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Understanding the Human Object: 'If you prick us, do we not bleed?'

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Abstract: This paper outlines the inspiration, process and ideas behind a design project regarding human relationships with humanoid robots. Taking a research through design approach, an interactive animatronic head is created to further knowledge and ideas exchange concerning the potential future of robotic relationship design. The responding robot that reacts to negative stimuli manipulates and measures the viewer's emotional arousal. The robot is programmed to respond in different stages of intensity based on the person's action towards it, predicting that a stronger response from the robot will produce a more intense emotional reaction from the person interacting with it. The robot then becomes not only an art piece in itself but also a tool to capture scientific data, furthering research and discussions. This data can then be used to form a greater understanding of sympathy and guilt towards non-human objects, and help demonstrate what sort of role design might play in this interaction.

Keywords: Bionics; Humanoid; Emotive-biosignals; Praxis; Reactive.

I. AIMS

> *'If you prick us, do we not bleed? If you tickle us, do we not laugh? If you poison us, do we not die? And if you wrong us, shall we not revenge? If we are like you in the rest, we will resemble you in that.' (Shakspeare, 1826, p.37.)*

This dialogue, taken from The Merchant of Venice, regarding the mistreatment of the Jewish people within the story indicates there are relatable bodily functions that are suggestive of human-ness; traits human beings possess that characterize them as human. These functions become powerful tools and without them humans are lessened to the status of objects devoid of human-ness. The struggle within humanoid robotic design is to capture the essence of this human-ness within objects, often through movement or sound[1]. Perhaps closer studies of these softer and more fluid functions may give further insight into how we might begin to capture the essence of human-ness that is apparent in human beings, as well as how to apply and gauge this 'human-ness' within objects such as humanoid robots. These functions will form the basis of a number of sculptural models of animatronic faces, which in their production and function will question our relationship and treatment of these types of objects, based on their level of human-ness.

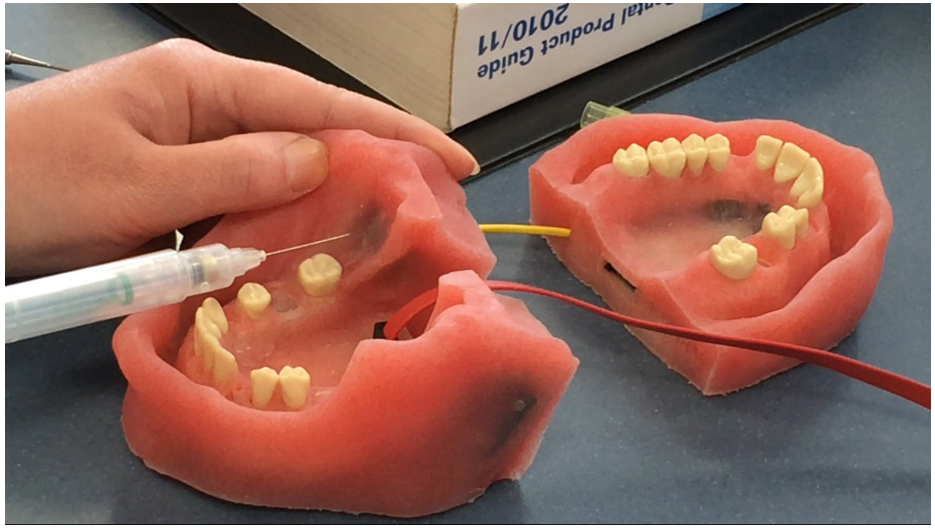

Figure 1. Injection testing. Image: Agi Haines

This work is part of a larger research project, 'understanding the human object,' in which various sub-projects will come together to question the idea of creating a working consensus between different disciplines and people. This particular strand ('If you prick us, do we not bleed?') intends to focus on the rhetoric within scientific modeling of humanoid objects and how the production of these visuals can alter emotional responses and behaviors.

Based on ideas within the historical representation of scientific imagery, the sculptures created are intentionally provocative, in order to replicate the themes and ideals found within this type of image production. These objects will act as tools to form a greater understanding of sympathy and guilt towards non-human objects, as well as questioning our perception of what might be considered more 'human.' They are intended to indicate how realism can alter our perception of humanoid objects.

The preliminary sculpture being shown at Research Through Design (RTD) conference is designed to respond to a negative stimulus, and in turn create an empathetic and regrettable response within the viewer interacting with it. This feeling is created in order for the audience to gain a stronger affiliation with similar humanoid robots. The robot will respond in varying degrees to the viewer shouting at it, the intensity of the viewer's shout will trigger a more penetrating response in the robot. The emotional arousal of the viewer will then be measured through galvanic skin response, which will indicate their responsiveness to the robot's output, and suggest which designed functions offer the largest emotional response. The conference itself will be an interesting format for this preliminary data collection.

By looking at aspirations in the portrayal of 'the human being' alongside the reality of bodily function, the models will bring together societal wants and desires alongside their counterpart horrors and disgusts. In order to test if they return a haptic and emotional response that conflates these opposing sentiments. In the aim to leave the audience with a greater understanding of the potential affects of the production and treatment of integrated societal technologies such as humanoid robots.

II. IDEA GENERATION

The human body is continually studied and depicted, beautified and disrupted. Greek Philosopher Protagorus suggested that "man was the measure of all things" (Barnett, 2014. p. 22) as the body itself was often used as an exemplary form of measurement[2]. Within most sciences modeling the human being is an important way of learning human anatomy as well as ontology. Whether it's within brain models in computational neuroscience, robotic figures or psychological mapping, these visions of the body are cornerstones for the comprehension of human-ness as well as future designs of models[3]. But these new visions of the body may be tainted by the past, and potentially alter future relationships with these images.

"As every artist knows, to represent a body is to comment upon it," (Tomasula, 2002, p.137) yet it seems the production of this representation itself plays a large part in the understanding of the comment. The famous critic William Hazlett often referred to the question of truth in representation. "How should an artist depict the flesh and the soul, and what thoughts and feelings should such a depiction evoke?" (Barnett, 2014. p. 22). The artist's representation has extremely influential power over the emotions of the viewer (Silvia, 2005), yet this extends beyond art as many visuals can cause an emotive response.

The production of humanoid robots has raised many questions regarding our relationship with objects that have particular visual human traits. The press questioned if "this is the most terrifying robot ever?" (Mail Online, 2014) when artist Jordon Wolfson revealed his dancing robot to the public (fig. 2), definitely more disturbing than the friendly looking icub, "an open source cognitive humanoid robotic platform" (iCub.org, 2014) (fig. 3) used in scientific experimentation. The visual traits in aesthetics and movement alter the emotional relationship towards these robots. Perhaps the more expressive dancing robot is too close to recreating human-ness for comfort yet still not quite close enough. Surely then to design acceptable humanoid objects they must appear as human-looking as possible to obtain this essence. Yet if acceptance can only be achieved through human essence, then how could this possibly be quantified to obtain the correct amount of essence for approval? An example of how difficult it is to quantify human essence can be observed in professor Masahiro Mori's 'uncanny valley' theory (fig. 4). This hypothesis has stirred robotic design since it was theorized in 1970. Many robots are designed with human functions in mind, and are often therefore created to appear more anthropomorphic, this can often alter the way we interact with them. We would assume that the more lifelike the robot, the more affiliation we will have with it and therefore the better our relationship will be, and studies have shown this to be true, to a point.

Figure 2. Jordan Wolfson » David Zwirner. Image accessed 24 September 2014: http://www.davidzwirner.com/artists/jordan-wolfson/

Figure 3. "iCub.org - an Open Source Cognitive Humanoid Robotic Platform." Image accessed 1 October 2014: http://www.icub.org/

The 'uncanny valley' theory suggests that the robots that look too human but yet still not human enough cause a response of revulsion among onlookers. Mori's graph in figure. 4 explains why. A humanoid robot can capture the essence of what it means to be human yet we are still aware it is not a person so we are able to connect with it, but the extremely lifelike androids give off a corpse-like demeanor. So perhaps replicating the human body in form is not exactly what 'human essence' is all about. Yet in the Horizon episode 'Where's my Robot?' (Where's my Robot?, 2008) A visit to Dr Ishiguro's robotics lab reveals a weird robot built exactly in the image of Dr Ishiguro himself (fig. 5).

"Being a 'bit' human is simply not good enough, if you're going to make an android, it had better be indistinguishable from the real thing or you might as well not bother" (BBC, 2008). Referring to the graph again, the designs of new parts must then fit into the two peaked sections to be acceptable. The last peak meaning that the parts would have been accepted as part of a healthy person, and the first peak would mean that the parts would be unrealistic but still accepted positively. In the viral clip 'Happy Birthday David' for the film Prometheus, David the android is an example of the 'perfect' robot "at Weyland Industries, it has long been our goal to create artificial intelligence almost indistinguishable from mankind itself." (Twentieth Century Fox, 2012, fig. 6). The 'indistinguishable' is often created through a prosthetic skin yet our knowledge of a metallic

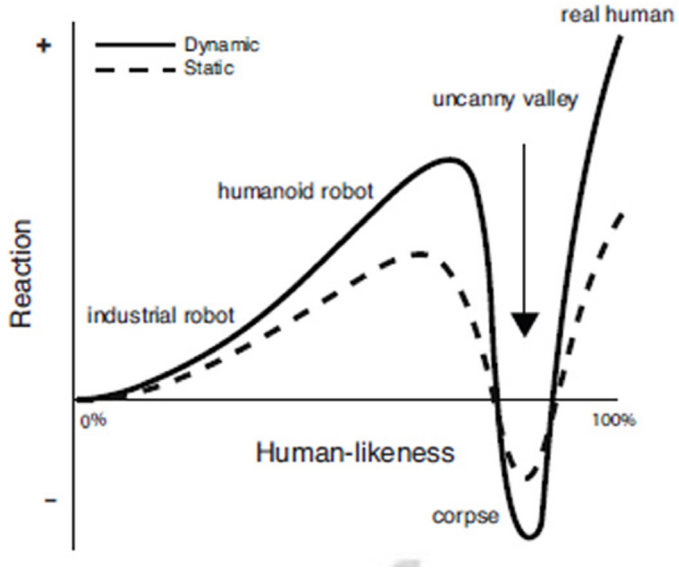

Figure 4. Uncanny Vally theory graph (2005). Image accessed 1 August 2012: http:// www.androidscience.com/theuncannyvalley/ proceedings2005/uncannyvalley.html

Figure 5. Dr Ishiguro's double Where's my Robot? Still (2008). Directed by Peter Friedman, United Kingdom: Where's my robot?, 2008

Figure 6. Happy Birthday film still (2012). Directed By Johnny Hardstaff, USA: Twentieth Century Fox [Viral Film]

interior is disruptive of this farce. It seems now the body is viewed as an enclosed system. Julia Kristeva discusses the visions of the abject body, as opposed to our desired 'clean and proper body.' (Kristeva, 1982) The abject body is one that does not respect borders or rules; in fact it is one that disturbs order. Barbara Creed suggests that outcomes such as horror films create a separation between these two images of the body, which helps the viewer establish emotional distance (Creed, 1993). So in the desire to create a higher affiliation with these objects the abject must mix with the clean and proper. Yet even if indistinguishable externally, the idea of inner bodily functions has rarely been addressed in robotics, which may add a new dimension to Mori's graph.

With this in mind, we tested the following hypothesis: that added human function may create further familiarity towards humanoid objects. We sought to make a piece that is hyper real, as to replicate the idea of the indistinguishable, as well as incorporating an abject dimension to test if this generates a response which increases familiarity. The sculptural piece will take into account all of these issues, in order to create a hyper real body part that can still fit under the bracket of 'prosthetic,' therefore the parts will be made of a prosthetic silicone (fig. 7) used widely within film prop production. Although not attached to a body the sculptures are realistic and 'indistinguishable' in their execution, yet understandably prosthetic. Similar to the work of sculptor Ron Mueck, hyper realistic in his fabrication although offering grounding with manipulation of scale, these sculptures will be grounded through presentation of their lone parts.

The encouragement of affiliation will come from the sculpture with the onset of the abject, in Kristeva's view, one which 'leaks wastes and fluids,' (Kristeva, 1982) the additional bodily functions added to the sculpture will promote a heightened human response. These functions will come in the form of facial contortions and tears, relatable outcomes that usually come from negative provocations, and which should trigger empathy towards the object and in turn affiliation.

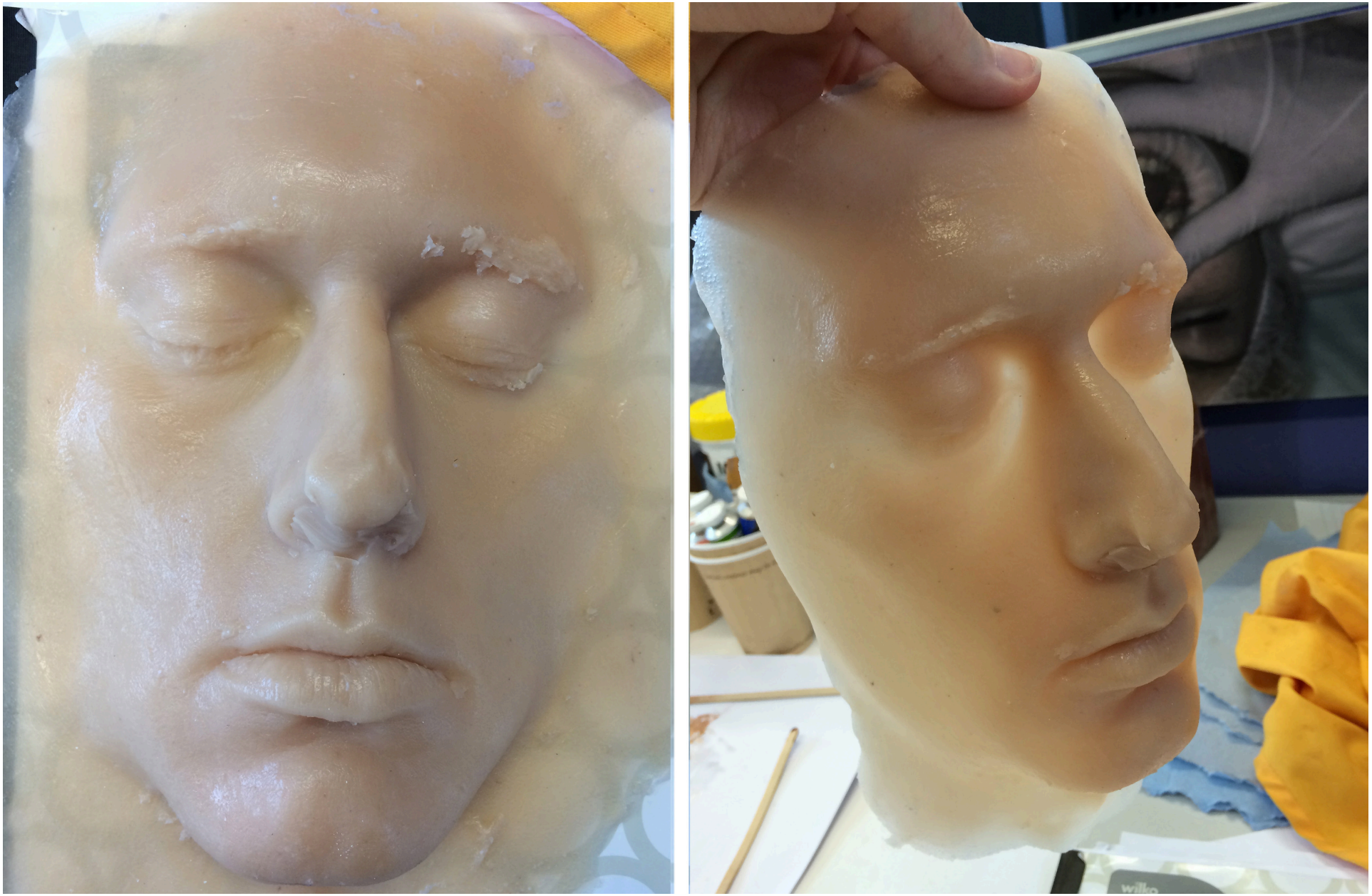

Figure 7. Image of first pour of prosthetic silicone used for 'If you prick us, do we not bleed?' Image: Agi Haines

Figure 8. Blade runner film still (1982). Directed by Ridley Scott, USA: Warner Bros. Pictures [Film]

III. INTENDED OUTCOMES

Testing human-ness in robots is a common feature within science fiction, and offers accounts of fear in inhabiting a world with such objects. The production of machines that are exemplary of certain human virtues show the desire to create more than human objects that could potentially "relieve human workers whose attention wandered, whose pace slackened, whose hand trembled." (Daston and Galison, 2010, p.90). Subservient and "all watched over by machines of loving grace" (Brautigan, 1967) this promise offered by humanoid robots free from the will, theory and judgment of the human being is both thrilling and terrifying. Allowing machinery precedence over our biology is a gamble between accuracy and error, which highlights our hopes and fears about the future of design and the body. Marvin the paranoid android in Douglas Adams' 'Hitchhikers guide to the Galaxy' with a "brain the size of a planet," (Adams, 2009, p.86) is forced into menial work, but the implementation of a 'genuine people personality' into his system means the other characters constantly feel sympathy and remorse in asking for his help, despite the fact he is an object. Or perhaps the focus is on the unruly robotic beings in 'Blade Runner,' (Scott, 1982) in which Harrison Ford's character Rick Deckard tests human-ness using a 'Voight-Kampff' machine (fig. 8) through asking provocative emotional questions. These narratives could be used as a paradigm for the intended outcomes of 'if you prick us, do we not bleed?'. The resultant work provokes audiences into creating an emotional response, but with the intention of them being able to gauge human-ness themselves. This historical context will create a base in which the justification and implementation of research into producing humanoid robotics can be questioned.

The practical element of this research will act as fuel to further discuss topics and concerns within ideas and knowledge exchange. Developing awareness that can only be informed through the creation of the practice and design of the physical sculptural works. As this stage of data collection is preliminary, the testing of these sculptures within the format of RTD will alter and further progress the works. The collection of galvanic skin

response will offer insight into whether the designed features are actually causing emotional arousal as the piece intended. This will involve the person interacting with the piece with their fingers attached to a computer that will collect data about the conductance of their skin. A higher level of conductance is an indication of heightened psychological and physiological arousal. The more intense outputs from the robot will predictably cause a heightened response in the viewer. The outputs from the robot will come in stages, first a facial contortion, then tears, then in extreme cases a nose hemorrhage. The viewer will also be filmed which will allow further assessment of their expressions post interaction. The piece will raise questions connected to theoretical study as well as embodying knowledge that can then be accessible to onlookers. The real testing of societal knowledge created through the perception of these sculptures will be a cumulative process that will develop through the acquiring data about the emotional states of the viewers after interacting with the pieces.

After RTD, other aspects may have to be tested beyond the design of the robotic outputs, for example the choice of face used may also bear huge significance on the output of the result, (fig. 9) yet this can only be tested during exposure of the piece. Robots are usually made with production lines in mind, all systematically uniform. But how should a suitable representation be made of such a mutable, perishable, natural material, to create the charade of a realistic face, it seems "nature is full of diversity, but science cannot be" (Daston and Galison, 2010, p.83). Using an average face may be challenging as the 'emblematic' is hardly ever embodied in a single individual. The age, gender or even the race may play a part in the subsequent emotional response achieved (fig. 10).

Through analysis of the galvanic response these alterations can be developed beyond the conference and perhaps engage scientific researchers. Tests can then be completed which may further interdisciplinary ways of knowing. By data analysis and researching past representations of humanoid robots and how they have altered behavioral changes[4], predictions may be made which can inform the design of future robotics regarding the manipulation of interactions. The treatment of the object is then controlled through the design process. These modified robotic outcomes will almost act as scientific primers, a stimulus that will affect subsequent feelings and actions, particularly towards these types of objects.

IV. CRITICAL REFLECTIONS

Vivian Sobchack argues "things transcend their status as objects at the very moment they promise to be only that, mere objects." (Sobchack, 2004, p.233) As if the life of the object intends to increase interpretation of a wider scene, which in turn modifies views. These sculptures intend to do exactly that, acting as tools that may create a consensus of perception

Figure 9. Image of face casting model. Image: Agi Haines

Figure 10. Hair insertion and colouring of face. Image: Agi Haines

in the people who interact with them. But how might the making of an image affect 'understanding' or 'awareness' and how might these ideas travel to form larger societal beliefs? The construction of an average within scientific imagery for example is greatly influenced by the production of facts, especially as it structurally relies on truth to reality. Bruno Latour focus' on the composition of facts and logic in "Laboratory Life." (Latour and Woolgar, 1986) The creation of logic forms the basis of how we visually represent how things exist, and the forming of this logic seems to come from "the all-too-human scientists" (Daston and Galison, 2010, p.81) who Latour suggests with straightforward character create practices of interpretation, which they try to sustain within a laboratory setting. Although this interpretation surely seeps beyond the lab, where the dutiful attempt to create imagery void of emotion has made the images perhaps alternatively emotive to those outside. Latour suggests "there were always some corners in which notions of "soul" or the "pure vital force" could find refuge," (Latour and Woolgar, 1986, p.168) beneath scientist's mechanistic view. Perhaps in the production of these interactive sculptures these notions will come to light.

It is often difficult to distance the self from the image, as humans empathize with all images of other bodies (Brener, 2008). Yet the level of empathy is variable, Jonathan Crary questions if the nature of the stimulus is not as important on the observer as their physiological makeup and functioning of sensory apparatus (Crary, 1994). Perhaps then the mechanical workings of the body may play a part in the perception of itself. With the aim to create a physiological feeling of guilt or emotional response of affiliation, these bodily responses will alter the levels of empathy felt towards the objects.

A look towards other cross-disciplinary projects and artworks may suggest how audiences have responded to these types of projects in the past. As they aren't being used to research medical conditions or the curing of diseases, cross-disciplinary artworks such as Eduardo Kac's rabbit Alba (GFP Bunny, 2014) or Oron Catts' Victimless Leather ,(Jacket Grows from Living Tissue, 2014) are often seen as "useless" or "decadent" (Tomasula, 2002) even though they open up other avenues for scientific research as well as new ways of knowing[5]. Through attending Research Through Design, the exposure of this project will reveal if the circulation of knowledge through this type of imagery is understandable across disciplines, and who finds what acceptable in terms of the use of that knowledge.

Endnotes

[1] Such as the injection testing robots used in dentistry studies which say 'Ouch' if the injection has been positioned in the wrong place (Figure 1).

[2] "A Cubit (for example) is the distance from your elbow to the tip of your

Figure 12. Hemorrhaging Robot. Image: Agi Haines

middle finger" says Prof. Marcus Du Sautoy in Horizon's 'How long is a piece of string?' (BBC, 2014)

[3] William Burroughs writes in his book Naked Lunch: "The study of thinking machines teaches us more about the brain than we can learn by introspective methods" (Burroughs, 2005).

[4] For example the personal robotics group at MIT found people were much more responsive in tests when faced with the robots in Figure 11 , as opposed to plain screens.

[5] Similar cross disciplinary artworks and their potential influence are discussed in: (Ginsberg, Calvert, Schyfter, Elfick, Endy, 2014); (Ascott, 2006); (Myers, Antonelli, 2014) and many more.

REFERENCES

Shakspeare, William (1826) Merchant of Venice, Philadelphia, C.Neal, no. 201, Act 3, Scene 1, p.37.

Burroughs, William S. Naked Lunch: The Restored Text. HarperCollins UK, 2005.

Barnett, Richard. The Sick Rose: Disease and the Art of Medical Illustration. D. A. P./Distributed Art Publishers, 2014. p. 22.

Tomasula, Steve. "Genetic Art and the Aesthetics of Biology." Leonardo 35, no. 2 (April 1, 2002): 137–44. doi:10.1162/00240940252940504. p. 140. / p. 143.

Silvia, Paul J. "Emotional Responses to Art: From Collation and Arousal to Cognition and Emotion." Review of General Psychology 9, no. 4 (2005): 342–57. doi:10.1037/1089-2680.9.4.342.

"Terrifying Animatronic Doll Stares at You as It Gyrates." Mail Online. Accessed September 24, 2014. http://www.dailymail.co.uk/sciencetech/article-2588040/Is-terrifying-robot-Animatronic-dancer-stares-gyrates-Blurred-Lines.html.

"iCub.org - an Open Source Cognitive Humanoid Robotic Platform." Accessed October 1, 2014. http://www.icub.org/.

Sanford, J.J. (2012) Spiderman and philosophy: The web of Inquiry. New Jersey, John Wiley & Sons. p. 154.

Where's my robot? (2008) Directed by Peter Friedman, United Kingdom, BBC [Documentary].

Happy Birthday David (2012) Directed By Johnny Hardstaff, USA, Twentieth Century Fox [Viral Film].

Kristeva, Julia. Pouvoirs de L'horreur (English). Columbia University Press, 1982.

Creed, Barbara. The Monstrous-Feminine: Film, Feminism, Psychoanalysis. Taylor & Francis, 1993.

Daston, Lorraine J., and Peter Louis Galison. Objectivity. Zone Books, 2010. p. 90. / p. 83. / p. 81.

Brautigan, Richard. All Watched Over by Machines of Loving Grace. Communication Company, 1967.

Douglas Adams' 'Hitchhikers guide to the Galaxy' (Adams, 2009) p. 86.

Scott, Ridley. Blade Runner. Sci-Fi, Thriller, 1982.

Sobchack, Vivian Carol. Carnal Thoughts: Embodiment and Moving Image Culture. University of California Press, 2004. p. 233.

Latour, Bruno, and Steve Woolgar. Laboratory Life: The Construction of Scientific Facts. Princeton University Press, 1986. / p. 168.

Brener, Milton E. Evolution and Empathy: The Genetic Factor in the Rise of Humanism. McFarland, 2008.

Crary, Jonathan. "Unbinding Vision." October 68 (April 1, 1994): 21–44. doi:10.2307/778695.

"GFP BUNNY." Accessed September 25, 2014. http://www.ekac.org/gfpbunny.html.

"Jacket Grows From Living Tissue." Accessed September 25, 2014. http://archive.wired.com/science/discoveries/news/2004/10/65248

Ginsberg, Alexandra Daisy, Jane Calvert, Pablo Schyfter, Alistair Elfick, and Drew Endy. Synthetic Aesthetics: Investigating Synthetic Biology's Designs on Nature. MIT Press, 2014.

Ascott, Roy. Engineering Nature: Art and Consciousness in the Post-Biological Era. Bristol ; Portland, OR: Intellect, 2006.

Myers, William, and Paola Antonelli. Bio Design: Nature Science Creativity. Thames and Hudson Ltd, 2014.