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Artistic Research Report

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Main subject: Jazz Drumming
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Research domain: Jazz Improvisation
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Title of the research: The Drum Also [insert blank]**:** jazz drumming and electronic sound processing

Artistic Research Question: "How can I integrate electronic sound processing into my jazz drumming improvisational and compositional practice through an organic synthesis of acoustic and electronic elements?"

Keywords: jazz drums, electronics, improvisation, composition, organic synthesis

Acknowledgements

I am deeply convinced that (and I am neither the first one, nor the only one to believe that) nothing can be accomplished alone. Consequently, if this paper goes under my only name, it is for practical reasons.

Indeed, it is actually a collective work of many, from the peers who first invited me to apply to the Master program, to the two fellow musicians and friends who played intensively with me through the last part of the research. From the teachers and coaches who invited me to approach every section critically, to my family, friends and partners who were there for me when I could not find a way to advance in the research process. The list of names would really be endless, comprising the Master's colleagues who shared this - at times - burden with me, the experts who kindly gifted me with their time and wiseness, and many more.

I thank each and every one of you with all of my heart.

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Date: 21/04/2025
Place: Rotterdam, Netherlands

I, Rita Brancato, hereby declare that this AR Report is my own work.

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Table of contents

1 Abstract

The following report aims to explore the potential of electronic manipulation of sound applied to drums' playing, with a focus on designing hybrid drum setups that can function in a jazz-derived band setting. Although the universe of hybrid drumming - blending a traditional drum kit with triggers, pads, or sample pads - continues to expand, the process of building such a setup is rarely documented, and the challenges involved are often overlooked. Through experimentation, interviews and media review I researched a way to fill this gap while embarking on my own journey with hybrid drumming.

Although the outcomes match with a very personal exploration, they also offer a variety of examples of how electronics can be applied to an acoustic drum set up and how this application can influence a drummer's perspective both in terms of improvisation and composition.

These results, indeed, can encourage musicians interested in the same topic to initiate their own creative processes, incorporating elements that resonate with them, with the goal of achieving a similar level of artistic progression.

2 Introduction

2.1 Motivation and goal

Captivated by the electronic aesthetics of Ikue Mori, FKA Twigs (Nicolas Jaar), and the electro/acoustic explorations of Michele Rabbia and Rodrigo Constanzo, I've recently started experimenting with my acoustic drum set by adding one sensor/trigger to my snare drum or channeling my bass drum signal through a guitar pedal. Through this exploration, I've come to the realization that my musical identity might reside in the intersection of these new sonic possibilities and the traditional realm of jazz drumming from which I come from. This has prompted me to contemplate how these two distinct elements could seamlessly converge into a unified expression.

The goal of my research would be to develop an approach that organically puts together drums playing (comping, soloing), with the possibilities of live electronics. Since "live electronics" consists of quite a wide topic, I will focus on enhancing the drum kit by incorporating additional sounds and capabilities without compromising my role within the rhythm section. The emphasis is on creating a hybrid system that expands my sonic vocabulary with electronic textures while maintaining a cohesive integration within the realm of jazz drumming.

2.2 Contextualization

Based on the information I have gathered to this point, electronic devices applied to drum setups in a jazz context have been a growing area of exploration among musicians. Actually, the more I have been going deep into the topic, the more examples would multiply in front of my eyes. In other words, there are plenty

of hybrid drummers out there.

Musicians like Max Jaffe, Giovanni Iacovella, Binkbeats to mention a few have devoted their career to finding a personal balance between the acoustic drum set and different electronic devices in a live setting. And there is more. From Ettore Merlin and Gerri Jäger[1], creating experimental music with distortion pedals, to Marcus Gilmore bringing samples into their improvisational practice, to Ian Chang pairing electronics with drums from a composer's perspective rather than improviser. Some, like Dan Mayo, use guitar pedals, others, like Max Jaffe, use Sensory Percussion system. Some, like Michele Rabbia[2], create their own set interacting with Max/MSP, others, such as Rodrigo Constanzo, design a system on its own (SP Tools).

Today drummers are incorporating electronic elements to enhance their sonic palette, experiment with new sounds, and contribute to the evolving nature of jazz music. Some of them, not necessarily belonging to the jazz domain, have produced written reports of their digital applications[3], while others have invested time in providing tutorials and lessons regarding the most recent approaches to hybrid drumming[4]. In general, the buzz around augmented drum kits is growing, and it can be also found in the new intersections between live electronics and drumming, for example in the recent development of new softwares and hardwares[5].

Nonetheless, it's reasonable to assume that the intersection of traditional acoustic drumming with electronic elements still is a rich area for exploration. For example, the practicability and flexibility of the hybrid kit is not often addressed. Many hybrid kits tailored for live performances typically feature either complicated hardware components that are challenging to transport and set up quickly, or they deliver significant results primarily in large venues with substantial PA systems. Moreover, most applications I've observed are designed for individual songs/productions and lack the flexibility to accommodate an entire performance. In my research, I aim to address these shortcomings and bridge some of these gaps.

2.3   Research question

After considering many options, the following research question seems the most appropriate one at the moment: "How can I integrate electronic sound processing into my jazz drumming improvisational and compositional practice through an organic synthesis of acoustic and electronic elements?"

When I refer to an "organic" synthesis, what I mean is a method that enables electronic devices to play a role in shaping the drum sound without overshadowing the drummer's role in an ensemble. In other words this approach aims to maintain clarity and distinction in rhythm and pulse, ensuring that the drummer's fundamental role remains prominent even as electronic elements contribute to the overall sonic landscape.

To further explain the use of this term, "organic" refers not only to a sonic blend of the acoustic and electronic sounds in terms of balanced volume between the two, but also to how the electronic sounds are adapted to the acoustic characteristics of the drums to which they are applied and to what extent they are applied to the acoustic drum set in a way that takes into account the habits of the drummer on the set. An example of this would be a sample that changes in pitch if the skin of the drum to which the sample is applied is dampened, as it would happen naturally on an acoustic kit, or if the volume of a sample increases according to the velocity of the hit when triggered.

[1] Gerri Jäger, *Gerri Jäger live at REWIRE Festival 2016*, published on April 15, 2016.

[2] Federica Michisanti, *Federica Michisanti Quartet - Nocturne (Casa del Jazz, Rome)*, published on January 30, 2024.

[3] Carvajal, Mario A., *Augkit: an Augmented Drum Set System Designed for Live Performance" by Mario A. Carvajal* (Master thesis, Florida International University, 2019).

[4] Mason Self, *Sensory Percussion Tutorial Files*. Last updated June 16, 2022.

[5] Constanzo, Rodrigo, *SP-Tools (alpha v0.6) - Max for Live Walkthrough*, Published on: Sept 15, 2022

2.4   Specific audiences and readers addressed

Analog and digital sound processors are still less accessible to the performing drummer. Part of the reason for this is that drums are usually enhanced with the use of electronic sounds and effects in a production setting, rather than in real-time performance. Then, this research addresses drummers who are first approaching hybrid drumming techniques and are looking for further resources for implementing their drum kits with digital sounds and effects and already have a basic knowledge of Ableton Live and the realm of digital manipulation of sound. As my research focuses on a jazz setting, it also addresses jazz musicians interested in the crossover between modern jazz and the realm of synth music and experimental electronic sounds.

3   Research Process

3.1   First research cycle

3.1.1 Overview of first research cycle

In my first research cycle, I focused on understanding the basics of live sound manipulation applied to the drum set. I experimented with different hardware and software settings and collected data in order to understand which set up serves best the purpose of blending together acoustic and electronic sounds coming from the drum set in a jazz ensemble. To implement the collected data effectively, I planned three interventions where I arranged one jazz standard and played it in a jazz combo with my augmented drum set up. The form and function of this set-up would emerge through the triangulation of data gathered from the three distinct strategies I applied in this first cycle: interviews, experiments, media research.

3.1.2 Reference recording

[01 reference recording 01 (Rita Brancato).mp4](#)

For this research cycle my first reference recording is an arrangement I wrote of a jazz standard for a jazz quartet where I tried to incorporate electronic sounds into my playing. In this case my snare drum and bass drum were connected to the DAW software in my computer through the use of sensors. Through the sensor I tried to manipulate samples triggered by my own playing using timbre, velocity and speed parameters (min 0.15s, 1.14s, 1.23s, 1.50s). This reference recording set my starting point in exploring and understanding the basics of manipulating acoustic sounds, which will be the core topic of my first research cycle.

- original piece: Duke Ellington, *African Flower*
- line up: tenor sax (Lorenzo Cucco), electric guitar (Giancarlo Blando), bass guitar (Christian Guidolin)
- recorded on 08/02/23, 03.34 min.

3.1.3 Feedback and reflection

Here is a summary of the feedback I received from peers and experts upon my first reference recording:

- Johannes Rissler recommended focusing on creating an improved recording where the electronic components are more effectively enhanced, as opposed to being prominently foregrounded, as in the reference recording. He suggested experimenting with solo drum sessions, even without the accompaniment of the entire band, to better emphasize and refine the electronic elements in the composition.
- Leonardo Franceschini asked some questions: what percentage of control do you have over the effects? Do you intend to work only in the live performing phase or also in post production? I think the latter can give you great space for maneuver and experimentation and can be useful for improving the live performing phase. There aren't any big moments where you're alone to highlight your drumming and effects, is that a choice? In any case, he said the bass drum ate frequencies from the other instruments so everything wasn't always clear to listen to. He liked the

sound of the snare when I put the net on. He would have liked to hear a drum-only part where the effects component is very present. In your arsenal of effects I could also have used modulators and distorters, he concluded, which would help changing the character of the sound as well.

- Piero Conte stated that the most important thing with electronics is to reduce your spectrum, kind of the same way you could do while practicing or playing, creating a smaller space to be able to be very free in it. Regarding pedals, he said they are great but he added that the first thing to check is figuring out how to send a proper signal into it. If recording with a mic the pedal might malfunction. He suggested studying how traditional chains are made.
- Mark Schilders said that it is hard to hear the true potential of it in the video you shared, that the sound is too compressed to hear details. However, he suggested a starting point: how to implement electronic samples and devices into an acoustic ensemble playing in a non-invasive and coherent way.

Upon reviewing my reference recording ([reference recording 01](#)), I've identified several areas that require improvement.

Firstly, the overall recording quality needs enhancement. I aim to achieve this by gaining more practical knowledge on higher-quality recording. In order to do this, I intend to refine the balance between electronic and acoustic drum sounds, ensuring a harmonious blend in volume. Finding the right equilibrium between the hybrid drum volume and the ensemble I plan to perform with would be another priority.

Secondly, it's evident that I lack sufficient control over the electronic elements integrated into my performance. To address this, my strategy for the upcoming cycle involves opting for less complex devices instead of the sophisticated software used in the current recording. I therefore plan to use a hardware controller separated from my drum kit and connected to my computer, allowing for better control over the electronic aspects. This focused approach excludes trigger samples from consideration too.

3.1.4 Data collection & data analysis: my findings

I collected data from media research, interviews, and experiments to determine the optimal type of microphones and their placement for capturing drum sound signals effectively for live sound manipulation. Additionally, I investigated the most suitable audio interface and PA system for processing these signals and identified computer software that exhibits minimal crashes and latency issues. Below, I provide concise descriptions of each data collection, organized in chronological order to emphasize the consequentiality of the data collection process.

Media review 01: [How to run a Live Drum Kit through Effects Pedals](#)
By carefully following the Modulated Drummer video I was able to understand the basics of sound routing for applying sound effects to a drum kit in a live setting with a pedal board and a mixer.

Experiment 01: Intended to apply the data collected from media review 01, I tested different templates for digital effects through an Ableton Live software set up. The setup consisted of a dynamic mic over my snare drum, routed through the audio interface into my computer where the Ableton Live software was running. In this picture ([38 experiment 01 ableton effect rack template](#)) I highlighted the effect chain I applied to the snare sound: hybrid reverb, eq and echo.

The first set up I tested would've outputted both the raw acoustic sound of the snare drum and the effected sound: in this case the raw sound would completely mask the affected one.

The second set up I tested made use of send channels which allowed me to output only the affected sound.

Thanks to this experiment I understood that the second type of setting I applied allows for the best blending of acoustic and digitally effected sounds in a small room.

Experiment 02: Understood and applied the basics of an effect chain (media review 01, experiment 01), I tested different pedal effects through a one dynamic microphone on a snare drum live effected through the Ableton Live set up.

In a small room the majority of the effects get lost in the mix of acoustic and digital sound. Reverb, echo and similar time-based audio effects resulting from the reflection of sound are the only effects that make a considerable difference to the overall sound when applied to the drum set.

Comparisons with a post-production application of the same effects helped in understanding which effects produce meaningful results in a live application.

Media review 02: [Dan Mayo - Radical #2](#).
In this video Dan Mayo shows a clever use of augmented drums by processing the drum sound through an echo effect panned. Nonetheless, the echo effect is not always activated, creating a subtle layer of sound that surprises the listener. I found it a creative way of making use of a simple sound effect. Nonetheless, by further researching upon Dan Mayo's application of effect chains to his drum set, I learned that he mostly applies them in post production settings or in huge venues, making the majority of his approaches irrelevant for my research since I am addressing applications of sound effects in live settings and small venues. Nonetheless, his sound and orchestration choices can still be relevant when it comes to designing samples and applying them to an augmented drum kit.

Experiment 03: I tested different amplification systems through a one dynamic microphone on bass drum effected via Ableton set up. PA system, bass amp and guitar amp. Each amplifier produces a different outcome and has different pros and cons:
- bass amp/guitar amp: they are more practical to move and set up, although the bass amp works better with low frequencies and the guitar amp emphasizes the medium frequencies more.
- PA system: although it takes longer to set up and it is less handy to move, it produces a more balanced sound in terms of equalization. After this experiment I decided to use only PA systems for outputting the effected sounds of my augmented drum kits in my future experimentations.

Interview 03 [04 Interview 03 with Mario Carvajal](#)
I interviewed Mario Carvajal, author of one of the theses that I included in my initial critical media review. He gave me insights of how he integrated objects from the Max/MSP software into his drum kit, and talked about the reasons that led him into his research about hybrid drumming: playing drums that are processed with electronics provided him with an additional means of expression, much like how electric guitar players use pedals or other processing equipment. While acoustic drums have their merits, the range of timbral possibilities afforded by processing is limitless. He also praised Max/MSP program as a flexible software that best translates what he outlines for his drum set electronic implementations.

Experiment 04: I tested different microphones on a bass drum effected through an Ableton Live set up:
- Panoramic and condenser microphones cause a lot of feedback
- Dynamic microphones cause less feedback and the feedback effect can also be monitored by changing the microphone position
- Triggers and sensors do not cause feedback and both can trigger digital samples, although sensors are not practical at all since they need a metal blister to be applied to the skin of the drum to function.

Thanks to the data gathered above I decided to leave panoramic microphones out of my research and to make use of dynamic microphones, triggers and sensors instead. Nonetheless a question about microphone positioning arised.

Experiment 05: Following the outcome of experiment 04, I tested different microphone positioning for a one-mic set up that covers both bass drum and snare.

After trying a variety of positions, having the mic behind the kit between bass drum pedal and floor tom does capture both snare and bass drum without causing feedback issues. This particular setting is similar

to one used by Mario Carvajal, who highlighted it in his own research (Carvajal, Mario A., "Augkit: an Augmented Drum Set System Designed for Live Performance").

Media review 03: [Gerri Jäger live at REWIRE Festival 2016](#)
In this video Gerri Jäger shows a peculiar use of electronics applied to the drum set. Specifically, he is using a pedal board to affect the acoustic sounds coming from the kit. His use of the spectral time pedal, an effect that belongs to the realm of time-based effects, influenced me to experiment with it.

Experiment 06: Following my latest media review (media review 03), I tested an Ableton Live template with three different effects on three different send channels in the same project. I respectively applied hybrid reverb, echo and spectral time to the sound of my snare drum. With this type of Ableton Live template I experienced latency issues that interfered consistently with my experiment.
By investigating through the Ableton Reference Manual I learned that both spectral time and echo effect can cause latency problems in a live effect setting in Ableton Live. Understanding the limitations of applying typical guitar pedal effects to a drum kit in a small live setting, I decided to move onto a different type of set up for the incoming experiments.

Experiment 07: Following the results of experiment 06 I tested a Sensory Percussion standalone setup with one bass drum trigger and one Sensory Percussion sensor applied to the snare drum.
This set up compared to the one-mic through an effect rack in Ableton Live used in the previous experiment does not cause latency problems. As a consequence, I decided to further investigate this type of set up. For example, one question that I would have addressed in future experiments was related to the practicability of the Sensory Percussion sensors applications: in order to function, each sensor is composed with a metal dot that has to be glued to the skin of the drum. This meant that I could only play with the same drum kit since I could not attach those metal dots to any drum set.

Media review 04: [Sensory Percussion: MIDI output to Ableton Live Introduction](#)
This video tutorial belongs to the tutorial playlist from Mason Self about Sensory Percussion. The techniques described in this video are relevant for sending MIDI to other DAW's or external hardware through the use of a virtual MIDI bus.

Experiment 08: after reviewing the video tutorial from my media review 04, I tested a set up that sends midi information from bass drum trigger via the Sensory Percussion standalone software to Ableton Live in contrast with a set up that applies the Sensory Percussion software as a plug in inside Ableton. The first set up appears to be more intuitive. Through the MIDI information translated from the bass drum I am triggering a bass synth instrument in Ableton.

Media review 05: [Sensory Percussion: Speed and External Controllers](#)
This video tutorial belongs to the tutorial playlist from Mason Self about Sensory Percussion. In this video Mason Self presents two tiles of controllers. These controllers encompass five main types: Timbre, which responds to nuances in drumming technique; Velocity, sensitive to the force of drum strikes; Speed, which reacts to the tempo of drumming, and Envelope. Additionally, the External/Automated category includes MIDI Input for connecting external controllers, Keyboard Input for assigning computer keys, and LFOs (Low Frequency Oscillators) for automated modulation. The external controller would allow me to implement the kit with a midi controller.

Experiment 09: I tested the setup I had been practicing with after experiment 08 by introducing a midi controller connected to my computer. Compared to the previous set ups, the hybrid kit supported by a midi controller allows for a more efficient use of the computer: I can customize the button and knobs via midi mapping according to what I need to manipulate and control for each hybrid kit I use and position the midi controller in a handy position that prevents me from moving towards the computer all the time.

Interview 04 [05 Interview 04 with Max Jaffe](#)

I interviewed Max Jaffe, expert on the application of the Sensory Percussion system to the drum set. He shared with me how not only the use of SP has influenced the way he plays, for example he refined his low dynamics by playing on mesh head, but also his way of playing has informed the software itself. This means that he did not adapt completely to the SP system, but rather the opposite, by carefully observing his habits on the kit as a drummer firstly and as a SP user afterwards. He also explained to me the way he integrated a midi controller (volume pedal) to the hybrid set in order to keep the acoustic and electronic blend balanced. Interestingly, he likes to think of SP as a third voice in the ensemble.

Experiment 10: Following the question aroused in experiment 07, I tested a new set up consisting of a mesh head with a Sensory Percussion sensor, a snare drum with a SP sensor and a trigger on the bass drum, all connected to the SP standalone. This setup may allow for a more natural approach to sample triggering as the surfaces that trigger digital sounds are more evenly distributed around the kit. It also respond to the practicability question from the previous experiments as the mesh head and the snare drum are easily portable, while the ddrum trigger applied to the bass drum does not need metal dots to function but can still be recognised by the Sensory Percussion standalone as a sensor[6].

Summary of my main findings through a triangulation of the three methods applied:
Up to experiment 05, the media reviews gave me a starting point in the basic routing for processing the acoustic sounds of the drums through microphones, and a hint that certain sound processing techniques would not work in small rooms settings, which I confirmed through experimentation. Experiments also let me put into practice the choice and positioning of microphones in a way that would minimize feedback, information that I firstly gathered reading Mario Carvajal work and examined in depth after by interviewing him.
Until experiment 07 I performed one last try with sound processing techniques that I extracted from media review 03, which failure caused by latency issues led me to reviewing the Sensory Percussion software, which together with new experiments and another interview with an expert in the topic allowed me to conclude that it would be a great software to add to my hybrid drum set in the making, thanks to its adaptability to the drums. I then experimented more with different hardware set up using the same aforementioned software.

3.1.5 Interventions / practical application

By triangulating the collected data I conducted three practical applications by using my augmented drum kit in a live session with my ensemble and collecting feedback from that.

Intervention 01 17 intervention 01 echo and reverb effect to snare drum in jazz arrangement.mp3: conducted after the data collected up until experiment 4. I brought an arrangement of African Flower by D. Ellington and I used an augmented drum set up consisting of a regular drum kit and three different effects applied to the snare drum through a dynamic mic connected to my Ableton Live DAW. The effects were reverb, echo (a type of delay) and a ring modulator. (ableton effect rack template.png) I connected the computer to the mixer and to the PA system, but panned the audio only to the speaker behind my drums. The sound seemed quite balanced, the effects were even softer than what I imagined. I had a hard time switching between effects and arming them as I was playing, but I knew about that possible problem. In the first recording we play the whole arrangement, in the second we play only the B/C section, leaving more space to the echo effect, and open to a drum solo.

Reflecting upon this first intervention, I introduced limiters to the Ableton Live effect templates to prevent possible feedback problems by controlling the gain level of the effect channels. I learned about good audio levels for a PA system when balancing digital audio of my computer within a jazz ensemble setting.

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[6] Sunhouse Forum, *Standard piezo triggers and Sensory Percussion software - Support*, accessed February 5, 2024.

I learned that time-based effects like reverb, echo alone or combined with other effects do not compromise the time keeper role of the drums.

Intervention 02 [21 intervention 02 midi bass synth on bass drum in jazz arrangement.mov](#): conducted after the data collected up until experiment 8. We played an arrangement of Evidence by T. Monk for electric guitar, double bass and drums. In the intro section I added a bass synth sound triggered by my bass drum. The Sensory Percussion/Ableton Live template I used for this arrangement was the outcome of experiment n.8 ([SP standalone MIDI to Ableton bass drum template.png](#)) where I learned that midi sent from Sensory Percussion to Ableton Live was a more practical solution than having the Sensory Percussion plug in inside the Ableton template, although in the long run it can cause more latency problems.

As an outcome of this intervention, I purchased a midi controller to communicate better with Ableton Live and Sensory Percussion while playing. I realized that the feeling of playing two instruments at the same time, as this is what I was told in the feedback session, goes in contrast with the intention of my research, thus I started searching for an approach that would allow me to blend digital and acoustic sounds in a way that fits better the drum kit as one only instrument.

Intervention 03 [36 Intervention 03 three sensors set up in jazz arrangement.mp4](#): conducted after the data collected up until experiment 10. In a trio setting with electric guitar and double bass we played The Peacocks by J. Rowles. I played using a hybrid set that I had experimented with before, consisting of a mesh head with a Sensory Percussion sensor, a snare drum with a second Sensory Percussion sensor, and a drum trigger on the bass drum, creating a balance of 3 electronic surfaces over 5 acoustic surfaces on the drum kit. I then applied to the kit a set of different digital sounds I created through the Sensory Percussion standalone template.

After this third intervention I decided to narrow down the sonic palette used for each augmented set, in order to characterize each set in a more defined way. I also decided to record my interventions and experiment by positioning the audio recorder somewhere else to capture a better blend of the acoustic with the electronic sounds.

3.1.6 Outcomes

Reference recording 02: [43 reference recording 02.mov](#)
As a new point of reference for the second research cycle, which set the end of the first cycle, we played an arrangement of Paranoid Android by Brad Mehldau. My hybrid drum set up consisted of an acoustic set expanded by one practice pad with a mesh head and a Sensory Percussion sensor connected to my computer where the Sensory Percussion program was running. Through the pad I could trigger four different zones which would respectively trigger four different samples: edge, rim tip and rim shoulder of the pad would trigger samples from a wuhan cymbal (for each zone several samples of a different part of the cymbal), while the center of the pad would trigger a library of bell samples. Each zone with its set of samples was affected by a rack of effects modulated by lfo's at different rates: reverb, delay, compressor, filters. The samples timbres and volumes were also affected by the velocity of the hit.
I decided to design this set of samples by imitating the sounds that can be heard at the beginning and in the B section of Mehldau's arrangement.
- original piece: Brad Mehldau, *Paranoid Android*
- line up: alto sax (Pau Jorda), electric guitar (Leonardo Franceschini), double bass (Enaut Armentia Uribe)
- recorded on 08/04/24, 01.51 min.

3.1.7 Feedback, reflection and conclusion

Here I summarized the feedback I received after the three interventions I presented in the 3.1.5 Interventions / practical application chapter. I also included the feedback, reflection and conclusions I gathered upon my second reference recording which is described in the 3.1.6 Outcomes section.

Intervention 01: I received good feedback about the augmented kit: Andrew Moreno and Cosimo Gentile, peers from Codarts, said the groove was still clear and not compromised by the use of effect. I could've used more if I had wanted to. I was invited to take more space for interacting with the effects and to practice solo improvising with them. I personally realized that not having a midi controller or keyboard for communication with the computer may be an issue, and noticed some feedback problems. I also received feedback from Mark who invited me to try different mic positions for preventing feedback problems as well.

Intervention 02: I received feedback about the synth application onto my bass drum. Marc Van Roon, my artistic coach from Codarts, said that maybe I have to get used to it (because I did not feel at my ease using it), while Leonardo Franceschini, a Master Codarts peer, suggested finding a way to control the sound better so that it does not get triggered every time I hit the drum but only in certain moments. They were not bothered by the sample and could still follow the groove, him and Leo they said instead that it felt like a fourth instrument was there.

Intervention 03: Marc Van Roon, my Master's coach, has asked me what am I adding to the plate, what is the function of the electronic sounds added to the drum kit, what do they do more than the acoustic kit. He also made notice that there are too many different sounds triggered by the sensors. I noticed that from my point of view, behind the drums, the electronic sounds always have a high volume, while in the recordings the electronic component is not as loud as expected. I shall change the position of my zoom recorder to see if anything changes. In general it feels like in a small setting the acoustic sound of the drums can easily conceal the electronic sound of the kit if I don't control the dynamics at all times.

Reference recording 02:

Mark Schilders, my Master's main subject teacher, said that it is a bit hard to comment on my reference recording when not hearing it in the room where it's being played but on video. Nonetheless, the acoustic sounds seem to have more impact than the electronic sounds in his opinion. He suggested playing the electronic sounds from a mono speaker standing right behind the drums. He thinks the hybrid set up can enrich the performance and bring surprising new textures to the playing - the question remains, how can you make these sound more organic and moving; like the drums. A further study into the possibilities of velocity/dynamics variation could benefit the research and the implementation of the samples. He advised me to check out Stijn Cools, a Belgian drummer.

Pau Jorda, a peer from Codarts, said that there the electronic implementation of the drums has great potential and he would've liked to hear more of it throughout the piece instead of only in specific sections. He stated that the overall sound coming from the drums was pretty balanced and he could hear everything very well. He suggested that I dive more into a solo practice without the limits of an arrangement or a song, giving prominence to the drums and its digital implementation.

Leonardo Franceschini said that the balance of the sound was about 65% acoustic and 35% electronic. Playing with the hybrid setup was very stimulating for him, suggesting a predisposition to timbral experimentation, while he also recognized that the drums maintained its role of time-keeper instrument. He suggested applying the hybrid solution also to introduce other parameters such as creating melodies,

adding a drone, etc, and experimenting by creating simple compositions where I can change one parameter in each of them. In his opinion I shouldn't only consult drummers for your research.

Ed Verhoeff, one of my APL coaches, recommended me to use an AER compact guitar amp or to always pan the sound coming out of the PA system so that it is clearly related to the drum kit and not diffused evenly in the room. He recognised that it is not very convenient to experiment with my augmented set up in an APL session as I am in charge of everything and the ensemble is constantly changing. He advised further research on more handy and ready-to-use settings for my hybrid set since it takes 15 to 20 minutes to set everything up. He felt the overall sound of the hybrid set was well balanced and liked the arrangement, although he also wanted to point out that the set of samples was designed for imitating the sounds of the original arrangement.

Enaut Uribe, a peer from Codarts, said: the implementation of electronics was weird at first and then it worked a bit better when the electric sounds were coming only from you. For sure the balance can be adjusted with a proper soundcheck. I don't think it affected the way I usually play cause I could perfectly feel your groove. I think the sounds work. But it feels a bit hard when the sounds come in section 'C'. Maybe you could try to add colors (kind of ambient sounds) from the beginning or in section 'B' if you have the tools. Speaking of artists recommendations, I don't know any specific artist, but you could find some good inspiration in the UK underground jazz scene. If I were you, I would also think about the orchestration of the electronics/effects in the other instruments. If you develop your bandmates' sound it can help yours.

Reflecting upon my personal thoughts over the aforementioned reference recording 02, and peers and experts feedback I received about such recording, I am intended to make a few changes in my setting in order to further develop and improve my research: I shall pan the sound when coming from a PA system or use a AER compact amp so that the digital sound is not diffused evenly in the room but feels like it is actually coming out of the hybrid set. I should avoid experimenting within the APL sessions, and rather prefer to put my hybrid sets into practice with a steady ensemble. I should focus on the expressivity of the samples applied to the drum kit, possibly taking into account the nature of the sounds coming out of an acoustic set. Lastly, I could start thinking of a hybrid set functioning on its own and not necessarily related to a specific song arrangement.

3.2 Second Research Cycle

3.2.1 Overview of second research cycle

Through my first research cycle I learned different techniques for a balanced blend of acoustic and electronic sounds in a jazz ensemble setting and I started to get acquainted with the workflow of a hybrid drum set up. This knowledge provided me with a solid ground for starting my next research cycle, which mainly addressed the "organic" side of my research question: In what way can I shape electronic sounds and arrange them on my drum kit by taking into account the acoustic characteristics of the drums and the way I play. Since it has been addressed in the feedback I collected so far, I also focused on arranging music that allowed me to make use of electronic elements throughout a tune, and not only in one section.

3.2.2 Reference recording

Since my second research cycle had started right after the recording of [43 reference recording 02.mov](), the outcome of my first research cycle, I believed it was the most relevant starting point for this new cycle. A complete overview of the reference recording, which can be found in paragraph 3.1.6 from the previous research cycle, has been down below for comprehensibility purposes.

Reference recording 02: [43 reference recording 02.mov]()
As a new point of reference for the second research cycle, which sets the end of the first cycle, we played an arrangement of Paranoid Android by Brad Mehldau. My hybrid drum set up consisted of an acoustic set expanded by one practice pad with a mesh head and a Sensory Percussion sensor connected to my computer where the Sensory Percussion program was running. Through the pad I could trigger four different zones which would respectively trigger four different samples: edge, rim tip and rim shoulder of the pad would trigger samples from a wuhan cymbal (for each zone several samples of a different part of the cymbal), while the center of the pad would trigger a library of bell samples. Each zone with its set of samples was affected by a rack of effects modulated by lfo's at different rates: reverb, delay, compressor, filters. The samples timbres and volumes were also affected by the velocity of the hit.
I decided to design this set of samples by imitating the sounds that can be heard at the beginning and in the B section of Mehldau's arrangement.
- original piece: Brad Mehldau, *Paranoid Android*
- line up: alto sax (Pau Jorda), electric guitar (Leonardo Franceschini), double bass (Enaut Armentia Uribe)
- recorded on 08/04/24, 01.51 min.

3.2.3 Feedback and reflection

The feedback I received on the reference recording, which marks the beginning of my second research cycle, suggested several areas for improvement. I was advised to use a hybrid setup that plays throughout the entire tune, rather than just one section. Additionally, I was invited to focus on making the electronic sounds both louder and more dynamic. It was also recommended that I work with a hybrid setup not bound to a specific song arrangement, using monitor and guitar/bass amp outputs instead of PA outputs. This would create the effect of the electronic and acoustic sounds coming from the same source—the drums. I personally believed that focusing on designing a hybrid set up considering the actual acoustic characteristics of the drums and the way that I perceive and play the instrument would

have been more effective and would have overcome some issues in terms of balance and volume of the electronic sounds with the acoustic sounds.

3.2.4 Data collection & data analysis: my findings

I collected data from media research, interviews, and experiments. Based on previous feedback suggesting I incorporate more electronics into my music, I believe that conducting experiments informed by my findings obtained through media research and interviews is the best approach. To ensure my experiments are clear and accessible, I shared more than one video for each experiment, demonstrating my playing with and without the electronic effects on the drums. Additionally, I provided an audio reference for the digital samples I'm triggering, along with a visual reference for the software I'm using (either Ableton Live and/or Sensory Percussion). The data collection is organized in chronological order to emphasize the consequentiality of the data collection process.

Media review 06: SP-Tools (alpha v0.6) - Max for Live Walkthrough.
SP-Tools are a set of machine learning tools that are optimized for low latency and real-time performance. The tools can be used with Sensory Percussion sensors, ordinary drum triggers, or any audio input. SP-Tools includes low latency onset detection, onset-based descriptor analysis, classification and clustering, corpus analysis and querying, and a slew of other abstractions that are optimized for drum and percussion sounds. In this video presentation Rodrigo Constanzo illustrates in detail each Max for Live object of the SP Tools collection within an Ableton Live template application to a snare drum.

The Max for Live onset detection tool, in particular, allows me to detect audio inputs from my drums and transform it into midi information that I can then use to trigger sounds, effects and instruments in Ableton Live.
Since this software allows for a more precise application of sound libraries and samples to the intended drum surface, and from the media review of the video it seems like it allows for a more organic blend of sounds with the acoustics of the drums, I will incorporate it into my research, delving into it in my second research cycle. Not only that, but the video also shows the use of a DPA microphone as trigger: this microphone, being a condenser microphone and not a trigger by nature, can detect hits coming from the whole drum set. This means that with this set up I can map the whole drum set by using one only microphone, and use it to trigger one type of sound only, which could bring me closer to designing a more coherent hybrid drum sound.

Experiment 12:

setup	sample reference	software	without effect	with effect
dpamicsetup one DPA microphone	audiosource	abletonlivetemplate Ableton Live	without	lockout_high lockout_low

I tested a hybrid setup consisting of a DPA condenser microphone applied on the snare drum (dpamicsetup) with the most basic setting from the SP Tools Max for Live objects designed by Rodrigo Constanzo for Ableton Live[7] (abletonlivetemplate). The condenser mic did not cause any feedback issue and was not only more practical to apply on the drums as it does not need a metal plaster to be attached to the drum skin, but it also detected signals from the whole kit. I applied a simple pentatonic scale with a synth timbre (audiosource) but the feeling I had on the drum was very organic and natural. Two more videos show the difference between applying a lock out high (lockout_high) and a lock out low

([lockout_low](#)), a feature knob of the onset detector M4L object that sets the milliseconds between each detected hit.

In my next experiment I practiced with velocity and timbre controller to enhance the expressivity of the samples and I will test another feature of the SP tools, in this case designed to recognize different parts of the drum kit.

Experiment 13:

setup	sample reference	software	without effect	with effect
[dpamicsetup](#) one DPA microphone	[audiosource](#)	[abletonlivetemplate](#) Ableton Live	[witout_descriptors pitch](#)	[with_descriptors pitch](#)

I added a *descriptor*[7] tool from SP tools to the setting from experiment 12. Descriptors allow for a more complexity of sounds: the pitch of each single hit can be detected and assigned, for example, to control the length of a note; this way the high pitch of the cymbals' hits will trigger long notes, while the darker, shorter hits of the snare will trigger short staccato notes. Another example shows how by assigning the speed of the hits to the same length of the note it's possible to play sequences of slow long notes and quick staccato notes ([descriptors speed_with and without](#)).

Interview 05 [44 Interview 05 with Gerri Jager](#)
Gerri shared a lot of useful information while talking about his journey with hybrid drumming. His set up has a lot to do with a good quality of sound, which loses points in versatility but means having a lot of control on the results. The quality of sound is so central that he works only with his sound engineer. Since hybrid drumming means transforming the drummer into a multi-instrumentalist, his playing becomes less virtuosic, but still the expressivity of the set is much higher than an acoustic drum set. In fact, leaving a bit of complexity of the groove behind allows for a constant fluidity of all the parts involved, both the acoustic playing and the electronic playing, which is core for Gerri's music.

Learning about Gerri's journey made me realize how personal the process of integrating electronics into an acoustic drumming practice, and how that can even imply a sort of compromise where a certain way of playing and perceiving the drums (in this case, a virtuosic playing) has to leave space for the hybrid drums to really have an impact. Being very jealous of my daily practice with the acoustic drums, this interview made me wonder how much I am willing to compromise in favour of my research.

Experiment 14:

setup	sample reference	software	without effect	with effect
[dpamicsetup](#) one DPA microphone	[experiment 14](#)	[ableton template](#) Ableton Live	[without and with_class match](#)	[without and with_class match](#)

Here I used the *class match*[7] set of tools from SP tools to apply single samples or instruments to specific drum sounds. This allows drum racks to perfectly fit on a whole drum set with the use of a single microphone. *Class create*[7] is a tool that detects different zones to which you can apply any type of sound. In this process sound design plays a key role as for aiming at the most natural blend of digital and acoustic sound I have to choose wisely samples that fit with the acoustic characteristics of the single pieces of the drum kit. For this example I decided to focus on three areas in order to avoid possible false

triggering: I trained the *class create* tool to detect snare drum, bass drum and hi hat. Afterwards, with the *class send* and *class receive*[7] tools, I assigned each area to a specific sound or instrument in an Ableton drum rack.

Unfortunately, as later confirmed by the SP creator (Rodrigo Constanzo), the tool does not work when two or more zones are played simultaneously, for this reason when playing a groove I could not get a great result out of it.

Experiment 15:

setup	sample reference	software	without effect	with effect
pick up as hi hat trigger_positioning pick up microphone on hi hat ddrum trigger on bass drum	experiment 14	Ableton Live	without	with samples

Starting from what I learned in experiment 14, I decided to overcome the limit of the *class match*[7] tool by substituting the one-trigger-setup to a set up consisting of two triggers, one for bass drum and one for hi hat (pickup as hi hat trigger). From a hardware point of view this setup is obviously less handy than the previous one; on the other hand, matching each trigger with an *onset detector*[7] allows me to trigger samples that can overlap, which means that it is a much better setup for playing grooves on a drum set where sounds overlap all the time.

Experiment 16:

setup	sample reference	software	without effect	with effect
dpamicsetup one DPA microphone	audio sample_1 audio sample_2 audio reference_corpus	Ableton Live ableton template	no effect	with samples

In this experiment I explored the use of another tool from the SP Tools kit, called *corpus match*[7]. Through this tool it is possible to load a large library of sounds (corpus) into one file (.json) that is automatically mapped to the drum kit in a way that allows the musician to trigger the sound from the library that best fits with the acoustic sound played in real-time. Without this tool, loading the whole body of sounds sample by sample would not only mean affecting the computer CPU performance but would also need a huge amount of work to match each acoustic sound to each single sample.

The sample reference in the related table shows two single audio samples that build up the corpus (audio sample_1, audio sample_2) and an overview of the whole body of samples (reference_corpus).

Media review 07: Ableton Tutorials: Understanding Beat Repeat
This video gives an overview of the Ableton Live effect called Beat Repeat. This device allows you to pick the incoming audio from any audio track and repeat a portion of it in many different ways according to how its parameters are combined. After being introduced to it by my main subject teacher Mark, since I

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[7] Constanzo, Rodrigo, *SP-Tools (alpha v0.6) - Max for Live Walkthrough,* Published on: Sept 15, 2022.

was looking for a device that could repeat the hits detected on my drum kit while playing in different randomized ways I decided to explore its features with a video tutorial.

Media review 08: Binkbeats: Live Setup
A walkthrough from the artist Binkbeat about his live set up. The main element that builds up his workflow is a Max for Live device designed by him and called "BinkLooper", which behaves as a looper but has some advanced features that allow him to automate the loops, delay them, and more. At min 5.29 Binkbeats introduces the concept of the "dummy clip", an empty midi clip that contains information about envelopes that are modulated in time to control the BinkLooper settings.

Media review 09: AUTOMATIC Live Looping with NO Pedals/Controllers using the IAC Driver
Stroke by the concept of "automation" discovered through the video presented in Media review 08, I delved into the topic through this tutorial. In this video Scott Uhl explains the concept of automation in Ableton. The first step consists in midi mapping each parameter that I want to automate to certain midi notes. After that, setting up a midi track with no input and output to an IAC driver and adding a dummy clip[8] to the track in session view, I can program the previously mapped midi notes to play in a specific order whenever I launch that dummy clip.

Experiment 17:

setup	sample reference	software	without effect	with effect
one bass drum trigger set up	audio reference	Ableton Live abletonlivetemplate		experiment 17

In this experiment I applied several techniques that allowed me to transform my bass drum into a sample trigger that would randomly trigger different chops of the sample each time that I hit it hard. By using the *onset detection*[7] tool from SP tools in Ableton Live, the signal captured by my bass drum trigger would start a midi sample pre-recorded in the DAW. The midi information incoming from the onset detection tool would be randomized by a random tool, which would allow up to 8 notes between C3 and G3 that had each been previously mapped to a series of dummy clips[9]. Each dummy clip was automated to set the initial sample to different lengths and starting points. Finally, the parameters of the onset detection tool were changed in order to capture only the loudest hits on the bass drum, so that I could be free to play it along with the rest of the kit.

Interview 06 45 Interview 06 with Ian Chang
Ian's view on hybrid drumming and Sensory Percussion opens up to possibilities that I had not considered. To him SP is more of a tool for composing and arranging, rather than an improvisational tool or something to practice with. Somehow this resonates more with my way of seeing it. In this sense the drums can still be expanded into being more than just a timekeeper, but still within a certain frame set by the arrangement or composition.

Summary of my main findings through a triangulation of the three methods applied:
Looking for smoother ways to apply electronics to the drums, I delved into Rodrigo Constanzo's work, one of the main influences who brought me into this research. Eventually I reviewed his Ableton devices' collection called "SP-Tools". This software informed the following experiments up to experiment 17, which were necessary to understand the pros and cons of the software in the specific context of shaping a practical hybrid drum kit. Among all the devices, the simplest one (*onset detector*) ended up as a fixed element of my setup.

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[8] Ableton, *Binkbeats: Live Setup*, published on February 27, 2019.
[9] Ableton, Binkbeats: Live Setup, published on February 27, 2019.

From media review 08 to experiment 17 I dealt with the topic of looping, as I was looking for a way to have electronics playing throughout a song, as suggested in my first research cycle feedback. Experimenting with what I learned through media reviews, I managed to put together a setup that would allow me record part of my playing and play it back as a loop right after.

My last interview introduced me to a new point of view, that of composing with electronics, which made an impact on me at the start of my third research cycle.

3.2.5 Interventions / practical application

Intervention 04 [75_intervention_04_rememory.mp4](): conducted after the data collected up until experiment 16. I brought an original tune called Re:memory, here arranged for piano, double bass, drums, electronics and trumpet.

Taking into account previous feedback I received from Ed Verhoeff, I opted for using a guitar amp for routing my digital sound out instead of using a PA system: this way both the acoustic and digital sources would come out of the same spot, the drums, instead that having the acoustic drum on one side and the digital sounds evenly distributed into the room through the speakers of the PA system.

The hybrid kit that I am using in this arrangement is a result of what I learned in experiment 16 with the addition of a beat repeat object that I reviewed in media review 07. I used this set up in section F of the tune because I wanted to add that specific color to that section only: compared to the other sections, where one ostinato line stretches for the length of 4 bars and is modulated harmonically a few times, is this section the ostinato is much shorter and incisive. On top of that the horn soloist improvises in a frantic, disjointed way, rather than following the chord changes like in the previous sections. For this reason I wanted to encourage and emphasise the chaoticness of this section by triggering a large library of sounds, which generates a constant timbric change ([69_experiment_16_beatreapeat.mov]()), that can even repeat themselves after each hit in an unpredictable way through the use of the beat repeat tool ([Ableton Tutorials:_Understanding Beat Repeat]()).

Intervention 05 [76_intervention_05_replica.mp4](): conducted after the data collected up until experiment 17. Here I am playing another original tune called Replica, arranged for piano, double bass, drums, electronics and trumpet. In this case I wanted to address one feedback that I had previously received about using an electronic kit throughout a song, thus I decided to apply a delay to my drum kit and use such effect for the whole song. Thanks to the DPA mic I have been using in this second research cycle, my setup is extremely simple and with one microphone only I can detect and manipulate the sound of the whole drum kit.

3.2.6 Outcomes

Reference recording 03: [52 reference recording 03 (end of second research cycle).mp4]()
As a new point of reference for my future cycle I decided to play an arrangement of Morena do Mar by Quartabe for drums, flute, bass clarinet and electronics. In this arrangement I took both the role of the drums and of the piano synth from the original tune. For achieving this I am using a set consisting of two microphones associated with two tracks:

- track 1: one DPA mic detects hits from the whole set and translates them to MIDI input that plays a randomized group of 4 notes on an Ableton instrument. I am also using speed descriptors to influence the reverb applied to the instrument.
- track 2: one Ddrum trigger detects hits from the bass drum. These hits are translated into a MIDI note mapped to the arm button of track 1. This way I can control the arming and disarming of track 1 through the velocity information of the bass drum.

A third track contains a midi clip that launches a bink looper tool that records and loops only the midi sounds of the Ableton instrument that I am triggering with the DPA mic. This loop serves as the foundation for the rest of the song. Once the loop is playing, I can play a harder hit on the bass drum to disarm track one and prevent an overlapping of sounds. Through the midi controller I can then control some filters and reverbs of the playing loop.

I believe this recording represents a good reference point as the kit I crafted is the result of my latest media reviews and experiments, while in the arrangement I tried to make use of some feedback that I received: using a guitar amp instead than a PA system for routing the digital sounds out, having the electronic elements played throughout the song and with a prominent role.

- original piece: Quartabê, *Morena do Mar*
- line up: flute (Hugrún Sigurðardóttir), bass clarinet (Lina Gronemeyer), drums (Rita Brancato)
- recorded on 17/10/24, 3.30 min.

3.2.7 Feedback, reflection and conclusion

Here I summarize the feedback I received after the two interventions I presented in the 3.2.5 Interventions / practical application chapter. I also included the feedback, reflection and conclusions I gathered upon my third reference recording which is described in the 3.2.6 Outcomes section. Each person that I am mentioning who is not identified down below is briefly presented in the 6 Network chapter.

Intervention 04:

Giovanni Nevyjel, among the musicians who played with me, felt that after a bit of volume adjusting the electronics had a good blend with the rest of the acoustic kit, and that generally the sound of the band was well balanced.
He added that the hybrid set surely added sounds that could not be possible in an acoustic setting, and the fact that it came to prominence only in some moments of the composition made it very significant from an arrangement/compositional point of view. In his opinion the hybrid setup was both enhancing the sonic palette of the drum kit and of the group as a whole.
As for his own way of playing, he does not think that he played differently than how he would've without the hybrid set, but still he believes that it made the sonic direction clearer and stronger: hearing the sounds from the hybrid set made immediately clear for him what type of sound I wanted from the band.
He then suggested that the entrance of the electronics could be slightly smoother, even though he liked that it was sudden and clearly perceivable because it really made a change composition wise.

Igor Ambrosin, another musician who played on the intervention, said that the use of electronics provided an important textural element to the composition. He felt the need to change his playing because of the electronics, mainly because of volume: he explained that the dynamic range of the piano is very wide so, in order to allow any kind of interaction with electronics, he needs not to cover the electronic sounds (if they're soft) or to play louder (if they're loud too, not to be covered). He concluded that the overall sound was sort of balanced and we managed to play the songs without major problems related to the mix of the instruments (even without spending too much time on it).
He then suggested that I put things upside down for once: to conceive a song in which the electronics are more in the spotlight, and the other instruments can just join for a section.

Stefan Lievestro liked the resulting sound of the hybrid drum kit in this piece, but addressed a problem in the overall sound of the band, as having only that electronic sound in an all-acoustic setting does keep

the two things too separated. He suggested that every instrument should go through the same reverb or the same processing, or that each other instrument is involved with some type of electronics.

Mark Schilders liked the overall sound of the band, that is starting to sound more organic, but wondered if the electronics could be more interactive, maybe by playing the drums with one hand and manipulating the electronics with the other.

Although I have added a limiter to the track that I am triggering for effects, in this recording I couldn't really have control over the sudden amplitude changes of the effects. With the use of that randomized metallic effect I wanted to bring nuances of chaos to that section of the arrangement, and influence musicians to play accordingly. I was happy that some of them felt this kind of influence, but still the overall mix of digital and acoustic sounds did not appeal to me, and eventually the whole arrangement of the song lost grip in my opinion.

Intervention 05:

Ed Verhoeff said that overall the song works fine with the delay effect, that it is good that the mic does not take other sounds from the other instruments into itself. He added that the delay is not exactly quantized but it does add some character to the tune, it adds a layer and so it would be missed if not used. He then said that it is hard to judge from a recording but the electronic sound seems quite well balanced both with the acoustic drum kit and with the rest of the band.

Stefan Lievestro agreed that the delay is adding some colors to the song, but he still felt a missing connection between that electronic manipulation and the acoustic sound of the rest of the band.

Mark Schilders suggested that I put the amp behind me when playing, so that I can understand the volume changes and adjust the playing accordingly. In his opinion the delay brings a contemporary mood to the tune, and since everybody has to play accordingly, it brings the ensemble together. He also recommended trying to play in a stereo setting with two amps and a stereo delay, and to add a pitch shifting to the delay to add some character to the effect.

Reference recording 03:
Lina and Hugrun, the musicians who played with me, were not bothered by the sample that I was triggering, although Lina suggested that I manipulate the volume fader throughout the tune to fade the sample in and out. Otherwise letting the sample run for the whole time would've been too repetitive.

Ed Verhoeff said that the electronic sound here is a little too loud compared to the other instruments. He then addressed the fact that since the loop sounds very tight, I should either go for a bigger contrast with what comes after (to play very loose), or to aim at the same tightness with the other instruments. Otherwise the loop and the other instruments sound too separated from one another. He also suggested keeping the guitar amp behind me as a good habit, and not to use the reverb at the beginning of the tune if I am aiming for a tight feeling. He also suggested letting the bass clarinet improvise alone with the loop for a longer time before I enter back with rhythmic information.

Stefan Lievestro agreed that the electronics were adding color to the piece, but wondered what the role of the electronic was, since it made a big part of the beginning and almost disappeared from the second part of the song till the end. He suggested that I process the loop with a very present reverb so that the sound becomes one whole pad that can remain underneath the piece throughout it. He also noticed again that the other two instruments had a very dry sound which made it difficult for the general sound of the band to

really blend together. Finally, he advised me to either pursue a solo set, or to write music starting from the possibilities that what I have learned so far can give me.

Sjoerd Huissoon liked the song and the idea of the electronics triggered by the drums. suggested that I mic all the acoustic instruments that I play with and run them through the same audio interface into the same Ableton project, and process them through the same reverb that the electronics coming from the drums are being processed by. Also, I could then add other effects to the said instruments and control them myself instead of looking for musicians who are also experimenting with sound manipulation. He then invited me to stick to my artistic vision if I believed in it.

I personally liked the result that came with the above mentioned reference recording, as I had complete control over the electronics that I would trigger and I could simultaneously be present and interactive with the whole ensemble's playing. I deliberately went for a contrast between the electronics and the acoustic instruments involved, but I understood that in some ways these two elements need a point of connection.

3.3 Third Research Cycle

3.2.1 Overview of third research cycle

During my second research cycle, I focused on creating a seamless blend of acoustic and electronic sounds coming from the drum set. I designed a flexible, easy-to-assemble hybrid setup that includes either a single DPA microphone capturing the entire kit or a few pre-configured triggers that require no additional adjustments. This knowledge provided me with a strong foundation for my third research cycle, which centers on the compositional aspect of my work. Following Ian Chang's suggestion, I plan to experiment with electronic devices and samples as tools for composition and the foundation of my written scores. At the same time, I aim to continue refining the way the ensemble sounds as a cohesive unit when performing with the hybrid kit.

3.2.2 Reference recording

The outcome of my second research cycle ([52 reference recording 03 (end of second research cycle).mp4](#)) introduced some of the elements that will be central in my third and last research cycle: the electronics as foundational tools from where my compositions stem out, and incorporating the role of other instruments when shaping my hybrid drum kit. For this reason I believed it served as the most relevant starting point for this last cycle.
For clarity, a full overview of the recording, detailed in paragraph 3.2.6, has been included below.

The reference recording for my third research cycle is an arrangement of Morena do Mar by Quartabe for drums, flute, bass clarinet and electronics. In this arrangement I took both the role of the drums and of the piano synth from the original tune. For achieving this I am using a set consisting of two microphones associated with two tracks:
- track 1: one DPA mic detects hits from the whole set and translates them to MIDI input that plays a randomized group of 4 notes on an Ableton instrument. I am also using speed descriptors to influence the reverb applied to the instrument.
- track 2: one Ddrum trigger detects hits from the bass drum. These hits are translated into a MIDI note mapped to the arm button of track 1. This way I can control the arming and disarming of track 1 through the velocity information of the bass drum.

A third track contains a midi clip that launches a bink looper tool that records and loops only the midi sounds of the Ableton instrument that I am triggering with the DPA mic. This loop serves as the foundation for the rest of the song. Once the loop is playing, I can play a harder hit on the bass drum to disarm track one and prevent an overlapping of sounds. Through the midi controller I can then control some filters and reverbs of the playing loop.

I believe this recording represents a good reference point as the kit I crafted is the result of my latest media reviews and experiments, while in the arrangement I tried to make use of some feedback that I received: using a guitar amp instead than a PA system for routing the digital sounds out, having the electronic elements played throughout the song and with a prominent role.

- original piece: Quartabê, *Morena do Mar*
- line up: flute (Hugrún Sigurðardóttir), bass clarinet (Lina Gronemeyer), drums (Rita Brancato)
- recorded on 17/10/24, 3.30 min.

3.3.3 Feedback and reflection

The feedback from my third reference recording focused on improving the balance between the electronics and acoustic instruments. It was suggested that the triggered sample's volume be adjusted throughout to avoid repetitiveness, and that the electronic sound be better balanced with the other instruments. Recommendations included either creating more contrast or matching the loop's tightness with the ensemble, adjusting the guitar amp placement, and reconsidering reverb use for a better blend. It was also proposed to process all instruments through the same interface and effects for a more cohesive sound, with the electronics maintaining a more consistent presence throughout the piece. Lastly, it was noted that a stronger connection between the acoustic and electronic elements would improve overall integration.

This summary of feedback from my previous cycle emphasized how it would be beneficial to both investigate what role can the hybrid drum take inside the composition and which amplification choices can provide the best result in a band set up with both acoustic and electronic elements.

3.3.4 Data collection & data analysis: my findings

Based on my own reflection, I chose to continue using the three methods that I have applied throughout the previous two research cycles: media research, interviews, and experiments. These methods proved effective in guiding my progress, and I believed they offer the most comprehensive approach for the next phase of my study. To maintain clarity and trace the development of my findings, the data collection was organized in chronological order. This approach highlighted the logical flow and interconnectivity of the data, emphasizing how each step in the process built upon the last and contributed to the overall research trajectory.

Media review 09: [Nularseq 0.9 User Manual](#)
Drawing inspiration from feedback that suggested incorporating electronics throughout a song, I began to explore the idea of introducing a repeating melodic pattern as the foundation of an arrangement, similar to an ostinato, triggered by one piece of the drum set. To bring this idea to life, I sought out a sequencer that would allow me to play sequences of notes in a predetermined order, triggered by a single input from the drum kit. After some searching, I discovered a Max for Live tool called Nularseq, which perfectly fit my needs. This tool enables me to trigger a midi sequence with one note midi input only, making it an ideal solution for integrating electronic elements into the rhythm of the drum kit.

Experiment 18

setup	sample reference	software	without effect	with effect
One bass drum trigger set up	18_audio sample reference	Ableton Live 18_ableton template	18_without sequencer	18_with sequencer

Driven by the Nularseq Max for Live tool, I experimented with a sequence that would serve as a bassline for a tune.

In this case my kit consisted of a bass drum trigger only. Through the onset detector the incoming sound of the bass drum triggers one midi note that allows me to play the sequence. I also noticed that the random option is quite handy and allows for more variation in the melodic line.

Mark Schilders provided me with some feedback, saying that I could take a chance on adapting the acoustic set to the digital one too, rather than only the opposite. For example, muffling the head of the bass drum to get a better blend of the acoustic and digital sounds. I believe this feedback highlights an approach for blending acoustic and digital sounds that I should investigate further.

Experiment 19

setup	sample reference	software	without effect	with effect
one bass drum trigger set up	18_audio sample reference	Ableton Live 18_ableton template		19_nularseq in song setting_random short notes

Using the same setting from Experiment 18, I introduced a bass line played by my computer as a sequence triggered by my bass drum pedal into a song played by me and Lina on the clarinet. While playing I encountered several issues, the main being that every time that I wanted to play the bass sequence from the beginning I had to play through the complete 16 notes. There was no "reset" button, which would instead be very useful.

My coach Ed Verhoeff suggested figuring out how to implement the velocity parameter. If how loud or soft I hit the drum influenced the velocity of the sound triggered, that would add a significant amount of expressivity to the sequence. Also, setting a threshold for detecting only the loud hits or only the soft hits could also be a very useful thing if I wanted to play the bass drum alone too.

We tried different settings for the bass. In the first attempt I played short random notes, which led to a very confused improvisation. I then moved to a second setting where the bass note for the improvised part would be only the fundamental of the scale.

There was then a third setting: randomized notes but very long and far from one another.

Lina found interesting the randomization of bass notes in the solo part when the notes were quite far from one another, in that case she could react to it playing accordingly to the bass note that would come out.

The sound and Ableton template references can be found in the references for experiment 18.

I believe it would be ideal if each instrument controlled its own electronics. I am still not very happy with the sensitivity and trustability of my hybrid set in this case.

Media review 10: *Sensory Percussion v1 Help*

This manual provides comprehensive instructions for setting up, calibrating, and utilizing Sensory Percussion to its full potential, empowering drummers to explore new dimensions in rhythm, texture, and sound design. In the Software section of the manual, under the "Sampler" paragraph, I found a potentially powerful alternative to the Nularseq plugin. The sampler in Sensory Percussion allows you to load, trigger, and manipulate a wide range of audio samples. Here, the "All, Cycle, Rand, and Control" functions are used to manipulate how samples are triggered during a performance. In particular, "Cycle" lets you trigger samples in a sequence, and "Control" gives you the ability to advance through the sequence of samples according to a specific parameter that you choose, and to restart the sequence anytime.

Experiment 20

setup	sample reference	software	without effect	with effect
one drum trigger set up	18_audio sample reference	Sensory Percussion 20_SP set up		20_bass sequence on SP

In my own track I substituted the Nularseq plugin with the Sensory Percussion plugin, which allowed me to overcome two issues:
1. being able to change the length of the bass note easily
2. being able to switch between playing the sequence as it is and playing the sequence deciding when to change bass note

In order to substitute the two plugins, I had to record each sample from the bass line into 16 audio samples, put the 16 samples as a sequence into the Sensory Percussion plugin, and and set it up as follow:
1. when I hit the center with a <u>high velocity</u> the sequence will advance of one note according to the cycle
2. when I hit the center with a <u>low velocity</u> the sequence will stay onto the same note
3. when I hit the <u>shell</u> of the drum a reset button will be triggered to go back to the beginning of the sequence

In the video it is possible to see how the notes change according to the velocity of the hits.

Media review 11 *Envelopes in Drum Racks | Ableton Live | Tutorial | User Friendly*

Wondering about other ways to trigger a sequence I have been suggested by Mark Schilders to just launch it as a backing track, as sometimes that is everything I am looking for and trying to trigger it through the drums is a smooth and well-incorporated way can be tricky. Following Sjoerd Huissoon recommendation to check the "envelope follower" device on Ableton Live when aiming at modulating sounds with an audio source, I searched for a video that could present a similar device, "envelope midi", which is used to apply an envelope curve to a parameter in real time, which can manipulate the way MIDI data is output, allowing for advanced modulation effects.

Experiment 21

setup	sample reference	software	without effect	with effect
One snare drum trigger and one bass drum trigger	86 experiment 21_audioreference. wav	Ableton Live 21_ableton template	21_without envelope midi.MOV	21_with envelope midi.mov

In this experiment I took what I learned in media review 11 and used an envelope midi device to modulate a sequence (audioreference) that I wanted to play for one tune section that I had been working on. If the sequence is modulated with the midi information that the drum triggers provide, it sounds less as a backing track and more locked in with the drumming. In this specific case, the midi from the bass drum opens the volume fader and decreases the high-pass filter, while the midi from the snare drum modulates the frequency filter and the resonance filter.

Interview 07: Interview 07 with Rodrigo Constanzo
Rodrigo Constanzo gave me interesting insights about amplifying sound in a way that allows for the best blend between acoustic and electronic elements in a space, according to his experience. When possible, he is using a PA monitor next to his set (so that he can also control feedback which is a parameter that he incorporates a lot in his playing), so that the two sound sources (acoustic and electronic) are very close to one another. When this is not the case, so there is more musicians involved and the setting requires a PA system, he still tries to pan himself to one side of the PA and sit close to where he panned his own sound, and the same for the other musicians, to give the impression that the different electronic sound sources are blending with the corresponding acoustic sound sources.

Summary of my main findings through a triangulation of the three methods applied:
From media review 09 to experiment 20 I documented the quest to play a bass sequence with my hybrid drum kit, a goal that arose from the feedback I received at the end of my second research cycle. The media reviews informed my experiments which informed my media reviews back, concluding that Sensory Percussion's sequencer is the best tool for designing a sequence that I can smoothly adapt to my playing on a hybrid set up. With regards to the matter of amplification and blending digital and acoustic sounds, insights from interviewing Rodrigo Constanzo, media analysis in my Creative Production classes, and feedback from my coaches further guided my experiments. I learned that in-ear monitoring is an effective way to track processed sounds while playing, and that routing all digital inputs through a single sound card into a PA system—panned to match each musician's position—offers a practical and three-dimensional method for amplifying and blending sounds.

3.3.5 Interventions / practical application

Intervention 06: 85 intervention 06 bass sequence in song setting.MOV This intervention is the result of the work done in experiment 18 and 19 and 20. I brought an original tune called Tantrum, here arranged for drums, electronics, bass clarinet and tenor saxophone.
My hybrid drum kit consisted of one drum trigger applied to a mesh drum pad next to my floor tom. Through the pad I could alternate between two choices: the first one triggered short notes that are sequenced to be the ostinato at the core of the song, the second one triggered long notes that I played as if they were the keynote of a scale for the soloists to improvise on. The sequence of notes was the same, but I designed the second choice in a way that let me change a note and move to the next one in the sequence only when a high velocity hit was detected. That way in the solo section I had the freedom to

decide when to move to another keynote. In the theme, instead, the sequence advanced to every hit of the pad.

Considering the feedback received in my second research cycle, that advised further investigating a balanced sound between the electronics and the acoustic sounds, I played with two instruments whose sound is processed through electronic devices. In this case, rather than me processing their sound with my computer (Experiment 19), the two musicians were in control of their own electronic devices themselves. This allowed me to focus on the music and allowed them to have more freedom in designing their own sound.

3.3.6 Outcomes

Reference recording 04: 91 reference recording 04 (end of third research cycle).mov
As outcome of my third research cycle I chose an original tune that I wrote that features hybrid drumming throughout the arrangement, bass clarinet and tenor saxophone. To achieve a good blend of sounds and a balance of acoustic and electronic elements, all the instruments involved produce acoustic sounds that are partially triggering digital sounds or being digitally processed. Both bass clarinet and tenor saxophone are connected to the sound card that I use for my hybrid drum kit. The sounds are then panned according to the placement of the musicians on stage, and everything is coming out of the same PA system. The second half of the tune features a sequence that is modulated by the drum kit, whose functioning is best explained in the description of experiment 21.
- original piece: Rita Brancato, *Hypernorm*
- line up: tenor saxophone (Andrea Leone), bass clarinet (Massimiliano Dosoli), drums (Rita Brancato)
- recorded on 14/03/25, 6.13 min.

3.3.7 Feedback, reflection and conclusion

Here I summarize the feedback I received after the intervention I presented in the 3.3.5 Interventions / practical application chapter. I also included the feedback, reflection and conclusions I gathered upon my final reference recording which is described in the 3.3.6 Outcomes section. Each person that I am mentioning who is not identified down below is briefly presented in the 6 Network chapter.

Intervention 06:
For Massimiliano and Andrea this type of set up could work, no need to run everything through my computer too.

Ed Verhoeff thought the sound quality of the ensemble improved significantly now that everybody is engaging with electronic devices or sound manipulation. He wondered if the randomness of the bass notes that I trigger sometimes kills the tension. Listening to the improvisation, he feels like the soloists are having a conversation and building tension, and when a new bass note comes in it cuts the conversation short and the soloists have to start from zero again. He suggested several approaches: having bass notes in a certain key center, or triggering one bass note only. He even suggested having no bass at all in the solo section. Then he said that It would be nice if the musicians knew the bass sequence in advance (since it is not random), and that I could also find ways to introduce the theme again in between improvisations.

Reference recording 04:

Sjoerd Huissoon liked the digital sounds of the drums, and the blending with the sound manipulation of the other instruments. He liked the idea that I applied to the sequence to match it better with my playing and he suggested that we use in ear monitoring or monitors when playing live. He believes that when we are all coming out of the PA we can really adjust the volume levels of each instrument to get the perfect balance.

Ed Verhoeff liked the digital sound and the composition. He recommended me to use headphones to hear the sequence well at all times, and wondered if using a pad to trigger certain sounds could free me up from playing in a kind of "fixed" way, not really free on the drum kit. He also thought I should work my intro and groove better, build them up in a less chaotic way, especially when random notes are involved. The hybrid kit is nice, and needs time to be introduced to the audience. He also wondered if I could work my way out starting playing without the electronics, in a tune, and then slowly adding it back in.

Mark Schilders liked the fact that the drums are bound to the electronic sounds and that I cannot play completely freely.

Stefan Lievestro appreciated the change in the band setting. The sound is quite balanced and the outbursts of the ensemble are well positioned too. He recognised a big improvement since the band sound that I recorded at the end of the second research cycle, and also a much more clear direction in terms of composition and arrangement. He also noticed that I am still quite stiff on the drums, and recognised that I am taking care of too many things: the song, the other band members, the drums, the electronics, the volume output, the triggers sensibility; he then suggested that it will be a matter of time to get over it. In terms of sound design, he also gave me tips on how to design a better bass sound. Finally, he thought that I should let go of the role of the drummer in the section where the sequence plays, and really experiment with sounds and how I can play with them without thinking of the stylistic features of the drummer.

4 Research findings and outcomes [AR|2 only]

4.1 Documentation and explanation of the research outcomes

To document the outcome of my research I provided a portfolio featuring the compositions I had been crafting in my second and third research cycles. In detail, the portfolio of my artistic results consisted of four performances and compositions that either intended to put hybrid drumming at the forefront or that stemmed out of a hybrid drumming practice.

1. Morena do Mar [52 reference recording 03 (end of second research cycle).mp4](#)

Through arranging this tune I wanted to experiment with the idea that the drum set could play both a groove and a randomized pattern of three notes that would turn into a long looping pad that would serve as a background for the rest of the music to develop on. The characteristic of the original tune that attracted me and I wanted to reproduce with the hybrid drumming is that there is a set sequence of notes that advances in speed from being very slow to being very fast; in the original tune this process is automated, as the notes would be too fast to be played by hands, but by triggering each note of the sequence with my drum hits I could easily reach that same speed just by playing a groove.

2. Replica [93 research outcome 2_replica.wav](#)

I wrote the rhythm of this tune after experimenting with delay applied to the drums. As I learned in my first research cycle, if the delay effect is handled well and the hardware allows for a low latency, having the real-time sound of the drums filtered by this effect does not compromise the groove, which remains clear. Instead, it adds an echo that gives an even more three dimensional layer to the drum sound, as if multiple drummers were playing at the same time, filling space between hits with infinite ghost notes. One tricky side of adding delay to a groove is that once it is set to a certain millisecond value, it serves as a metronome too, especially for a tight rhythm as the one designed for this song. It was then crucial to set it according to the speed we wanted to play at.

3. Tantrum [92 research outcome 3_tantrum.mp3](#)

While arranging this short composition, I saw an opportunity to adapt my hybrid drum setup to take on a more melodic role by playing one of the two main themes. I chose a sound that resembled a bass, aiming to fill in the low-frequency range that the rest of the band couldn't quite reach. To bring this to life, I used a sequencer that allowed me to trigger each note of the melody by striking my floor tom.
During the solo section, I made a deliberate shift by extending the length of the triggered notes. This created sustained tones that helped glue the overall sound of the band together—almost like holding down a long bass note. In doing so, I was not only reinforcing the harmonic foundation but also providing support for the soloists.

4. Hypernorm [91 reference recording 04 (end of third research cycle).mov](#)

This piece lies at the core of my experimentation with the manipulation of sequences, developed during the final phase of my third research cycle. Initially, I attempted to orchestrate the ostinato coming up in the second section of the song on my drum kit. However, this approach imposed significant limitations on my freedom of performance. Consequently, I decided to assign the sequence to a computer, while still aiming to integrate it within the hybrid setup by interacting with it through live performance.
Through the use of specific devices within Ableton Live, I was able to achieve this objective. This setup

enabled me to incorporate pre-programmed sequences into the arrangement in a way that allows them to respond more fluidly to my playing, creating a more cohesive and dynamic interaction between the electronic and acoustic elements of the performance.

4.2 Self-assessment of the research outcomes and expert feedback

Integrating electronic sound processing into my drum practice through a synthesis of acoustic and electronic elements required considering many more factors than I initially anticipated.

1. The sound output (depending on the venue)
2. The choice of hardware and software gear to create a hybrid set up
3. How the electronic elements are orchestrated in the band
4. How the playing is affected by the integration of electronic elements

Through my three research cycles I found ways to address these issues, which altogether provide me with a system to approach electronics sound processing with drums in a band setting. The system consists of taking care of each of these factors:

1. For smaller venues, one option is to use a monitor positioned behind the drum kit. Alternatively, a keyboard amplifier may also be suitable; however, bass or guitar amplifiers are less ideal as they tend to alter the processed sound with non required colors. In larger venues, it is preferable for the output from the hybrid setup to be routed through the PA system, alongside the other instruments. Additionally, panning the sound of each musician according to their proximity to the PA system can help ensure that the electronic sound sources align spatially with the acoustic ones. For bigger venues, the use of in-ear monitors or stage monitors is also highly recommended. This issue was addressed firstly in my second research cycle and then examined more deeply in my third research cycle.
2. The development of a flexible, reliable hybrid setup was a central focus throughout my first research cycle, and it continued to be a key element in the subsequent two cycles. During the first cycle, I recognized the need for a setup that could be easily adapted to any drum kit and assembled quickly. Consequently, I chose to use triggers instead of sensors, as the latter require an additional metal plate to be affixed to the drum skin. To capture the full drum kit simultaneously, I incorporated a DPA microphone. Complementing the setup, I selected a low-latency sound card, ideally suited for live performances, along with a high-performance laptop and a MIDI controller to complete the hardware configuration. In order to preserve the authentic feel of an acoustic drum, I consciously decided against using pads or mesh heads.
   With regard to the software component, at the end of my first research cycle I concluded that processing the acoustic drum through guitar pedals would only be feasible with the use of a large PA system or in a post-production setting. As a result, starting from the second research cycle, I shifted my approach to working predominantly with digital samples, which were designed and orchestrated using two software programs: Ableton Live and Sensory Percussion (V1 and V2).
3. Performing with a hybrid drum setup can be a challenge when the other members of the band are playing purely acoustic instruments. Achieving a balanced sound between the "dry" acoustic tones and the "wet" processed electronic effects requires a great deal of attention and precision. For instance, ensuring that all the instruments, including the hybrid drum setup, are routed into the same sound card and processed through a unified set of effects can help create a more seamless blend. However, a more harmonious and cohesive sound can often be achieved when the band's other instruments already incorporate their own electronic elements. By integrating acoustic instruments that are themselves processed with electronics, the band can shape a more

unified and dynamic band sound that allows each instrument to complement the others in a natural yet innovative way. This approach, which was the central element of my third research cycle, can help bridge the gap between the organic and synthetic elements, creating a smoother and more cohesive overall musical experience.

4. Playing with a hybrid set up most of the time implies having less control over the final sound resulting in a mixture of acoustic and electronic elements. Meaning for example that the dynamic range is smaller and playing softer helps enhancing the electronic samples or the processed sounds. The need to take care of a "new instrument", with its limits and possible errors even in the best case scenarios, asks for a less virtuosic approach, either in terms of playing with much more clarity, or by leaving much more space as a new layer of sound is involved. Depending on how the hybrid drum kit is designed, this can also result in a different way of playing in terms of orchestration (for example I will play the floor tom more often or less often because by playing it I will trigger a certain sample).

I believe that in the documentation provided for my research outcome evidence of how I addressed each of these elements can be found. Nonetheless, there is still much room for improvement.
For example, I believe that the drum setups that I have designed so far leave little room for improvisation, or, from a different point of view, I have yet experimented with those same set ups enough to play as freely as I would play with an acoustic drum kit.

Mark Schilders believes too that there is room for further explorations with electronics applications to the drum kit. From the last reference recording he felt the electronics has become like an extra member of the band and that sets a quite grounded end point for this research and starting point for the future.

4.3 Conclusion

What if a drum could express harmonic content? What if its sharp, fast-decayed timbric palette consisted of long sounds too? What if it could trigger words, chords, or a melodic sequence? What if it could reproduce pitched sounds and modulate them along a scale like a melodic instrument would do? What if it could sound like a hundred drums are being played at the same time?

And how would all of these possibilities influence the role of the drums itself? Would it still be a timekeeper, would it still be able to complement other instruments's improvisation?

These are only some of the questions that arose in my mind while researching upon integrating electronic sound processing into my improvisational and compositional practice. The more I delve into the topic, the more questions would come up to my brain.

Therefore, It has become clear to me that although this research process may end here, with a handful of jazz-derived compositions for hybrid drums, hours of data collection, experiments, interviews, feedback collection and media reviews, it has initiated a practice that will continue for many years to come. I believe I have established a solid base (learning to balance electronic and acoustic sounds in a hybrid setup, selecting the best amplification options, choosing the right gear to reduce latency and enhance the practicality of the performance, and becoming familiar with the workflows of Ableton Live and Sensory Percussion.) to break free into the world of hybrid drumming, which means that the fun has just started.

Outcomes aside, not only have I embarked on a journey that has deepened my knowledge of hybrid drumming and its influence on my improvisational and compositional practice, but I have also been honing several "side skills" that I consider essential for fostering a healthy artistic practice.

To give an example, something that the research process has taught me, and that I am grateful for, is that things never go as planned. You can meticulously plan every detail, envisioning how everything will look and sound, believing it will work flawlessly. At first, things might even seem to fall into place perfectly, but eventually, nothing goes according to expectation. A painful lesson, maybe, but to approach every new intuition, every new experiment with this lesson in mind is a skill which I believe will be extremely significant for my artistic growth. Maybe I have not mastered the art of patience yet, but through this research journey I am learning the joy of following an idea - or letting it go, sometimes, too - with the challenge of making something out of it no matter how many times something will go wrong during the process.

There is more. If I look at my past self, what I am most proud of is how this ongoing journey with electronics is teaching me to be true to myself and to my artistic practice, to have the courage to embrace what musically and artistically speaks to my soul and nobody else. In other words, this research has helped me to get connected to my musical identity, a very precious starting point to enlighten my future artistic practice.

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6 Network

Name	Description	Role in my research
Giacomo Baronchelli	Drummer who has tried different augmented drum settings	He has suggested to me possible augmented drum set up and provided me with insightful feedback on my work.
Mario Carvajal	author of one of the thesis I mentioned in my critical media review	I interviewed him about his approach to hybrid drumming in a live setting
Ian Chang	musician, drummer, producer	Ian Chang investigation of augmented drums possibilities has inspired me from the very

		beginning of my research. I contacted him for an interview and he kindly answered my questions.
Rodrigo Constanzo	Musician, drummer, researcher	author of one of the theses I read before starting my research, and creator of the computer software I am intended to use in my second research cycle. He has kindly agreed on answering my questions for an interview and has constantly provided me with support through the Discord platform
Massimiliano Dosoli	Codarts' former student	he has extensive knowledge and experience on effect pedals and their application to music instruments, and on playing in a half acoustic/half electronic band setting
Leonardo Franceschini	Codarts' Master student	he has extensive knowledge and experience on effect pedals and their application to music instruments
Giovanni Iacovella	Musician, drummer who performs with live electronics applied to the drumset	He gave me meaningful insights about the process of approaching the drums through electronics
Sjoerd Huissoon	Musician, producer, teacher	Expert on sound design and engineering, he gave me meaningful advice on these topics.
Max Jaffe	expert on Sensory Percussion sensors and software who has brought this knowledge into his music	His work has inspired me and he has been available for interviews, giving me insights about hybrid drumming set ups
Andrea Leone	Codarts' Master student	he has extensive knowledge and experience on effect pedals and their application to music instruments, and on playing in a half acoustic/half electronic band setting
Stefan Lievestro	one of my coaches at Codarts	has provided me with feedback in sound amplification and processing, guitar pedals, composition and arrangement.
Andrew Moreno	a Codarts' Bachelor student	has extensive knowledge and experience on effect pedals and their application to music instruments
Michele Rabbia	Musician, drummer	He has been a primary inspiration for me to embark on this research. He mostly performs with synthesizers and Max 8 software, sometimes with application to a drum set.

Johannes Rissler	a Master student at Codarts who is currently researching sound and has already made use of electronics like effect pedals and synthesizers.	He has helped me choose the right audio interface to use and in the correct routing on audio signal when live processing incoming sounds from the drums.
Mark Schilders	Main subject teacher at Codarts	He has given me useful opinions and insights regarding my topic in the context of the research process itself.
René Uijlenhoet	New Media teacher from the classical composition department. Expert on coding, Ableton, Max/MSP and much more.	I've followed his course on New Media which has been a great help in designing my work and delve into the world of electronics.
Ed Verhoeff	one of my coaches at Codarts	has provided me with feedback in sound amplification and processing, guitar pedals, composition and arrangement.

7 Appendices

Appendix 1: List of all self-produced AV media included in report

- 01 reference recording 01 (Rita Brancato).mp4
- 02 Interview 01 with Michele Rabbia
- 03 Interview 02 with Giovanni Iacovella
- 04 Interview 03 with Mario Carvajal
- 05 Interview 04 with Max Jaffe.docx
- 06 Experiment 01 mixer set up.HEIC
- 07 experiment 02 ableton template of effects applied to snare drum through dinamic mic.HEIC
- 08 experiment 02 flanger effect applied to snare drum through dinamic mic.mov
- 09 experiment 02 echo effect applied to snare drum through dinamic mic.MOV
- 10 experiment 02 reverb effect applied to snare drum through dinamic mic.MOV
- 11 experiment 02 snare echo+eq effect chain post production recording.mp3
- 12 experiment 03 bass drum dinamic mic ableton distortion effect PA system.mov
- 13 experiment 03 bass drum dinamic mic ableton distortion effect bass amp.mov
- 14 experiment 04 snare dinamic mic distortion effect PA system.mov
- 15 experiment 04 overheads distortion effect PA system.mov
- 16 experiment 01 bass drum distortion+reverb+limiter+eq effect chain_ post production recording.m…
- 17 intervention 01 echo and reverb effect applied to snare drum in jazz arrangement.mp3
- 18 experiment 04 sample applied to bass drum through ddrum trigger.mov
- 19 experiment 03 bass drum trigger through guitar amp.mov
- 20 experiment 08 midi from SP to Ableton triggers bass synth through ddrum trigger.MOV
- 21 intervention 02 midi bass synth on bass drum in jazz arrangement.mov
- 22 intervention 02 midi bass synth on bass drum in jazz arrangement.mov
- 23 experiment 09 reverb freeze with controller.mov
- 24 experiment 09 ddrum bass synth with note lenght effect and midi controller integration.mov
- 25 experiment 06 reverb effect one mic latency issue.mov
- 26 experiment 06 spectral effect latency issue.mov
- 27 experiment 06 spectral effect latency issue.mov
- 28 experiment 06 spectral effect latency issue.mov
- 29 experiment 06 spectral effect latency issue .mov
- 30 experiment 06 echo latency issue.mov
- 31 experiment 10 mesh head midi controller set up.HEIC
- 32 experiment 10 mesh head + midi controller + one mic reverb.mov
- 33 experiment 05 brushes snare ableton reverb one mic.mov
- 34 experiment 10 mesh head three sensor set up.mov
- 35 experiment 10 mesh head three sensors set up.mov
- 36 Intervention 03 SP standalone applied to three sensors set up+midi controller in jazz arrangeme…
- 37 experiment 01 ableton effect rack template.png

- 38 experiment 08 SP standalone MIDI to Ableton template.png
- 39 experiment 08 SP standalone MIDI to Ableton bass drum template.png
- 40 recording SP set via Ableton SP plugin .png
- 41 recording SP set via Ableton SP plugin.png
- 42 recording SP set via Ableton SP plugin.png
- 43 reference recording 02 (end of first research cycle).mov
- 46 experiment 12_with_lockout_low.mov
- 47 experiment 12_with_lockout_high.mov
- 48 experiment 12_audiosource_majorpentatonic.mp3
- 49 experiment 12_abletonlivetemplate.mov
- 50 experiment 12_dpamicsetup.HEIC
- 75 intervention 04_rememory.mp4
- 52 reference recording 03 (end of second research cycle).mp4
- 53 experiment 13_abletonlivetemplate.mov
- 54 experiment 13_audiosource_majorpentatonic.mp3
- 55 experiment 13_with_descriptors pitch.mov
- 56 experiment 13_descriptors speed_with and without.MOV
- 57 experiment 13_witout_descriptors pitch.mov
- 58 experiment 14_midi sound references.mp3
- 59 experiment 14_070824_class match ableton template.mov
- 60 experiment 14_without and with_class match.mov
- 61 experiment 15_with samples_041024.mov
- 62 experiment 15_without_041024.mov
- 63 experiment 15_pick up as hi hat trigger_positioning.jpeg
- 64 experiment 15_pickup as hi hat trigger.jpeg
- 65 experiment 16_ableton template.mov
- 66 experiment 16_audio reference_corpus.mp3
- 67 experiment 16_audio sample_1.wav
- 68 experiment 16_audio sample_2.wav
- 69 experiment 16_beatreapeat.mov
- 70 experiment 16_effect.mov
- 71 experiment 16_no effect.mov
- 72 experiment 17_270724_parameters.mov
- 73 experiment 17_abletonlivetemplate.mov
- 74 experiment 17_audio reference_xylophone loop.mp3
- 75 intervention 04_rememory.mp4
- 76 intervention 05_replica.mp4
- 77 WIP_pitch_Rita Brancato.mp4
- 78 experiment 18_audio sample reference.mp3
- 79 experiment 18_without sequencer.mp4
- 80 experiment 18_with sequencer.mp4
- 81 experiment 18_ableton template.mov
- 82 experiment 19_nularseq in song setting_random short notes.wav

- ✉ 83 experiment 20_SP set up_bass sequence on SP.mov
- ✉ 84 experiment 20_bass sequence on SP.mov
- ✉ 85 intervention 06 bass sequence in song setting.MOV
- 📄 86 experiment 21_audioreference.wav
- ✉ 87 experiment 21_ableton template.mov
- ✉ 88 experiment 21_with envelope midi.mov
- ✉ 89 experiment 21_without envelope midi.MOV
- 📑 90 Interview 07 with Rodrigo Constanzo
- ✉ 91 reference recording 04 (end of third research cycle).mov
- 📄 92 research outcome 3_tantrum.mp3
- 📄 93 research outcome 2_replica.wav

Appendix 2: Critical media review

Carvajal, Mario A., Augkit: an Augmented Drum Set System Designed for Live Performance" by Mario A. Carvajal (Master thesis, Florida International University, 2019). *FIU Electronic Theses and Dissertations*. 4343. This paper introduces the "Augkit," a system for enhancing drum sets in live performances. It provides a comprehensive overview of the method used to incorporate electronic sound processing into an acoustic drum kit using Max 8 devices, triggered through sensors and controlled by foot pedals. In the first chapter it points out how rare it still is for drummers to use computers or pedals to manipulate the acoustic sound of their instruments rather than replacing it completely with electronic sounds. Given the shared objective of operating within a more traditional popular music context, and the focus on live performance, I find this paper extremely pertinent to my research.

Constanzo, Rodrigo. Towards the Beat of a Different Drummer: A Journey into the Loss of Fidelity in Drums and Electronics « Rodrigo Constanzo (Master thesis, University of Manchester, 2011). Accessed November 21, 2023. This paper offers an insight into the personal journey of Costanzo Rodrigo through the augmentation of his drum set. Exploration helped him inform his drumming too and shape the intended sounds and textures he wanted to achieve. It mentions an interesting chain that addresses amplification problems too: a DIY 4-to-1 mixer, which merged all of his amplified instruments into a single mono channel, then routed into a WTPA sampler where they could be sampled and manipulated in real-time. He also prefers a guitar amplifier as sound output rather than a PA. In general it is an interesting example of thinking outside of the box when experimenting with electronics.

Constanzo, Rodrigo, *SP-Tools (alpha v0.6) - Max for Live Walkthrough,* Published on: Sept 15, 2022. SP-Tools are a set of machine learning tools that are optimized for low latency and real-time performance. The tools can be used with Sensory Percussion sensors, ordinary drum triggers, or any audio input. SP-Tools includes low latency onset detection, onset-based descriptor analysis, classification and clustering, corpus analysis and querying, and a slew of other abstractions that are optimized for drum and percussion sounds. In this video presentation Rodrigo Constanzo illustrates in detail each Max for Live object of the SP Tools collection within an Ableton Live template application to a snare drum. Since this software allows for a more precise application of sound libraries and samples to the intended drum surface, I decided to incorporate it into my research, delving into it in my second research cycle.

Modulated Drummer, *How to run a Live Drum Kit through Effects Pedals*. Last updated April 8, 2020. In a practical video demonstration, learn how to set up a live drum kit with individual microphones connected to separate channels on the mixer. With a total of 7 microphones covering the entire drum set, the setup includes integrating an effect pedal into the auxiliary (AUX) chain. This configuration routes all microphone signals through the pedal for enhanced sound manipulation. By connecting the pedal to the

AUX input via its line INPUT, the signal from all microphones is processed. The AUX output from the mixer feeds into the pedal, and the processed signal returns to the mixer. Each mixer channel features an AUX send control, regulating the amount of signal directed to the AUX and subsequently through the pedal. This comprehensive setup offers dynamic control over the drum sound, allowing for creative effects and live performance enhancements.

Schuette, Paul. *Demystifying Max/MSP*, January 2013. Demystifying Max/MSP is a set of tutorials for students beginning to learn computer music programming. It specifically attempts to cover initial vocabulary and other basics that the Max tutorials glance over at best. All objects are clearly explained before they are used in example patches, and the tutorials seek to highlight the unique capabilities of Max as a tool for creating music. When approaching the software SP Tools for the first time, since its primary source is Max/MSP, this pdf document has helped me figuring out the basics of this type of coding system, its most common objects and patches.

Appendix 3: Full feedback on reference recordings

Upon reviewing my reference recording (reference recording 01), I've identified several areas that require improvement.
Firstly, the overall recording quality needs enhancement. I aim to achieve this by gaining more practical knowledge on higher-quality recording. In order to do this, I intend to refine the balance between electronic and acoustic drum sounds, ensuring a harmonious blend in volume. Finding the right equilibrium between the hybrid drum volume and the ensemble I plan to perform with would be another priority.
Secondly, it's evident that I lack sufficient control over the electronic elements integrated into my performance. To address this, my strategy for the upcoming cycle involves opting for less complex devices instead of the sophisticated software used in the current recording. I therefore plan to use a hardware controller separated from my drum kit and connected to my computer, allowing for better control over the electronic aspects. This focused approach excludes trigger samples from consideration too.

Johannes Rissler recommended focusing on creating an improved recording where the electronic components are more effectively enhanced, as opposed to being prominently foregrounded, as in the reference recording. He suggested experimenting with solo drum sessions, even without the accompaniment of the entire band, to better emphasize and refine the electronic elements in the composition.

Leonardo Franceschini's feedback started with a series of questions: what percentage of control do you have over the effects? Do you intend to work only in the live performing phase or also in post production? I think the latter can give you great space for maneuver and experimentation and can be useful for improving the live performing phase. There aren't any big moments where you're alone to highlight your drumming and effects, is that a choice? The song is one of my favourites and you rearranged it in a very beautiful and interesting way despite the recording quality! In any case, unfortunately, especially the bass drum also ate frequencies from the other instruments so everything wasn't always clear to listen to. I really liked the sound of the snare when you put the net (I don't know what it's called). I would have liked to hear a drum-only part where the effects component is very present. In your arsenal of effects you could also have used modulators and distorters. This would help you change the character of the sound as well.

Piero Conte stated that the most important thing with electronics is to reduce your spectrum, kind of the same way you could do while practising or playing, creating a smaller space to be able to be very free in it. A good start could be deciding either to expand the sound of the drum kit or keep the drums as they are and use electronics to play synths or other things, or have a mix of both. He personally loves prepared drums, so using not exclusively drum parts but upgrading the kit with several tools to reach a produced drums sound but with an analog flavour. Regarding pedals, he said they are great and the new expensive ones work great with other input sources as well (so not low impedance guitar) but he added that the first thing to check to get good sound with pedals is figuring out how to send a proper signal into it. Pick-ups of a guitar send a very low and "shattered" electronic signal into pedals while if recording with a mic there is a different source and therefore the pedal might malfunction. He mentioned that the "vocoloco" pedal is a very good one to deal with this problem. Second most important thing is the chain, he said, so where the signal starts and where it goes into. It takes a whole life to figure out what you like most and each pedal reacts differently on it so he suggested studying how traditional chains are made. In the end, he said, you'd do what your taste will tell you through experience.

Mark Schilders: It's hard for me to hear the true potential of it in the video you shared; the sound is too compressed to hear details. However, a good starting point could be - how you can implement electronic samples and devices into an acoustic ensemble playing in a non-invasive and coherent way. Perhaps that can point you in a direction?

For what concerns my [reference recording 02](#), I have collected the following feedback.

Leonardo Franceschini: I had the opportunity to listen to your reference recording and I'm glad to provide some feedback.
I believe that in your sound, the acoustic part was still quite present, but nevertheless, it was possible to perceive the electronic part as well, I would say about 65% acoustic and 35% electronic.
Playing with your setup was very stimulating for me. In fact, I perceived it as a single instrument but with greater sonic and expressive possibilities. I didn't see it merely as a supporting element to the drums because its role was quite similar to that of the drums, namely maintaining the pulse, with only the timbre parameters changing. At the same time, it greatly influenced me because it's not common to hear drummers expanding possibilities in this direction. As a musician and listener, it suggests a predisposition to timbral experimentation, which, in my role as an electric guitarist who uses electronics extensively, opens up expressive doors that are not always accessible.
I think the hybrid solution is definitely a way to develop the arrangement. At the same time, I would evaluate which of the 6 parameters you want to change (melody, harmony, dynamics, timbre, expressiveness, rhythm). In other words, to integrate it into your playing, you could use it not only as a means to obtain new sounds but also to introduce other parameters such as creating melodies, adding a drone, etc. This would allow you to think of it as an expansion of your instrument but also as a supportive instrument that you can play simultaneously. You could create simple compositions where you experiment with developing the electronic part by changing one parameter in each of them.
I have to think more about it, but you shouldn't only consult drummers for your research.
For me, you could try other ways of applying the electronic part using, for example, microphones or other equipment. At the same time, I believe that even if at the end of an experiment there is no positive result, it would still be valuable information. However, if you manage to evaluate even just a few expressive possibilities at the end, the direction you have chosen is so strong that it would have an excellent stylistic, compositional, and musical impact. I have great respect for you as a musician and for the direction you

have chosen to pursue. I see that you are at the beginning of a journey that can lead to great results and help you differentiate yourself uniquely as a musician in your career. Keep going and continue like this!

Ed Verhoeff: I'd recommend to use an AER compact guitar amp or to always pan the sound coming out of the PA system so that it is clearly related to the drum kit and not diffused evenly in the room. I understand that it is not very convenient to experiment with your augmented set up in an APL session as you are in charge of everything, the ensemble is constantly changing and sometimes not well prepared. Maybe you could have a more handy and ready-to-use settings since it takes 15 to 20 minutes to set everything up. The overall sound of the hybrid set was well balanced and I liked the arrangement, although the set of samples you designed copies the sounds of the original arrangement by Brad Melhau.

Enaut Uribe: The implementation of electronics was weird at first and then I worked a bit better when the electric sounds were coming only from you. For sure the balance can be adjusted with a proper soundcheck. At first I felt them different, but when we got the balance of the mix it felt more natural. I don't think it affected the way I usually play cause I could perfectly feel your groove. I think the sounds work. But it feels a bit hard when the sounds come in section 'C'. Maybe you could try to add colors (kind of ambient sounds) from the beginning or in section 'B' if you have the tools. Speaking of artists recommendations, I don't know any specific artist, but you could find some good inspiration in the UK underground jazz scene. If I were you, I would also think about the orchestration of the electronics/effects in the other instruments. If you develop your bandmates' sound it can help yours.

Pau Jorda: I felt there was more acoustic sound than electronic sound, both from a volume point of view and an arrangement point of view, in the sense that you would play more acoustic sounds than electronics. The augmented kit definitely influenced me and gave me new ideas while playing, to think more about textures and timber, and it really felt integrated as one only instrument, the electronics complementing the acoustic and vice versa. The hybrid set up does produce a new layer of expression to the song, not necessarily to the arrangement tho. I would recommend diving more into a solo practice rather than experimenting with preexisting songs. Give prominence to the drums first.

Mark Schilders: It's a bit hard to say when not hearing it in the room where it's being played but on video; however, the acoustic sounds seem to have more impact than the electronic sounds. I think one of the biggest quests when combining the samples and acoustic drums is how to blend them together well in a (semi-) acoustic setting. You could investigate how it would balance out if you would play the electronic sounds from a mono speaker standing right behind the drums. I feel this could improve your own feeling of dynamics and balance greatly as well as the perceived balance in the room. Ideally, all sound combined should sound like one instrument.
I think the hybrid set up can enrich the performance and bring surprising new textures to the playing - the question remains, how can you make these sound more organic and moving; like the drums. A further study into the possibilities of velocity/dynamics variation could benefit the research and the implementation of the samples, I think. Think LFO's for pitch/volume/filter modulation, that's where the challenge lies. A drum will sound different when played in various spots and in different volumes. If you can achieve that with your electronic setup, then yes - it can enrich the expressivity. If the samples stay more or less in the same volume and sound all the time, then my brain stops finding it interesting to listen to and thus will lose some expressivity. I felt that towards the end of this performance.
I think it would be good to check out Stijn Cools, a Belgian drummer who is one of the few people I know that managed to craft an expressive setup with electronic drums. He is active in bands such as Hoera. and EOP/AAN (might be AAN/EOP), they have some cool Youtube videos to check.

Most important to me as the first thing to check seems the setup in an acoustic setting as I said in my first answer. Since often we don't play on stages with an elaborate sound system, or venues that are small, how are you going to bring the right volumes into the acoustic setting? I've tried to do this with a guitar amp in the past, it worked but it's usually quite noisy and definitely colors the sound a bit. A keyboard amp worked best for me so far, since it can handle all of the frequency spectrum - which is kind of the same as using a monitor from a small PA system. Then the next step is expressivity I think - since you pose these questions I think you're on the right path!

Related to my [reference recording 03](#) I collected the following feedback.

R: Do you think the overall sound of the band together with the electronic set is well-balanced?
Ed Verhoeff: Here it is a little loud. It takes up so much space in the structure.

R: What is your general impression of the piece?
Ed: when you gather together with your peers what you want to achieve is a band sound. And that is hard. What I really miss here is the band's sound. That has to do with the band setting, which is new, you have to find each other. There is the computer, which is very tight, and you (meaning the musicians) are not. It doesn't have to be tight, it can be a contrast, but in this case it is neither.

R: If I get what you mean, we didn't want to follow the tightness of the loop.
Ed: But then the question is "what does the loop add to it?" Is it just a pad or.., but because it's so rhythmical, then I start interpreting it as something rhythmic and not only a pad, a background, and so I expect the others to follow along with it. So, I'm not saying I'm right, it is only a thought. So when they start playing, like…at the beginning for me it is just rhythm, the prominent thing is rhythm. Then when they start playing, it is a totally new world. I was waiting for a moment where they played tight, maybe two voices, together with the loop.

R: otherwise you would say that the loop and the rest are too separated from one another?
Ed: Yeah, I'm missing the connection. Maybe it is the way they played, the flute plays…it's quite loose, while the loop is very tight. So either you bring these things together, or they really play loose and exaggerate the contrast.
I can imagine that in a set this song is about the rhythm, so I imagine that everybody is tight. And then the next song can be open. Now I don't know what the song is about. You ask if the loop adds anything to the music, it adds but then you have to bring it together. That is my thought.
I really like the beginning. I would not use the reverb at the beginning, if you're going for a tight feeling, I would add that later. Otherwise it is too floaty. For me the reverb is distracting.
I would leave the bass clarinet alone for a longer time before entering back with the drumset, leaving her to play with the loop alone freely for a longer time. You are giving a lot of information about rhythm. You can give this information back later.

Stefan: In Morena do Mar, in order to match with the acoustic sound, you also need to process the acoustic sound, to a certain extent. They belong to the same realm so to speak. And there is not a lot that you need to do, because the sound they have is very dry, so there is no animation in the sound. So at least when I sense that that is a problem for the listener to engage. Maybe all you need is a little reverb, fixed. As simple as that. Because then it is processed, and you could have the same reverb on the electronically generated sound, because then they belong to the same space. Now it is two completely different spaces, and they do not connect.

That is basically also when in mixing different instruments get sent to the same reverb. In Ableton you can use the send track, and send everything to the reverb and give the impression that they belong to the same realm.

You could do the same with drums, but maybe drums is the only instrument that maybe can be a little dry. In terms of composition, I also..so drums and electronics they are really together, but flute and bass clarinet I don't really feel the connection with the looper. Also because the looper fades out. It shouldn't fade out but rather be filtered by an infinite reverb, and then it's not this rapid firing of notes but one sound only.

In Replica it is also a matter of bringing sound together. Maybe that is not always possible.

You should not forget that the sound is part of the composition, you could also focus on that, and how that develops. That is a different type of thinking, it is not much about pitches, but more about how instruments make sounds. Now it feels like you have a playback tape and you are playing on it, it does not feel like the electronics are part of the composition. To be aware of the possibilities of sound design and how sound evolves through time. As acoustic players we just add the effects to our playing. That should instead result first in you playing differently. And then the instrument just became a way of playing the electronics, who have a prominent role instead. I recommend Jozef Dumolin as a starting point.

R: Do you feel that the sound coming out of the amp has a nice blend with the rest of the acoustic kit?
Mark Schilders: I think that in the beginning when you just turn it on, it does. However, the patch seems to output things at an unpredictable volume, am I correct? Perhaps it would be good to start adding compressors and/or limiters to your Ableton set, if you haven't already. That way you make sure the details are always audible and you can control the maximum output volume.

R: As far as you can tell from the video, would you say that the overall sound of the band plus the electronics is balanced?
M: A bit similar thoughts as above come up. I like what the electronics add to the arrangement and band sound. I would be curious to find a way to influence the patch more - like Gerri Jaeger can do with his pedals - that it can become more interactive, besides the surprise it is bringing now. It would probably mean playing drums with one hand, I can imagine that's not ideal either but worth a try?

R:Do you think the hybrid set is adding a significant part to the arrangement or that the acoustic set only would have provided the same result?
M:I do feel it's significant since it alters the sound of the drums/band a lot. However, it could become more significant if there would be more response to it from the band members who are improvising.

Could you say that the hybrid set up is enhancing the sonic palette coming from the drums?
Yes! It is starting to sound more organic!

R:Any suggestions about how this set could be improved?
M: See above

Intervention 2:

R: Do you feel that the sound coming out of the amp has a nice blend with the rest of the acoustic kit?
M: Again almost! Whenever I have worked with an amp for fx myself, I used to put it behind me so it's by matter of positioning already more part of the kit - perhaps you can try that too so the sounds don't only sound 'away' from you but you can feel more what each volume does to you and the playing. The current positioning is very external minded, definitely worth an investigation.

R: As far as you can tell from the video, would you say that the overall sound of the band plus the electronics is balanced?
M: Yes, much better than before already. But I also feel this can be improved on by trying the above mentioned approach. If you are more in balance with it yourself, automatically the blend with the ensemble will be better, I imagine.

R: Do you think the hybrid set is adding a significant part to the arrangement or that the acoustic set only would have provided the same result?

M: Yes it definitely puts this track in a more contemporary mood. Also all the players have to stay in time with the delay, which makes everyone sound close together and I can imagine this kind of limitation is beneficial for the song and the interplay. It sounds together and compact to my ears, somehow.

R: Could you say that the hybrid set up is enhancing the sonic palette coming from the drums?

M: Yes. It could be interesting to have some more movement in the delay in terms of modulation, pitch shifting? Have you tried a stereo set up with two amps and a stereo delay? Might be the next level and could be more moving (literally, but also feel wise)

R: Any suggestions about how this set could be improved?

M: See above!

Regarding my last reference recording, aka the outcome of my third research cycle, I have collected the following feedback.

Sjoerd Huissoon: I really like the sounds you produced, they match very well with the other two instruments and with how they are processing their own sounds, which I like very much too. The electronic sounds coming from the drums can be louder, especially the sequence. When you start playing the drums it almost disappears. But I really like the concept of manipulating it with the cut off, it blends very well and it gives me ideas too. So I don't think it is a bad idea to have the sequence playing throughout the section. As for playing live and balancing everybody's sound, having everybody coming out of the PA system would be ideal, panning the sounds according to the placement of the musicians on stage can be a detail to consider but it is not something to focus on in my opinion. What I would really take care of is monitoring: either have in ear monitors or one monitor each.

Andrea Leone: I like it, I believe the sequence can work but I would find a better way to cut it out at the end of the section, less abruptly maybe. I also like the sounds you have on the drums at the end of the last section. I couldn't hear myself back very well while playing in this setting so I would also recommend having a monitor during a live set.

Ed Verhoeff: Yes, I can appreciate the electronic sounds of your kit. I really like the sounds at the beginning. As for the sequence, it makes me think of this trio in a jazz club, to hear the loop coming from the keyboard the drummer was wearing headphones. Only him. I would recommend wearing those open ones, so that you can hear outside too.

I understand the adventure that you started with the electronics: you're facing a lot of practical issues, there are examples but you're trying to figure things out yourself. You may ask yourself "is this good enough?" and having all of these practical issues "oh I cannot hear myself" and all. All the questions pop up. Somehow you have to be very practical about it.

R: If I am practical about it, honestly it sounds nice without the electronics too.

Ed: It sounds good to me. If you take the electronics away, it is still good! So, there you go. What you need to do, maybe, is to play it without electronics and slowly bring it in. Because now you come from the opposite side "I am gonna do stuff with the electronics".

On one side there is also taste. Considering the way you start, there is already too much information. If I had to start like that I would first introduce a pattern, a fixed thing or a melody. Now it is random, maybe there is a way not to have it random, or if it is 2 or 3 notes as you say maybe you can have one note first and then increase the number of notes? As a listener I go like "where am I?". It's great that I hear those notes played super tight with the drum kit. I would, you know, either throw the listener in a complete chaos, or try to give something clear and then start to play around with it, build it a little. Not immediately

giving it all away. Also, the snare hits are a bit random in the groove too, it would be nice if it complemented the groove first and then you played with variations.

Another thing. I see that with these electronics you are kind of fixed, limited in your playing. Have you tried playing freely around the kit with these hybrid setups?

R: yes, it is something that I noticed, especially because I wanted to provide harmonic or melodic information with my kits.

Ed: have you considered using a pad to trigger chords or loops, that does not interfere with your playing?

R: I can turn any drums into a pad and I use a midi controller too to trigger things, but yes maybe an external pad could be a practical option too.

Ed: You could start a loop, play with it, then stop it and continue playing.

Stefan Lievestro: The last class we had was in October wasn't it? Well the sound and the intention are much better, I can see that you kind of know what you're doing. I remember last year's performance, you did not have a clear idea of what you were doing. The end sequence of the song, I see that you are quite stiff, and you're playing thinking of what a drummer usually does, bass snare hi hat. Instead you could get rid of it and really explore sounds on the kit.

R: Yeah, I am also quite stiff because I am taking care of a lot. The band, the song, how the band sounds, if my electronics are too soft, or too loud. I am also not that great of a drummer so drums also get a lot of my attention. My triggers also are not amazing and I have to check on their sensitivity every now and then.

S: I guess it is also a matter of getting used to it. I understand, when I am the leader I am listening a lot if everything goes the right way. The volume when the sequence starts: that is how it should be, I don't think it is too loud, it is great that way.

R: yes, listening from outside the sound is much more balanced than inside, I was very worried while playing. I designed this whole thing and then I am afraid to play it.

S: I think the direction is good, you just have to stick to it.

Appendix 4: Transcription of interviews

▤ 02 Interview 01 with Michele Rabbia

▤ 03 Interview 02 with Giovanni Iacovella

▤ 04 Interview 03 with Mario Carvajal

▥ 05 Interview 04 with Max Jaffe.docx

▤ 44 Interview 05 with Gerri Jager

▤ 45 Interview 06 with Ian Chang

▤ 90 Interview 07 with Rodrigo Constanzo