

Institute of Art Design and Technology, Dun Laoghaire  
Faculty of Creative Technologies

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**The Sounds of Sci-Fi: Wall-E**

Aoife Rees

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This dissertation is submitted by the undersigned to the Institute of Art Design & Technology, Dun Laoghaire, in partial fulfilment of the examination for the BA (Hons) in Film and Television Production. It is entirely the author's own work except where

noted and has not been submitted for an award from this or any other educational institution.

Signed Ajle Rees

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## Introduction

When watching films, sound is often overlooked compared to the visuals. However, sound plays a vital role in shaping our emotional and narrative understanding of what we see. This is particularly evident in science fiction films, where sound constructs entirely new worlds, brand-new technologies, and creatures with no real-world references. As a result, sound becomes responsible for how we engage with what we see on screen, whether it is good *or bad*.

Throughout this thesis, I will answer the question: *to what extent does the sound design of Wall-E (2008) directed by Andrew Stanton, influenced by theories of emotional prosody, semiotics, and audiovisual perception, allow audiences to empathise with a non-verbal robot and to experience his curiosity and loneliness across contrasting sonic environments?*

This thesis, *The Sounds of Sci-Fi – Wall-E*, argues that the film's sound design is fundamental in showing how sound shapes our understanding of people, robots and their environments. By studying theories from Michel Chion and David Sonnenschein, I will analyse how these ideas can be applied to Ben Burtt's sound design in WALL-E.

Sound theorists, Michel Chion and David Sonnenschein, will be crucial in developing my understanding of sound as a language, not just a tool. They have studied sound for years, getting an in-depth understanding of how it shapes our emotional connection to a scene and our understanding of characters.

I will apply these theories by analysing scenes from Wall-E that I believe effectively demonstrate these concepts. By breaking down the film into stand-alone scenes, I hope to understand just how effective sound is in shaping our perception.

In this thesis, I will dive deep into the sounds that make up the 2008 sci-fi animated movie. This thesis will be comprised of three chapters, each focusing on a different aspect that makes the film the aural masterpiece that it is.

In chapter one, I will be focusing on the main character, Wall-E, and how we can understand and empathise with him even though he does not speak our language. I will be dissecting the human language and analysing how pitch, tone and timbre all affect how we aurally perceive sound and how that shapes our understanding of this little robot. I will then compare other robots throughout history to gain a deeper understanding of the robotic language.

The next chapter, Chapter Two, will primarily focus on how we understand curiosity and what it *sounds like*. Since we understand how to interpret sound, we can then apply it to different emotions caused by different locations. Chapter two is set aboard The Axiom, which is a completely new environment for Wall-E. I will be looking at how Ben Burtt used techniques from Chion and Sonnenschein to create a vastly new

soundscape for *The Axiom*. I will also look at why some directors and sound designers chose to prioritise story over science and what that means for the film. Like chapter one, I will also compare this film to preceding films.

In the final chapter, chapter three, I will be looking at how Earth is portrayed, how that plays with emotions, and how it reflects *Wall-E*'s mental state throughout the soundscape - again looking at theories by Chion and Sonnenschein that Ben Burtt used to play with sound and emotion. I will then analyse the beginning of the movie, comparing it to the end and how the soundscape tells you the story aurally.

# Chapter 1

## The Sounds of Sci-Fi: What makes Wall-E so human?

### Introduction

Robots have appeared in cinema and TV for the last hundred years. They have been able to make us laugh, cry, and cover our eyes in fear, but only some robots have done something the others have failed to do: make us empathise with them.

In this chapter, I will explore how we can connect with Wall-E's character despite his inability to talk. Sound design plays a crucial part in how this little robot can be so expressive. Wall-E expresses himself in so many different ways, through his eyes and eyebrows, his hands and especially his voice – or lack thereof.

I will mainly focus on Wall-E from a sound design perspective, as I believe this is where Wall-E really comes to life. This film combines real-world sounds, like clanking and motors, and blends them with emotional prosody to create a robot we can connect with on an emotional level. I will look at why this is and what exactly emotional prosody is.

I will also be looking at robots throughout sci-fi history because Wall-E is a culmination of all the robots that came before him. He has surpassed his metallic predecessors and developed human-like attributes. Apart from all his regular robot sounds, like his beeps and bops, he can also sing, whistle, and laugh. Wall-E is special because he is not a humanoid robot, yet he has characteristics of one while also keeping his robotic charm.

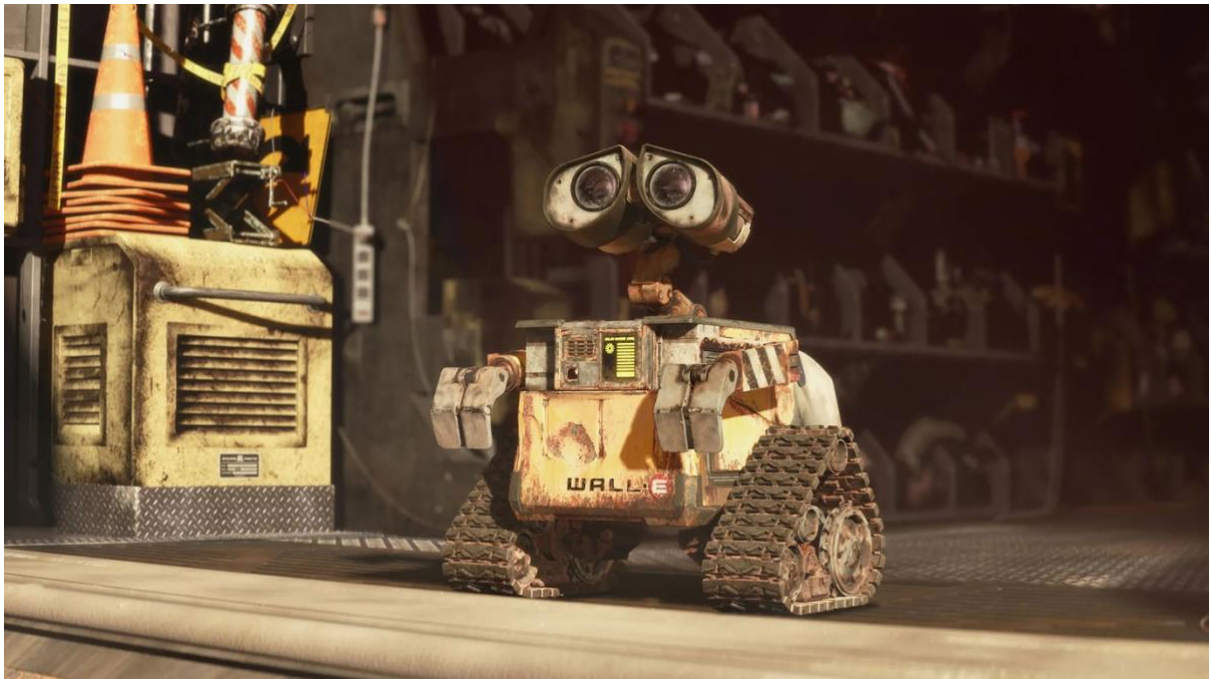


Fig. 1

One robot in particular inspired Wall-E, *R2D2*. Ben Burtt created both of these robots, and it is really telling. Both these robots are mute and rely solely on their

emotional prosody. Ben Burtt cultivated their voices through techniques such as voice modulation, Foley, and synthesiser. I intend to look at these sound design techniques in greater detail later in this chapter.

## Language

Before we look at Wall-E's language, we must first look at the human language. According to the book *Sound Design - The Expressive Power of Music, Voice and Sound Effects in Cinema* by David Sonnenschein, "Vowels were probably the first sounds to be developed by humans." <sup>1</sup> This is due to the fact that the sound would've been able to travel the loudest and greatest distance. Sonnenschein goes on to state that "we create and perceive harmonics through the vowels." <sup>1</sup> The vibrations produced by the vocal cords resonate within the vocal cavities, generating distinct frequency spectrums or *formants*. With formants, we are then able to apply them to different emotional states, such as excitement or anxiousness. (Sonnenschein, 131-132)

So... **Why** do we associate these sounds with human emotion, and **how** do we understand them?

We understand him because of two very important things: prosody, specifically emotional prosody, and semiotics.

Prosody is *the study of poetic metre and of the art of versification, including rhyme, stanzaic forms, and the quantity and stress of syllables* <sup>2</sup>, according to Collins English Dictionary. Semiotics is *the academic study of the relationship of language and other signs to their meaning* <sup>2</sup>, according to the same dictionary. These two things play a very important part in understanding our robotic friend. Wall-E has no vocal cords, so he cannot physically talk, but that doesn't stop us from understanding him.

When talking about prosody, Sonnenschein states that speech has two types of meaning. The verbal meaning describes what the speaker has experienced, while the intonational meaning shows how the speaker feels. Our brain hemispheres have developed to specialise in telling these apart. (Sonnenschein, 138) More on this later.

Semiotics play a big part in understanding Wall-E. Semiotics have been around for a long time; we often don't even realise it, but they are very significant to our understanding of how we perceive things. In Wall-E's case, without it, he would be a robot with no emotional capacity.

Semiotics is the study of signs <sup>3</sup> and was first coined by the Swiss linguist Ferdinand de Saussure (1857-1913). Saussure defined a sign as being composed of:

- a 'signifier' (signifiant) - the form which the sign takes; and
- the 'signified' (signifié) - the concept it represents. <sup>3</sup>

In relation to Wall-E, the relationship between the signifier and the signified plays a crucial role throughout the movie. For example, in the scene when he runs away

from the sandstorm, we know that he is stressed because the signifier signals the signified:

- *The signifier* - Wall-E's beeping, gurgling and chugging rapidly
- *The signified* - His fear, stress and urgency

At the same time, a lot of Wall-E's can be broken down into different semiotic categories allowing us to further understand him. There are three types, **iconic, indexical and symbolic**. Iconic sounds resemble what you see, for example, when Wall-E's cockroach friend crawls over him, he lets out a metallic chuckle, which we can assume is due to the fact that he is tickled. Indexical sounds point to a physical source but don't always resemble it, such as his big, heavy wheels, and the rusty clunkiness of his movement indicates his weight and age, despite acting so juvenile. Finally, a symbolic sound refers to a sound that must be learnt. During the film we grow to understand that Wall-E cares about EVE by the way he says her name, drawing out her name "Eve-aaAAA".

Semiotics doesn't achieve this on its own, though; it is also greatly helped by the pitch change in Wall-E's voice and the increase in tempo through the scene – this is known as emotional prosody.

Emotional prosody refers to variations in **pitch, tone, rhythm, and intonation** that allow us to understand certain attitudes and feelings. These factors really help with our understanding of Wall-E and where he is at emotionally. His electronic vocalisations have been meticulously crafted to mimic these specific prosodic elements, allowing him to express himself.

So, how does this all work if Wall-E doesn't use words? It is the same way babies have been communicating with us for years. The way that we understand the difference between an over-tired cry and a hungry cry. It all comes down to our understanding of sound through prosody. I will break each of these down in relation to Wall-E to better understand how each part comes together to create something so human.

### **Pitch and Tone** <sup>1</sup>

Throughout the movie, Wall-E makes all sorts of noises. His emotional sounds are beeping, whirring, and chirping, and his more mechanical sounds are clanking, motors, and gears. His emotional sounds are where we really get to know our robot. Although he can't use words, we can still understand that he can be lonely, curious, and in love.

Scientifically, pitch is one of the most notable aspects of emotional prosody. It allows us to get an idea about our character's emotional state. Research consistently shows a strong connection between pitch variations and specific emotions. <sup>4</sup> That being said, we can now look at Wall-E.

When Wall-E is excited at the end because EVE is finally holding his hand, he exclaims and gurgles a little. We know it's excitement, not disgust, because of the tone. His exclamation is higher-pitched, and research suggests that a wider pitch

range and a higher average pitch are often associated with positive emotions, such as excitement.

On the contrary, when he accidentally runs over his cockroach friend, he yelps and then lets out an "aww" kind of sound. We know that this isn't a "aww how cute" sound but an "aww how sad" sound. This is due to the flatter pitch contour, which our brain associates with negative emotions, such as sadness.

### **Rhythm** <sup>1</sup>

It might seem hard to think that Wall-E has a rhythm to the way he communicates, but it is definitely there! Rhythm refers to the timing and tempo at which a character says something. It can signify whether a character is panicked or rushed, or if he is calm and contemplative. A fast tempo usually signifies urgency or enthusiasm, or in Wall-E's case, panic, whereas a slow tempo displays curiosity or sadness.

Regarding Wall-E, looking at the sandstorm again, he makes a fast-paced gurgling/chugging sound – it sounds urgent and intense. This is because of the fast tempo. Alternatively, if we look at when EVE kisses WALL-E, he makes a slow-paced exhale noise and floats away. There is nothing urgent about this; it's calm, and we know Wall-E is on cloud nine.

### **Intonation** <sup>1</sup>

Intonation refers to the use of **pauses** and changes in **loudness** in speech patterns. With Wall-E, this one is a bit trickier to spot. Because Wall-E is a robot with a very limited vocabulary, his pauses and variety in loudness are hard to hear. Pauses at the right moments in a film can be so effective at showcasing a character's emotional state, and a change in a character's loudness can be especially effective.

For example, in the first half hour of the movie, the music pauses just as Wall-E throws a fire extinguisher. Not only does this make the clang of the extinguisher sound stand out, but it also shows us just how quiet and barren the world is. WALL-E truly is alone.

Loudness in Wall-E is subtle, but it is so effective. An example of this is when Wall-E is panicked, and he can't get EVE to wake up. He starts whirring and beeping, but most importantly, when he says her name, "Eeee-VAAA". This is what I mean by loudness. This change signifies his heightened emotional state; he is clearly unstable, as his voice suggests. This makes us empathise with Wall-E on a human level, connecting us to him emotionally.

Ben Burtt took advantage of emotional prosody and semiotics, using them so well. Because of him, a robot with no vocal cords could whistle, talk and sing, all without saying a full sentence. If we look at Ben Burtt, this wasn't his first robot creation. He also gave Wall-E's senior a voice, R2D2. *So how exactly did Burtt achieve this?*

### History of Robotic Language

Firstly, to understand why Wall-E's "voice" worked so well, we must first look at the robots who paved the way for him. Throughout history, we have observed a variety

of different robots, each one teaching us about how robots express and convey emotions. Robots can be traced back to early cinema, but they didn't start making iconic sounds until much later. How did these early robots communicate?

The first robot to appear on TV was "The Mechanical Man" (1921), directed by André Deed. Although this was a silent film, the robot's communication was conveyed through his movements. His slower, machine-like movements contrasted sharply with those of his human counterparts on scene, establishing a clear distinction between humans and robots early on in cinematic language.

In 1956, "Robby the Robot" was introduced to the world of sci-fi. He first appeared in "Forbidden Planet", directed by Fred M. Wilcox. Robby was different to other robots; he could talk. This method of recording human voices and filtering them was new; it gave a new line of communication for robots. Robby spoke in a flat, monotone voice, leaving him without much personality. Although Robby still took inspiration from the real world, he made beeps and whirrs just like any other machine. Robby the Robot combined human voices and mechanical sounds to create robot voices.

Robby the Robot went on to inspire a new robot, B-9, which first appeared in "Lost in Space" (1965), created by Irwin Allen. Just like Robby, B-9 had a voice and also had a mechanical aspect to him. Compared to Robby, B-9 has a bit more personality in his voice, making us as viewers start to connect emotionally and resonate with him.

1977 was when history for robots was made. This was when Ben Burtt signed on to sound design George Lucas's Star Wars. Burtt had taken note of all the robots that came before him, but George Lucas wanted to try something new, something that hadn't really been done before: create a voice for the non-verbal. When asked in an interview with *The Hollywood Reporter* journalist, Scott Roxborough, he said

*"Well, at the time, most science fiction films contained sound effects and ambience that were electronic in nature. Things sort of derived from Forbidden Planet, you know, that wonderful electronic score and sound effects that were made for that film. George felt that was a cliché by this point, so he didn't want to have a synthetic or electronic score or electronic effects of any kind. He described it to me as an organic soundtrack, which meant, let's go out in the real world and gather acoustic sounds, be they motors, animals or jet planes."* <sup>5</sup>

Ben Burtt describes that way himself and George Lucas established the language at the beginning. He said that George had started making "beep-beep" vocalisations and Burtt replied back with "whoop-whoop" vocalisations and that's when it dawned on them; they wanted baby-talk with the intonations but without the words. <sup>1</sup>

Before starting, a lot of preparation had to be done. Burtt has said himself that he even wrote dialogue for the non-verbal robot, so that he could match the rhythm of speech and use the correct intonation. <sup>1</sup> (Sonnenschein, 148)

That is exactly what he did. Burtt went out into the real world and collected organic sounds for R2D2. He decided to combine an imitation of a baby babbling with the whistling sound of blowing through a small, flexible plumbing tube <sup>6</sup> and intercut it with more classical robot sounds, such as electronic beeping and chirping. According to a research paper by Jee et al <sup>7</sup>, Ben Burtt used an analogue synthesiser and processed his own vocalisations through sound effects in order to create the sound

of R2-D2. As a result, when R2D2 spoke, the higher notes sounded more metallic than the lower ones; the lower ones sounded more human-like. This human-like aspect of his voice created more emotion in his speech, allowing us to connect with R2D2 more. These two aspects created something alive, organic and natural while also staying true to the physics of a robot.

Burt then applied these same techniques to Wall-E. By focusing primarily on his baby-talk technique, he was able to achieve Wall-E's distinctive language. He truly is an amalgamation of all those who came before him. We get the clanks and motors from Robby the Robot and B-9, paired with the humanness of R2D2.

### Conclusion

Combining these sound design elements with emotional prosody and semiotics creates Wall-E. It is why we connect with him emotionally, despite not understanding him. Burt's clever sound design transcends the human language and breaks the need for speech.

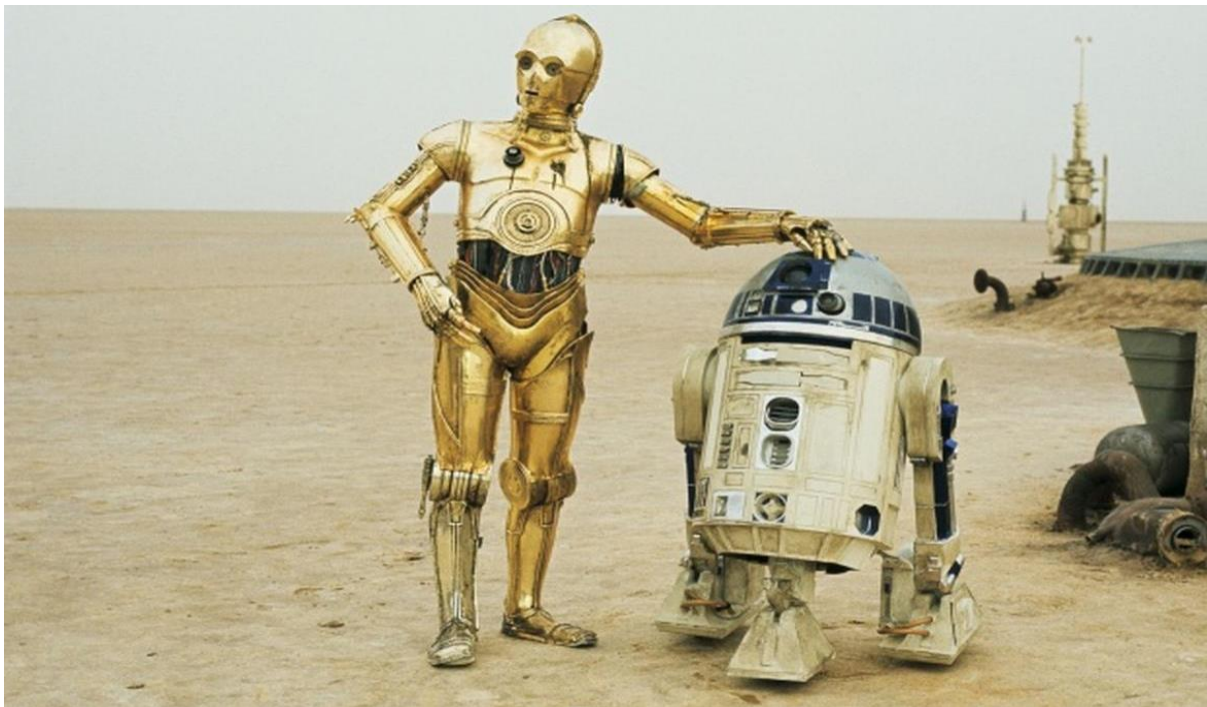


Fig. 2

## Chapter 2

### The Sounds of Sci-Fi: What makes Wall-E curious?

#### Introduction

Now that we understand *how* Wall-E feels through semiotics and prosody, we must look at *why* he feels this way. A big source of Wall-E's curiosity is the huge spaceship he boards, *The Axiom*. Not only is the Axiom a completely new visual

environment, but it is also completely new to him aurally. It contrasts greatly with his run-down, mechanical, and clunky world. Everything on board whizzes and beams, unlike Wall-E's motors and whirrs.

While Chapter One explored how sound allows us to empathise with Wall-E, this chapter examines how sound motivates his curiosity and his engagement with the unknown.

### Curiosity

Before we look at the axiom, we must first understand **curiosity**. Curiosity is what makes us question things, what makes us explore things and what makes us human. According to Philosopher and psychologist William James, curiosity is “the impulse towards better cognition.”<sup>8</sup> He goes on to talk about curiosity in children, which we have already established that Wall-E is childlike in his mannerisms and speech, where he says in children, it drives them towards objects of novel, sensational qualities - that which is “bright, vivid, startling.”<sup>8</sup>

This is very true when we talk about curiosity in regards to Wall-E, everything is exciting. The Axiom is bright, vivid and startling in every aspect, from its white lights, dynamic machines and brand-new soundscape.

The Axiom and Earth share nothing in common. The earth is dull, lacking any form of excitement; it has stayed the same for the seven hundred years since humans left. Whereas The Axiom is ever-changing, loud and new. Curiosity is what drives Wall-E forward, it is what made him follow the red dot out of his house to the spaceship, it is what made him follow EVE around Earth, it is what got him to jump onto a departing spaceship mid-air – curiosity is evident in all these scenarios. Without curiosity, there is no story, he would still be on Earth, the same.

### The Axiom

The Earth and The Axiom couldn't be further apart sonically. They are both incredibly different, creating a great contrast in Wall-E's environments. The Earth is quiet and empty, whereas the Axiom is overpopulated and overstimulating; two ends of the sonic spectrum. This aural shock is bound to create a sense of intimidation and, more importantly, curiosity in this solitary robot.

When Wall-E is on Earth, there is an obvious lack of something *more*. Right from the opening, we get an immediate sense of loneliness and a lack of life. It is sparse and barren. We get this all through Ben Burtt's sound design, from his wind SFX to his echoey reverb. They all work together to create a very lonesome atmosphere—more on this in Chapter 3.



Fig. 3

On the contrary, the Axiom is a high-tech cruise spaceship, with robots far more futuristic and polished than Wall-E. From the moment Wall-E enters the spaceship, it's different in every possible way. There are two standout moments of curiosity when Wall-E enters the spaceship: his first impression of the robots and his first impression of humankind. The robots are sleek, new and a lot more dynamic. They lack any mechanical noise; it's all low-frequency hums. For humans, Wall-E has likely never encountered one before; this newness is bound to foster curiosity.

On board The Axiom, it is like a brand-new world to Wall-E, who only knows the sparse and empty wasteland of Earth. As described earlier, Earth is sonically lonely, whereas The Axiom is everything but lonely. One of the first things I noticed about The Axiom was how clean everything sounded.

If we look at the very first scene that takes place in The Axiom's "Work Zone", immediately we are bombarded with lots of different sounds. Right off the bat, Wall-E is met with flying robots that whizz and hover above his head, the smooth sound of the low frequency piston arms extending, mechanical exhales of machines being released, alarms going off to signify that this is a working area, more pistons extend, whirring, extending their arms to elegantly press buttons, cleaning machines brush and wax the spaceship until another piston arm swoops down and disengages EVE from her pod. All these new sonic stimuli work together to create a contrasting environment from Earth, but Wall-E isn't scared, he's intrigued. From describing it, The Axiom sounds like an overwhelming situation to be in, but because of something Michel Chion calls *Added Value*, the scene isn't overstimulating but instead, comes alive.

*Added Value* is "the expressive and informative value with which a sound enriches a given image so as to create the definite impression, in the

*immediate or remembered experience one has of it, that this information or expression "naturally" comes from what is seen and is already contained in the image itself."*<sup>9</sup>

Added Value takes what could be an overwhelming sonic nightmare and applies it to Wall-E's environment, creating a brand-new world for him and us as viewers. These layers of sounds act in harmony with each other, but it's not by accident. Burt carefully crafted these sounds to take up the full dynamic range and then go background, he did this with all these new sounds. This gives them importance but also not making them the only thing we hear. This clever trick places Wall-E in the middle of this soundscape, as he is the only constant that we hear, exemplifying his alienness to this situation and allowing his curiosity. This drives the theory of added value home, as this scene wouldn't be heard the same if not for it.

It's not just added value that helps immerse us in this unfamiliar world; it's the subtle changes in sound design techniques that use rhythm and timbre. I talked about these in chapter one when describing how Wall-E communicates, but I will apply this to The Axiom's atmosphere.

According to David Sonnenschein, in his book *"Sound Design - The Expressive Power of Music, Voice and Sound Effects in Cinema"*, he divides rhythm into two categories: organic and mechanical. In the case of The Axiom, it is mainly mechanical rhythm. Mechanical rhythm, unlike organic rhythm, is based on predictability rather than the actual *rhythm* of the sound itself. Sonnenschein describes it as;

*"Mechanical sound tends toward predictability, until it signals some kind of breakdown or outside intervention. The predictability of a sound can lend to a certain tranquillity...An irregular sound can keep you alert, frightened."*<sup>1</sup>

Because the sounds are so rhythmic, they create a sense of safety, even though they're unfamiliar; this comfort gives Wall-E the space to be curious. We see this when Wall-E meets M-O for the first time. M-O's rhythm plays a huge part in Wall-E's curiosity as it doesn't feel aggressive. M-O's movement is clean, uninterrupted, and sleek. He has one wheel that creates a low hum when he moves, and his arm movements sound docile and non-threatening. These predictable cycles give a sense of stability and comfort right from the moment that Wall-E meets him, instead of feeling threatened by him, he really couldn't feel more at ease - he even felt comfortable enough to put some "foreign contaminant" on M-O's face, to see what would happen. That's curiosity. This soothing rhythm of The Axiom contrasts greatly with that of Earth's. Everything on the spaceship seems to work in sync with one another, like a perfect system. This significantly contrasts with Wall-E's world; there is no rhythm, just chaos.

It is not just rhythm that cultivates this new and curious space, but also timbre. Timbre refers to the quality of a sound. On the axiom, the timbre is generally quite smooth, clean and synthetic, opposite to that of earth's. For example, what makes it so clean and smooth is the low whirring and humming from the other robots, the way the robots talk (they're less expressive than Wall-E), and the way everything seems to stay within the same dynamic range. There is very little metallic harshness and

clunky, outdated sounds. All these factors come together to create a futuristic, polished atmosphere.

On paper, The Axiom is incredibly overwhelming, but due to its sonic translation, it doesn't come across that way at all. Unlike Wall-E's home, this ship's aural environment is controlled, repetitive and smooth, fostering inquisitiveness rather than anxiety.

### Sound vs Science

If we look at Wall-E through a scientific lens, half the film would be silent because, in space, there is no sound. Let's get scientific for a second. When we talk about sound, we are talking about mechanical waves (vibrations). These waves cannot travel through space because space is a vacuum; outside The Axiom, there is no medium for them to travel through. In order to travel, they need a medium in which to move. These mediums can be Air (how we are able to communicate on earth), Water or other materials. With these facts in mind, much of Wall-E's sonic world becomes impossible.

However, cinema rarely prioritises science over good storytelling purely for much-needed narrative clarity and emotional depth. Sound provides many aspects of a film that are often unbeknownst to us, such as the tone, scale, and dramatic intensity of a scene, especially in science fiction. This abandonment of scientific principles can be described as an "aesthetic decision". John Belton argues that sound in film does not need to reflect reality.

*"Images attain credibility in the conformation to objective reality; sounds, in their conformation to the image of that reality, to a derivative reconstruction of objective reality." (3)*

With this new realm of aural possibility, space starts to get a lot louder and a lot more interesting. The sound designer of Wall-E, Ben Burtt, describes it like;

*"In space fantasy, the work becomes much more abstract. Your imagination can take much greater leaps. You are not limited by what people are expecting. Sound in fantasy can function somewhat like music. You can decide what emotional reaction you want to create" (3)*

It is understandable why directors would want the freedom to play with space sounds and lightsabers rather than being confined by the silence of science, although not all of them did.

Stanley Kubrick's "2001: A Space Odyssey" has been described as "*easily... the most scientifically accurate film ever made for its time.*" (4) (lab coats.. book ref). Unlike most modern sci-fi films, Kubrick used the emptiness and vastness of space to their advantage in order to play with the viewers' emotions. Techniques like cutting from room tone to silence and back to room tone make even silence sound loud. This works well and pays off when HAL kills Dr Frank Poole in space. The silence not only heightens the tension but also really drives home that he is truly alone.

On the contrary, Wall-E wasn't so keen on staying so scientifically accurate. There are many times Wall-E is on the outside of the axiom, and we can hear him perfectly well, despite the huge vacuum he is in.

If we compare the scenes when Wall-E is floating outside the axiom after emergency ejecting himself out of an escape pod with the scene where HAL kills Frank in space, they couldn't be any more sonically apart. The obvious difference being, one scene is filled with slow breaths and... nothing and the other one is filled with sound effects and even some dialogue. When Wall-E is in space, they did get the physics of motion correct, but decided against aural physics. I believe both work in their own separate ways. In 2001, the silence creates tension; it makes us hold our breath, almost like we are the ones out in space. But with Wall-E, although the stakes are quite high as we thought Wall-E got blown up, it's quickly revealed that he didn't by having him zoom across the screen screaming with a Doppler effect.

### History of Sound in Space

Evidently, the sound of space and spaceships has never been scientifically consistent. Instead, it adapts to the ever-changing aesthetic priorities, technological advancements and audience preferences.

#### 50's – Forbidden Planet

Looking at *Forbidden Planet* (Fred M. Wilcox, 1956), it definitely lacked some of the realism found in modern films, but what it lacks in that, it makes up for in the electronic sound effects and score. Together, husband and wife composers Louis and Bebe Barron created something entirely new by using electric circuits. The use of electronics in sound wasn't very common, so the sounds that were produced sounded new and alien, perfect for sci-fi.

Compared to Wall-E, *Forbidden Planet* certainly isn't as immersive; the sound feels one-dimensional. It lacks layers of sound design, making the environment feel empty. In terms of what Michel Chion would describe as *added value*, the sound does not reshape or deepen our emotional interpretation of the image. The electronic tones instead act as a signifier, signalling to us that we are in a spaceship; we form no real sonic connection to the environment.

#### 60's – 2001

*2001: A Space Odyssey* (Stanley Kubrick, 1968), as previously stated, is said to be one of the most accurate depictions of space for its time. It's not because of how new and futuristic everything looked on screen, but because they used real science. Kubrick himself said that he wanted the film to be as realistic as possible. It's not just what was seen that was realistic, but also what was heard.

Discovery One's soundscape is completely different to that of Wall-E's. On *Discovery One*, there aren't loads of people or lots of robots; it's very simple, and most of the time the sound reflects that. It's simple, but it works so well. Explosions and movement occur in silence, grounding us in the reality that there is no sound in space, and, in doing so, the aesthetic priorities shift and create something stylised.

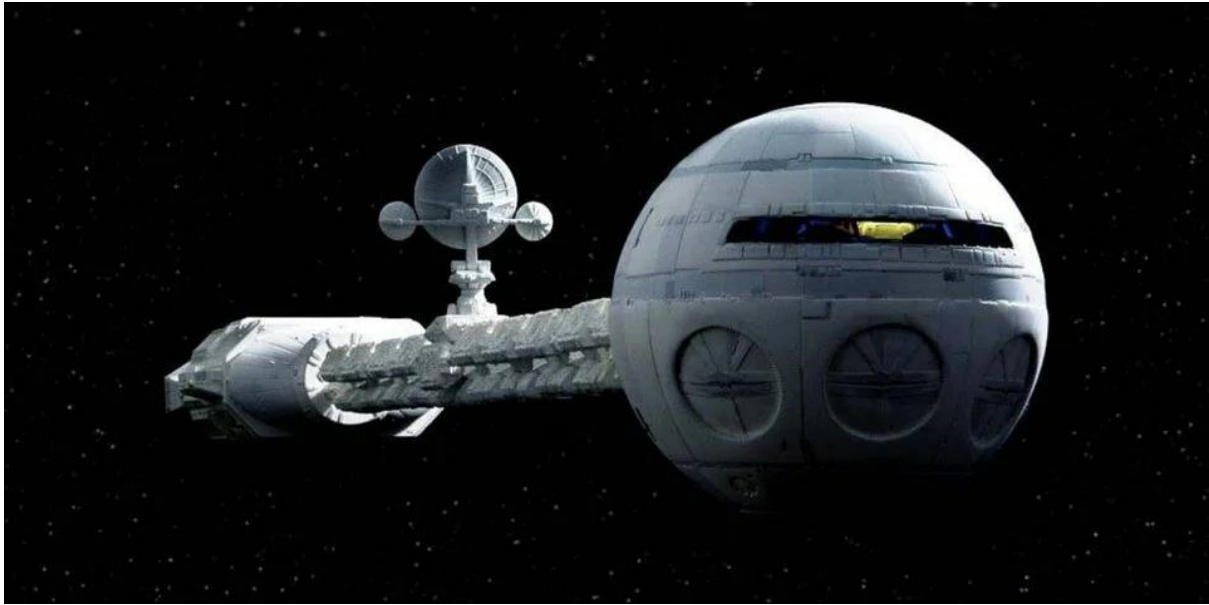


Fig. 4

### 70's – star wars

The release of Star Wars changed sound design in space as we know it. Ben Burtt created what would become the modern sonic lexicon, a shared vocabulary of sounds that would forever change viewers' sonic expectations of space and spaceships.

Burtt gave his spaceships aggression, weight, and a physical presence; they felt alive because they were. He didn't adhere to scientific rules, but perhaps we are better for it; sci-fi just wouldn't be the same. Burtt obviously carried a lot of inspiration from Star Wars into Wall-E, from robots like R2D2 to the soundscape of bustling, awe-inspiring spaceships.

### Conclusion

WALL-E is curious not only through narrative and visual design but also through his sonically diverse environment. The barrenness of Earth and the bustling rhythm of The Axiom create a journey from isolation to community, giving him the space to be curious and to allow wonder. By ignoring the rules of science, Burtt was able to prioritise emotional connection and depth, allowing for complete immersion in the soundscape. In this film, it is clear that the sound is at the centre of shaping Wall-E's curiosity.

## Chapter 2

### The Sounds of Sci-Fi: What makes Wall-E curious?

#### Introduction

In this chapter, we shift focus from the curiosity about space to the construction of loneliness on Earth through sound. In the previous chapters, we looked at how Wall-E feels and why he feels that way, but now we are looking at how his environment produces isolation. Visually the film is designed to be barren and empty, but it's exemplified through the sound design.

#### The First Impressions of Earth

Sound manipulates our perception of earth right from the very beginning. The film opens on the vast and beautiful space with the song "Put on Your Sunday Clothes" from the musical "Hello Dolly". The song is upbeat and chirpy, mixing well with the stunning visuals of the milky way. About 20 seconds into the opening credits, we see Earth for the first time, it is not as beautiful as the other planets, old satellites and brown debris deprive the earth of its former glory. As we get closer to Earth and realise it is a barren wasteland, the music slowly gets quieter, slowly distancing us from it while the diegetic sounds take its place.

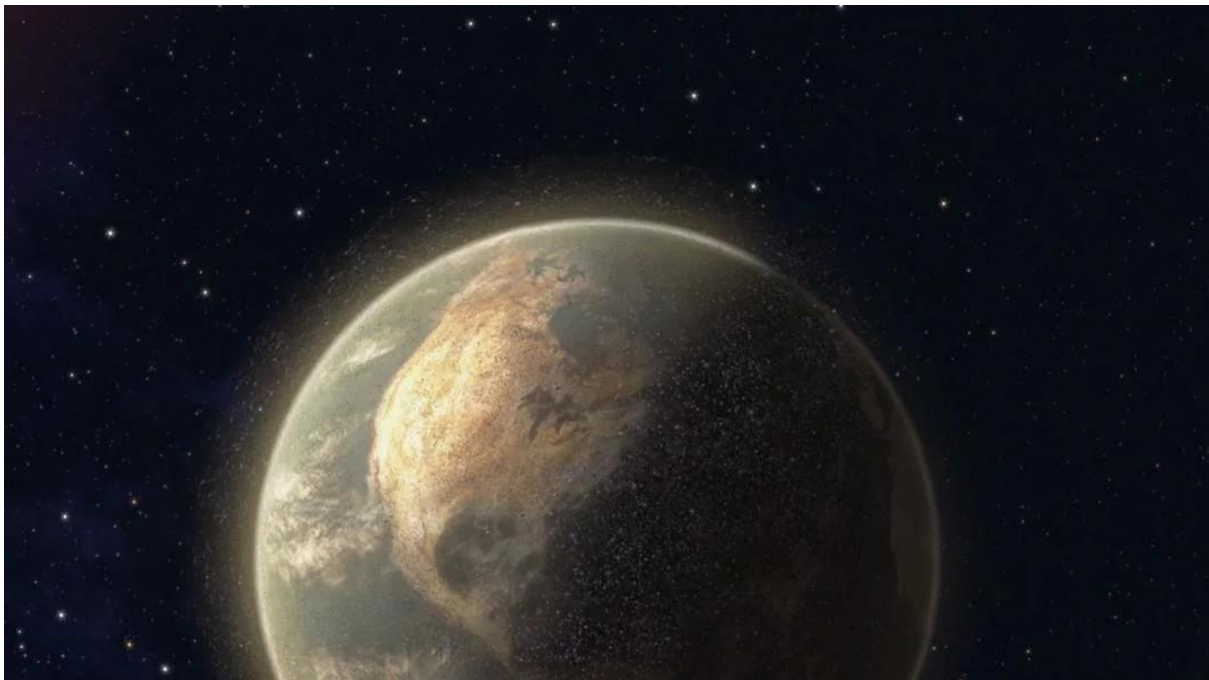


Fig. 5

The diegetic sounds slowly sneak into the sound mix about a minute in, we get a slow rise of apocalyptic wind and it's quickly joined by other gusts of wind. The last line of the song slowly fades out into a long reverberance, exaggerating the vastness of Earth. This can be described as the *shape* of a sound. David Sonnenschein, it explains that every sound has a shape, defined by its attack, body and decay. In this case, the attack would be the very beginning of the song, the body being the song

itself until it starts its decay, which would be the slow fall-off or termination. For the last line of the song, it's a long decay, which can be described as "reverberant". Sonnenschein goes on to say that;

*"The listeners perception of the sound shape depends not only on the waveform created by the source, but also on the distance and reverberation properties of the surrounding space". (Sonnenschein, 68-69) <sup>1</sup>*

This helps reinforce the emptiness of Earth. Had Earth been full of life, the sound design choice wouldn't work, it would feel misused and misleading. This extended reverb allows us to feel the loneliness of Earth, if it were shorter, we would feel closer to Wall-E and earth, but this distance created by the reverberant tail makes us feel as though we are far away and Wall-E is alone. This is because brains don't interpret reverb as a sound effect, we recognise it as context for a specific situation, and context is where we get meaning from, i.e., emotional connection.

The shape of sound clearly has a role to play in our perception of a situation. The long tail on the reverb signifies a great distance that the sound needs to travel in order to reach us, this can be interpreted as an emotional distance too, placing us far away from Wall-E, physically and emotionally - playing on his loneliness. The camera's slow and drifting movement with the gradual shift in volume of music work together with the reverb to make Earth feel unreachable, and Wall-E, completely isolated. This sound design technique subliminally teaches us that none of the sounds of Earth are filler sounds, but that they are emotionally charged. Every gust of wind and every clanky motor carries an emotional weight. They all have a shape and that shape means something.

Ben Burtt does something spectacular, once the non-diegetic music slowly dissipates, it comes back as a diegetic track, playing from Wall-E's internal tape player. Except this time when the music comes into ear shot, it sounds different, the reverb has changed from clear to 700-year-old speaker. Accompanying the music is now Wall-E's motors and wheels, fully immersing us in his reality. The music phases in and out when Wall-E enters and leaves the frame, this gives moments of silence in-between the music cues, where we hear the wind again. These small fractions of sound design may seem insignificant, but they reinforce the idea that Wall-E is completely alone on this earth, he is the only one making any sound. Referring back to Sonnenschein, he says that if;

*"a certain sound was present in a given scene, or associated with a certain character, the lack of this same sound in a similar scene later in the film will create an expectation and make the audience aware of the previous sound's absence. This can create a striking shift in the emotional language." <sup>1</sup>*

This change in point of audition plays with our audio-visual perception of where we are in the movie. By hearing this song come from Wall-E himself rather than as a soundtrack, we are instantly transported into his head. This allows us to get a glimpse inside Wall-E's sonic bubble, while the outside world stays dominated by the relentless wind. By doing this, Burtt allows us to not only see his loneliness, but feel it too. It is far more intimate; his loneliness feels real and not just environmental. This connects us to Wall-E, making us root for him and engaging us in the movie.

Although it's a much smaller scale of time, the theory still holds up and we do get the emotional pay-off. Undoubtedly, Silence in this film plays a part in loneliness. Not the scientific silence, but emotional silence.

### Silence, Emotional not Scientific

When I refer to emotional silence, I don't mean no sound at all, I mean "silence can take on different meanings, depending on the context." <sup>1</sup> just as Chion agrees that;

"The impression of silence in a film scene does not simply arise from an absence of noise. It results from a whole context, and from preparation—the simplest of which involves preceding it with a noise-filled sequence. In other words, silence is never a neutral void: it is the negative of sound we've heard beforehand or imagined, the product of a contrast." <sup>8</sup>

This confirms that Earth feels empty. As humans we have an understanding of what Earth sounds like, it's loud and rarely every quiet. There are cars, people, animals, machinery and factories, the list goes on, and they all make their own sounds unique sounds. When we see Earth it lacks any of that noise which is what makes Wall-E's environment so lonely. According to psychology, humans like to make and surround themselves with sounds to "nourish the concept of perpetual life so silence can represent aspects of negative attitude such as oppression or solemnity". Perhaps this is why Wall-E plays music constantly and hums to himself, to ease his isolation.

### The Soundscape

The soundscape itself reinforces Wall-E's loneliness on earth. A soundscape is made up of four types of sounds: **Keynote sounds, signals, soundmarks, and archetypal sounds.** <sup>1</sup>

The keynote acts as an anchor or reference point to all other sounds. The keynote can be listened subconsciously or unconsciously but "it's omnipresence suggests the deep influence it may have on the characters behaviour and mood." In Wall-E's case this keynote would be the wind and it is really the only thing audible on Earth other than his own mechanics. It is argued that with keynotes, or tonal centre, that it "alleviates boredom and drives us onward". This is true in Wall-E's case as he doesn't have any new sounds so he is stuck in a constant state of aural sameness keeping him bored and reminding him of his loneliness.

Signals in Wall-E refer to the "figure or foreground sound" that is consciously heard. These would include sounds that motivate him to do something. For example, the alarm warning him of the huge windstorm or the landing of the spaceship for the first time. These sounds informed Wall-E of his environment, building the soundscape.

A soundmark, just like a landmark, establishes a particular place. In the case of Earth, personally I think it would be the BnL advertisement Wall-E drives past in the opening scene. This tells us something really important, that humans are in space and that Wall-E is completely alone on this desolate earth.



Fig. 6

Finally, an archetypal sound activates our memories, "bringing us into an environment through a universal emotional reaction." These sounds tap into the emotional part of our brain that associates specific sounds with specific feelings. In Wall-E, the heavy wind evokes coldness, sadness and maybe even distress.

*"The natural soundscape can create not only a wide range of emotional spaces, it can also link with our human environments through analogy or simply because of our tendency to seek meaning in all stimuli."*

All four of these types of sounds make up this chilling soundscape to construct an overwhelming loneliness. The constant wind, overlapping everything and its omnipresence wherever Wall-E goes, the sporadic signals, often alarms or collapsing buildings, unnervingly keep Wall-E on his toes, paired with the very few soundmarks around and finally the archetypal wind, reminding Wall-E of his loneliness. These combine together to evoke a sense of isolation, vastness and a deserted earth. On Earth we expect the soundscape to be similar to the earth that we live on, so the absence of these sounds, and the replacement of other sounds, creates a sense of unease.

At the end of the film, the soundscape shifts as each category is repopulated from sparse to communal, changing the sonic world as Wall-E once knew it. This

soundscape is masterfully crafted, making us empathise with Wall-E and connect with him and it pays off at the end when he returns to Earth. (Sonnenschein, 123, 182-184)

### Return to Earth

When The Axiom returns to earth, it is not the same sonically, or physically. The loneliness that once choked him is now gone. The loudness and intensity of the Axiom overpowers the once lonely gusts of wind. This shift in loudness gives us a new sensation of hope, the once barren streets now feel alive. For the first time on Earth, there is layers to the soundscape. Initially when the Axiom lands, we hear the diegetic sounds of walls crumbling, low rumbling, metallic impacts and other environmental debris. This creates a dynamic atmosphere in the once still landscape. As the Axiom finishes its arrival, a huge gust of wind is released and sweeps across the whole sound field, this may be interpreted as a sonic closure of sorts, marking the end of Wall-E's isolation.

With the landing of The Axiom, it also means that everything on it has also landed. Wall-E is no longer the only thing, apart from his cockroach friend, to populate Earth. Other robots and also humans now roam the Earth, each with their own unique sounds, It is now full of other life, and motors. The high-tech robots now inhabit earth with their distinct new wave whirrs and chirps and the humans walk, talk and breath, all these sounds accumulate, changing the soundscape as we know it. Sonnenschein talks about how overlapping sounds generate emotional vitality and this is evident when we talk about breathing. Breath particularly is an archetypal sign of life and with Wall-E, life = community.

All of this is overshadowed by Wall-E's "*death*". The new soundscape slowly escapes us, the wind slowly returns and it feels as though the hope of a new world is gone. When EVE works on Wall-E in his truck, the silence is back. Going back to Chion's theory that silence is defined by contrast is particularly relevant here. EVE cannot get a response from Wall-E, even when he wakes up, he isn't the same robot, he doesn't respond to her at all. When he moves, he has lost all individuality and quirks, ultimately, his sonic identity is stripped of its distinctive characteristics. This silence feels heavier and more intense because for one, they have been communicating with each other throughout the whole movie and two, we just had a sonic awakening with so many new sounds on Earth, this makes Wall-E's silence distressing. It raises the question; *is this the beginning of EVE's loneliness on earth?*

Just as Eve is about to give up hope, it is Wall-E's sonic quirks that give EVE, and the viewers, hope. Chion's "added value" theory works here, through Wall-E's distinctive sounds, his subtle auditory cues reshape the ending in it's entirety. These subtle sounds, indicates that hope isn't lost, he is alive. These familiar mechanical whirrs and his distinct eye mechanics signal more than auditory value, but emotional relief. Sound indicates that Wall-E is alive before we see that he is, acting subtly but so powerfully.

The background sounds come into play again as the other robots celebrate and let out mechanical exclams. The humans plant the seedling, talking about the future of

earth. All these sounds create a harmonious soundscape of new life and new beginnings. The loneliness that was once felt by Wall-E is gone as he is now surrounded by the sounds of a community in what was once a desolate land.

In this final sequence, we can break the sound mix into three distinct phases that correlate directly to Wall-E's loneliness and then to its resolution. Just as The Axiom is landing, the soundscape of Earth is immediately different, people are talking, robots are whirring and the wind seems to have settled. Layers of sound populate the world, it is crowded and hopeful. As soon as EVE goes to Wall-E's home, the soundscape seems to have escaped us, we are back in the old Earth, we cannot hear any humans, the robots go silent and the wind is back. EVE's voice takes over, her voice is soft and panicked and just as EVE is about to give up, we go into the final phase. Burtt gradually introduces those familiar sonic quirks and we are met with immediate relief. Along with his sonic quirks comes the slow introduction of the robot and human sounds along with the soundtrack.

Hello Dolly's "*It Only Takes a Moment*" begins to play over the ending sequence of the film once it's established that Wall-E is alive, slowly drowning out the world. The music gradually envelops the environmental sound, but does not erase it, instead, it integrates it. Earth is not restored to its former state, but sonically transformed into a communal and hopeful environment.

## Conclusion

In conclusion, the earth Wall-E left in search for love is not the same as the one he came back to. What was a barren wasteland, with no aural prospects and just wind storms to fill the silence, became a place of hope and new beginnings through thoughtful sound and a great understanding of human understanding. It is through theories of Chion and Sonnenschein that sound on both versions of earth was as impactful as it was.

Our understanding of loneliness starts with sound, without sound, there is nothing. Sound gives us a meaning, hope and understanding, which is why the contrast of Earth before and after is so virtuously done.

## Conclusion:

Throughout this thesis, I wanted to explore the question of how, and to what extent, the sound design of Wall-E is influenced by theories of emotional prosody, semiotics and audio-visual perception, allowing viewers to feel empathy for a robot and to experience his curiosity and his loneliness all without speaking a word of our language. I have argued that Ben Burtt's sound design is not simply a supporting element of this film but a crucial part of how we understand Wall-E as a character and also how we experience his world.

In Chapter One, I examined how Wall-E's "voice" is created through emotional prosody and semiotics rather than a spoken language. By breaking down features like pitch, tone, rhythm and intonation, I showed how his beeps, bops and whirrs became legible as human emotions such as excitement, sadness and love. Expanding on prosody, I found that variations in pitch and tempo gave us insight into Wall-E's inner world, even though he cannot speak. Tying this into Saussure's theory of the sign and the signified. I then compared Wall-E to some robots that came before him and how Ben Burtt masterfully blended old-style vocalisations with the human voice to give us something unheard of.

I shifted focus in Chapter Two, centring on Wall-E's new environment, asking what curiosity looks like, or sounds like, for Wall-E. By comparing the quiet and stillness of Earth with the smooth, high-tech soundscape of the Axiom, I found that sound actively motivates Wall-E's curiosity and his engagement with the unknown. Using theories of added value by Michel Chion, I explored how layers of hums, beeps and mechanical whizzes transform what would be a sonic nightmare into a new and inviting world, giving Wall-E the space to be curious. I then also compared The Axiom to spaceships throughout history, learning that not all films adhere to the rules of science and that sometimes sound is vital in making the picture work, whether it is scientifically accurate *or not*.

In Chapter Three, I looked more at how Wall-E's environment on Earth made him lonely and examined how soundscapes directly affect emotion. Focusing on theories by Chion and Sonnenschein, I analysed the introduction of the film closely and found that we associate the shape of sounds with emotion, learning that a long reverberance separates us from the world, creating distance, whereas a short one brings us in closer, feeling more connected. I then compared the soundscape at the beginning to the end, noticing a completely contrasting sound mix, Burtt had created a world full of life very subtly but so effectively.

Overall, it is evident that sound manipulates us, playing with our emotions and our understanding of a film. Ben Burtt cleverly invites us to read Wall-E's beeps and chirps as more than just noises, but as his voice and the soundscapes as more than simple sound effects to fill in silence, but to subliminally tell us how Wall-E is feeling.

As David Lynch once said:

***"Sound is, at least, fifty percent of the picture"***<sup>10</sup>

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