patterns-in-practice/) - the link will also be in the podcast description.

Without further ado, here is the conversation I had with Craig about: his new instrument, automated technology, and the role of artificial intelligence in the arts

*Guitar music fades in and out*

**Samborne:** So Craig I want to talk a little bit about your journey to get to this contraption. How did you arrive at this guitar?

**Craig:** So my background is in jazz and improvised music, initially, as a performer and as a composer. So it was kind of through frustration, I suppose, with the transience of making music in that way that I started to get more into recorded music. Then as I got more into the recording process and the surrounding kind of technologies of audio recording, I was kind of attracted to this uncanny kind of blurred line between something that feels alive or that happened in real time, in a room and the kind of post-production illusions that you can...the ways in which you can manipulate recorded audio to essentially create illusions or lie for lack of a better description.

So then through that I got into the recording technologies themselves and the various kind of different tools of electronic sound recording and how different technologies almost…encapsulate different eras of music.

So yeah, how the technologies influence the actual evolution of the music and what is possible in terms of sound creation because of new technologies. So I started building, initially it was…really like circuit bending guitar pedals and stuff like that because I was a guitar player. And then that then led to building recording equipment mainly because I couldn't afford to buy, because it's very expensive so it's borrowing things from a lot of people and getting on everyone's nerves every time you want to make anything you have to rely on other people…

**Samborne**: \*laughs\*

**Craig:** …which is quite…a fundamental part I guess of how I've got to this today it's just having access to the means of production I suppose. So yeah, I started building microphones and preamps and compressors and that kind of thing just to facilitate what I was doing and then as I got into the different technologies…it was around a time where everything was becoming digital and all the focus within the digital kind of audio world was trying to recreate a lot of these classic sounds of analogue equipment and it became apparent that like a lot of the... there's quite a lot of kind of fetishization over analogue, old analogue audio equipment especially, and like magnetic tape and that kind of thing nowadays. And a lot of the kind of fetishization of it seems to stem from its inconsistencies or the inconsistent way in which it malfunctions because digital is, you know, infinitely reproducible- result exactly the same thing every time.

The thing I found interesting about all of that was all of the inconsistencies and almost…the malfunction. And when I got into using, like building things with digital control or micro controllers, myself, a large part to begin with was using that digital control to harness the malfunction of the audio technologies and using the malfunction as function.

**Samborne:** So all that learning of the jazz improv background and then the fiddling around with the electronics and building different microphones using these analogue technologies, that brought you to the guitar?

**Craig:** So no, the guitar was the kind of…starting point of everything.

**Samborne:** Okay…

**Craig:** So I was improvising as a guitar player and then after years and years…find myself trying to, desperately trying to make the guitar not sound like a guitar I suppose, or avoid the kind of tropes of the guitar, which served a purpose at the time. But now with this project it feels like a real folding of a lot of the areas of my practice that were kind of going in parallel before, so I'm taking a lot of the hacking elements or instrument building elements and folding that back into my work as a guitar player as well.

Because the guitar is physically mechanised but the physical mechanisations are digitally controlled, it's operating almost in three realms at once because it's within the acoustic world, within the electric world of magnetism and amplification of physical strings, and then also with the digital controlling. So it's almost like a folding of lots of parallel streams that I've been exploring individually.

**Samborne:** And so the project you're working on now, you’re doing an artist residency here at Watershed, where we're recording the podcast today. What's this residency involving? What are you building on?

**Craig:** So this residency has been really interesting. It's essentially centered around involving machine learning and AI in my practice, which is something I've not done up until this point. All the kind of machine control of instruments in the past has always either been pre-composed by myself or there are some very simple chance operations but mainly it's predetermined really. What I've been doing with this is with the semi-mechanized guitar using Markov chain machine learning algorithms to essentially give the instrument a little bit more flexibility in decision making.

So it's designed so that I can improvise on it and simultaneously the computer will listen to what I'm playing and respond in real time on the same instrument with the mechanisation so it’s an internal feedback loop between myself, the instrument and the computer but all within one instrument and all of the output, the actual audio output, that results from that is all coming from the same source.

So there's this kind of friction, that’s like an obscuring of what is being contributed by who.

**Samborne:** And how would you describe that sound?

**Craig:** It's quite chaotic at the moment.

**Both:** *Laughs*

**Craig:** It will probably get less chaotic maybe over time as things get refined. I'm not adverse to chaos by any means and I think it's quite- I mean it's almost deliberately chaotic because in order to try and I don't know reflect the chaos of the digital world you know just the sheer density of information that we are surrounded by every minute of every day it's definitely got that vibe about it so yeah certain chaos and there's a certain tension between the human and the machine as well for somewhere between a fight for control over the instrument and a collaborative process of creation.

**Samborne:** We ran an event here at Watershed where we invited some guitar players to come and play the guitar. Something that came out of that event was people felt this tug of war, this slight frustration, slight area of creation as like co-producing or…or playing the guitar at the same time as the machine. I wonder if you could speak about what's that feeling like? Is it frustrating…is it magical?

**Craig:** It…oh it can be a bit of both, I think, and everything in between! I find it fascinating and to have that sort of feedback as a physical process that you can feel and is physically interrupting you is very different and I think that was seemed to be the thing that like people were slightly taken aback by as a very initial reaction to the instrument.

It was really interesting seeing other people's reactions to it and other people play it as well because obviously like my relationship with the guitar as an instrument is very personal and… yeah so just to see how different people who have other relationships with the instrument - it functions in a very different way. So yeah, it was very interesting to see how other people interpreted it. Yeah, it's cool.

**Samborne:** And you can train the guitar…the machinery of the guitar to react based on a different song can't you?

**Craig:** Yeah at the moment because it's relatively simple Markov chain machine learning that I've just been feeding it…so it works through feeding it MIDI files. To begin with I've just been you know having quite a restricted data set so even like at its most extreme you know…one piece of music…so then that's obviously biased towards like tempo and key and probably like certain note lengths and that kind of thing.

*Interlude*. *More guitar music plays. This time it is different, with a more minor tone. You can still hear the unfamiliar patterns of guitar plucking and the faint mechanical clicking in the background.*

**Craig:** So essentially the instrument that I've created is a modified electric guitar. I've added solenoids too, which are electromagnetic hammers that can strike the string or hold down frets.

So for the first four frets of the guitar are covered in solenoids and there's also extra solenoids at the bridge of the guitar, one on each string, to attack the strings. Alongside this there are also six e-bows built into the guitar and which are essentially internal feedback loops, that can be activated remotely from the computer as well, that give the ability for the guitar to sustain notes infinitely, which overcomes one of the dynamic shortcomings of the guitar itself, which is that it's inherently attack-decay.

You strike a string and it fades out immediately, so with these it means dynamically the guitar can do things that it's not supposed to. There are also six sensors, one on each string that detect change in magnetic field, so that means that the computer can tell when I strike a string on the guitar.

*Guitar music plays again. It is similar to the opening sounds.*

**Craig:** Using the data from these sensors coupled with an audio feed from the guitar, the computer is able to determine the rhythms that I'm playing and then also the pitches that accompany those rhythms. I'm then able to process this information on the computer using a program called MaxMSP. So using a series of patches I've designed around some Markov chain machine learning algorithms, I'm able to take this information and then the computer can decide an appropriate rhythmic and pitch response. There's a certain continuity between all responses because everything is being translated and filtered through the response of the physical guitar. So there's a certain continuity in that, but it's surprising: the responses can change quite dramatically, they can be from quite reserved conversational slow exchanges to quite dense and chaotic.

*A final piece of guitar music plays. This fades and the conversation between Samborne and Craig restarts.*

**Samborne:** So the title of your project is Improvised Human Machine Conversations: Instrumental Extensions and Amputations. I wonder if you could elaborate a bit on that?

**Craig:** Yeah, it seems elaborate enough, doesn't it? Maybe too elaborate, it looks like some sort of thesis rather than a performance.

**Both:** *Laughs*

**Craig:** The alternative title actually that I've been playing with is…I've got to ask the person that came up with it…I was in a band a long time ago which was called ‘Craig Against the Machine’…

**Samborne:** *Laughs*

**Craig:** …which is a bit snappier, \**clicks fingers\** kind of rolls off the tongue doesn't it? So we might go with that instead but we'll see.

So yeah the first part of it I suppose is self-explanatory, it's me improvising on an instrument that can talk back essentially, or will answer back. Yeah and the second part of it really comes from Marshall McLuhan's idea that every technological extension is also an amputation inherently. So at it's kind of simplest or most literal, I'm adding lots of mechanisms onto the guitar which means that I don't have control over certain areas of the guitar, certain aspects of what I'll do, but also through becoming accustomed and relying on various technologies we will lose the skills necessary to actually do these things without the technologies.

Which has been interesting throughout this whole process as soon as I started it I've had quite a lot of problems with my hand and I've currently got a trapped nerve and can’t feel my fingertips, well, two fingertips in one hand. So I don't know if it's some sort of kind of cruel cosmic joke.

**Samborne:** It's not ideal for guitar playing.

**Craig:** It’s not ideal no! So as I'm adding these kind of electronic appendages to control the instrument…I have been losing sensation of the instrument itself but hopefully by the performance in January that will not be the case anymore.

**Samborne:** And tangent to that…to the idea of like technology as a as an amputation, alongside being an extension, when we were doing the show and tell with the guitar players, I know one person, one musician who was concerned about the trajectory of this sort of technology put a question to you saying “I see this as another way on the path to hell” or something…it was quite dramatic!

**Craig:** *Laughs*…Yeah it's interesting to see how people…I think there's a certain like reaction that people have as soon as you say AI and especially within any sort of creative industry that it's like you're choosing to replace a human with a computer essentially that will make the decisions that a human should be making.

But I *really* think it depends on how you…it's the same as any tool you know it's how it's implemented. Like obviously there are totally legitimate concerns. The way I really see it I think is that tools can either be made to create efficiency in…there’s been a huge amount of emphasis on, especially like recorded music production tools recently, of it just being about workflow and efficiency and everything seems to be really narrowing in towards...it's almost as if the piece of software or the tool assumes what you actually want to make and just gives you a very efficient path to get there. But in that assumption of what you want to make is…it’s obviously extremely restrictive if you would like to have options outside of that.

So I think these tools can either be used as means of efficiency to get into a point quicker, or they can also be used as like an expansive…expand the possibilities. I've always been very much a fan of going the long way around with things and trying to find something new along the journey. So yeah, I think it feels like the way I'm using this, it's opening up possibilities rather than simply kind of streamlining the process to get to an already preconceived ideal.

**Samborne:** And so Craig, you're building this guitar and you're doing this project in collaboration with the Patterns in Practice research project. I wondered if you could speak a little bit about how you've taken these ideas, which are from academic process, from research, and then you've kind of brought them into your own creative practice.

**Craig:** Yeah, so because it was also at the very, very early stages of me incorporating these processes into my own practice, it was really helpful just to be able to read through all the research and see what themes are emerging.

What I find really interesting was that it was across all the industries that they [Patterns in Practice] were looking, so they were looking across the arts, the pharmaceutical industry and education. And…even I suppose the place I least expected it to out of the three was within the pharmaceutical industry that a lot of the AI process that we're using they felt were infringing on their personal creativity or the kind of spontaneity that is necessary to, I suppose, stumble across something that is wildly different and then would be considered a breakthrough later on down the line.

Yeah, it's this thing of like efficiency again, I suppose, of everything seems to be geared towards efficiency, whether that's time or money.

But then within the arts, a lot of people seem to have a similar mentality of, you know, small curated data sets, still retaining control - it's not as if you're kind of completely handing over control over, you know, large aspects of what you're doing to an AI. You're almost just using it as like a sounding board or a mirror or a way of potentially generating things that you might not come up with on your own or with other tools.

But yeah, it was quite reassuring, I suppose, to see that a lot of people feel the same about these technologies.

**Samborne:** I do have one more question. If you were going to continue this kind of building new instruments with AI, with machines attached to it, and you had unlimited money and technology was not an issue, what would you do? What would be your vision?

**Craig:** I really struggle to think how…like my practice is so based on what's in front of me. This tech stuff that I work with is you know, it's all recycled or I'm giving it broken by somebody or somebody says “Oh, you know, you can do something with this, it's more valuable to you”.

A lot my practice is very much being given an object and then my imagination just kicks in of what's possible with it and also I've always been working on zero money. So like as soon as somebody says “oh, you've got all the money in the world” and all this…I don't know.

I'd maybe carry on doing the same thing. I find it really hard to envision.

**Samborne:** So if you want to get the most out of Craig's potential, you should hire him and not pay him.

**Craig:** *Laughs…* Yeah don't pay me, don't feed me. Yeah, give me something that's broken and maybe something will come out of it. We'll see…

**Outro:**

*Guitar music fades in and out*.

**Samborne:** I hope you enjoyed that conversation with Craig - his music and sounds are wonderfully intriguing and the ideas behind them are similarly fascinating. If you want to hear more from Craig, he is speaking at the Pervasive Media Studio in Watershed, Bristol, on Friday 9th February. This event will also be livestreamed on YouTube so you can watch there if can’t make it in person - visit <https://pmstudio.co.uk/studio/events> for more details.

You can also check out Craig’s work on his own website: [www.craigscottslobotomy.com/lobotomy](http://www.craigscottslobotomy.com/lobotomy)

Just to say again, links will also be in the podcast description

This episode is the first in a series from Patterns in Practice - a research project which is exploring how beliefs, feelings, and values shape engagement with data mining and machine learning, or ‘artificial intelligence’.

The podcast series will explore some themes that have arisen from our research and we’ll be talking to and hearing stories from people working across different industries – from drug discovery, to higher education to the creative sector.

We have recently published our interim reports from this project, available at

[www.lifeofdata.org/site/patterns-in-practice/](http://www.lifeofdata.org/site/patterns-in-practice/)

Here, you can also view the transcript for this episode, along with photos of Craig’s guitar - do go and check that out.

Thank you so much listening, we will be back soon.

*The podcast ends with 20 seconds of Craig’s guitar music.*