Mechanical genders – how do humans gender robots?

# **Introduction**

Are robots gendered? If so, how? This paper will examine some of the most advanced robots in the world and examine their gendered qualities to determine the way in which they are gendered. This paper uses robots to exemplify the way in which we apply the quality of gender to a ‘being’. By understanding the way in which humans express the concept of gender through robots and discussing the way in which humans gender robots, we have a unique opportunity to improve our understanding of gender. Robots are an advanced created mechanical species and are thus programmed, perceived and applied in a human gender-sociological context. A study by Siegel et al. (2009) shows for example how female robots receive more monetary donations when used by charity organisations from male humans than male robots receive. Robertson (2010) notes that most gender research on robots have been focused on the way in which male/female humans interact differently with male/female robots, and has disregarded the gender quality in itself. Robots share many gender criteria with humans, and, arguably, they also embody some novel criteria. The question ‘What makes us human?’ is one that robot scientists in Japan are attempting to research through ‘androids’ – robots that strongly resemble humans. At the same time, the boundary between humans and machines is weakening (Turkle, 2011). Turkle explains both how humans are becoming more like robots (cyborgs) and also the other way around, robots becoming more like humans (androids).

Gender is one of the most important intra- and interpersonal human characteristics. Humans very often use gender as a key criterion when speaking about other humans, as well as when naming boats, pets and so forth. How, then, do humans gender robots? How do human and robot gender co-relate? And how do these gender characteristics affect each other? The paper will discuss how robot manufacturers and controllers impact our understanding of robot identity through the aspect of gender. The social and mechanical aspects of robots will be examined, and the paper will also ask whether there is a unique Japanese phenomenon relating to robot gendering practices, as most of the robots studied are made in Japan. The paper presents a gendered view on technology, but also a technological view on gender, aiming to explore the symbiosis of the techno-gendered society we inhabit.

The research is based on a discussion of relevant literature, as well as observations and discussions on some of the most highly technological robots to date. Following the introduction, the paper investigates previous research in regards to robotic gender studies, and gives an explanation of methodology. The paper’s second part presents presumably genderless robot entities, discussing the blank slate that robots are created with before human gender categories are applied to them. This part gives examples of androids that have not been given many gender characteristics such as Pepper and ASIMO, and also discusses zoomorphic robots such as AIBO and PARO in regards to the gendering of animal-like robots. It also discusses the linguistic aspect of talking about robots, and shows how different languages gender robots more than others. The third part of the paper discusses more heavily gendered robots such as the Geminoids – robot twins of humans, especially concerning Matsukoroid, an android copy of a famous Japanese transvestite TV-star, who co-host the world’s first android talk-show. Also, sex-robots are discussed in regards to gender, discussing if mechanical genitalia can gender a mecha-specie. Lastly, a discussion of humans who have are becoming more robotic (cyborgs) are discussed in regards to gender identity.

## ***Placing the robot in gender research***

Robots – and particularly cyborgs – have symbolically been used by gender theorists, most notably Donna Haraway, who theorise what new mechanical entities might mean for humans (Haraway, 1987, 1997). Whereas Haraway uses robots as a symbolic image, this paper aims to add knowledge of robots’ symbolic value, i.e. how the actual robots that exists right now impact our perceptions of gender. Haraway wonders if concepts such as cyborgs will obliterate gender categories, and this paper further discusses how modern cyborgs and androids already affect gender categories. The paper distinguishes Haraway’s theoretical constructed symbol – the cyborg – with living, breathing cyborgs that exist today.

Jennifer Robertson has conducted extensive research on the topic of modern robotic gender. She writes:‘Roboticists assign gender based on their common-sense assumptions about female and male sex and gender roles... Humanoid robots are the vanguard of posthuman sexism, and are being developed within a reactionary rhetorical climate’ (Robertson, 2010). The “reactionary rhetorical climate” used in the quote can be read in the sense that robots are developed with certain traits in accordance to whom makes them, but also who the user is perceived as. The rhetorical climate is for example apparent in Robertson’s own writing. Robertson uses the word ‘gynoid’ to describe female androids – but this word is not commonly used. Additionally, it puts pre-made (biological) categories on the being. In this paper, the author will use the term ‘android’ to refer to a human-like robot and will derive gender afterwards. To better understand how gendering affects humans, this paper uses robots to exemplify our manner of applying gender to a ‘being’. *Are* robots gendered? If so, *how* are they gendered? This paper connects potential gender differences between robots to gender differences between humans, be they perceived or ‘real’. This is done in order to uncover how the notion of robotic gender can relate to or add to that of human gender(s).

Although robots might be one of the frontiers of gender studies, their technical heritage has received much research attention. Francesca Bray (2012) writes on the topic of feminist technology studies: ‘One fundamental way in which gender is expressed in any society is through technology.’ But how is gender expressed through technology, and what – if any – transmutations take place when gender is understood in the context of technology? Robot gender might show a ‘becoming of gender’ (Bray, 2012). In her article ‘Gender in the image of technology’, Merete Lie explores ‘how and why gender is related to technology’ (Lie & Sørensen, 1996, p. 201), seeing how humans affect technology, but also how technology affects humans back in return. Lie (1996: 203) theories:

…if technology has had a constitutive role in a particular image of masculinity, to the extent that it has become a stereotypical and common image, what happens when technologies change?... Any study of gender and technology necessarily will be a study of change.

This paper aims to further explore this co-relation between gender and technology, using newer empirical examples (with robots and particularly androids) and drawing a connection to other gender theories. The field of gender studies is broad, with many clashing theories. The paper sees the topic at hand through some of these theories, and attempts to open the discussion rather than closing it. Human gender can for example be understood through the framework of two categories: biological sex and psychological gender (or sex and gender, for short) (Biemans, 1998; Skitka & Maslach, 1990; Todman & Day, 2006; Vade, 2004). It is possible to have a mismatch between the gender one looks like on the outside and the gender one feels like on the inside. I.e. social and biological gender can be mismatched. Biological gender, the physical attributes on is born with, often referred to as biological sex, has been heavily criticised for being the sole gender determinant. This paper applies social gender – meaning the gender society refers to you as – as a category. Much has been written on the notion of human gender and its intricacy as a co-production of biological, social and psychological aspects. Prior to the post-structural shift in gender studies, gender was understood as binary: male/female. Post-structural traditions opened for a discourse on the social constructivism of gender. With leading thinkers such as Cixous, Irigaray and Kristeva genders’ intersectionality to other human criteria was focused upon, and along with Foucault (1979) and Butler (1990), some overlapping and additional categories – such as transgender – and a more ‘diffuse’ gender categorisation were introduced, as well as “gender continuum”, i.e. seeing gender not as a binary male/female, or “shades of male/female gender” in between, but rather make room for third genders, agender, two-spirit, and different dimensional models of gender.

Judith Butler suggest, through performance theory, that the distinction between sex and gender should be abolished (Butler, 1990). Butler writes, ‘performativity is the vehicle through which ontological effects are established. Performativity is the discursive mode by which ontological effects are installed’ (Butler, 1994). Performativity is thus a reinforcing process wherein one becomes the gender they perform ­– at least with respect to humans. This seems a direct reference to social and psychological gender. But what about robots? *Are* they gendered? Do they perform a gender?

Still, lack of gender is not often discussed; it would seem that human beings must have a gender if they are to have an identity. Gender studies seem to lack reference to gender antimatter – the lack of gender. It was observed through the research that some robots were very gendered in appearance, while others were not. Can gender be redefined when it is applied to the new techno-species of androids? Do we need the notion of gender at all? Margrethe Aune writes in ‘The Computer in Everyday Life’ (Lie & Sørensen, 1996, p. 92) about how we adapt technology and how it changes us in return: ‘This is a two-way process of which both technology and humans are affected, and in which both technical and social features are changed.’ In gender studies, an equivalent can be found in the concept of ‘becoming gendered’ (Martin, 1998; Phoenix, 1997; Powlishta et al., 2001), which understands gendering as a process through which one is constantly ‘becoming gendered’.

Powers et al. (2005) discuss how a robot that appears inexperienced in a skillset gets a clear response and direction from its human counterpart; for example, a male nurse or a female mechanic robot will get clear information, as they are perceived as less knowledgeable than they otherwise would be should their gender roles be changed. Another research team, Crowell et al. (2009), conclude in their study of the robotic voice parameter that: ‘Results indicate that physical embodiment and perceived entity gender may interact with human sex-related characteristics and pre-experimental attitudes in determining how people respond to artificial entities.’ This was concluded on the basis of their finding that masculine embodied robots and female disembodied robots were seen as more reliable than the opposite, but that physical robots were seen as more friendly. This is similar to the *Media equation theory*, proposed by Reeves and Nass (1996), where the researchers found that people tend to treat computers and media as other people. Along the same lines, one might argue that humans are also (biologically) programmed to have some choice over which gendered stereotypes they adopt and adapt to.

# **Genderless robots**

Before exploring mechanical genders, let us consider robots in a *tabula rasa* state and discuss whether they have a gender at all. A robot is perhaps perceived as a gendered *tabula rasa* actor in this world of extreme gender discussion – the genderless robot. However, this *tabula rasa* state is not achievable when a robot is constructed by humans, as the robot’s design is affected by the human creator’s belief in what gender the robot ‘does’ and ‘does not’. The choices that creators make when applying gendered criteria to robots are often (unintentionally) based on their views on gender (Akrich, 1992; Oudshoorn et al., 2004). Designers and producers can, for example, choose not to implement large bosoms (to make robots less female) or broad shoulders (to make them less male). But removal of gendered criteria does not necessarily implicate a lack of gender. Technologies can also ‘change’ a machine’s gender, as evidenced in the ‘microwave case’ (Cockburn & Ormrod, 1993), where she analyses how microwaves are made by male engineers, but adapted, and thus changed in the process to a female technology, by housewives.

Much has changed since Cockburn’s study in 1993. 23 years later, many machines are moving on their own, and are getting considerably more sophisticated in their functions. Consider the robot Pepper, made by Softbank (Japan’s largest mobile company). Pepper has a slim build, big eyes and a curious gaze towards the world. Her head follows you as you walk around her, and she will ask you questions. When writing about Pepper, the author initially planned to use genderless articles such as ‘it’ to describe… *her*; but as it turned out, the author had already gendered Pepper linguistically as female. English could not operate within a genderless grammar without very strict monitoring. When the store clerk responsible for presenting Pepper was asked in May 2015, ‘Pepper wa otoko desu ka? Onna desu ka?’ (EN: ‘Is Pepper male or female?’), he answered, ‘Docchi demo ii’ (EN: ‘Both are good/it doesn’t matter which of the option presented you choose to use’). On its company webpage, Softbank writes:

In our mind, robots have no gender. But they are much more than a[n] ‘it’, much more than just a product: they are an artificial species. But we noticed that depending on where you come from, people project Pepper to be a male or a female! (SoftBank, 2015)

Interestingly, SoftBank states that it, as a seller does not assign gender, but that buyers choose a male or female gender for the robot they purchase. However, when asking the same question about Pepper’s gender in March 2016, another store cleric informed that Pepper had the voice of a teenage boy, and thus was “male”. Another famous robot designed androgynous is Honda’s ASIMO, which have for many years been the face of modern robotics. Unlike Pepper, who glides across the floor, ASIMO walk on two legs, can ascend stairs, and play football; and avoid humans in its way. When Honda was asked in an interview if they had assigned a gender to ASIMO they replied: “It can be anything a human wants it to be…” (Motoring 2012).

In many Western languages, speaking of androids such as Pepper or ASIMO puts one in the difficult position of using, for instance, the name of the ‘being’/robot (e.g. Pepper or ASIMO). Whilst this may work for a while, it would sound strange to Western ears to say: ‘Pepper is home now, and Pepper is reading a book to ASIMO. ASIMO is enjoying Pepper’s tale.’ Normally, one would replace some surnames with pronouns. A second option would be to use gendered pronouns such as ‘he’ or ‘she’: ‘Pepper is home now. She is reading a book to ASIMO. He is enjoying her tale.’ This puts the speaker in the position of having to choose the gender of said robots. There are ways to overcome this, though, with genderless pronouns, such as ‘it’, which would make the robot more of a thing than a being, but effectively would save the speaker from having to gender it: ‘Pepper is home now, it is reading a book’. Animal-looking robots provide an example of a less gendered robotic type.

## ***Zoomorphic robots***

Let us consider two zoomorphic robots: AIBO and PARO. AIBO is a robotic dog made by the Japanese electronic company Sony, known also for its televisions and PlayStations. In 2013, Sony was the 94th largest company in the world (fortune.com, 2014). Its AIBO robot was sold from 1999 to 2005, and is currently out of production due to a low profit margin (cnet.com, 2015). The Japanese word *aibō* means ‘partner’ or ‘sidekick’ (robotbooks.com, 2014), and signals the intention behind the creation. The designer, Masahiro Fujita, received the IEEE award in 2007 ‘[f]or creating AIBO, the world’s first mass-market consumer robot for entertainment applications’. Sherry Turkle describes AIBO as a device that: ‘heighten[s] our sense of being close to a post-biological life’ (Turkle, 2012). In relation to post-biologism, this might prepare us for our own post-biological journey, as described in the ‘FemaleMan©Meets\_OncoMouse™’analogy (Haraway, 1997). As Haraway describes, biology and technology can in the future fuse together, thus redefining humanity altogether, rendering gender to a relic of the past, or a choice of fashion.

AIBO is, however, not just a copy of a dog: ‘75 percent regarded their AIBO as something more than just a machine’ (Singer, 2009). While AIBO production has been discontinued, the robots still have an active user base and remain popular. The user forum contains some very interesting data on which gender the AIBO owners perceive their AIBO to have. Bardian, from America, who owns six AIBOs, writes about his newest: ‘introducing Madison, a White 7M2 running Mind 3. I’m making her the lady of pack, and she has been tweaked to have the British female voice’ (aibo-life.org, 2015a). The owner here chooses the dog’s gender and enforces it through the voice software (similar to what we saw in Crowell et al.’s (2009) study). Erika, from Virginia, writes: ‘As I was thinking of names (already had in mind I wanted a female 7) I was considering giving her name spelled backwards- Akire. When I googled it to see if it was actually a name- google came up with Akira which happens to mean bright and intelligent in Japanese…. She really is like a mythical creature from a book, so lifelike!’ (aibo-life.org, 2015b). Erika also includes a picture of her new robot, and other users comment on how cute it is and congratulate Erika on her purchase. By connecting her own gender identity as a female-named human creature to the robot, Erika perhaps reinforces both the robot’s gender identity and her own (though Akira normally is a male name in Japan). She forms a gendered relation to the robot, which then performs – or reinforces – the chosen gender.

Another popular zoomorphic robot, PARO, the therapeutic robot seal, was designed to be very cute and to calm its users, according to the producer. Although calmness can be measured by stress hormones, cuteness is more of a sociocultural variable. PARO has been sold to the public since 2004, and is used in elderly care facilities in many countries. It’s design is based on a baby harp seal, and the robot emits the sound of a real seal. It has light, posture and temperature sensors all over its body, and responds to being petted and stroked. It also gives cries of happiness when it is given attention, in order to request further contact with its human user. Turkle (2012, p. 9) describes a case in which a depressed user became more relaxed by comforting her PARO, and thus comforting herself. The gendering of these robots is dependent on the linguistic and cultural context they are placed in, among other factors. In the example above, Turkle uses the name “PARO”, which is gender neutral, but this would be grammatically difficult to do in the long run utilizing the English language.

## ***Japanese robot gender pronouns***

Japanese makes a very clear distinction between male speak and female speak: ‘Japanese is a sexist language, differentiating between male and female vocabulary, expressions, and accents. The male language is supposed to be coarse, crude, and aggressive, while the female language is expected to be soft, polite, and submissive’(Sugimoto, 2014). However, a peculiarity of the Japanese language is that it lacks personal pronouns. The Japanese words for ‘you’ (*anata*), ‘he’ (*kare*) and ‘her’ (*kanojo*) are not used as often as their counterparts are in English (Hasegawa, 1985; Hinds, 1975).For example, if one were to speak to Jim about Susan, one would – in English – say ‘Have you seen her?’, heavily relying on the personal pronouns ‘you’ and ‘her’. But in Japanese one would say ‘Jim-san, Susan-san wo mitta?’ (EN: ‘Mr Jim, have you seen Ms Susan?’, with the *san* meaning either Mr or Ms, but without the explicit gender attribution of the two English words. There are, however, some gendered end-titles in Japan, such as *chan* (used to refer to cute things/girls/young boys) and *kun* (used to refer to boys and men of lower status) (Ogasawara, 1998).

Direct use of *anata* (‘you’) and *kanojo* (‘her’) could be considered rude and unnatural. Therefore, when talking about robots, it would be unnatural to say (when referring to ASIMO, for example): ‘Is he popular?’ A better phrase would be: ‘Is ASIMO popular?’ This might also be one of the reasons why Japanese researchers when interviewed, who did not have much facility with English, had to think extensively about questions such as ‘Is it a he or a she?’, since, for them, ‘it’ was simply ASIMO. When conducting the interview, the linguistic gender of the robot seemed unimportant for the scientists interviewed. Whether this is because the robot had no gender, or the gender did not matter, is difficult to say. Also, the English word ‘it’ does not translate easily to Japanese; the closest might be *ano mono* (meaning ‘that thing’), which has a slightly different meaning. It seems that gender parameters was not given much consideration for that particular robot, and one might reflect - why should it? Although it has little to do with ASIMO’s practical skills, it is an interesting reflection on what lack of gender means to the personnel that work with the robot. Another Japanese linguistic character trait that is embedded in many Japanese androids is the ‘high-pitch girlish voice’, as found in the Actroid Repliee Q2 (Robertson, 2010), and which the author (mistakenly?) used to gender the robot Pepper as female.

# **Mechanical gender**

Biological gender does not apply to or exist in robots (at this time). Robots are not biological creatures, but are mechanical and are created by humans. Robertson (2010, p. 4) writes: ‘How robot-makers gender their humanoids is a tangible manifestation of their tacit understanding of femininity in relation to masculinity, and vice versa.’ In some cases, robots can have a physical mechanical gender (i.e. sexual mechanical organs). Such attributes are mainly found in sex and pleasure robots. The function of these robots is to act human, and the robot’s mechanical vagina/penis, along with other sexual characteristics, is made to resemble that of a human.

Besides the subspecies’ mechanical evolutionary trait of physical-mechanical gender, the author advocate for also identifying the social gender of robots, a sort of ‘social-mechanical gender’. To paraphrase de Beauvoir (1949), ‘you are not created a robot-woman – you become one’. Although the way in which one genders humans is highly debated in itself, the paper draws on a framework of three human gender categories: biological, psychological and social. Some adjustment is needed for this framework to apply to robots.

[Insert Table 1 here]

In Table 1, we see that both species have physical genders (i.e. the genders they are created with), with the human variant being biological and the robot version being mechanical. Note that most robots lack a physical-mechanical gender comparable to a human-biological gender. Seeing biological sexual organs as agents of fertilisation and/or pleasure, we see that robots lack the former capability, though the latter can be implemented – mainly if the robots are so-called ‘sex-bots’. Milder features can include an increased bosom size for female robots or broader shoulders for male robots. This can also bee seen in comic book and movie studies of gender, where it is described that gender roles and characteristics can both redesigned and reinforced through popular culture (Springer 1996, Brown 2004).

Whether these attributes should be labelled physical or social is debatable, as the physicality is granted by the human creator in a planned process involving active choices regarding the robot’s physical-mechanical gender. Seeing the combined effect of the attributes from the side of the producer, one could label it social gender. This is, however, just a replica of human-biological gender, and, although it is physical, it does not necessarily make the robot male or female. The psychological gender that humans have simply by ‘feeling’ like a certain gender does not apply to robots. This is because robots do not have feelings – they can be programmed to feel, but artificial intelligence has not (yet) been achieved; the term, itself, is strongly debated (Hinds, 1975; McCarthy, 1987, 2007; McCarthy & Hayes, 1969; Nilsson, 2014). Due to this lack of artificial intelligence, one cannot state that robots have psychological gender. The author argue that the category of social gender should also apply to robots, but should be called ‘social-mechanical gender’, and this should be understood as a product of our gender society. How do these categories play out in robots?

## ***Robot twins gendered by lineage***

Robots with highly gendered features most strongly resemble humans. An example of such robots are the ‘Geminoids’ – robot clones created by Dr Ishiguro. Geminoids are ‘teleoperated’, or remote controlled, and are made to look as human as possible. The name is a combination of the Latin words *gemini* (meaning ‘twin’) and *oides* (meaning ‘similarity’) (Sugimoto, 2014); this borrows from the naming convention used for the word ‘android’. While androids look like *some* person, Geminoids looks like a *specific* person; that is, they are robot twins – or copies – of an existing human.

As Geminoids are exclusively made in Dr Hiroshi Ishiguro’s laboratory at Osaka University, they are not mass-produced, but are unique entities. Each is a unique clone of one specific human, though Dr Ishiguro, himself, has been copied twice. According to Dr Ishiguro, Geminoids are created in order to answer the questions: ‘What is a human presence?’ and ‘Can human presence transfer to a remote place?’ (Laboratories, 2015). Dr Ishiguro has been creating robots for a long time, but, at the start of his career, there was minimal positive acceptance of robots – a factor described by the ‘uncanny valley theory’ of Masahiro Mori(for an explenation, see Borody 2013), which states that robots who attempt to look human risk being perceived as scary or strange if they appear *too* human. The uncanny valley theory therefore problematises that robots through their design can appear as frightening hybrids, which has guided many roboticists to de-humanise the design of robots. Whether or not we apply human interfaces to robots, we tend to anthropomorphize machines, giving them personalities, being polite to them and gendering them, as evidenced in ‘media-equation theory’ (Reeves & Nass, 1996).

Ishiguro tried to make a copy of his young daughter. This copy was apparently unsuccessful, as it frightened her and made her cry, and she refused to set foot in his laboratory again (Singer, 2009, p. 305). Some scholars seem to have interpreted the uncanny valley as an obstacle that has been made into a design criterion, stating: ‘a robot’s design needs to reflect an amount of “robotness”. This is needed so that the user does not develop detrimentally false expectations of the robot’s capabilities’ (Fong et al., 2003, p. 105); whilst others, such as Dr Ishiguro, seek perfection as a means to overcome the problem. When realising that he needed to make robots even more human-looking for them to be accepted as androids, Ishiguro made the Geminoid, a highly advanced robot that used his own hair as a basis and a silicon skin mask that had been copied from his own skin (Nishio et al., 2007, pp. 346–347). In fact, the Geminoid’s appearance, alone, is enough to trick many people who enter into its presence to believe:

…the Geminoid to be Dr. Ishiguro […] they saw HI-1 for the very first time, they thought that somebody (or Dr. Ishiguro, if familiar with him) was waiting there. After taking a closer look, they soon realized that HI-1 was a robot and began to have some weird and nervous feelings.(Nishio et al., 2007: 350)

Another example of gendered androids is Kodomoroid (EN: ‘child robot’), a news reporter robot that resembles a girl of about 14 years, with black hair, a white dress and a smile. This robot is currently located in Miraikan science museum in Japan, where she appears locked in a white room, sitting on a little white bench. One might feel sorry for the robot girl. The scene reminded me very strongly of *Ex Machina* (Garland, 2015), a Hollywood movie about a very unhappy, imprisoned robot who wants to escape and see the real world. Seeing the ‘locked up’ Kodomoroid robot girl, one might get the sensation that it is ethically questionable to ‘imprison’ something that looks so human. The most recent Geminoid made to date is perhaps one of the most exciting gender-beings: he/she/it is called ‘Matsukoroid’.

## ***Transvestite robot Matsukoroid***

The human Matsuko Deluxe is a curiosity in Japan. He is a plus-size, cross-dressing TV star, writer and comedian, with a huge fan-base and a major brand name. Watching Japanese television, one often finds Matsuko Deluxe starring in some commercial, often regarding food (he is a spokesperson for Mister Donut), weight-loss or ‘being a true woman’. Japan is often criticised for providing fewer LGBT rights relative to other industrial nations; there is little marriage equality right or adoption right for same-sex couples (Lunsing, 2005; Shimizu, 2008). Matsuko Deluxe is thus a very important role model for people who are different, both within the LGBT community and among the overweight (both small minorities in Japan) (Ó’Móchain, 2015). Matsuko Deluxe is a fascinating gendered figure, not only for having broken through as LGBT and cross-dressing as a woman, but also for being a plus-size celebrity.

Recently, Matsuko’s twin, the Matsukoroid – a Geminoid – was revealed. One cannot overstress the importance of this robot in a gender context. Not only is it the fifth Geminoid created, but it is also one of the most advanced, as it has 500 Matsuko Deluxe phrases built into it. It is operated by a human, but it is hoped to ‘within 10 years control itself’ (dailymail.co.uk, 2015b), which raises some interesting questions relating to artificial intelligence. In the world’s first android hosted TV-show, an interview hosted by Matsukoroid and Matsuko Deluxe, with Dr. Ishiguro who created the Geminoid, the following discussion takes place (YouTube 2015):

Matsuko: Am I this creepy?

Matsukoroid: Yes, you are.

Matsuko: Ordinarily, we’d never be able to look at ourselves so objectively.

Dr. Ishiguro: Now, even if you get sick, it’ll be ok.

Matsukoroid: I’ll take over for you. [Matsuko looks concerned]

In robotics, a creator can ‘choose’ (via technology) how the robot is produced. An issue with roboticists’ perception of femininity has been that female robots ‘needed to be slender’, and this makes it more difficult for all of the mechanical parts to fit in the female robot’s body (Robertson, 2010). Although the Japanese are much slimmer than their Western counterparts, there are, of course, also plus-sized women in Japan. Matsuko Deluxe is a very important cultural figure, and a paragon for people who are different (e.g. those who are plus-sized, trans, gay, etc.). The robot demonstrates a strength in Japanese robotic creation – an inclusive society. Generally, Japanese society is believed to have very strict gender roles, but, as Robertson (2010, p. 6) points out: ‘In Japan past and present, for example, femininity and masculinity have been enacted or lived by both female and male bodies as epitomized by the 400-year-old all-male Kabuki theater and all-female Takarazuka Revue founded in 1913.’

Some might criticise Matsukoroid for being a marketing prop, as LGBT people in Japan are often strongly characterised and ‘A4’ gay people are not highly featured on television (Somers, 2012). Lie and Sørensen (1996, p. 203) emphasise that ‘any study of gender and technology necessarily will be a study of change’. Technological gender is also changing norms in society through transvestite robots. In Matsukoroid, we have a social-mechanical gendered female robot that portrays a biological gendered male who identifies and portrays a social and psychological female gender. This robot shows a willingness for its creators to play with gender, making it more fluctuating and less strict. Haraway (1987) writes: ‘The cyborg is a creature in a post-gender world…. In a sense, the cyborg has no origin story.’ Perhaps androids are more bound to a gendered origin – that of their human creators. Akrich (1992) writes that creators of technology often use their own experiences when making things for end users. One can philosophically ask: ‘When removing the make-up and wig, does Matsuko-bot become a social-gendered male, as its human twin would be?’

## ***The sexbots are coming for you***

One of the possibilities and/or problems that comes to mind when discussing androids and gender is the question of sexual use. Love dolls have been on the market for quite a while. The following quote is from a purveyor of such dolls: ‘Roxxxy the world-first sex robot comes with her own personality matched to yours. She talks, listens, converses, reacts and offers more than high-end sex dolls’ (gizmag.com, 2015). The sex industry is well known for its symbiosis with technology, “The growth and expansion of the sex industry is closely intertwined with new technology” (Hughes 2000), so it is not surprising that we find robots in this industry. However, some questions that arise from their presence are: What about prostitutes – will they lose their jobs, and is that good or bad? And what will happen to relationships – are you cheating if it is with a robot? What about zoomorphic sexual robots, for zoophiles? Some argue for a more diverse approach. A sex robot might be seen as morally wrong, and many might prefer a human companion. On the other hand, some people do not have the necessary qualities to obtain the willingness of another person to share intimacy. For this reason, some turn to prostitutes, and this has its own ethical debates (as seen in Richards, 1979; Shrage, 2013; Weitzer, 2006). Is it ethically wrong for a person who cannot obtain a human sexual partner – apart from buying one – to buy a sex robot instead? This brings us into the ethical dilemma of determining ‘who takes harm’ and potentially ‘choosing the lesser evil’. Technology is not necessarily good or bad, but the way in which we, as humans, choose to use it determines our moral stance towards it. Whilst some may argue for a total ban, other cultures might argue for acceptance, as has been seen in the case of prostitution regulative laws (Bagley, 1999; Farley et al., 2004).

These important ethical issues will emerge, and it is therefore important to have a language with which to speak about robot gender. As is often true for sexual debates, the polarisation is often dominant; this is also true in the case of robots and technology. Sex robots have social-mechanical gender, as they are made to arouse people who find pleasure in the particular gendered aspects of the human type they portray. They might also have physical-mechanical gender, represented by usage tools for the sexual act. Sex robots are perhaps one of the most gendered robots that exist, as this gendering emphasises their function. However, sexual reproduction does not make these robots gendered, as Butler (1994) points out: ‘There are women of all ages that cannot be impregnated’.

## ***Gendering cyborgs***

So far, the paper has discussed robots becoming more human, but what about the other way around? As a species, humans are evolving not only biologically, but also mechanically. The first human cyborgs are already walking among us, and quantum leaps in mixing biological bodies with mechanical parts are occurring at astonishing speed. Examples of mechanical parts include artificial arms and legs, pacemakers and other specialised parts, such as that of the co-founder of the Cyborg Foundation, Neil Harbisson, who is connected to an antenna that perceives colour. In response to people who fear the cyborg future, Harbisson says: ‘People are afraid of the unknown. They tend to exaggerate or be very negative about the possible consequences of what is new to them’ (Madeleine Stix, 2015). This is in contrast to the more theoretical cyborg discussed by Haraway (1987). This meeting of man and machine, flesh and metal, is a meeting point of two species that fits questions such as Lagesen’s (2012, p. 443): ‘Are there perhaps benefits from thinking about gender as a process of reassembling human and non-human elements?’

A cyborg is the opposite of an android, as it is a human with mechanical parts who has therefore become more robotic. Today, the process of gendering cyborgs is fairly simple, as cyborgs presumably had a gender identity when they were previously ‘just human’. In the future, when sexual organs might be considered part of what makes a person a cyborg, we could find conundrums of the sort: ‘biological man undergoes operation, is now equipped with a mechanical vagina’. Would that make the said person female and male at the same time, and what toilet should that being use? Could a sub-division of physical-mechanical and social-mechanical gender help resolve this question? Butler (2002) warns: ‘that feminism ought to be careful not to idealize certain expressions of gender that, in turn, produce new forms of hierarchy and exclusion’. This should also be taken into account in processes of gendering (or not gendering) the robot species. To date, technology has not reported any mechanical-sexual organ operations, but presumably this will be a very exciting era in which to study gender and technology, and an updated technological-gender language may be needed if we are to do so.

# **Further discussion**

This paper has discussed the way in which robots are gendered by exploring the gendered qualities of some of the most advanced robots that have been produced. It has attempted to analyse and define robot gender(s). The way in which we gender robots will most likely define their ‘personality’ or usage areas. As robotic technology is only in its earliest stages of development, current robots are perhaps the Neanderthals of robotic evolution. How society chooses to label these beings will undoubtedly affect us in return – we might even end up in a ‘cyborg gender utopia’ (Haraway, 1987), but this is not certain. The question is not only what we gender robots as, but if we really must gender them at all. As we have seen in the Japanese attitude of *docchi demo* *ii*, both options are fine. But are they only fine in Japan, or does the West also have a linguistic category for genderless robots? Robots might be symbolically burdened with humanity’s obsession with gendering things in binary categories. Lie and Sørensen (1996, p. 204) write:

Speaking of gender symbols might indicate a dichotomous categorization of male and female. However, a specific quality of symbols is their multivocality… a symbol speaks with many voices and is a carrier of multiple meanings. But at the same time the symbol unites this complexity.

A robotic multivocal aspect to gender seems necessary. This paper defines the gender categories of mechanical gender: physical-mechanical and social-mechanical gender (and the artificial intelligence prohibited physiological-mechanical gender). One might argue that physical-mechanical gender is a product of social-mechanical gender, as a robot penis is just bolts and wires until some human desires it and physically genders it into a usage area. The human biological gender at conception is redundant in robotic-mechanical gender, as Mecha babies surely would be easier grown in laboratory tanks, safely guarded and monitored, than inside robotic mothers walking about and exposed to dangers.

Genderless or gender-neutral robots have been discussed throughout the paper. When the robot Pepper is described to have a *docchi demo ii* gendering of ‘either is fine’, the gendering is placed in the eye of the beholder. In some languages, gendering must be performed in order for the being to be spoken about, and in other languages – such as Japanese – one can refer to a creature’s name when talking about him/her/it. It then becomes a matter of personal taste if and how sociological gender is applied. For zoomorphic robots, the choice is easier, as those speaking Germanic languages can draw on the personal pronoun category of ‘it’. When we ‘it-ify’ robots, we do not have to worry about gendering them. The less human a robot becomes, the less need there is to gender it. Speaking about PARO and AIBO in an ‘it’-fashion makes gendering less of an issue.

This paper has also discussed robots that are gendered in the binary human categories of male and female. The Geminoid robots, being twin copies of humans, explicitly replicate the copied human’s social gender (though the biological sex organs are not copied mechanically). There are important exceptions to this, as well as techno-gender conundrums such as the Matsukoroid, which plays with gender identity. The human species is extremely gendered, and we apply gender to our robotic creations – especially androids, which resemble us. The more humanoid a robot becomes, the more gendered it also becomes.

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