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# **Contemporary jewellery as affective experience — resisting biopolitics**

An exegesis presented in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

in

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New Zealand.

Johanna Zellmer

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FIG. 1. Johanna Zellmer, *Threaded* (2024), MiSeq and NextSeq2000 flow cells, glass-headed steel pins, Ø 250 × 90mm. Photo credit: Antonia Boyle.

The moment jewellery finds its place in the contemporary world as an act of resistance and as an expression of autonomy with respect to a norm, it triggers off the ancient project of self-enhancement.<sup>1</sup>

Pravu Mazumdar

## Abstract

Through this creative, practice-led research I consider the affective aesthetic experience of contemporary jewellery as an interactive event of resistance.<sup>2</sup> 'Contemporary jewellery' is a field of visual art practice distinct from commercial, fashion and costume jewellery. Its objects relate the body to the world through affective events, through which they may be considered as a mode of political intervention.

As a jeweller, I am working in the space between craft and bioart, where materials are in a continuous visceral process of transformation.<sup>3</sup> My project focusses on the making of collars and chokers out of used *Illumina* flow cells, waste products of the data collection technology known as DNA sequencing. Encircling and adorning a neck with these materials can create a significant affective experience.

The human neck is a site of vulnerability and affect, where acts of power are displayed and experienced. Both jewellery and genomics are instruments of identity construction: the former a technology of the self and the latter a study of human bodies through scientific observation.<sup>4</sup> Contemporary scholars such as Pravu Mazumdar, Elizabeth Povinelli, Stefan Muecke, and Thomas Lemke have undertaken extended research on such biopolitical conditioning.<sup>5</sup>

As an outcome of my craft training, my research inquiry is led by a creative, object-based practice. I have adopted the methodological framework known as speculative experimentation. This approach aligns with jewellery's affective aesthetics through 'critical hesitation, reflective questioning and thinking with unthinkable futures'.<sup>6</sup> The experience of the resulting work can be destabilising and in turn creates hesitation, tension, and resistance. Artists and theorists Lauren Kalman, Tiffany Parbs, Agnieszka Wołodźko, and Renée Hoogland draw on these affective qualities of contemporary art and adornment.

Informed by these key sources, this research project considers the agency of collars and chokers made from DNA sequencing tools as resistive 'noise' or irritants undermining the biopolitical standardisation of life and self. By fastening adornments firmly around the bare skin of a human neck, I am seeking to channel the haptic experience of these affective material objects into modes of resistance.

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# 1. An introduction: Setting the scene

I am a German jewellery artist and a dual citizen of Aotearoa. At the age of 19, I undertook a traditional goldsmith's apprenticeship in Germany. It was then that I discovered my love for forging, using torches, and working sheet metal, which led to postgraduate studies in silversmithing at the Australian National University in the late 1990s. Since moving to Aotearoa my work has involved exploring contemporary discourses of capitalism, identity, and biopolitics by testing the potential of jewellery objects to be used as a medium of socio-political knowledge. This reflection was prompted by the unease created by carrying Germany's history of marking bodies for exclusion and condemnation on my shoulders. In working with Indian, Munich-based philosopher Pravu Mazumdar, I came to see that adornment could function as an analytical tool and instrument of identity politics. In turn, I began to explore the transformation of DNA sequencing tools, which in turn confirmed my desire to undertake this practice-led, creative PhD research. Informed by science and multidisciplinary in nature, this project draws on philosophy, art theory, science, visual art, and craft. This exegesis is a critical reflection on my contemporary jewellery practice. It posits the aesthetics of adornment as an affective experience, producing forms of resistance to biopolitical governance.

## Contemporary jewellery

My current creative work is informed by Damian Skinner's description of contemporary jewellery as a practice firmly situated in a craft, material, and studio history.<sup>8</sup> 'Contemporary jewellery is a self-reflexive studio craft practice that is oriented to the body'.<sup>9</sup> Skinner defines self-reflexive as 'reflecting on itself and the conditions in which it takes place'.<sup>10</sup> In line with Skinner, I consider jewellery to be enacted by demarcating and activating distinct parts of the body, such as the neck. In her presentation of *Nuda Vita*, curator Ilaria Ruggiero delineates contemporary jewellery as a complex interweaving of making, wearing, viewing, responding to and talking about objects that were traditionally meant to be wearable. For Ruggiero, as for myself, this whole process is an act of intervention capable of critiquing normative behaviour; a test of our sensitivity and awareness and has the potential to increase social knowledge.<sup>11</sup>

Jewellery's capacity for defiance rests on its identity as a tactile and haptic medium of embodied knowledge. Through the act of adornment, the object's tactile and performative qualities are

experienced. I consider jewellery a triangulated practice, involving the intention of the maker, the commitment of the wearer, and the production of open-ended knowledge discourse that is produced in the force field between wearer, witness, and maker. In this scenario, the focus shifts to what objects do — beyond their mere formal aesthetics — an approach which has been a driving force behind my practice. Some of the collars I have created for this project require assistance from another human being to be fastened. This demands a sense of trust and inherently sets up an affective experience. Accordingly, in this creative practice-led doctoral project, I posit the making, wearing, viewing, responding to and talking about jewellery as public agents of social critique and defiance, in which one asserts a particular position in relation to biopolitical regularisation.

### **Affective experience as a form of resistance**

Drawing on the work of Brian Massumi, Simon O'Sullivan defines affect as 'moments of intensity, a reaction in/on the body at the level of matter', and asserts that 'indeed, you cannot read affects, you can only experience them'.<sup>12</sup> In line with Massumi's definition, this research project explores jewellery's affective aesthetic beyond representation. I am working within the self-imposed material limit of used Illumina flow cells, DNA sequencing tools that carry the traces of diverse life forms in their hollow channels.<sup>13</sup> By applying heat and gravity to pinned stacks of these medical glass slides, I strive to amplify their fluid instability in order to make the complex world of biopolitics perceptible. Using this process, I am testing methods that may transform the utilitarian characteristics of pins and flow cells into affective experiences. In resisting utilitarian function and control through an inverse fluid, organic aesthetic, I aspire to give these tools new agency. The wearing, witnessing and responding to these uncomfortable and precarious collars against the bare skin of one's neck can be destabilising and in turn create resistance, hesitation and tension.

I propose that in activating affective experiences, this encounter can provoke profound ethical and political responses, which in turn, lead to an awareness of the need for resistance. In the performative acts of making, wearing, witnessing and responding to the work, accomplices can maintain themselves as a noise or irritant.<sup>14</sup> These acts of differing form an essential stance against the normalisation that biopolitical conditioning engenders.



FIG. 2. Johanna Zellmer, *Hybrid Being<sub>10</sub>* (2023), Illumina flow cell glass, plastic frames and clip, glass-headed pins, Nordic Gold, 50 × 40 × 40mm. Worn by a participant during Nelson Jewellery Week 2023.

## **Biopolitical governance and ethical complexities**

During my 22 years of teaching contemporary jewellery at university level, I have become ever more curious about the affective nature of jewellery and the increasing standardisation of life and identity production in society. This research project sets out to resist the standardisation and control that are part of today's emerging biotechnological governance apparatus.<sup>15</sup> As German sociologist and social theorist Thomas Lemke observes:

Life has become an independent, objective, and measurable factor as well as a collective reality that can be separated from concrete living beings and the singularity of individual experience. [...] Our understanding of the processes of life, the organisation of populations and the need to 'govern' individuals and collectives lead to practices of correction, exclusion, normalization and disciplining.<sup>16</sup>

In this research, I am at pains to emphasise that the world is entering an era of mass genetic surveillance using algorithms based on narrow data derived from DNA sequencing, a process which inevitably causes discrimination.<sup>17</sup> While DNA research enables science to advance and improve both archaeological and medical knowledge, rapid advancements in the biotechnological sphere, entangled in capitalist ideologies, generate questions of bioethics and biolaw.<sup>18</sup> These issues are considered throughout this document. For example, biotech company Illumina, the global leader in DNA sequencing products and services, has identified population sequencing and consumer genomics such as 23andMe and Ancestry.com as opportunities to expand its market reach.<sup>19</sup> The data collected offers valuable insights to companies invested in health insurance, pharmaceuticals, advertising, and biotechnology, as well as law enforcement.<sup>20</sup> As manifestations of biopower, these systems regulate societal and individual compliance.

In response, my project draws on the affective aesthetics of contemporary jewellery to make the complex and often hidden world of biopolitics perceptible. This exegesis depicts how neck adornment can effectively expose and defy biopower through the processes of making, wearing, and witnessing.

## Towards a creative, practice-led PhD

Concerns about the governance of biopolitics have shaped my contemporary jewellery practice for over 15 years. Consequently, when I began this doctoral project, I recognised several of my previous projects that helped to form the question, purpose and material process specific to this research: *forged* (2010-2013), *ACCess mATters* (2017), *For Otto and Alfredo* (2018), *Political aesthetics: When DNA sequencing meets contemporary jewellery* (2019) and *ID collar* (2021). In the following section, I briefly discuss each project, asking what was achieved and how it fed and shaped the present research project, as well as outlining how each earlier body of work generated the questions and concerns that motivate this doctoral project.



FIG. 3. Johanna Zellmer, *forged* (2013), passport booklets, pierced and forged currency, monofilament, dimensions variable.

## ***forged***

In 2010 I launched a call for public participation in an art project, later known as *forged*, asking to interview and photograph immigrants to New Zealand who were unable to obtain dual citizenship. I fashioned jewellery 'aids' from cut and forged coin emblems and fitted them with hearing aid material. The pieces were contextualised by adding portraits of the participants and 'passport' booklets presenting their transcribed interviews and drawings (FIG. 3). Visitors to the exhibition were invited to take a seat and read the immigrants' stories.<sup>21</sup>

In hindsight, this project laid the foundations for my PhD inquiry into the agency of creative work and objects in performing acts of resistance to biopolitical governance. I removed each coin from its national economic jurisdiction and subverted its political sovereignty by cutting it into the separate elements that constitute its identity, as outlined on its embossed surface. The resulting 'jewellery-aids' marked the human neck with the shadow or outline of a national symbol and a number, projecting the governmental data back onto the wearer's bare skin. Further, in stating that the silver filings from the legal tender remained the property of the Federal Republic of Germany, I revealed its status as precious metal and the power invested in its material form (FIG. 4).<sup>22</sup> However, seen as underpinnings to my PhD project, my processes were still firmly embedded in formalist aesthetics — that is, I was using form as a symbolic language, which I perceive as jewellery's primary concern.<sup>23</sup>



FIG. 4. Johanna Zellmer, *Property of the Federal Republic of Germany* (2009), silver lemel, Ø 40 × 30mm.

### ***ACCess mATTers***

In 2017 I engaged in one of Otago Polytechnic's annual collaborative Art & Science projects, working with Aaron Jeffs, sequencing specialist at the University of Otago Genomics Facility.<sup>24</sup> This is another example of how my practice has progressively moved towards my present PhD research. I learned that current technology enables the sequencing of entire populations and wondered if the biometric data used in passports might be replaced by the collection of one's genetic data in the not-so-distant future. After discovering that HiSeq flow cells delaminated in my enamelling kiln, I began to integrate Illumina flow cells fragments for the first time.

The resulting body of work, *ACCess mATTers*, consisted of four silver ID cards made from European commemorative coins and stamped with sentences written in genetic code.<sup>25</sup> I backed the warped, iridescent glass slithers with a self-adhesive film, bearing a pair of eyes copied from a gifted passport. Single glass slithers were then attached with silicone glue on the top of each card. The cards were suspended from lanyards, printed with the twelve gold stars of the European Union on a red ground, instead of azure blue (FIG. 5). *ACCess mATTers* played with colour and text codes as a symbolic representation of questions of access, value, identity, and power. Owing to the utilitarian nature of the soft lanyard ribbon, and the lightness and formal familiarity of the clipped-on silver cards, the work was easily wearable. Wearability was an element that I wanted to embrace more fully in the future and one that I felt my practice had typically circumvented.



FIG. 5 (a), (b). Johanna Zellmer, *ACCess mATTers* (2017), PET lanyard, silver coin, Illumina flow cell glass, self-adhesive printed film, 180 × 105 × 2mm. Photo credit (a): Emily Davidson.

**For Otto and Alfredo**

I made a little pile of eye-bearing Illumina slivers (FIG. 6) as a nod to Alfredo Jaar's 1996 work *I remember her eyes. The eyes of Gutete Emerita*, in which a mound of one million film slides bears the eyes of a survivor of the Rwandan genocide.<sup>26</sup> I encountered Jaar's work during my master's studies, when it was first presented at the National Gallery of Australia in Canberra in February 1996. It never left me. Without being able to verbalise it at the time, witnessing Jaar's work made the complex world of biopower visible and perceptible to me. Through the eyes of Gutete Emerita, I gazed on millions of people, mobilised as a resource and asset by governmental power, commodified for economic profit and political gain, without regard to human dignity. The affective force of Jaar's work leads the viewer to an awareness of the need for resistance.

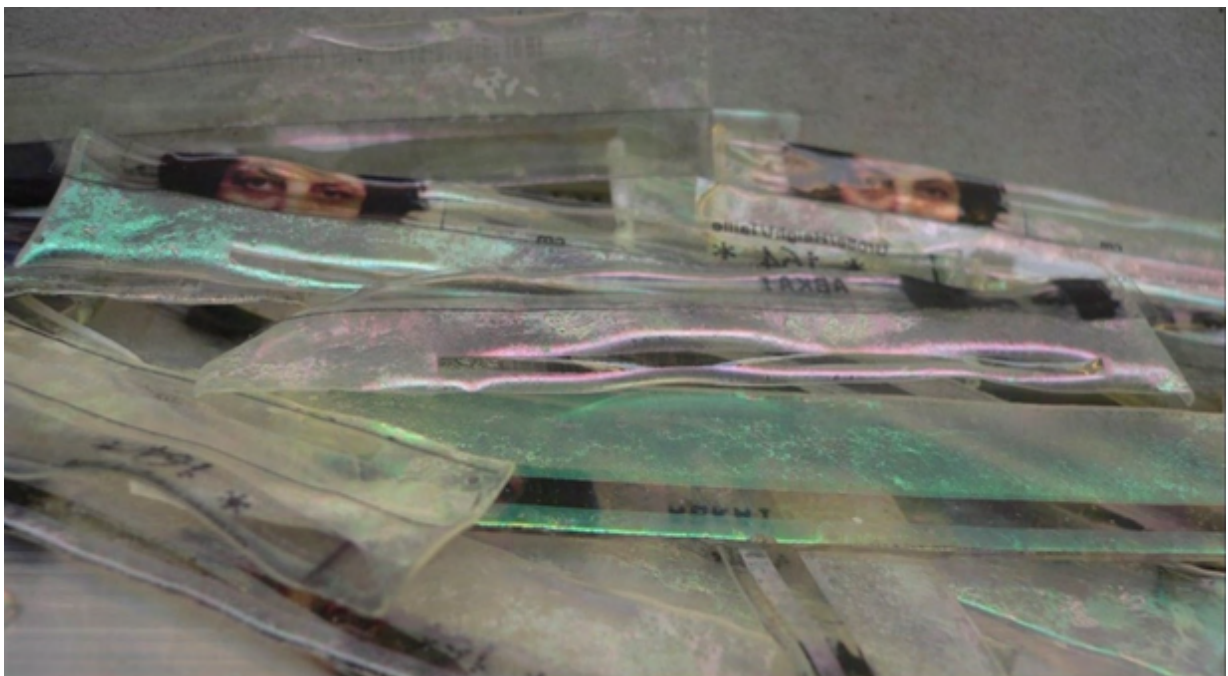


FIG. 6. Johanna Zellmer, *The eyes of Parwin Abkai* (2018), self-adhesive printed film, Illumina HiSeq glass, dimensions variable.

### ***The Complete Entanglement of Everything***

A residency in Sweden enabled me to push my experimentation further.<sup>27</sup> Now, steel pins, initially used as tools to secure multiple slides during a firing, became integral to the work. It might seem an unusual choice for a jeweller to resort to pins, yet these small sewing tools form an integral part of our trade. Jewellers often secure individual pieces with sturdy steel pins onto their soldering block to prevent them from shifting when subjected to heat and flux. They tend not to stick to any rogue solder and don't draw as much heat as soldering tweezers or clamps. When I used these pins to secure the sliding glass rectangles, they became embedded in the work as molten glass flowed around them. The emerging work was reminiscent of unknown primal species, with legs and tentacles of carbonised steel (FIG. 7). However, I had returned to creating objects to be looked at. In fact, this body of work was shown in a tall glass vitrine across three levels in *The Complete Entanglement of Everything* exhibition.<sup>28</sup> The translucency of its sheer glass shelves, with a single light source at the top, connected the individual object groupings and alluded to a medical display in the style of a Wunderkammer. Their affect was only perceptible through sight, not touch. This experiment prompted me to return to the notion of jewellery as a tactile and haptic medium of embodied knowledge, something worn.



FIG. 7 (a), (b), (c). Johanna Zellmer, *Political aesthetics: When DNA sequencing meets contemporary jewellery* (2019), Illumina flow cell glass, steel pins, rubber gaskets, dimensions variable. Photo credit (a) and (c): Jodie Gibson.

## **The research gap and question**

Objects that directly engage with the skin can be found in the history of both medicine and human adornment. How do we navigate the seemingly disparate experiences of affect and scientific enquiry to achieve further knowledge? When considering this question in terms of jewellery, the haptic experience of adornment relies on enactment. I began to wonder if contemporary jewellery could contribute new knowledge derived from the space between aesthetics and DNA sequencing.<sup>29</sup> These questions emerged from the creative research leading up to my doctoral studies. I sought to deepen my understanding of the magnitude of biopolitics, or biopower, through creative practice. I specifically wanted to probe jewellery's role in resisting the dogmatic application of biotechnology to the systems of biopolitics and capitalism, which reduces the complexities of life to a set of data. By drawing on jewellery's inherent aesthetic and haptic responses via an engagement with the bare skin of the human neck, I sought to make the elements of biopower perceptible.

These endeavours led to my initial research question: 'What kind of socio-political knowledge could contemporary jewellery produce from the interstitial space of scientific enquiry and "aesthetics as perceptible by feeling"?'

One of the texts that initially informed my interest in aisthēsis, or 'aesthetics as perceptible by feeling', was Jennifer Fisher's 'Tactile Affects'.<sup>30</sup> According to her, the pre-critical, open-ended nature of affect produces knowledge that resists the closure of discourse.<sup>31</sup> Her essay outlines the affective environment of exhibition spaces and the enactment of art as something that requires interaction, an experience not able to be reduced to objects alone.

My enquiry addresses an existing research gap by channelling the affective experience of collars and chokers made from the tools used for DNA data collection into modes of resistance. My doctoral project aims to advance the agency of contemporary jewellery as it engages with biotechnology and bioethics at the interface of craft and bioart. An extensive survey of the field has revealed a lack of previous research at this interface that investigates jewellery's role in resisting the biopolitical conditioning for standardisation enabled by DNA sequencing technologies.



FIG. 8. Johanna Zellmer, *ID collar*<sup>32</sup> (2021), Illumina MiSeq flow cell glass, steel pins, sterling silver and Nordic Gold coins, Ø 200 × 60mm. Photo credit: Neil Alan Pendergast.

## Exegesis structure

This exegesis adheres to the Modern Humanities Research Association (MHRA) 2024 Style Guide and unfolds as a series of interconnected themes.

Following the introduction, chapter 2, 'Touching bare skin: Jewellery and bodily boundaries,' examines jewellery at the site of the neck. It addresses skin as a physical and fabricated boundary, which situates us in the world. The introduction of artists whose practices use affective registers leads to a discussion of the act of adornment as a relational experience.

The third chapter provides a background to the key concept of biopolitics as it relates to my project. The separation of meaningful human experience from the technical event of scientific observation is situated as key to biopolitical governance. The division between the sovereign position of science and social governance is outlined as a key area of concern, which in turn brings ethical considerations into view.

Chapter 4, 'Speculative experimentation: From hi-tech scientific instrument to daring object of adornment' positions my practice in the space between craft and bioart. Linking process and methodology, it contextualises the development of my project and its changing focus from symbolic to affective aesthetics through the contemporary theory of speculative experimentation.

In the fifth chapter, 'Affective experience: The energetic force of jewellery', I consider the magical, incorporeal, and unseen forces at play in my work in the context of affective aesthetics. This section unfolds the destabilising experiences inherent in my final collars and chokers.

In the sixth chapter, 'Resisting biopolitical governance', I introduce bioartist and biohacker Heather Dewey-Hagborg and reflect on the various forms of resistance to biopolitical governance through deflection, interruption, creation, destruction, disappearance, and 'moving-in-line' discussed in my project.

The final chapter expands on the perception of contemporary jewellery in relation to the situations in which it is encountered. It emphasises the discipline of jewellery as inherently interactive and triangular, involving the intention of the maker, the commitment of the wearer, and the creation of a 'force field' between wearer, witness, and maker.<sup>33</sup>

## 2. Touching bare skin: Jewellery and bodily boundaries

*[Jewellery] references the world – through its shrewd, critical awareness of the age we live in with all its social, cultural, ecological and political fragility, but also its potential.*<sup>34</sup>

Karen Pontoppidan



FIG. 9. Louis-Marie Autissier, *The actress Johanna Wattier-Ziesenis* (1809), Ø 84 mm. Private collection. Photo © Christie's Images / Bridgeman Images, Image No. CH8978871. Sourced from Christie's Images.

### Collars and chokers

The etymological roots of *choker* point to an action: 'The one who chokes'.<sup>35</sup> This definition firmly embeds this type of adornment in the history of neckwear, closely worn against the throat and conveying power relations. A telling historical example is found in the period following the French Revolution. For just over a decade, from 1794 to about 1810, aristocratic women adopted a hairstyle known as *coiffure à la Titus* (guillotine haircut) as a political stance in opposition to the new republican regime. This coiffure was complemented by wearing thin red ribbons or pearl chokers made from coral or rubies around the neck to imitate a cut throat (FIG. 9). Family

members lost to the guillotine were mourned at *bals des victimes* (victims' balls) which included greetings conveyed with a sharp jolt of the head mimicking decapitation.<sup>36</sup> Author Angela Carter draws on this history in her rewriting of the fairy-tale Bluebeard, titled *The Bloody Chamber*.<sup>37</sup> She portrays the husband's morbid behaviour towards his wives as a form of revenge in the aftermath of the French Revolution. Further subverting the original, she writes from the heroine's perspective: 'His wedding gift, clasped round my throat. A choker of rubies, two inches wide, like an extraordinarily precious slit throat'.<sup>38</sup>

Conversely, enveloping the neck with jewellery to protect this vulnerable site, to highlight its beauty, or to cover undesirable marks is evident across many cultures and centuries. Chokers were used to disguise disfigurements of the neck, as in the case of Austrian and Bavarian *Kropfketten* (goitre chains) of the nineteenth century.<sup>39</sup> Their multi-stranded chains, fastened with a stately clasp at the front, were designed to hide goitre swellings caused by iodine deficiency.<sup>40</sup> At the time, collars and chokers had become highly fashionable in Europe, a trend credited to Britain's Queen Alexandra (1844-1925), who was said to hide a small scar by wearing broad, multi-stranded chokers made from pearls and precious stones.<sup>41</sup> Subsequently known as *colliers de chien*, these 'dog collars' underwent a revival in the punk movement in the twentieth century, now literally mimicking dog collars through the use of punched leather and studs and spikes.<sup>42</sup> This development draws attention to chokers and collars as affective measures of possession, ownership, and privilege. I remember my profound and firsthand encounter in 1994 in Myanmar, then known as Burma, with Padaung women who have traditionally covered their necks in tightly stacked brass coils. Rather than stretching the neck itself, over time this adornment pushes down the collar bones, creating the appearance of an elongated neck.<sup>43</sup> In his memoir *From the Land of Green Ghosts*, Khoo Thwe establishes a relationship between magic, aesthetics, and privilege, through this practice, equally relevant to my current research:

Only girls born on auspicious days of the week and while the moon is waxing are entitled to wear them. These girls start wearing rings from the age of five, when the neck is circled only a few times. As they get older more rings are added [connecting them to] the memory of our Dragon Mother. Our grandmothers would allow us to touch their 'armour' when we were ill. One should touch them only to draw on their magic — to cure illness, to bless a journey. The rings were portable family shrines.<sup>44</sup>



FIG. 10. Malvina Hoffman, *Padaung Woman* (c. 1933), bronze, metal, ©The Field Museum, Image No. A115228d\_014A, Cat. No. 337119. Photo credit: John Weinstein. Sourced from The Field Museum.

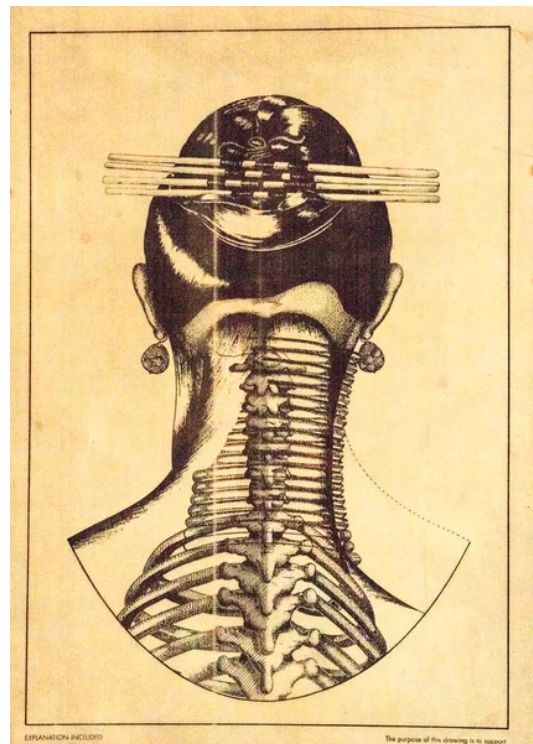


FIG. 11. Illustration of the anatomy of traditional neck rings around women's necks in Myanmar, Padaung ethnic minority tribe in Northern Thailand. Sourced from Deposit Photos.

## The neck

Anatomically speaking, the human neck provides the quintessential connection between the head and the rest of the body. All essential lifelines pass through this narrow channel to keep information and bodily functions flowing. The cervical spine with its final set of vertebrae curves towards the head, which balances above as the highest point of the upright body. This precarious balancing act is stabilised by thick strands of muscular tissue which attach symmetrically to the left and right of the skull, the centre of the top vertebra, and collarbones. Several core veins, such as the jugulars, pass through this narrow passageway that we term the neck, supplying blood to and from the brain. Oxygen travels through the oesophagus in the neck to the lungs. The larynx, commonly known as our voice box, is located at the front of the neck, at the top. It protects us from choking and enables us to make sounds and to vocalise.<sup>45</sup> The epidermis that forms one's skin creates the outermost layer of the neck. Its nerve endings, pigmentation, hair follicles, and 'microbial living world' situates one's body in its living environment. Writers such as Agnieszka Wołodźko, Lieta Marziali, and Elizabeth Povinelli draw on the concept of the human body as an 'assemblage' of living and non-living substances.<sup>46</sup> They perceive biological life as a series of intersecting and entangled substances in a continuous state of collaboration, cooperation, and interactive interference. The boundary of our skin, which is in fluid equilibrium with bacterial, viral, and fungal bodies, is therefore not an autonomous boundary at all, but rather a permeable membrane, in constant exchange and contact with, and affected by, our surroundings. Age, heredity, work environment and health all impact on the shape and size of human necks and the condition of our skin.

As a jeweller, I regard the neck as an explicitly public site and at the same time as a deeply intimate one, having been consciously adorned by humans over aeons, aware of its symbolic power and need for protection. For me, where the neck begins and ends is a zone informed by adornment. Pendant earrings, for example, while fastened to the ear, activate the neck zone sensually through playful, swaying haptic contact. Other pendants lie against the chest, but can only do so by being attached to a chain or string that fastens at the nape. (Personally, I don't wear a lot of jewellery, but when I do, it is mostly pendants that are tightly fastened, resting on my neck just below my Adam's apple.) Neck adornment can change posture. Its tautness, pulling downwards from a strand fastened around my neck, or embodied in the weight of a collar resting on my shoulders, effects my movements. I grow aware of being in the world, my encounters, and the affective

qualities of my personal aura through adornment. I imagine this experiential knowledge is familiar to many — such as the perception of the bareness of one's throat and Adam's apple, the habitually tightened muscle strands that curve down to the shoulders and back of the neck, and the hairline above one's highly intuitive nape. The physical manifestation of my neck is intrinsically linked to my personal experience and shapes my future encounters.

There are a multitude of adjectives to express one's experience of this affective zone: *angular, aristocratic, broad, chiselled, curved, delicate, elongated, emaciated, flaccid, fleshy, flimsy, gaunt, masculine, rigid, rubbery, saggy, scrawny, short, skinny, square, squat, stiff, strong, sturdy, sweaty, swollen, taut, tender, tense, thick, thin, tough, weak, withered, wobbly, wrinkled, wry*.<sup>47</sup> With each word I can picture an individual walking towards me. Each word evokes a bodily condition with some degree of genetic heredity, accentuated by habit and modes of living. The conditions of one's daily existence and one's own experience of biopolitical pressures — such as stressful or violating environments affecting daily life through oppression, discrimination, and exploitation — can make one's genes express differently.<sup>48</sup> This can cause inheritable changes in our bodies.<sup>49</sup> Ultimately, I believe that human lives — and bodies — are filled with experiential knowledge and an immense variety of corporeal and incorporeal experiences that no amount of data collection can feasibly explain. This project seeks to bring this awareness into focus through examining the affective force of acts of adornment.

### **Contemporary jewellery and affect**

For this project, the affective nature of collars and chokers in close encounter with the skin of a human neck requires a focus on human bodies. Not only is biological life part of the material of the work, but it is also a human body which is in turn affected by the work. Art historians Liesbeth den Besten and Damian Skinner have provided in-depth accounts of how the body is indispensable for the discipline of jewellery. Skinner describes this site as a complicated, uncontrollable, and mediating portable host, with the concluding note: 'Questions regarding whose body, which body and from where the body originates are open arenas for contemporary jewelry to explore in the next decades'.<sup>50</sup> Den Besten gives an account of contemporary jewellery's relationship with the lived body and locates work from the 1990s onwards that uses the body as a source. According to her, this emergent work formed a commentary on the rise of the cosmetics

industry, biomedical research, and the adaptability of the human body.<sup>51</sup> She concludes that 'the youngest body jewellery [...] really tries to get "under the skin", not only physically, but also mentally'.<sup>52</sup>

Skin becomes flesh, jewel becomes tool, scar, bruise or blemish becomes ornament, personal becomes public, pain becomes art, while the craftsman is 'crafting' their own body and self. It seems that in jewellery, finally, all sacred cows have been sacrificed.<sup>53</sup>

Den Besten's book *On Jewellery* contains a chapter dedicated to artists whose practices address human bodies, not only in a physical and material sense, but also in their use of affective registers.<sup>54</sup> Of particular interest for my project is her account of the protagonists of a short-lived anti-jewellery movement, Gijs Bakker and Peter Skubic. Den Besten discusses Bakker's *Organic Jewellery* from 1973, a photographic project showing temporary imprints left by wire being tightened around an arm, leg, or waist (FIG. 12).<sup>55</sup>



FIG. 12. Gijs Bakker, *Organic Jewellery* (1973), silver gelatine photograph.

Eight years later, Peter Skubic taped a sewing machine needle to his eyebrow with sticking plaster, with its sharp pointed tip suspended in front of his pupil. Titled *Irritation*, this photographic work, for den Besten, as for myself, was less radical but more provocative than Skubic's earlier work *Jewellery under the Skin* from 1975, where the placing of a steel implant and its subsequent removal were recorded on X-ray film and video.<sup>56</sup> Moving forward to the end of the twentieth and beginning of the twenty-first centuries, contemporary jewellery practices have embraced this very experimental mode of working. My own practice has been shaped in these decades when jewellery's recognition as an autonomous artform was fiercely debated.

Contemporary jewellers such as Katinka Kaselinke, Tiffany Parbs, Selina Woulffe, Stefan Heuser, and Lauren Kalman have engaged the affective aesthetics of body modification by sewing pearls into their underarm (Kaselinke, 1999); pouring hot wax onto the skin of their left middle finger to make *blister ring* (Parbs, 2005, FIG. 14); grafting filigree silver brooches onto the top layer of the skin with surgical wire (Woulffe, 2008); modifying body fat and human breast milk to sculpt ornaments (Heuser, 2008-09); and encrusting face, lip, nostrils, and upper back with gold and precious stone 'blisters' (Kalman, 2006, FIG. 13).

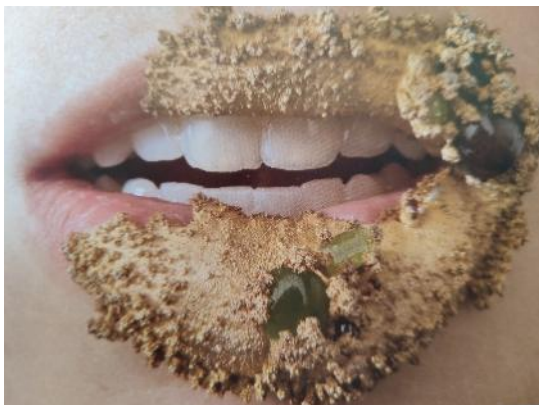


FIG. 13. Lauren Kalman, *Hard Wear (Lip Adornment)* (2006), inkjet print, gold-plated electroformed copper, semi-precious stones, 610 × 810mm and 76 × 51 × 12mm.



FIG. 14. Tiffany Parbs, *blister ring* (2005), skin, digital documentation, 330 × 470 × 40mm. Photo credit: Terence Bogue.

During my own career as a contemporary jeweller, I encountered art provocateur the late Peter Skubic in my student years in Germany, witnessed Selina Woulffe wearing one of her *Silvergrafts* years later in Aotearoa, and hosted Lauren Kalman as an artist in residence at the Dunedin School of Art. For these artists, as for myself, the affective forces involved in acts of adornment can be likened to the moment of realising an ethical positioning. It is an instinctual response, a becoming aware of one's self and socially constructed bodily boundaries. The images of Kalman's and Parb's visceral transformations of their own skin and flesh offers an intense tactile experience for the viewer. One can 'feel' the fluid-filled blister, as if surrounding one's own finger, and sense the dryness of the metal-and-stone encrusted lips, swollen like pustules. These radical affective experiences trigger emotions, questions, and thoughts about one's own being-in-the-world, of life and self. In other words, 'affect is a stage of triggering. When activated, it can do ethical, political and consequential things through begetting thoughts, emotions, ideologies and identity.'<sup>57</sup>

Similar to Parbs and Kalman, the materiality and aesthetic intensity seen in the creative work underlying the present project activate affective experiences. During my research, I have learned that the affective registers of my jewellery objects can shift unexpectedly when worn and witnessed on a human body. Sometimes, this affective force is emphatically greater when seeing the jewellery worn than when experiencing its touch. This is particularly evident when witnessing the raw yet temporary marks left on one's skin immediately after removing a work, signs which are imperceptible to the wearer (FIG. 15). The marking of the human body is integral to jewellery's function as a social signifier. The epidermis, which situates one's biological being in this world, also places one into a social realm. As Mazumdar put it:

A mark can be a thing, a sign, a function. Common to all three types is the function of modifying the surface of an object: marking it and rendering it distinguishable from other objects similar to it. Jewellery, for instance, can be a mark in all three senses of the word.<sup>58</sup>

A mark on one's body can be distinguishing, but it can also be a sign of an old wound, a permit, or an imperfection. It can be a momentary mark, such as the imprint left by a jewellery object, or the symbolic lines of dyed skin delineating a tattoo, for instance. During my research, colleagues were excited about the potential of this project to fully embrace the traces and marks my objects left on the skin as the chief means of capturing affective forces beyond wearing itself.



FIG. 15 (a), (b). Johanna Zellmer, *Marked* (2022-23), digital documentation. Photo credit: Meg van Hale (a) and Sarah Read (b).

### **The act of adornment**

However, one might say that such work functions as an art object *about* jewellery, grounded in the discipline of photography and the use of one's own body as medium and process. To my mind, the reliance on a photographic medium as documentation and artwork removes the inherent triangulation of jewellery as a practice deep-rooted in the relationships between maker, wearer, and witnessing viewer. Here, maker and wearer have become one, relying on the sense of sight rather than touch. However, my work is invested in jewellery's affective 'force field' that operates via touch, the relational act of adornment, and the multiplicity of collective DNA traces. It demands commitment from a wearer to position their personal beliefs and principles in a shared realm. I am dedicated to a material experience, defined by a very specific resource which, in turn, unfolds its aesthetic dynamics through the significance and power invested in a tactile medium. Rather than being work that communicates through photographic (representational) means, my collars and chokers are relatable as objects that are to be touched, passed through hands, and fastened around someone's neck. It is this imparted haptic knowledge that creates a visceral awareness of one's own body, flesh, and self. In this way, my own creative PhD study embraces contemporary jewellery's affective, tactual, and interpersonal impact on human bodies.

In considering the compelling act of adorning the bare skin of one's own neck, my work positions contemporary jewellery within the relationality, fluidity, and porosity of our bodies and reinforces the agency of a collective space that contemporary jewellery inherently inhabits and must activate.

### 3. 'Bare' life governed by biopolitics<sup>59</sup>

*An analytics of biopolitics [...] is interested in questions that have not been asked. It raises awareness of all those historical and systematic correlations that regularly remain outside the bioethical framework and its pro-contra debates.<sup>60</sup>*

Thomas Lemke

Analysing the history of necks, collars, and relevant artists' projects has made me realise how the separation of meaningful human experience from the technical event of scientific observation is a vital key to biopolitical governance. German sociologist and social theorist Thomas Lemke outlines the meanings of the combined terms that the word biopolitics represents:<sup>61</sup>

*Life* has ceased to be the assumed but seldom explicitly identified counterpart of politics. It is no longer confined to the singularity of existence, but has become an abstraction, an object of scientific knowledge, administrative concern, and technical improvement. [...] *Politics* disposes not only of direct forms of authoritative command, but also of indirect mechanisms for inciting and directing, preventing and predicting, moralizing and normalizing. Politics can prescribe and prohibit, but it can also incite and initiate, discipline and supervise, or activate and animate.<sup>62</sup>

Lemke defines biopolitics as a dynamic and complex relationship between power processes which mobilise scientific knowledge, create exclusive knowledge practices which establish a regime of truth, and install modes of subjectification which require subjects to monitor their health and conduct as organisms regulated by genes.<sup>63</sup> His definition of biopolitics reflects the concerns of my practice and of this project in particular: The biopolitical pressure for subjectification as a means of participation and the reduction of human life to mere scientific observation.

For practising physician and professor of medicine Paul Komesaroff, as for myself, medicine has degraded intimate and meaningful human experience to the realm of mere technical events and materials in the sterile environment of the laboratory, where they provide a means to an end.<sup>64</sup>

For instance, once a part of your body is separated from you, it is legally treated as waste and as something that does not belong to anybody.<sup>65</sup> According to Donna Dickenson, this definition relies on the distinction between raw matter, which can be owned, and a person, who cannot, as this would undermine the notion of human dignity.<sup>66</sup> The 'raw' matter of 'bare' life contained in the Illumina flow cells that I am able to collect as hard waste is a point in case. In his book *Principles of International Biolaw: Seeking Common Ground at the Intersection of Bioethics and Human Rights*, legal scholar Roberto Andorno considers what it means to be human and establishes the perils of reducing individuals to mere instruments for the benefit of science.<sup>67</sup> Like Andorno, I consider dignity as inseparable from the human condition, a state that transcends biology. As a result, my practice-led research broaches the complexity of the lived material world at the cultural divide between humanities and science.<sup>68</sup>

### **Bioethics and the Human Genome Project**

In this context, the coordinated international efforts to map the entire human genome and create a complete database, known as the Human Genome Project, or HGP, are of interest.<sup>69</sup> Released in 2001, the HGP by no means captured the vast variety of genomic material, nor the diversity of humanity.<sup>70</sup> Largely achieved by using current DNA sequencing technology, that has some limitations in the way it captures sequences, the resulting outputs failed to take into account the immense diversity of the human species.<sup>71</sup> For instance, the processes used may exclude Copy Number Variation (CNV) as an aspect of genetic diversity (FIG. 16).<sup>72</sup>

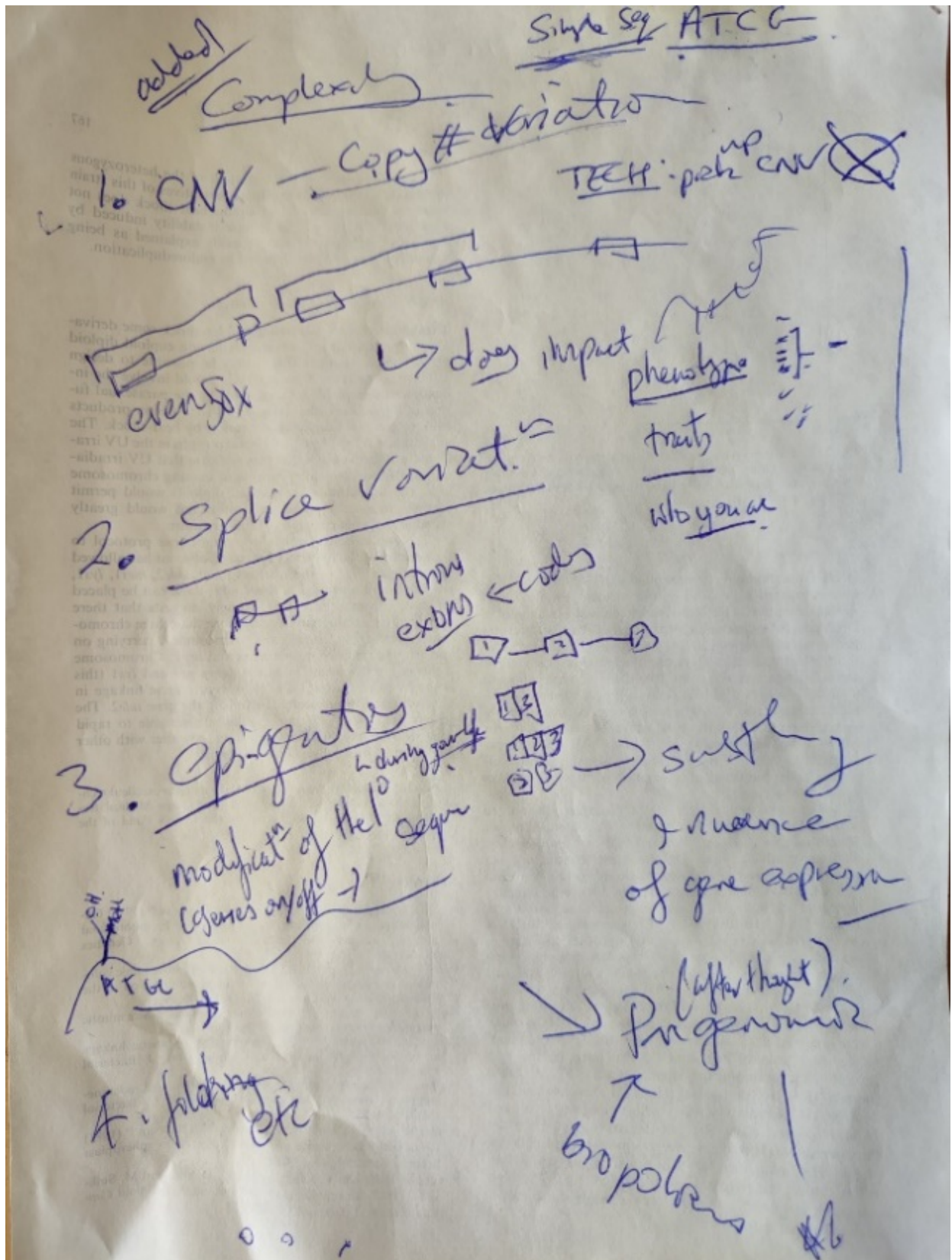


FIG. 16. Craig Hilton, *Genetics101* (2024), sketched meeting notes on recycled A4 paper.

Furthermore, the project resulted in increased discrimination toward minority groups, as DNA was used and evaluated using racial terminology without respecting the needs and wishes of the indigenous communities concerned: 'Indigenous groups, among others, felt they were being treated as living fossils, headed towards extinction'.<sup>73</sup> Khamsi discusses the limitations, unsatisfactory methods and colonialist attitudes of the HGP in her paper 'A More-inclusive Genome Project Aims to Capture All of Human Diversity'.<sup>74</sup> I was astounded to learn that 93% of its sequence derived from just eleven individuals, many of whom were recruited through a newspaper advertisement placed in Buffalo, New York, and that 70% of the DNA sequenced came from just one man, Craig Venter — meaning that the project failed to adequately represent regions from outside the US.<sup>75</sup> Khamsi subsequently gave an account of the latest Human Pangenomic Project, with its mission aimed at 'making human variation intuitive and easy to understand [...], while trying to avoid ethical pitfalls'.<sup>76</sup> With a release planned for mid-2024, its success is yet to be verified.<sup>77</sup>

Lemke calls for a 'critical ethos of an analytics of biopolitics to disrupt the current institutional and discursive dominance of bioethics', an ethos which emphasises abstract choices, 'reduces problems to alternatives that can be treated and decided and gives answers to specific demands'.<sup>78</sup>

An analytics of biopolitics opens up new horizons for questioning and opportunities for thinking, and it transgresses established disciplinary and political borders. It is a problematizing and creative task that links a diagnostic of the contemporary with an orientation to the future, while at the same time destabilizing apparently natural or self-evident modes of practice and thought — inviting us to think differently. As a result, an analytics of biopolitics has a speculative and experimental dimension: it does not affirm what is but anticipates what could be different.<sup>79</sup>

Lemke's critique of the institutionalised and abstract nature of bioethics resonates with me, specifically from my experience of completing a full human ethics application for this research (see Appendix 1). Useful in many ways, completing the application highlighted the contrast between the abstract nature of scientific research and the discursive approach of the humanities. I am drawn in by Lemke's proposition as it mirrors the destabilising processes of the methodology I adopted in this research project, the contemporary theory of speculative experimentation. One

of the pieces I made in 2021, *Do not apply to body, do not ingest*, illustrates this way of working. As a means of comprehending the contrasting approaches, I piled a handful of RFID chips onto a white gel pack collected from the Otago genomics facility (FIG. 17). Gel packs are used to cool flow cells during shipping and the clear and black RFID chips are part of Illumina MiSeq units. Drawn in by the chips' resemblance to eyes, I domed both sides of each little chip with silicone stoppers. By surrounding the gel pack's warning 'Do not apply to [a] body. Do not ingest' with these watchful tracking devices, they started to resemble pills, staring back at you. Self-evident modes of thought, instruction, and utility began to destabilise, inviting a questioning of established disciplinary borders. I recalled this piece in the context of my human ethics application: It transgresses the abstract nature of bioethics and invites a different kind of thought.



FIG. 17. Johanna Zellmer, *Do not apply to body, do not ingest* (2021), RFID chips, self-adhesive silicone stoppers, gel-pack, 115 × 140 × 30mm.

## **Foucault**

My interest in the modes of control and power that permeate society drew me to French philosopher Michel Foucault. In his writings from 1975 to 1979, he coined three terms to describe existing forms of power, which serve to secure territory and govern inhabitants and populations. Sovereign power, which is the forbidding power of law, subordinating subjects out of fear; it is the power of death. Disciplinary power shapes and normalises individuals who eventually become, speak, think, and act in a similar manner through activity control. Third, according to Foucault, biopower or biopolitics emerged at the end of the eighteenth century with a focus on regulating the economy through the governance of entire populations.<sup>80</sup> While biopolitics integrates disciplinary power, it uses different instruments such as statistics, forecasts, insurance, and collective savings.<sup>81</sup>

Following Foucault, Munich-based Indian philosopher Pravu Mazumdar proposed that the advent of biopower at the end of the eighteenth century is linked to the simultaneous emergence of the disciplines of political economy and biology as objects of scientific knowledge.<sup>82</sup> He emphasises that biopower relies on classifying populations into a plurality of identities in order to establish manageable groups.<sup>83</sup> Foucault termed this biopolitical pressure to produce identity 'the technology of the self', a socially constructed appearance and means of participation, which subsequently binds us to a particular identity and external power structure.<sup>84</sup> Consider, for instance, gold and diamond adornments, which promise beauty and signal status and wealth.<sup>85</sup> Individuals are conditioned to strive for approval by utilising such ornamentation as a means of participation in daily life. In turn, one binds oneself to this socially constructed appearance and the prevailing system of capitalist economies. Foucault proposed that individuals could break the consensus of biopower by positioning themselves as 'noise' or as an 'irritant'.<sup>86</sup> Correspondingly, as a jeweller, I contemplate the agency of adornment in breaking the consensus of biopower by making its complex world perceptible. This project highlights the urgent need for individuals to make a stand against the prevailing commodification of life and standardisation of self, — that is, against the biopolitical incentives to behave as an organism regulated by genes and appreciated as a beautified, heathy, fit, and 'normal' individual.

### **Life, non-life and lived experience**

The concept of biopolitics has evolved since Foucault's groundbreaking work. For instance, in her book *Geontologies: A Requiem to Late Liberalism*, Elisabeth Povinelli asks if we are seeing a return to the concept of sovereignty in late liberal power regimes, with biopower hiding its homicidal systems by telling us to be normal, healthy, and vital, while allowing those who do not thrive to die.<sup>87</sup> Among her contemporaries who have appraised and advanced Foucault's ideas, Giorgio Agamben is one of the most relevant to my research.<sup>88</sup> Agamben's position has recently come under scrutiny and I will return to the relevance of his ideas to this project in chapter 5.<sup>89</sup> Povinelli concludes that current theories struggle to maintain the difference between life and non-life.<sup>90</sup> For her, late liberalism presides over difference and separation, and she urges a new approach in the light of our animal, plant, and particle-entangled existences.<sup>91</sup>

My project brings together aspects of both Foucault's and Povinelli's models. On the one hand, Illumina flow cells are the biopolitical tools for determining what is healthy and what is abnormal, for unifying, mitigating risks and establishing acceptable tolerances. In turn, this scientific methodology influences social and cultural practices and power relations. On the other hand, genomics facilities produce data derived from plant, animal, viral, and human DNA for a wide range of research projects. At the stage when I receive the used flow cells, they still contain unspecified DNA residues which are broken up and unreadable using current technologies. Transformed into jewellery and worn against the bare skin of a human neck, these objects of entangled existences highlight the artificiality of an autonomous body and the separations induced through biopolitical means (FIG. 18).



FIG. 18. Johanna Zellmer, *Protean Being*, (2023), Illumina sequencing waste (medical glass, steel pins, sterling silver and plastic frames, QR code tab), 100 × 70 × 35mm.



FIG. 19. Johanna Zellmer, a collection of Illumina flow cells (2024), (left to right) HiSeq, MiSeq, NextSeq, NovaSeq, NextSeq 2000, dimensions variable.

When collecting my initial material from the Dunedin laboratory, I understood that there were no readable traces left in the glass and interpreted this as the complete absence of DNA residues. Soon after, however, I learned that the glass cells did in fact still contain DNA; broken up and unreadable using current technologies, but still very much of a material nature. DNA is 'sticky' in a material sense. I began to wonder at what temperature DNA is eradicated. In one forensic study, the authors observed that, for a given time period, DNA residue can be obtained from burn victims exposed to 700 degrees Celsius.<sup>92</sup> As my objects are kiln-fired at between 850° and 1200° degrees Celsius over an eight-hour cycle, any biological material should therefore certainly be removed. Yet ethical considerations pointed to an inherent predicament. What if traces — perhaps of a spiritual nature — from the sequencing process in fact remain, undetectable using current scientific methods?

## **In Aotearoa**

I don't know if any of the flow cells I collected carried human DNA, but they did contain DNA related to us. In the context of Aotearoa, the recent publication *Te Mata Ira: Guidelines for Genomic Research with Māori* makes the point that human tissue and DNA from any genetic source that connects to whakapapa are considered taonga and hold mauri.<sup>93</sup> Whakapapa is a taxonomic framework that links all phenomena, animate and inanimate, known and unknown, in the terrestrial and spiritual worlds.<sup>94</sup> Whakapapa therefore binds all things; it maps relationships so that mythology, legend, history, knowledge, custom, philosophies, and spiritualities are organised, preserved, and transmitted from one generation to the next.<sup>95</sup> Mauri underpins the Māori worldview and can be described as the 'life essence'. As with whakapapa, it is applied to both animate and inanimate objects.<sup>96</sup> Maintaining mauri can be thought of as maintaining the genetic or biological integrity of an organism or system.<sup>97</sup>

In the context of the dominance of scientific advances over ethical considerations, this project raises questions about standardised social and cultural practices and the resulting hierarchies, separations, and power relationships in Aotearoa and beyond. Consider, for example, how the data collected through DNA processes is typically uploaded into databases. These bio-surveillance records can have discriminatory social implications that exacerbate an already inequitable society; this can impact matters as diverse as employment, parenting and health insurance. Moreover, the fact that my working material contains DNA fragments creates anxiety and raises questions about the likelihood of individuals being implicated through my work. Such ethical implications were highlighted during the third international summit on human genome editing held in London.<sup>98</sup> The divisions between innovation and social impact, governance versus technical ability, and the sovereign position of science stood out as key areas of concern for attendees Françoise Baylis, Ben Hurlbut, and Josephine Johnston. In a special event hosted by the Hastings Centre they examined the problem of contemporary capitalism with its striving for maximum profit and the dominance of presentations on scientific advances over ethics and governance issues as critical takeaways from the summit.<sup>99</sup>

In like manner, geneticist, artist, educator, and my external supervisor Craig Hilton repeatedly affirmed during my studies that 'what is possible, is inevitable'. He was referring to the rapid advancement of biotechnology and its insatiable appetite for new findings, driven by the

prospect of economic gain over and above ethical considerations. Thomas Lemke, too, alerts us to the fact that neoliberal capitalism's vision of biological growth is premised on the overcoming of all limits.<sup>100</sup> This vision is rapidly becoming a reality with the recent creation of a new lifeform through an artificial intelligence.<sup>101</sup> Funded by industry, the project was primarily driven by the collaborators' curiosity about the capabilities of biotechnology, beyond and ahead of ethical considerations.

Baylis, Hurlbut, and Johnston concluded that responsible participation in biotechnology requires humility, flexibility, and a willingness to learn. As I will establish, it is through the tensions in my work between protection, power, and vulnerability, and the aesthetic force field that is created, that such learning can take place. Thus, a pin positioned on the jugular — with its perceived potential for injury and the continuous collecting and shedding of DNA via pins, silicone, and tape — is connected with a pre-critical knowledge system which can create a visceral awareness of one's own condition.

The bicultural context, specific to Aotearoa, was a subject which remained on the periphery of my research, as the complex responsibilities involved in the application of DNA sequencing towards building appropriate and responsible ethical frameworks, are a global issue. I have been fortunate to discuss this project with several leading Māori artists, anthropologists, and academics, whose positions were surprisingly similar.<sup>102</sup> For instance, Gerard O'Regan (Kāi Tahu), curator Māori at Otago Museum, felt that by and large this project sat outside of his expertise, however related flow cells to containers of human remains, and as such tapu. A conversation about the appropriate handling of such objects ensued. He pointed to the fact that such traditions aren't exclusive to tangata whenua, but exist globally, including the Western world. Dr Khylla Russel (Kāi Tahu, Kāti Māmoe, Waitaha, Rapuwai) was on the advisory group for the publication *Te Mata Ira: Guidelines for Genomic Research with Māori*. She dedicated a generous amount of time to discussing the project with me. Topics covered were bodily matter and the changing status of objects in touch with it, the concepts of mana, whakapapa and tapu and responsible research. She reiterated to trust my instincts and called the project 'brave and unusual'. This was mirrored in my conversation with Robert Jahnke (Ngāi Taharora, Te Whānau a Iritekura, Te Whānau a Rakairoa o Ngāti Porou), professor at Te Pūtahi-a-Toi / School of Māori Art, Knowledge & Education at Massey University. He deemed the project conceptually strong, particularly with view to addressing the neck. For him, the anonymity of the DNA material did not raise any issues

related to tapu. He acknowledged that the medium could cause distress, but concluded that we share it all the time, as an element of contamination.

My listening, conversing and exchanging of thoughts with tangata whenua have instilled different ways of thinking, knowing and acting. This kōrero with tangata whenua has so far affirmed that the project, as I have outlined it to them, upholds tikanga in terms of the bodily traces carried by my jewellery objects.<sup>103</sup> Dr Khyla Russell invited me to her home on two occasions to continue conversations around the work and its relationship to whakapapa. For her, whakapapa is essentially a layering, and is inherently connected to the making of things. Her perspective helped me understand the connection between whakapapa and taonga. She pointed to the importance of taking appropriate action at the completion of the project after new knowledge has been acquired. 'Tapu is like faith', she said, 'it's the ability to do a good job. You need life experience to do good research, be aware who you implicate and trust your instinct'. In her view, the important question is not one of anonymity, of life or non-life, but what happens to the material after I have acquired, used, and shared the new knowledge. Russell emphasised the importance of place when dealing with matter relating to bodies. In other words, the work must be correctly disposed of at a suitable site via burial or incineration. This will provide a fitting conclusion to research which aims to ask pertinent ethical questions arising from constantly evolving technological advances and their impact on social and cultural change.

## 4. Speculative experimentation: From hi-tech scientific instrument to daring object of adornment

*Technology is not an image of the world but a way of operating on reality. The nihilism of technology lies not only in the fact that it is the most perfect expression of the will to power [...] but also in the fact that it lacks meaning.*<sup>104</sup>

Octavio Paz

### **Between craft and bioart**

Octavio Paz's quote reminded me of a lecture by Pravu Mazumdar delivered at the Royal Academy of Arts in London in 2023, which I attended online. Titled 'On Bio-art: How Science Appropriates Art', it illustrated his 2017 paper 'The Dual Matrix of Life: On Genetic Science, Art and the Truth Games of the "Third Culture"'.<sup>105</sup> Drawing on Nietzsche, Paz reasoned that with science, people have forgotten that truths are illusions, while art always makes the illusion of the image its focus and point of interpretation.<sup>106</sup> In line with Paz's 'perfect expression of the will to power', Mazumdar further contends that science turns things into objects that resist us and are to be observed and dominated.<sup>107</sup>

Physicist and novelist C. P. Snow stated in his notable 1959 lecture (and later book) 'The Two Cultures and the Scientific Revolution' that the division between the sciences and humanities is a major handicap to both cultures. Later, Snow more optimistically predicted the advent of a third culture that could potentially bridge this divide. Unfortunately, this has not occurred to any real extent, a perception reiterated, among others, by Mazumdar in 'The Dual Matrix of Life'.<sup>108</sup> Here, he turns to jewellery art and concludes that:

it comes as a surprise that jewellery art has hardly yet entered the exchange with genetic science and technology, despite its anthropomorphism, expressed in the fact that it positions itself between the human body and the world at large to enhance the physical and spiritual being of the wearer. However, [contemporary works] scrape past the socio-cultural challenges posed by genetic science and [...] its impact on human self-understanding since more than half a century. [...] It can only be hoped that jewellery

art [...] finds its entry into the kind of critical discourse that has been practiced by bio-art since almost four decades. For [...] in jewellery art, the reflection embodied by a piece is in a sense absorbed by the entire body through the act of wearing it.<sup>109</sup>

I consider my jewellery objects to be operating at the 'interface' of technological objects and epistemic things, of material and immaterial, of the observational experience of science and the lived experience of art and culture.<sup>110</sup> In this way, I am positioning my practice in the space between craft and bioart. German molecular biologist and historian of science Hans-Jörg Rheinberger describes this interface as a common focal point for craftspeople and as the point where life and technology collide.<sup>111</sup> According to Mazumdar, bio-artists penetrate and dissolve this interface.<sup>112</sup> Bioart is also known as *transgenic* or *wet art* and generally works on the level of an actual intervention into living systems, whereas my practice involves the disintegration and reconstruction of the instruments of biotechnology, which contain and observe living systems. In this process anonymous animal, plant, viral, and human DNA becomes transformed into matter invisible to the human eye. My methods and methodology turn the tools that are used for the administrative and technical enhancement of life into meaningful objects of adornment. One might say that my jewellery practice returns *zoé*, natural bare life common to all living beings, to *bios*, a mode of living that constantly adapts itself to the conditions of a social existence.<sup>113</sup> In turn, my work defies biopolitical and biotechnological governance by making their presence perceptible through jewellery's inherent aesthetic affect and haptic response. This chapter follows the development of my creative practice-led research project.

### **The methodology of speculative experimentation**

As an outcome of my craft training, the practice of making is intrinsic to my methodology and research inquiry. In the process of making, creative actions become research actions. In recent decades, artists have become accustomed to adopting methodological frameworks from other fields of practice, including sociology, psychology, and science, to communicate their research. However, with respect to the capacity of creative practice to create new knowledge, this approach has been challenged and a range of methodology frameworks have been identified. In the wider discourse of creative practice methodologies, Martin Savransky's essay 'For Speculative

Experimentation' particularly resonates with me.<sup>114</sup> He draws on affective aesthetics to argue for a different mode of engagement with theory, one that is felt and experienced through 'critical hesitation, reflective questioning and thinking with unthinkable futures', moving beyond conventional scholarly and academic modes of thought and method. I'm familiar with his description of an open-ended *not-knowingness* when working with materials in a studio environment — this continuous visceral process of becoming, which is equally inherent in affective practices.

To engage in speculative experimentation is to think with facts. It is not to be sceptical of but to attempt to think with the sciences. But unlike the scientific reliance on methodological reason, hard or soft, speculative experimentation is characterised by the willingness to risk a thought about that which our habits would advise us against thinking, to cast off into what we may have not yet thought, to reclaim what we may have learned to forget, to construct elements for thinking what we do not yet know how to think.<sup>115</sup>

Savransky goes on to explain that theories must themselves be experienced, felt, and involve feeling, in order to sensitise us to the possibility of different futures.<sup>116</sup> Correspondingly, I could describe the development of my own work of transforming Illumina flow cells from a scientific instrument into an object of adornment reminiscent of fictional life forms and micro-level cataclysms as speculative experimentation. As Savransky writes, this approach 'shifts the intensities with which a future might be felt'.<sup>117</sup>

To enlarge on this mode of practice, I draw on philosopher Jürgen Mittelstraß's definitions of research *through* or *in* art versus research *on* art. In his introduction to his book *Art and Research*, he outlines how artistic discovery, or research *through* art, leads to sensually organised knowledge — to be distinguished from research *on* art, which, like customary research methodologies, leads to conceptually organised knowledge.<sup>118</sup> Professor Henk Borgdorff identifies the former approach as a 'material thinking', a methodology which articulates non-propositional knowledge and experience embodied in artworks and creative processes.<sup>119</sup> For me, this methodology is ideally suited to contemporary craft research with its inherent material tradition, a key factor for this project. For instance, many craftspeople, such as ceramicists and textile artists, develop an affinity for and in-depth knowledge of a particular material. Further, American jeweller and writer Bruce Metcalf argues that one of the most distinct differences of jewellery from other artforms is

its limitations.<sup>120</sup> I concur with his notion that self-imposed limits are inherent in the intimate discipline of jewellery and experienced as freedom, giving structure, focus, and clarity to the discipline. In the same way, the Illumina flow cell fragments utilised in this research project serve as a fundamental reference point for the work and bring a welcome sense of confinement.

### **Process and method**

The flow cells used for this project were sourced from Otago and Massey universities' genomic facilities (NZ) and from Sahlgrenska Genomics at the University of Gothenburg (SE). Over a span of just five years, from my first engagement with these instruments in 2017 until the present, the rapid development of this technology is reflected in the ever-changing sizes and shapes of flow cells and sequencing machines, in which manual labour is increasingly replaced by robotics. The speed with which new sequencing tools arrive on the market has created a constant flow of new shapes, sizes, and materials for this project. The material that is fundamental to my research would have taken a very different form in the 1980s, before the first automatic sequencer became available.<sup>121</sup> At the beginning of 2024, my latest resource is the Illumina NextSeq 2000 flow cell, a completely enclosed unit. I now search out its internal white plastic clips, with their irregular octagonal, ghost-like Pacman shapes, due to their malleability and size. In turn, these rapidly developing tools have kept me on my toes in the 'laboratory' of my own studio, with the need for continuous testing and creative adaption and the stimulation this brings. The iridescent glass slithers of HiSeq flow cells I first used already belong to the 'dark ages' of sequencing history and are no longer available. I still have a small precious stash of them. Over the course of this project, I have taken advantage of the availability of new instruments as they respond to constant technical innovation.

My creative process starts by collecting the bio instruments from the lab and, back in the studio, emptying and sorting the contents of the small cardboard or plastic Illumina containers and resealable bags on my worktable, before dismantling the units. Like a magpie, I then organise the separated elements into collections of material which are stored in their original containers. In my studio there are boxes and bags overflowing with black and clear glass slides; white and grey plastic frames; shiny white plastic and metal clips, tiny black rubber gaskets; clear plastic tabs; and RFID buttons consisting of smaller, translucent golden-hued examples and larger, opaque black ones.



FIG. 20. Johanna Zellmer, Illumina material collection (2023), dimensions variable.

Some trays contain gem-like slumped glass fragments, remnants of fused flow cells transformed by heat. This hoard sits alongside a carefully chosen collection of ceramic and neodymium button magnets; textile threads of varying colours, thickness and shape; and black, red and white glass-headed steel pins ranging from 0.4–0.8 mm thick.

This systematic, 'scientific' approach to organising the salvaged material stands in stark contrast to the less controllable processes I use involving heat — with the ensuing excitement about the inevitable 'organic' products created. This is inherent to my practice at the 'interface' of technological objects and of epistemic things, of material and immaterial, of the observational experience of science and the lived experience of art and culture. This process influenced the making of my first jewellery objects at the beginning of my study in March 2021, where I focussed

on the glass alone, slumping and fusing MiSeq slides with their alluring and familiar gem-like reflective quality. I prised them out of their plastic frames like pearls from their shells. In this process, I plucked the translucent, shiny rounds of golden-hued RFID chips off their hinged lids, onto which they had been glued.

In this way, I made the first two collars for this project by stringing masses of grey Illumina MiSeq frames, stripped of glass, gaskets, lids, and RFID chips, onto a single monofilament cord. When pulled tightly around the neck, the collar was reminiscent of an Elizabethan ruff. The second, longer necklace hugged the nape of the neck in a fluid cascade, draping over the collar bones and across the lower chest like a garland or lei. Viewed from the top, it revealed a skeletal structure. I never felt compelled to make a catch for either work, sensing the need for a less formal aesthetic and more improbable translation, one that hadn't yet been thought, or that I didn't yet know how to think. They remain sketches on my studio wall (FIG. 21).



FIG. 21 (a), (b). Johanna Zellmer, *Ruffle* (2021), MiSeq flow cell frames, monofilament cord, 340 × 90 × 350mm.

The process described above left me with a box full of square lids. I threaded several onto a wire through one of the pin holes revealed after removing the minute rubber gaskets. Twisted into a spiral and affixed with superglue, the objects are reminiscent of DNA structures (FIG. 22).

This resemblance may well be an illustration of speculative experimentation coupled with a limited and specific, yet unfamiliar, pallet of materials. That is, I was 'feeling myself into' the scientific study of DNA sequencing via the material aesthetics of its tools, while subjecting it to the craft skills specific to the discipline of jewellery. The objects emerged organically from this material, and the process guided my creative experimentation in the studio. To put it another way, my pieces pointed towards their own material potential as a trace of my reflective questioning and open-ended *not-knowingness*.

### **Money and biopower**

As a jeweller with a long-standing interest in currency, I decided to cast the spiralling plastic structures into hard cash. Using a lost-wax casting method, I turned these lightweight, grey helixes into solid golden and oxidised black metal structures by melting down €0.20 and €0.50 coins and sterling silver (FIG. 22). The history of jewellery as investment is inevitably tightly entwined with that of money and precious metals.<sup>122</sup> The need for self-enhancement still draws us to reflective surfaces and their fundamental bond to value systems. This allure is mirrored in the fact that the utterly 'non-precious' aluminium–bronze alloy used in modern currency — such as NZ\$1 and \$2 and €0.10, €0.20 and €0.50 coins — was given the name 'Nordic Gold' when first used in 1991 to produce Sweden's 10-krona coin.<sup>123</sup> Aptly, Sweden was also the first country to trial a cash-free society, a failed attempt to achieve better surveillance techniques.<sup>124</sup> Pertinently, Shoshana Zuboff terms capitalism 'the foundational framework of a surveillance economy' in her book *The Age of Surveillance Capitalism*.<sup>125</sup> The entanglement of the capitalist production of value with the scientific production of knowledge was a motivating concept for my early PhD work. While this notion does not sit at the core of my research, the interconnected systems of capitalist production and biopower contextualise my continued use of physical currency and precious metals in this project.<sup>126</sup>



FIG. 22 (a), (b), (c). Johanna Zellmer, helix structures (2021), plastic, Nordic Gold, sterling silver, dimensions varying 75 × 35 × 25mm.

The weight, hardness, and temperature of these gleaming cast jewellery objects affected my bodily response. Each one was satisfying to hold, with my fingers running across its reassuring repetitions of solid rising steps and openings. The Nordic Gold coins had transferred their tactility, allure, and perceived value. At the same time, the DNA accumulated from this loose change, which had passed through countless hands over time, had been eradicated in the process of melting, together with the money's function.<sup>127</sup> And yet, this transformed material continued to absorb the warmth of the human body. I cut one of these tightly spiralling cast structures lengthwise. Placed on the nape of my neck, this golden helix adopts my body temperature as if submerging through the skin (FIG. 22(c)). Reminiscent of DNA molecules or spiralling staircases, its formal aesthetic mimics underlying skeletal structures like a prosthetic device, suggesting a mechanical implant or body-enhancing accessory. Evocative of Donna Haraway's 'cyborg', this jewellery object shapes a fictitious confusion of boundaries between machine and organism.<sup>128</sup>



FIG. 23 (a), (b). Johanna Zellmer, *DNA Collector* (2021), Nordic Gold, oxidised sterling silver, plastic lids, rubber gaskets, entomological pins, 180 × 60 × 50mm.

### ***DNA Collector***

For the next piece, I cast the frames I had used for the initial two collars into shimmering shades of rich gold and blackened silver. Cutting each metal frame off its sprues, I filed and then re-fitted them one by one, each with its hinged plastic lid. The lid's tiny rubber gaskets provided enough friction to insert four opposing entomological pins through the two miniscule gasket holes. Strung together, they created a precariously prickly structure, entitled *DNA Collector* (FIG. 23).<sup>129</sup> Following Savransky, I could say that by amalgamating entomological pins and cast biotechnological components, the affective experience of the work becomes perceptible against the bare skin of a human neck as an unpredictable 'continuous visceral process of becoming' through the unremitting collecting and shedding of DNA.<sup>130</sup>



FIG. 24 (a), (b). Johanna Zellmer, *Hard cash* (2021), Nordic Gold, suede thonging, varying dimensions.

### ***Hard cash***

The casting left many of the thin-walled frames incomplete. I left these attached to the central metal knob, which forms as the liquid metal fills the pouring channel. In the process of cutting the MiSeq frames off the casting tree, I needed to bend the partial casts out of the way to allow my jewellery saw, burs and cutting wheels to reach into tight places. The bent structures with their fluid, golden movement were unexpected. As a contemporary jeweller, I know by experience that artistic decisions form part of a mercurial process.<sup>131</sup> I didn't have a register for these rejects yet, but rather an experiential knowing about their relevance, owing to their curved substantiality and gleaming surface inscribed with the markings of their former technological function. Still attached to their pouring buttons, these heavy bases invited me to treat them like beads or knotted pearl chains. Given their size and weight, I used red suede thonging to complete the strand (FIG. 24).<sup>132</sup> Not unlike my original ruffled grey plastic collar, their density was reminiscent of an Elizabethan collar, yet the transformation of plastic frames into the hard cash of the Nordic Gold aluminium bronze weighed heavily on my collarbones and shoulders, like a slipped crown.

The work had gained a substantiality and permanence, in an affective aesthetic manner, which transferred itself to my posture and gait. Its perceived value and seemingly ritualistic importance connected its aesthetics to the history of royal jewellery, signifying power. Yet, the fact that its components were cast from physical currency meant they were not an accessible attribute of the work. In considering the significance of the biotechnological medium as a fundamental reference point in the project, I turned to the frames' own materiality, the medium of plastic.

### ***My Great-grandmother's Bones***

I wanted to retain a traceable residue of the original, akin to the flow cells. I pondered whether such recognition could result in another perceptible and comprehensible act of defiance of the complex world of biopolitics. I was curious to test the material's reaction to the heat of my large annealing torch. Holding each plastic frame above the forge with a pair of tongs, I watched as the open flame instantly glazed the surface, the result resembling porcelain (FIG. 25). I could feel each segment yielding to the pull of gravity, with the heat changing the internal structure of the plastic. Twisting and turning the now limp material in the air, I was able to render the rectangles into curved, chain-like links. I might best describe this process as experiencing and 'feeling' the theory of speculative experimentation through the 'give' of the relaxing plastic molecules. Used for the administrative and technical enhancement of life, the utilitarian NovaSeq and NextSeq Illumina frames succumbed to their own state of fluid instability and revealed their potential to be turned into meaningful objects of adornment.

By casting one frame into Nordic Gold and melting a small portion of plastic on top (FIG. 26), I conceived *My Great-grandmother's Bones*. In hindsight, this amalgamating of the two materials was a key moment in the development of my creative work. It was the point in time where I discovered the affective force of combining molten and drooping plastics with golden casts and fused glass — 'a reaction on the body at the level of matter'.<sup>133</sup>



FIG. 25. Johanna Zellmer, heat-treated NovaSeq Illumina frame (2021) (detail).



FIG. 26. Johanna Zellmer, *My Great-grandmother's Bones* (2021), detail of cast Nordic Gold link fused with Illumina plastic.

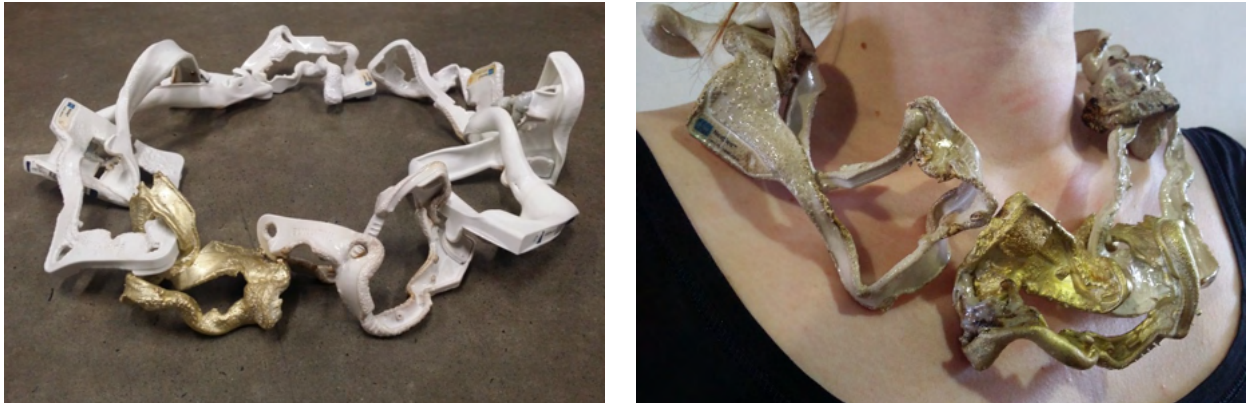


FIG. 27 (a), (b). Johanna Zellmer, *My Great-grandmother's Bones* (2021), NovaSeq and NextSeq frames, Nordic Gold, Ø 250 × 65mm.

The transformative processes of heat and gravity inverted the perceived aesthetic hierarchy of the golden and plastic links of *My Great-grandmother's Bones*. Initially, the ivory-coloured, silken segments appeared to be bone or porcelain. This deceptive valuation was diminished when the lightweight structure and surface was revealed as plastic captured in the act of adornment. In turn, the formal aesthetics of the golden segment, which approximated spray-paint amidst the bone-like structure, were transformed into an affective experience when haptic engagement revealed it as solid metal.

When placed on the neck, the collar performed as an unwieldy shackle, creaking as the plastic links scuffed alongside each other during movement (FIG. 27(a)). Seeking a closer embrace, I decided to reheat the piece on a steel bust resembling a 'classical' female upper torso. The gooey and pudding-like hot plastic links succumbed to gravity and nestled onto the warm steel. Now even more bone-like, most of the collar's links were fused. Unsurprisingly, the finished work only fits 'classical' necks (FIG. 27(b)) — mostly the slender and straight type, following the biopolitical desire to be a healthy, fit, and 'normal' individual. This piece doesn't fit my own neck; rather it hovers on top of my rounded shoulders and bent-forward neck. I have been told it feels comfortable when worn, flowing, light, and lavish. Nevertheless, its smooth, bone-like appearance is deceptive. The now stiffened necklace just spreads enough to be put on or removed and, when slid across the throat, produces a perilous sensation not unlike the precious slit throat in Angela Carter's *The Bloody Chamber*.<sup>134</sup> Prising the collar open requires assistance due to the work's fragility. The wearer's visceral experience of their jugular, larynx, and throat creates a momentary awareness of their body, flesh, and self.

### **SkinTite collars**

In search of alternative modes of fastening objects to the bare skin of the human neck, I contacted artist and technical teacher Caitlin Devoy, who focuses on the tactile, seductive, and kinaesthetic potential of materials and their potential to engage the viewer in an embodied, rather than predominantly visual, experience.<sup>135</sup> Devoy's material of choice is silicone, cast into shapes which invoke intimate flesh. By employing the material's affective aesthetic in relation to haptic bodily experiences, she conjures a visceral tactile knowledge which 'gets under one's skin'. The lure of her objects is touch. Yet, her sculptural objects, when encountered in gallery spaces, are seldom in physical contact with the body of a viewer — in contrast to this project, which is invested in objects that are made to be touched, passed through hands, and fastened around someone's neck. Devoy introduced me to the silicone bio-adhesive SkinTite, used for skin effects in movies and stage design. I recognised that by adopting this method, I could push myself beyond my embodied habits as a jeweller, with the potential to contribute new knowledge to the discipline of adornment. Subsequently, for the confirmation event of this research project, I managed to construct a full collar from Illumina flow cell material, encircling the neck as free-flowing elements anchored by SkinTite silicone (FIG. 28).

My first gut response to this affective, sensory experience was to compare it to an exoskeleton. I was fascinated by the unsettling sensation produced by the Illumina objects becoming one with the body at the site of the neck. Uncannily, they became imperceptible to the outer membrane of the skin, which detects the slight pulling and tugging of the silicone like a second skin, rather than the objects themselves. Yet, applied to form a continuous circumference, the destabilising experience of this floating, exoskeleton-type shield was memorable. I was excited by the sensation of its shielding protection and decided to continue with further experiments, seeking to create new, similarly unsettling and 'unthinkable futures' as potential forms of resistance to biopolitical governance.



FIG. 28 (a), (b), (c). Johanna Zellmer, collar sketch (2022), Nordic Gold, Illumina flow cell glass, rubber gaskets, RFID chips, plastic frames, dimensions variable.



FIG. 29: Johanna Zellmer, *Hybrid Being<sub>15</sub>* (2023), Illumina flow cell glass, plastic frames and clips, glass-headed pins, sterling silver, 60 × 35 × 50mm. Worn by a participant during Nelson Jewellery Week 2023.

### ***Protean Beings***

I recalled the affective aesthetics of my initial tentative melting of a piece of plastic onto the Nordic Gold link in *My Great-grandmother's Bones* and began to compile and fuse materials onto each other. The forces of gravity and heat transformed the instruments for measuring biological data into an organic state of their own, in which DNA traces are erased, barcodes discolour and distort, and RFID chips sear, rendering them inoperative. This disintegration and reconstruction of the instruments of biotechnology into jewellery objects placed the emerging work firmly at the 'interface' of technological objects and epistemic things, of material and immaterial, situated between bioart and craft. The tools used for the administrative and technical enhancement of life turned into meaningful if phantastic objects of affective adornment.

An exhibition of selected work during Nelson Jewellery Week 2023 highlighted the significance of interaction and collaboration between wearer and maker through the act of adornment.<sup>136</sup> My exhibit required individuals to read and sign a participant information and consent form (see Appendix 1), select a work and have me affix it to a chosen part of their neck with SkinTite silicone. Conversations were recorded. In the process of adhering the object of choice to the preferred area of each wearer's neck, the 'shadowlands' of the neck came into view. Participants were invested in exploring the zones of their own necks, looking for answers to questions such as 'Is the ear still part of the neck?', and, when moving the object down past the distinct curve that delineates the neck from the upper body, 'Is the chest still seen as a relevant zone for the purposes of this research?' (FIG. 29). In the context of my prior reflection on human necks, this body of work exemplified that where the neck begins and ends is a zone informed by adornment.

The body of work was fully invested in close interaction, demanding trust, closeness, and control through a collaborative act of adornment. The exhibition format brought the inherently performative and triangulated characteristics of jewellery to the fore as a practice deeply rooted in the relationships between maker, wearer, and witnessing viewer. Visitors reported that their decision to engage in the project was often determined by their curiosity to push their own boundaries and experience the unknown. Participation demanded commitment from a wearer to position their personal beliefs and principles in a shared realm. After returning the objects to me, individuals voiced their experiences as ranging from repulsion to a growing affection, from unanticipated acceptance to a sense of unsettling intrusiveness, and from sorrow to relief. I discovered that the length of wearing changed the participants' relationship to the objects they had chosen. The objects' presence became felt. The visual and haptic impacts of aesthetics operated in unison; feedback confirmed that pieces were initially chosen for their attractiveness, based on their formal aesthetics and associations. When affixed, the silicone adhesive enacted the object becoming part of the body, a sensation which was experienced as intrusive, both physically and psychologically. However, wearers' relationship to the objects they selected changed over time — from an initial pushing of one's own boundaries and overcoming fears, to an experience of emotional attachment or symbiosis with a natural being, variously likened to a leech, bat, or coral. For the wearers, the haptic knowledge imparted created a visceral awareness of one's own body, flesh, and self.



FIG. 30. Johanna Zellmer, *Hybrid Being*<sub>12</sub> (2023), Illumina flow cell glass, glass-headed steel pins, RFID chip, plastic clip, Nordic Gold and plastic frames, 50 × 40 × 40mm. Worn by a participant during Nelson Jewellery Week 2023.

In one instance, a selected piece was placed by the wearer on their neck just below the left ear (FIG. 30). Once the silicone was fully set and the piece was stuck to the skin, they caught a glimpse of themselves in a wall-mounted mirror and jumped back in surprise. They were witnessing a strange object or creature seemingly emerging from beneath the skin of their neck. Curling forward on two legs extending from its centre, its corpus conjured associations with a glass vial. A thin black needle-like object protruded from its pointy top, creating a small circle of red below, reminiscent of blood. The piece's aesthetic amplified the sensation of wearing a medical device or an implant collecting data. The object's intrusiveness, transgressing bodily boundaries and seemingly built into the visible external membrane of the skin, caused instant alarm. As an onlooker, I could almost 'feel' its pin pushing through my own skin to pierce a vein in search of blood, a medical leech. The viewers' shared perceptions of an uncanny form of biotechnology had a visceral, bodily affect, produced by witnessing the object on a human neck.<sup>137</sup> Their

response elicited thoughts of the controlling power of ownership over one's personhood, beyond the discourse of cyborgs. Returning the object after five hours of wearing it, the participant remarked:

Crazy, when it was first on, my initial reaction in the mirror was horrified — even though I chose it and held it onto my neck, as soon as it was stuck there on its own accord, that was quite another experience. You become quite accustomed to it. It's kind of terrifying and disconcerting, how you get used to it. It doesn't feel as inert as [wearing a necklace], it feels more intrusive, psychologically, as well as physically. It's literally stuck onto your body in a very real way. When you are conscious of it, it feels like an intrusion, like a leech, and when I catch a look of it, when I can see the skin being pulled, it's certainly something that's taken hold of me. I don't have much agency over it. I feel quite relieved, it's quite surprising — you're kind of used to it, but then, when you take it off, then and there, it's actually quite invasive.<sup>138</sup>

The affective forces released through these acts of adornment sparked another reaction — the instantaneous realisation of an ethical position formed through an instinctual awareness of one's own self and one's socially constructed bodily boundaries. Discussions on biopolitical governance, constructed identities and resisting conventional standards ensued. One might say that at this point in the research, the perception of biotechnological governance was intensified by the methods and methodology I had adopted. I had titled the individual objects *Protean Beings*, each with a subscript number as identifier, such as *Protean Being<sub>1</sub>*, *Protean Being<sub>2</sub>*, and so on. The word *protean* describes things that are unstable and *in flux*. The *Online Etymology Dictionary* defines protean as 'of or pertaining to the Greek sea-god Proteus', from Greek *Prōteus*, son of Oceanus and Tethys, who could change his form at will; hence, 'readily assuming different shapes, exceedingly variable'.<sup>139</sup> With this title, I wanted to capture the pieces' physical and metaphorical transformation from the state of *zoé*, natural bare life, to *bios*, a mode of living that constantly adapts itself to the conditions of a social existence. And, at the same time, allude to their constant re-forming and evolving nature. Here I was thinking of the fused glass which frequently 'sheds' fragments during the making process, pieces which I collect and incorporate into new objects in a continuous, *protean* way of practicing.



FIG. 31. Johanna Zellmer, *Hybrid Being*<sub>16</sub> (2023), Illumina medical glass syringe, steel pins, plastic frame, RFID chip, 60 × 35 × 50mm. Worn by a participant during Nelson Jewellery Week 2023.

I recognised that the unstable nature of these materials informed and demanded a fluid way of working. As a result, some pieces have ceased to exist in their original form and have been 're-materialised' as part of a new work. The subscript number in the *Protean Beings* series was a nod to chemical formulae, where a subscript number indicates how many atoms an element contains. When worn, the pieces exist in a temporary symbiosis with a human being, at which point the work becomes activated and, in a sense, completed as jewellery. Speculating whether the incorporeal bodily traces of a *Protean Being* might form a new temporary entity with the wearer, I shifted their titles to *Hybrid Being*<sub>1</sub>, *Hybrid Being*<sub>2</sub>, and so forth (FIG. 31). With this allusion to the potential materialisation of a new being, beyond jewellery's conventional function of identity construction, I was contemplating something which scientific, methodological thinking would

advise against, reaching towards 'what we may have learned to forget'.<sup>140</sup> In the next chapter, I explore the intangible traces of bare life that the work may still carry.

I returned from Nelson Jewellery Week with the realisation that, as a mode of attachment, SkinTite silicone had two major snags. One was that the objects I had created did not have a natural affinity with the neck. Other than my insistence, there was no apparent reason to prevent a wearer sticking them on their wrist, forehead, finger, bare navel, or shoulder. The pieces didn't naturally speak of the nape, throat, larynx, Adam's apple or collar bone. Second, the silicone itself was not particularly integral to the work, other than fulfilling a practical function. While examining the *Hybrid Being* series to establish if it fully communicated the concerns of my research, I returned to creating complete collars.

#### **From primary to quaternary structures**

As Savransky put it, 'to engage in speculative experimentation is to attempt to think with the sciences'.<sup>141</sup> When I review my project through the cross-disciplinary lens of formal aesthetic connections, my research processes and the resulting objects could be likened to the formation of proteins, from linear to secondary and tertiary through to quaternary structures.<sup>142</sup> The work reflects a visual likeness through my speculative engagement with the concepts and structures of genetic science. When considering the medium of the work, jewellery objects filled with traces of life forms, the association transcends formal aesthetic appreciation. One might say that jewellery is physically and metaphorically part of the existence of our species. Its social function is integral to *bios*, as much as protein structures are the foundational elements of *zoé*. In the process of returning 'bare life' to a social and political existence, the elements followed the all-encompassing structures of life.

I started with forming simple linear strands by connecting individual elements of the same type into a sequence. Collars like the *DNA Collector*, *My Great-grandmother's Bones* and *Hard Cash* belong to this category, which was followed by the formation of strands out of different material entities, which could in turn be likened to secondary protein structures. I arrived at this mode of working when I loosely arranged individual elements into circles on my studio table, suggesting the outline of collars. Subsequently, I combined a variety of materials into single globular

domains, or tertiary structures, superimposing spiralling metal casts onto slumped flow-cell glass fused with molten plastic frames and gilded with RFID chips. In line with Savransky's proposal, I 'felt and experienced' affective aesthetic theory throughout this process as I returned to making full collars and chokers. Tightly encircling the circumference of the neck, these objects carry the formal qualities of the functional chain assemblies of biological units in quaternary protein structures (FIG. 32).

As noted above, artistic decisions are part of a serendipitous mercurial process. When I make work, I don't design or draw it, I respond to the material properties in front of me. One might describe this process as speculative, a way of working that I have grown into over 35 years as a maker. I make decisions in the moment with a sense of curiosity, akin to the open-ended *not-knowingness* of speculative experimentation. Serendipity is inherently part of this process, specifically when working with heat and gravity to slump and fuse glass and plastic. Geneticist, artist, and educator Craig Hilton has pointed out the parallels with biotechnology — for instance, the futility of controlling variables. 'Like DNA', he noted during a shared conversation, 'the process is not repeatable'.<sup>143</sup> However, while part serendipitous, part material knowledge, my processes also involve aesthetic decisions, precritical and subconscious, feeling my way into a work. The result is related families of works, which can be bundled into groups. Each piece is unique and draws on various affective registers. Again, thinking of genetics, I could liken this process to gene regulation, the chemical reactions cells use to turn genes 'on' or 'off', making them express differently.<sup>144</sup>

The making of these later collars involved a fluid back-and-forth between conventional jewellery techniques and speculative solutions. Early on, I had recognised the agency of glass-headed pins for embodied and affective experiences (see FIG. 8) and strived to integrate them more fully. As a jeweller, I set myself the technical challenge of working within the limitations and connotations of these materials, not only in forming the chokers, but also including their catches.<sup>145</sup> I naturally drew on traditional jewellery training and used techniques known as 'cold connections', such as crimping, setting, stringing, knotting, bending, and chemical welding. I often combined existing elements into a single strand, as in the *Protean Beings* series, seeking to be true to the cyclical and fluid nature of this project's method and methodology.

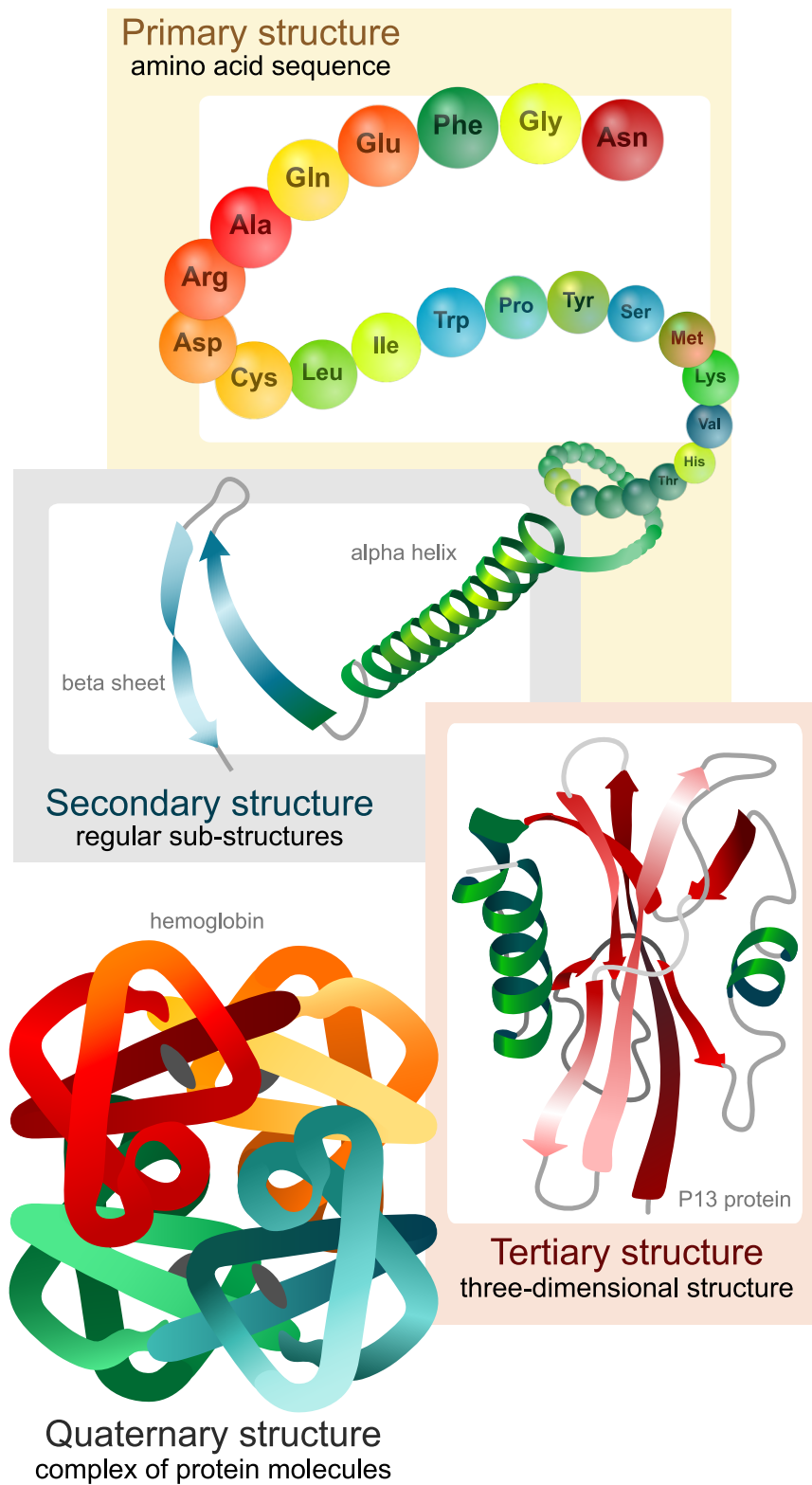


FIG. 32. LadyofHats, *Main protein structure levels* (2008), public domain, sourced from Wikimedia Commons.

If asked how I arrived at this latest group of collars, I simply know that I began with a focus on making the most of the translucent qualities of many of the materials, such as the glass, RFID chips, plastic tabs, and silicone. The etymological roots of 'translucent' are found in the Latin verb *translucere*, 'to shine across; beyond; through'.<sup>146</sup> *Lucere*, 'to shine', stems from the Proto-Indo-European noun *leuk*, meaning 'light' or 'brightness'.<sup>147</sup> Since my initial encounter, I have been captivated by the flow cells' reflective shininess and precision. When transforming them into the elements that form collars and chokers, I actively draw on the history and allure of jewels made from beads, pearls, gemstones, chains, and precious metals (FIG. 33).

Recently, I recalled a piece of writing about the hypnotic power and affect of gems and jewels in relation to neuroscientific questions by writer, curator, and critic Barbara Maria Stafford:<sup>148</sup>

Each time our gaze strikes the surface of any material or substance, a small miracle occurs. That which was nothing before becomes something for a few moments, and then nothing again once our gaze is averted. Looking at jewels makes us aware that we are aware, integrating the mind with the body at a particular instance in time while simultaneously incorporating the nonhuman world into our innermost being. [...] Objects in this scenario are scaffolds to support moments of reflection.<sup>149</sup>

Stafford's remarks tie in with the processes of becoming, fleeting awareness, reflection, and hesitation inherent in speculative experimentation. At the same time, her words highlight my pushing and pulling at the formal aesthetics of adornment, always seeking to reach beyond, towards its affective aesthetics as a fleeting event of becoming aware of oneself.<sup>150</sup> Stafford's writing draws attention to the 'unknowingness' of a creative practice grounded in intuition, observation, experimentation, and playfulness, without fear of failure, exclusion, or disruption of biopolitical standardisation. The following chapter connects this intuitive unknowingness that marks my practice to the affective aesthetic experience of my most recent work.



FIG. 33. Johanna Zellmer, single element of a choker in process (2024), MiSeq and NextSeq flow cells, glass-headed steel pins, plastic clips, anodised aluminium, 60 × 65 × 40mm.

## 5. Affective experience: The energetic force of jewellery

*Unlike my experience of looking at a painting or sculpture in a museum, with the usually explicit instruction “do not touch,” the activity of wearing a work of modern/ art jewelry urges me to forge singular, sometimes fleeting im/material corporeal connections with its energetic force, its intensity, so that I temporarily emerge as a “fresh event,” a new self in and as a never-to-be-fully stabilized or finalised plane of consistency — and it makes me aware of this.<sup>151</sup>*

Renée C. Hoogland



FIG. 34. Johanna Zellmer, material sketch (2023), sterling silver, Nordic Gold, etymological and glass-headed pins, Illumina sequencing waste (medical glass, rubber gaskets, RFID chips, plastic frames), dimensions variable.

I am standing in front of the horizontal surface of my tall studio table. Its top is covered with a large sheet of grey, semi-reflective stainless steel. My gaze upon the series of encircling objects sitting on it is met with black pins hurtling towards me, materials in a state of flux, a previously molten event suddenly frozen in time amongst pins piercing the air. Tentacles move between and stretch out from amoeba- or jellyfish-like creatures. Their white, barcode-like markings pulse within their bodies. These qualities foster a sense of abjection, caution, the obvious potential to inflict pain. Yet, the translucent and reflective quality of the slumped, jewel-like, coloured medical glass, the glistening molten plastic in shades of porcelain white and grey, and the collapsing golden metal structures draw the viewer in.

To the left, sunken plastic Illumina NextSeq frames, stacked and fluid MiSeq glass, curving structures of cast Nordic Gold frames, and creature-like object assemblages are strung tightly on a thin, twisted red wire, like a minute rope. At both its ends, it passes through crimps and is fastened to small silvery discs adorned with golden-hued circles and a black rubber, face-like element. The scene conjures a sense of familiarity, recalling the wearing of chains and precious stones. Its lure is to be worn. As Hoogland's quote suggests, it is only in the moment of wearing that one may forge 'fleeting im/material corporeal connections with its energetic force, its intensity'.<sup>152</sup>

Lifting this object involves an unsteady gesture due to the weightiness of each of its elements and the precariousness of the thin, twisted wire strands that hold the fragile, individually threaded pieces together. Filled with traces of life forms, the diversity of these disparate components mirrors the all-encompassing structures of life, comparable to secondary protein strands. The collar's perceptible weight rests solidly on my collarbones, physically and metaphorically part of the existence of our species. It is not restricting, rather it is reassuring through its presence and substantiality, qualities which transfer to my posture and gait. The red beading wire cord twirls past its magnetic catch and lunges into the air above my nape, where small and indistinct magnetic catches, covered in golden-hued RFID chips and black rubber gaskets, gather their resonating, invisible forces (FIG. 35). It is this very intangible nature of things which plays an important role in this project, given that intense affective sensations can have a reaction at the level of bodily matter.



FIG. 35. Johanna Zellmer, *Strung* (2023), Illumina sequencing waste (flow cell glass, RFID chips, plastics, Nordic Gold, sterling silver), glass-headed steel pins, beading wire, magnets, Ø 154 × 42mm. Photo credit: Shelley Norton.<sup>153</sup>

Philosopher Simon O'Sullivan expands on the experience of art beyond its identity as a mere cultural object of knowledge and signification in his article 'The Aesthetics of Affect: Thinking Art Beyond Representation'.<sup>154</sup> According to O'Sullivan, art has always produced affects, unrepeatable and in the present moment, responses which inherently constitute its power and effectiveness.<sup>155</sup> He asserts that these moments of intensity have a reaction in and on the body, on the level of matter and beyond signification and representation. I posit that these encounters can provoke profound ethical and political responses which, in turn, can disrupt biopolitical modes of life and self. Künzli's *chain of wedding rings* (1985–86) illustrates this moment (FIG. 36). Made of forty-eight used wedding rings obtained through advertisement, Künzli's chain is skilfully crafted and appears elegantly functional. Yet seen at close quarters, this physically weighty work reveals its freight of untold lives and temporarily bound histories of anonymous strangers, most likely deceased. The rings' former intimate contact with the skin, conducting body temperature and pulse, and their associations with the immateriality of death, unknown identities, and untold stories give the work a sense of disquiet. It is claimed that people have the urge to wash their hands after touching it.<sup>156</sup>

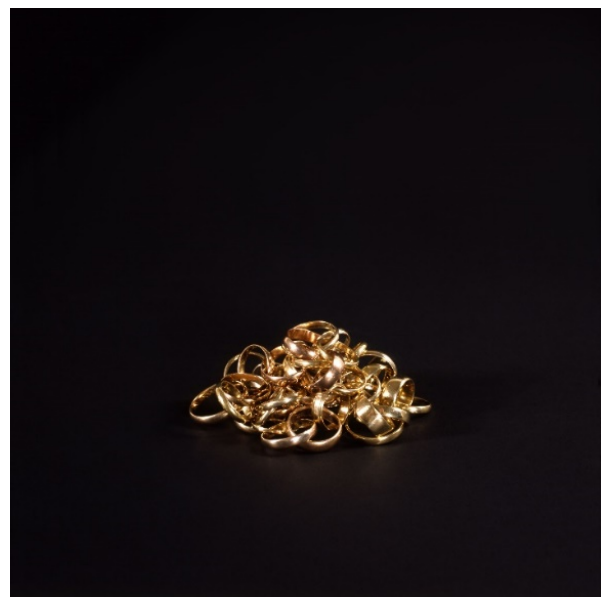
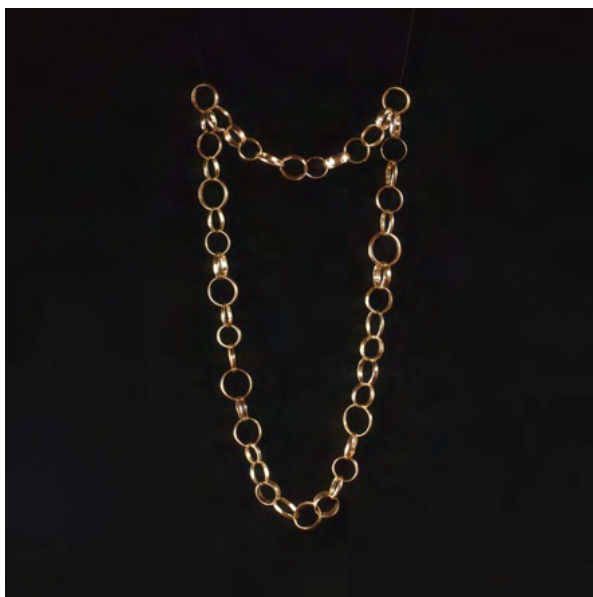


FIG. 36 (a), (b). Otto Künzli, *chain of wedding rings* (1985-1986), dimensions variable. Photo credit: Otto Künzli.

### **Fundamental affective interactions and ethical implications**

My copy of the Oxford Dictionary of Science says that *fundamental interactions* 'can occur between bodies and can take place even when the bodies are not in physical contact'.<sup>157</sup> And further, that 'they account for all the observed forces that occur in the universe'.<sup>158</sup> I've been thinking a lot lately about affective fields and ethical implications of my work, especially when contemplating moments of charged intensity which I see as potentially integral to the incorporeal bodily traces transported by the transformed Illumina objects. In the context of affective and material forces these intense moments operate as waves invisible to the human eye, like RFID chips and magnets.

For Mazumdar, as for myself, the attraction of jewellery is founded in the materials' perceived transfer of magic to the body of the wearer.<sup>159</sup> During my research I have come to realise that my current work, with its remnants of human, animal, plant, and viral DNA, is a continuation of this 'gathering being'. Our species has adorned itself with human, animal, and plant DNA throughout the ages — consider locketts of human hair, a mosquito encased in amber, a shark's tooth, a painted bead necklace, or a daisy chain. My chokers connect with this history with their associations with pearls, specimens, beads, chains, as well as barcodes that stand in for locketts, symbolic of DNA. I concur with Mazumdar's view, for whom this process of 'gathering being' is innately linked to jewellery's role as an ancient and essential intermediary.<sup>160</sup> At the second jewellery biennial in Nelson, New Zealand, facial recognition researcher and artist Louisa Baillie discussed this hypothesis in the context of quantum physics.<sup>161</sup> Her presentation about the invisible forces of jewellery as electrical charges, present in all atoms and connecting us to all things beyond our bodies, echoed my own sensory perception.<sup>162</sup> Following Baillie, I might say that any object, including jewellery and rocks, can affect a body to the degree that one's encounter with it enters one's consciousness.

Exhibition work such as Renee Bevan's *Burial Necklace* from 2018 and Teresa Margolles' installation *So it Vanishes* (intended for, but then cancelled by the Dowse Art Museum in 2012) amply illustrate the truth that a material thing cannot be separated from its intangible charge, nor its specific cultural responsibilities.<sup>163</sup> Bevan's necklace is made from clay dug up from a cemetery. It is inserted into the floor of a crypt-like space entered via a gentle ramp within the Dowse Art Museum (FIG. 37). To the right is a basin for cleansing purposes. In the context of Aotearoa, protocols like the provision of a purpose-built space, water and kawakawa (pepper tree) leaves are designed to protect other works and the people around them. I encountered *Burial Necklace* during the opening at the Dowse, drawn in by the quiet and powerful austerity of the work — the necklace's central void-like space is created by the shadows cast by its beads — and its unsettling and destabilising affective aura. The exhibition opening was packed. Visitors entered the space hesitantly, one by one; some experienced a tension so great that they turned back, unable to approach the work.

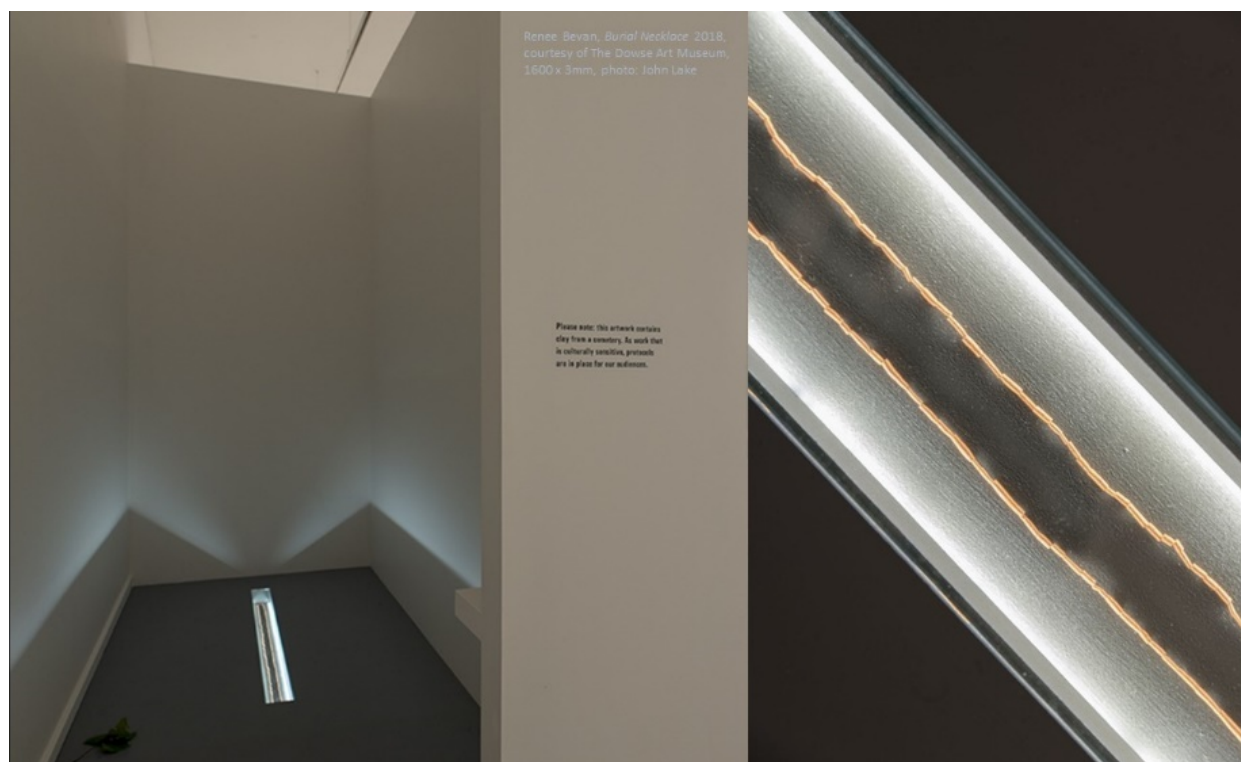


FIG. 37 (a), (b). Renee Bevan, *Burial Necklace* (2018), installation, dimensions variable.

Following the opening, Bevan, our colleagues and I conversed into the early hours of the morning. The question before us was: Can 'inert' materials be imbued with a memory, or charge, with the ability to influence human lives in a physical sense? Stafford and Hoogland consider similar interactions between human beings and objects, such as the affective experience of 'temporarily emerging as a fresh event' and becoming aware of oneself through 'incorporating the nonhuman world into [one's] innermost being'.<sup>164</sup> Bevan's *Burial Necklace* seemed to constitute a testimony to the ability of such invisible material interactions to take place between entities not in physical contact — a sequence of intersecting and entangled substances in a continuous state of collaboration, cooperation, and interactive interference.<sup>165</sup> These thoughts and questions rematerialised at the beginning of this research project, when I began considering the cultural and spiritual nature of the undetectable DNA traces contained in my work, coupled with the appropriate actions to be carried out at the completion of the project, such as the burial or incineration of my materials.

Our species has created ever-advancing tools and instruments to make visible and thus 'prove' existence. The advances of biotechnology have enabled us to comprehend microbiological processes which were beyond our imagination 75 years ago — DNA was only discovered by Watson and Crick in the 1950s.<sup>166</sup> The fact that we can't detect traces of DNA in my heat-treated collars with current technologies doesn't mean that they don't exist.



FIG. 38. Johanna Zellmer, *Clipped* (2023), Illumina sequencing waste (flow cell glass, silicone gaskets, RFID chips, plastics, aluminium), brass safety pins, Ø 180 × 50mm. Photo credit: Shelley Norton.

### ***Clipped and Pinned***

As a jeweller, I expect that such fundamental and affective interactions between human beings and objects will occur in the case of objects of adornment closely worn against one's skin. In like manner, sensations of protection and the sacramental have been ascribed to one of my chokers, *Clipped* (FIG. 38). It forms a tight structure of layered, bead-like Illumina material fragments, fused to sharp, golden spikes. They move in response to laughter, coughing, and bending the neck. A box of everyday, gold-coloured safety pins was entirely transformed into a choker, achieved by easing each open pin's coiled ends over its capped sides. I subsequently covered this gaping chain with gooey plastics, seared RFID chips, and slumped glass fragments. The bodily response to protection and sacrament is felt when sensing and witnessing *Clipped* on a neck, with the golden-hued, violating spikes tightly enclosing it. The RFID chips, which are embedded in many of the bead-like structures, resemble eyes. They may suggest associations with the ancient eye-bead amulets popular in Türkiye. At the same time, their 'stare' creates discomfort. Former tools of surveillance, their disconcerting gaze may yet protect the wearer from misfortune. Linked together, the individual segments project the sensation of a sharp shield for the confronted viewer and wearer alike.

*Clipped* is one of the few pieces I made with unsoftened metal pins. Most of the other pins I used, annealed and blackened, bend when pushed against the layered skin of the neck. It communicates the dangers inherent in piercing. I have worn it several times and been asked to take it off, each time creating intense discomfort for the onlooker. One of my tightest pieces, I have found it almost impossible to operate the clasp myself. One can sense the trembling of the assistant-cum-viewer in the act of adorning and removal. The close-fitting, choker-like embrace of this piece, coupled with the experience of being subjected to the collar, conjures a controlling object that makes the grip of biopolitical power perceptible on a bodily level.



FIG. 39. Johanna Zellmer, *Pinned* (2023), Illumina sequencing waste (flow cell glass, RFID chips, plastics, sterling silver), SkinTite silicone, glass-headed steel pins, Ø 180 × 55mm. Photo credit: Shelley Norton.

Another collar, titled *Pinned*, bears a similar shield of protruding pins (FIG. 39). It extends and gathers the affective force of *Protean Beings* by piercing its individual elements in a joint, fluid motion through a semi-translucent silicone band. Reflecting on *Protean Beings*, I sought to make the silicone integral to the work. In an experimental and playful attempt to revert to its former, largely functional, relationship with the Illumina 'bodies', I poured SkinTite into a free-flowing strand and rolled and pinned it into a thick, viscous wrap. I wasn't interested in its castability, so affectively employed by Devoy, but was rather speculating on its viscosity — letting it find its own organic shape, one that reflected its original gooeyness, felt familiar. Its behaviour is not dissimilar to the structural collapse undergone by glass and plastics under exposure to heat. Not only alluding to touch, *Pinned* physically wraps itself, snake-like, around my neck. The heat-treated soft steel pins of multiple exchangeable Illumina elements push and glide through the skin-and-fleshlike silicone band, accompanied by a satisfying measure of resistance. While the bulbous band still acts as a boundary, in touching the skin it enacts associations with layers of membranes and tissue. I am aware of its stickiness collecting dead skin from my epidermis. When wrapping itself around someone else's neck, the multiple layers of my own and others' DNA will share a collective space in the interaction with the 'im/material' traces of the suspended organic glass and metal bodies in the work, and resist the biopolitical need to categorise life forms through separation and difference. Hovering precariously above the silicone, these elements bestow a sense of uncertainty and temporality when moving. I can sense their protruding pinpoints scarcely touching the flesh of my neck. As a collar, *Pinned* fastens to the desired size with a single, fused red-and-black glass-headed steel pin.

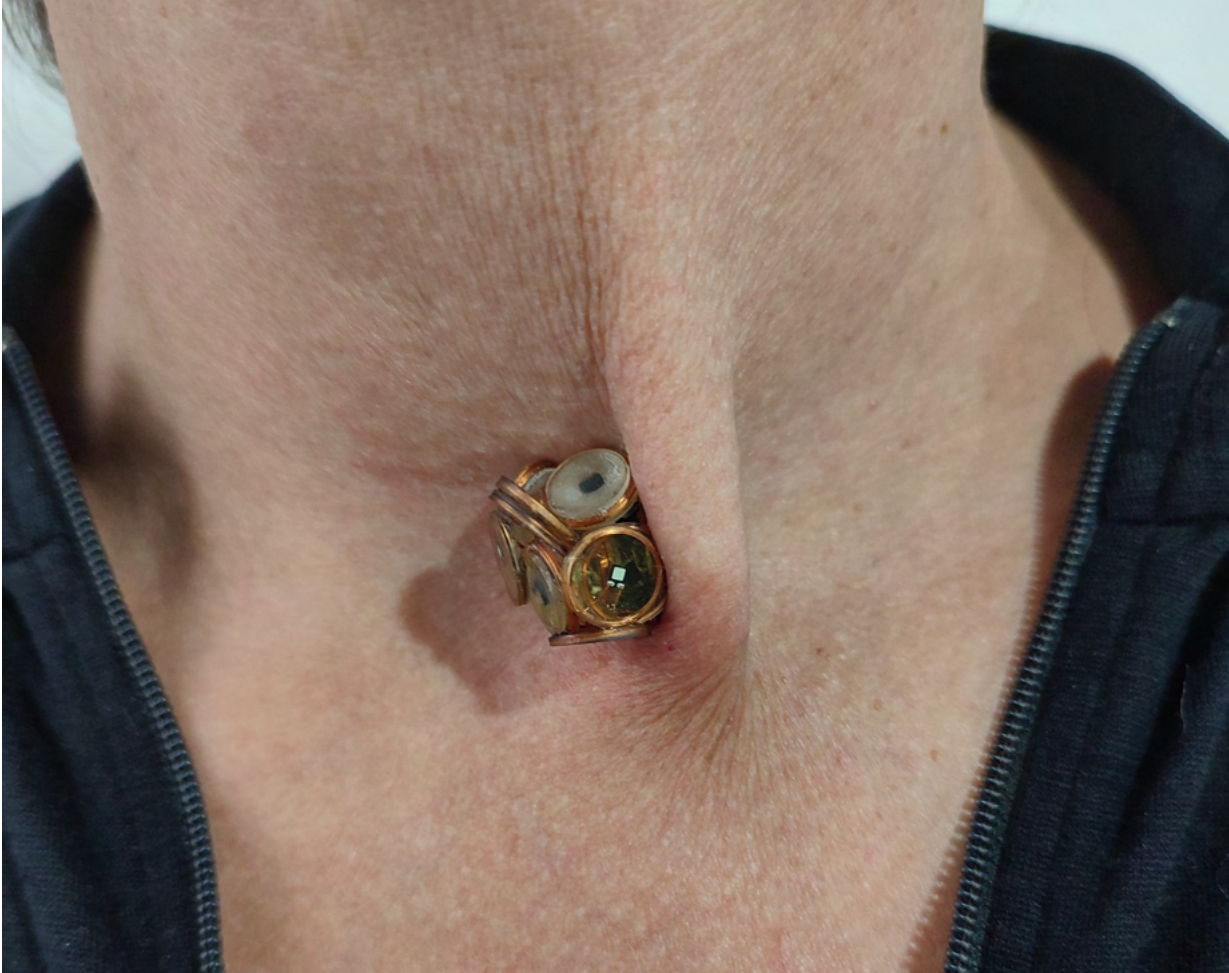


FIG. 40. Johanna Zellmer, *Jugular RFID* (2023), MiSeq RFID chips, silicone caps, magnets, 20 × 18 × 21mm. Photo credit: Shelley Norton.

### ***Jugular RFID***

While experimenting with button magnets for clasps, a couple slipped from between my fingers and I ended up with one magnet hovering on either side of my middle finger, with their joint magnetic force travelling through my flesh and bone. This serendipitous event resulted in a piece which sits between the earlier *Protean Beings* series and the final sets of collars. As a clasp, it doesn't allude to neck adornment, but would conventionally sit on a jacket, like a brooch pin. Yet, in the material and experiential context of the chokers, and with its resonating magnetic force, *Jugular RFID* is affectively activated only at the moment it clips together a loose piece of skin at the front of one's neck under the chin (FIG. 40). Here it fuels aesthetics as a force field, an event, or activity, enacted between me as the maker, a wearer, and a witnessing viewer. The resulting event is something unexpected, immanent in this world and yet beyond everyday experience. Part jewel, part piercing, covered in luminous RFID chips, its magnetic waves enter the body at its most vulnerable site, the jugular. When considering the nature and level of biopolitical intrusion into daily life, one's own identity and sense of self, *Jugular RFID* has the potential to expose the disciplinary nature of the power processes that underlie biopolitics, which encourage those who do not thrive to die.



FIG. 41. Johanna Zellmer, material sketch (2023), acrylic tape, RFID chip, 100 × 20 × 20mm.

### ***Taped, Caught and Threaded***

I experience a similar visceral awareness of my own neck, flesh, and self when applying the choker *Taped* (FIG. 42). By strapping Illumina bodies to my neck with acrylic double-sided adhesive tape, I am contemplating the act of being choked. The acrylic material can easily be torn by force, yet the fragility of the sizable glass objects makes me hesitate. I recognise the strap as a kind of 'reversal' of the concealed SkinTite silicone adhesive: The visibility of the tape is integral to the forceful moment of a person being choked. Firmly trapping fused glass and metal bodies in its grip, *Taped* could be said to enact biopolitical 'strangulation' at the level of materiality. The ability to strap multiple or single fused bodies around one's own neck in each event makes *Taped* the most 'uncontrollable' and flexible piece in this series. Even recognising its potential as a collar to be strapped around a human neck relies on the context created by the whole body of work. When removed, the glass and metal bodies leave discernible reddened imprints on the neck, while the acrylic tape becomes a gel-like organism of its own, trapping my DNA within itself (FIG. 41).



FIG. 42. Johanna Zellmer, *Taped* (2023), Illumina sequencing waste (flow cell glass, RFID chips, plastics, Nordic Gold), acrylic tape, glass-headed steel pins, dimensions variable. Photo credit: Meg van Hale.

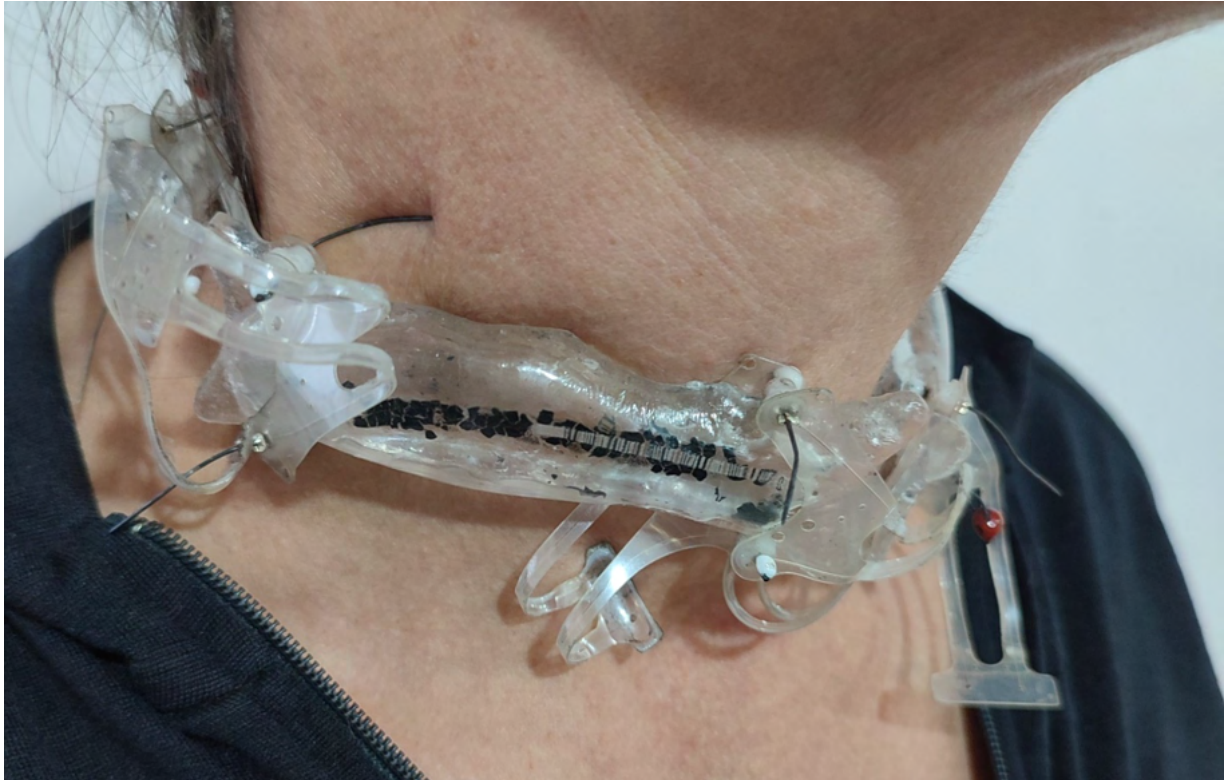


FIG. 43. Johanna Zellmer, *Caught* (2023), NovaSeq flow cells, NextSeq2000 plastic tabs, silicone gaskets, glass-headed steel pins, beading crimps, 145 × 145 × 45mm. Photo credit: Shelley Norton.

The collar *Caught* is of interest in the context of trapping matter. It is made of only four, initially identical, NextSeq flow cells, blown into irregular, hollow, three-dimensional glass organisms as air channels expanded during kiln-firing. During this process, the cells' black coating turned into ash-like flakes, trapped and floating freely inside each vial. Contemplating the spiritual and bodily traces transported by these objects, I concluded that the floating carbon particles gave the work an urn-like quality. Nevertheless, each object's printed barcode, turned white, remains discernible, offering a distinct sense of its origin and relationship with technology. Biopolitical power relies on the scientific production of knowledge, which is visibly subverted in *Caught* and becomes perceptible when worn. The precarious blown glass specimens allude to the complexities of technology and flesh, with the potential to question dominant power structures.

As one of the first collars in this latest series, *Caught's* ephemeral quality, the sense of an otherworldly in-betweenness, is triggered by its lustrous transparency. When worn, the fluid movement of its curling plastic and steel tentacles is temporarily arrested, with the flat undersides of each of the four precarious glass specimens lying firmly against the squared neck. The 'bare' glass medium, former tool of the administrative and technical enhancement of human life, uncompromisingly connects with the wearer's living skin. Softly bending blackened steel pins fasten the glass to the curling plastic tabs with silver crimps and white Illumina silicone stoppers. Some settle against the neck (FIG. 43). Irritating, maybe, but not threatening, and reminiscent of medical objects that directly engage with the body's skin. The trapped and floating matter inside each vial settles, pulled downwards by gravity. Only a careful observer would catch a glimpse of it in motion, when the wearer's movements bring it 'back to life'.

In comparison, *Threaded* upends the relationship of metal pins to biotechnological tools: Masses of black, glass-headed iron pins form dense, piercing mounts for sunken glass peaks. The resulting fused piles become sharp-edged spheres with semi-translucent centres, dotted with the red glass droplets of finer steel pins (FIG. 1 and FIG. 44). Their colour and likeness to blood intensify the unsettling thought of injury activated by the work. As with *Strung*, a cord-like red beading wire travels through each segment, supporting the intricate hooks and catches which connect one segment to the next. And as with *Caught*, *Threaded* demands assistance to wear. Some of the blackened steel spikes, swarming in all directions, have been fashioned into barely detectable jewellery catches. Small hook-and-eyelet connections fasten the collars tightly. An experienced eye and hand are called on to fasten the collar around a neck. Like the golden-spiked choker *Clipped*, when fitted, *Threaded* intervenes by continuously collecting DNA. At the same time, it continually sheds tiny black speckles of iron oxide as a kind of complementary contamination, albeit a fruitful one.<sup>167</sup> Its affective, risky, messy, unstable and fragile qualities contaminate bodies, functioning as an irritant to the biopolitical standardisation of life and self.

In summary, the contemporary jewellery objects discussed here contribute new knowledge from the interstitial space between scientific enquiry and affect by exposing biopolitical power processes at the tactile level of an experienced materiality.



FIG. 44. Johanna Zellmer, *Threaded* (2024), MiSeq and NextSeq2000 flow cells, glass-headed steel pins,  $\varnothing$  250  $\times$  90mm. Photo credit: Antonia Boyle.

## 6. Resisting biopolitical governance

*What I think we need then is a form of biopolitical art which [...] critiques its own form, and engages biopolitics at the level of materiality, using the medium itself as a site of artistic research to understand and question its dominant position. [...] Art as biopolitical critique problematizes the biopolitical apparatus in which it is produced, making visible or experiential the power/knowledge relationship that it relies on. It makes power visible in knowledge — in the sense that it creates objects or experiences of knowledge that question dominant power structures, or it reveals the way in which power is enacted.<sup>168</sup>*

Heather Dewey-Hagborg

The title of this exegesis positions events of resistance as central to this research project. It is important then to take a closer look at how resistance to biopolitics, as a form of all-encompassing control of life, is embedded in and activated by creative work.

### **Heather Dewey-Hagborg**

During my initial research Craig Hilton introduced me to Heather Dewey-Hagborg, an artist and biohacker working with DNA. Grounded in defying biopower and surveillance capitalism, her ethically provocative project *Stranger Visions* was first exhibited in January 2013.<sup>169</sup> The work consists of several life-size, 3D-printed faces, which she reconstructed using forensic DNA-phenotyping obtained from hairs, chewing gum, coffee cups, and cigarette butts obsessively collected from the streets, public bathrooms, and waiting rooms of New York City. The idea for this work took shape in a waiting room, when the artist noticed a hair stuck in the cracked glass of a framed picture on the wall. Trying to picture the person whose hair had got caught, Dewey-Hagborg turned to contemplating the messiness of human bodies — leaving artifacts and evidence everywhere by continuously shedding skin, hair, and nail clippings. But, she asked, how much information can actually be obtained from these things that make us human?<sup>170</sup>

To answer this question, Dewey-Hagborg learned how to extract and sequence DNA, becoming aware of the differences between established and speculative genome research. When presenting this project via Zoom at IMPAKT TV in September 2021, she observed that while facial recognition and speech surveillance were already established procedures in 2013, DNA surveillance as a technique for criminal profiling was not.<sup>171</sup> From her collected DNA samples, Dewey-Hagborg produced five to seven possible versions of each face and 3D-printed those images which she found aesthetically pleasing or meaningful (FIG. 45). Among other things, her work drew attention to the fact that current technology cannot yet fully achieve true profiling. In that sense, Hagborg's work is fictional, operating in an imaginary future shared by bioartists at large.

Dewey-Hagborg's work calls attention to the fact that we have entered an era of mass biological surveillance, sparking concerns about discrimination following the use of algorithms based on narrow data from DNA sequencing. I share these concerns with Hagborg. Just two years after beginning her research, in 2014, Parabon NanoLabs launched their DNA 'snapshot' service, offering it to police forces around the US.<sup>172</sup>

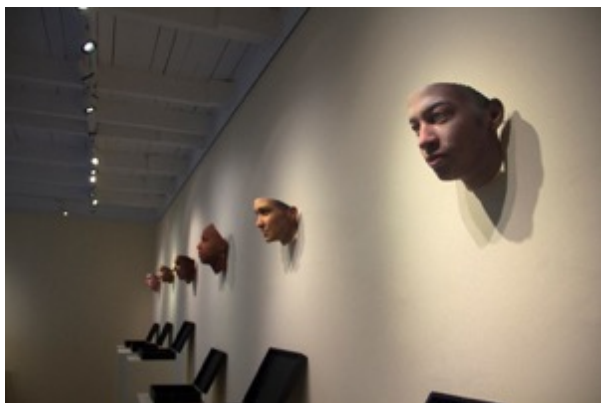


FIG. 45 (a). Heather Dewey-Hagborg, *Stranger Visions* (2012-13). Installation at Saint-Gaudens National Historic Site, 6 September 2014. Sourced from artist's website.



FIG. 45 (b). Heather Dewey-Hagborg, *Stranger Visions* (2012-13). Sample box for NYC sample 4. Installation at Clocktower artist residency. Sourced from artist's website.

## **Jewellery as an intervention**

For me as a jeweller, the affective aesthetic of adornment has become a subversive and creative tactic to resist biopolitical conditioning. I would like to suggest that, in terms of personal adornment, becoming visible, and at the same time becoming aware of one's own im/material presence, is in itself a political act. This positionality, derived directly from my research project, echoes Pravu Mazumdar's belief that it is important what objects *do*, not what they *are* — an object is constituted not only by form, content and material, but it is a force generating affect.<sup>173</sup> The experience of a piece of contemporary jewellery can have a transformative, disorganising, or transgressive affect. It can bring us, the wearer or onlooker, temporarily into view, creating a momentary awareness of self. In her inspiring seminar 'Nuda Vita: The Practice of Collective and Political Body', curator Ilaria Ruggiero asserts that a body is never politically neutral; that jewellery objects are signifiers that can highlight social ritual, otherness, and identity; and that precisely because adornment is not generally perceived as political, it can act politically and become a symbolic event of resistance.<sup>174</sup> In her exhibition catalogue she states: '[Nuda Vita] is an act of provocation and resistance, subversion and sensitization, which focuses upon the body, through the medium of the jewel, as a statement of politics, identity and humanity.'<sup>175</sup>

I, too, practice this same notion that the act of adornment can be a sensitisation and an intervention, and that the immediacy of jewellery's communication can critique normative behaviour. In this context, my own research positions adornment as a resistant noise or irritant, disrupting the biopolitical standardisation of life and self.

Ethnography professor Stefan Muecke mirrors my point of view by referring to resistance as something that rewards a life lived more fully, more intensely.<sup>176</sup> He follows Walter Benjamin who stated that to lead a resistant life is necessary to lead a creative one: 'Creativity flashes up in moments of danger.'<sup>177</sup> Drawing on Michel Foucault, Muecke argues that power needs inefficiency built into all its systems to give it something to work against and that it is '[i]mpossible for power relations to exist without insubordination'.<sup>178</sup> Muecke's hypothesis of six effective forms of resistance that operate without the need to oppose or withstand someone or something directly resonates with me:

- Deflection — using the energy of the opponent against them, such as good-will and creative community spirit against capital.

- Interruption — a performative method which reveals the workings of the system and their conditions of existence.
- Creation — performing an action which is confounding.
- Destruction — traditional sabotage, such as putting sugar into fuel tanks.
- Disappearance — depriving the powerful of the resistance they need to act upon, such as protesters disappearing.
- Cut-it-off, somehow — moving in line with it, rather than fighting it.<sup>179</sup>

However, I note that Muecke's approach to resistance generally involves challenging a physical opponent, such as a powerful corporation or institution. My research into the aesthetic affective experience of jewellery, on the other hand, is situated in the cultural politics of emotion and its affective turn. It considers aesthetic theory in relation to somatic or bodily knowledge and draws on the practice of neo-aesthetic theory, a radical aesthetic. How, then, might Muecke's hypothesis be applicable to my creative research practice?

### **Means of resisting**

To illustrate *deflection* as a form of redirecting dominant energy, Muecke uses the example of creative community spirit set against a system which understands everything in terms of monetary value. Today, this capitalist ethos includes the commodification of biomaterials, with biopolitics' very functioning dependent on the conception of human bodies and life as informational networks. In this project, I am seeking to turn the very tools that produce the information for the administrative and technical enhancement of life into meaningful objects of adornment. In this transformation, steel pins become an integral part of the work (FIG. 46). When worn, my collars and chokers actively collect DNA from the bare skin of the wearer's neck. However, rather than using technology to produce information, this dominant system is momentarily destabilised and deflected through the affective aesthetic experience of the event of adornment — by highlighting human bodies as individual free agents, rather than calculable subjects which can be shaped. A similar strategy of deflection is mirrored in a proposition made by jewellery artist, writer, and curator Lieta Marziali. In her catalogue essay for Ilaria Ruggiero's *Nuda Vita*, she proposes that jewellery can be the catalyst for a body to reclaim its own critical freedom from the state of suspension induced by corporate power, manifesting as 'a personal and most intimate act of resistance'.<sup>180</sup>



FIG. 46. Johanna Zellmer, a single element of *Threaded* (2024), MiSeq and NextSeq2000 flow cells, glass-headed steel pins, 85 × 70 × 35mm.

I now understand that the contemporary jewellery I have made during this research project reveals how the haptic experience of handling and wearing chokers made from used DNA-sequencing instruments can have a transformative, disorganising, and transgressive affect. There is an uncertainty as to the function of these objects: Were they made to touch the skin of a human neck?<sup>181</sup> While their formal aesthetic alludes to this function, the onlooker is conscious of the sharpness of the pins, which contradicts their actual use — to tightly encircle this vulnerable and intimate zone. The viewer becomes implicated in a commitment to decide on engagement or withdrawal. The work is unsettling in its premise, endangering, and disorganising. One might wonder if it was safe. It fails to conform to normative, rational thought patterns and known domains of experience.

With a closer inspection of the individual elements that make up the collars and chokers, distorted barcodes, seared RFID chips, directional symbols, fused glass, and the word 'Illumina' all become discernible (FIG. 47). I am confronted by ethical and moral questions alluding to their conditions of existence.<sup>182</sup> What were they? Where did these items originate from? Shouldn't flow cells be marked as biohazard waste? Were these used to examine human, plant or animal, viral or fungal life? How does DNA sequencing work? What if traces from the sequencing process do remain, perhaps undetectable by current scientific methods, and possessing spiritual elements? In the sequencing process, is the original more 'sacred' than its copies? And in addition, what is life? What does it mean to be human?<sup>183</sup> These questions continue to linger and remain unanswered, resisting biopolitic's reliance on the production of verified knowledge. Rather, they present an opportunity for critical engagement with the disciplines of biotechnology, bioethics, and biolaw.



FIG. 47. Johanna Zellmer, a single element of the collar *Strung* (2023), former *Protean Being*<sub>13</sub>, Nordic Gold, NextSeq2000 plastic clip and tab, RFID chip, MiSeq flow cell, steel pins, 70 × 30 × 40mm.

The act of adorning one's body with these collars and chokers made from used laboratory genome instruments is physically and ideologically uncomfortable, to say the least. One may well think of the sensation of the transformed flow cells' frozen fluidity touching the bare skin of one's neck as a form of contamination. In her book *Affect as Contamination* Agnieszka Wołodźko discusses contamination not in relation to sickness and disease, but as a threat to the standardised ideology of purity.<sup>184</sup> Whereas scientific practices strive for rational and controllable objectivity, with contamination being treated as a threat, the humanities consider contamination as a potentially fruitful multiplier, fuelling creation.<sup>185</sup> Following her premise, we can see contamination as a form of creative resistance, a tool to reflect and think about creating new relations and facing the risk of the unknown — which is inherently how our bodies are conditioned, maturing through continuous, unpredictable change and interdependencies.<sup>186</sup> In this sense, my creative work exposes the wearer and witness of jewellery objects as players in a mutual commitment to vulnerability and entanglement, questioning the standardisation of life, self, and adornment in order to measure up to an ideal. One could consider my work to be aimed at 'contaminating' jewellery's prevailing formalist aesthetic as form of creative resistance.

The interactive dialogue that results, requires and evokes a sense of care and trust, complicity and collusion. It sets up an affective experience through an inherent state of tension embedded in complex power relations. The combination of the act of adornment and the subsequent viewing of the work creates a confounding experience, one that fails to conform to the conventional symbolic and 'inert' function of ornament.<sup>187</sup> The tensions of this haptic and visual experience draw biopower out of its invisible, safe space through a disruption of one's socially constructed identity, firmly integrated into the biopolitical power processes of capitalist production and subjectification.<sup>188</sup> That is to say, wearer, 'fitter' and viewer become collaborative accomplices who jointly commit to a resistive act of differing (FIG. 48). In this act of resistance, jewellery becomes an expression of autonomy with respect to biopolitical norms.



FIG. 48. The artist, Johanna Zellmer, during the act of adorning a participant at Nelson Jewellery Week 2023. Photo credit: Thorsten Müller.

My work establishes a critical relationship to jewellery's craft, material, and studio history. The luminous cast and heat-glazed surfaces of its materials reflect light, not unlike noble metals and stones. Their transformation into aesthetically alluring objects connects them to jewellery's inherent mission to beautify and strive for human enhancement. As Mazumdar pointed out, the ancient project of self-enhancement is triggered at the moment that contemporary jewellery finds its place as an (autonomous) act of resistance to a norm.<sup>189</sup> My material transformations manifest acts of defiance in themselves and undermine the distribution of power inherent in the medium. One such instance is the removal of currency from circulation in the pieces containing Nordic Gold.<sup>190</sup> In the process of melting the coins, the DNA accumulated from the small change passing through countless hands has been eradicated, together with the money's commercial function. Nevertheless, the transformed base material continues to absorb the warmth of the human body. Another way of undermining power distribution becomes apparent when considering biopower's reliance on tracking populations. In this project, the barcode on each flow cell signifies the technology used for AI data collection. It is a mark of biopower, not unlike the stamps of power engraved on coins. Here, in the process of making the work, biopower is defied by disrupting the tracking device on each flow cell, its barcode, through the transformation process wrought by heat. The now fluid, organic glass object renders this tracking device unreadable (FIG. 49(a)).



FIG. 49 (a), (b), (c). Johanna Zellmer, fused MiSeq flow cell elements (2021), Illumina MiSeq glass, glass-headed steel pins, 60 × 50 × 40mm.

Similarly, by fusing layers of individual flow cells into a single glass body, the controlled isolation of individual DNA material is annihilated. This process reinforces the relationality, fluidity and porosity of our human–animal–plant–particle bodies. Povinelli challenges the separation and difference of Life and Nonlife, living and inert, by focusing on the membranes of life forms that link them with and separate them from their environment.<sup>191</sup> One might say that humans experience this final membrane as the skin. My freely arranged stacks of flow cells fuse multiple samples of anonymous DNA. Seen in that way, a single body adorned with jewellery is wearing the genetic traces of a collective. Involving another form of destruction through heat, this mode resists the biopolitical need to categorise life forms through separation and difference.

Last but not least, the affective experience of these ‘receptacles of charged concentration’ acts to retrieve the intangible conditions of existence. Thus, my fragments of altered sequencing instruments resist the reduction of human life to mere scientific observation. As discussed above, natural, ‘bare’ life has become an object of administrative concern and technical enhancement and is thus the focus of the mechanisms and calculations of biopower. However, life is filled with experiential knowledge that cannot be secured, monitored, and optimised. One’s experiences are often intangible and elusive and resist control, monitoring, and optimisation. By transforming DNA sequencing instruments into jewellery objects, the project contributes towards retrieving human existence from its reduction to *zoé*, understood as ‘naked’, biological life, and the prime target of biopower. It sets up a co-agency between the objects and the body, enabling a two-way flow between *zoé* and *bios* and drawing attention to the intangible conditions of life and incorporeal experiences that no amount of data can feasibly explain (FIG. 50).



FIG. 50. Johanna Zellmer, *Pinned* in the Massey Genome Service laboratory (2024), MiSeq glass, glass-headed steel pins, Illumina sequencing waste (flow cell glass, RFID chips, plastics), sterling silver, SkinTite silicone, glass-headed steel pins, 170 × 170 × 55mm.

## 7. Making, wearing, witnessing, and responding to objects

*Instead of approaching making and perception as two wholly distinct types of wilful individual action — the craftsman imposing form onto matter through the production of a crafted object, and the viewer perceiving and judging this fixed crafted object — we might consider both as encounters within a wide spectrum of sensuous curiosity, haptic learning and skilled collective care.*<sup>192</sup>

Sarah R. Gilbert

The dual life and status of jewellery as wearable artifact and artistic object becomes apparent in the varying spaces and display scenarios in which we encounter it; these places serve as framing devices that determine our perception.<sup>193</sup> Sarah Gilbert alerts us to the complex nature of the separation between the artist studio and the public's encounter with a crafted artwork. I liken her approach to Damian Skinner's, who correlates the situations, places and events through which contemporary jewellery is encountered, discussed, made, and presented.<sup>194</sup> For his seminal publication *Contemporary Jewelry in Perspective*, Skinner invited five writers to define the seven spaces that contemporary jewellery inhabits: The page, the bench, the drawer, the plinth, the street, the body, and the world. As you read this, you are engaging with the page that this project inhabits for now, while I transform flow cells in a workshop involving the personalised, horizontal space of my jeweller's bench. The viewer then encounters the work as wearable objects in exhibition scenarios and might witness it on a body walking down the street. Finally, the world 'represents the implications, responsibilities and possibilities of contemporary jewellery in the space beyond the contemporary jewellery scene'.<sup>195</sup>

During my nearly 40 years of involvement with jewellery, I have seen and personally engaged in contemporary jewellery exhibitions and events in Aotearoa and abroad across three generations. Mostly designed by the makers themselves, these exhibitions have ranged from traditional displays in museum showcases to immersive 'installations' and performances.<sup>196</sup> The fact that jewellers spend a lot of time thinking about bodies by creating integral catches and jewellery

findings in order to physically attach their work to a person can result in compensation for the absent body in the way exhibits are set up. In my experience, any attempt to challenge the conventions around jewellery exhibition tends to result in scenography, instead of activating objects through handling or wearing to provide affective experiences.<sup>197</sup> As Lignel remarks, the resulting theatricalization threatens to dominate the artifact or art object to the point where the entire encounter becomes a spectacle, which in turn becomes the artwork itself.<sup>198</sup>



FIG. 51. Shane Hartdegen and Johanna Zellmer, *CLINKProject#2* (2015). Photo credit: Shane Hartdegen.

For example, when I co-founded *CLINKProject* with colleague Shane Hartdegen in 2014, we were seeking a form of intervention — through collaboration — that would disrupt the conventions of jewellery exhibition.<sup>199</sup> In the search for bypassing institutional spaces and encouraging public interaction, the collective often returned to the street, or, if engaging with a gallery or museum space, sought out utilitarian spaces and existing display interventions. In hindsight, the least successful engagement with the objects and rituals of jewellery was the most choreographed and mobile event, when the collective settled on the idea of using clear umbrellas as portable showcases (FIG. 51).<sup>200</sup> The jewellery objects, that were carefully fastened inside the umbrellas, were rendered invisible by the spectacle of our performance on the streets of inner city Auckland. Lignel was right: The theatricalization of jewellery became the artwork itself.

When contemplating exhibition scenarios for this doctoral project, I didn't want my work to become a 'celebration of showmanship: [A] complex site-specific production that transform[s] the wearer-collector into a witness-spectator.'<sup>201</sup> Rather, I needed to facilitate an encounter which would highlight the affective experiences sparked by jewellery through haptic and visual engagement and create perceptible forms of resistance to the viewer's own biopolitical conditioning. When considering material transformations as a form of resistance, one's own studio becomes a site of resistance. For artists, a studio is part workshop — containing the necessary tools and facilities for the production of objects — and part laboratory, a site of research and investigation where materials are tested in the search for answers. I realised that a studio space with all the residues of processes and experimentation, would conjure both the material and immaterial aspects of the project.

The chosen exhibition site provides this dynamic space of discovery, where making is an in-depth conversation with materials in transformation (FIG. 52).<sup>202</sup> A former engineering workshop, activities — past and present — involving the use of heat for distorting, fusing, and assembling materials are perceptible on a bodily level through senses that reach beyond sight. The scale of the facility chosen can lend small-scale objects an intense concentration. Placed on studio table surfaces, the work invites touch and handling. These interactions can make acts of resistance at the level of material perceptible — actions such as the removal of currency from circulation and the destruction of tracking devices. In turn, the disruption of biopolitical categorisation through separation and difference can be sensed as an embodied experience.



FIG. 52 (a), (b). Elizabeth Thomson's studio at 307 Mansfield Street, Newtown, Wellington. Photo credit: Elizabeth Thomson.

### **The interactive condition of jewellery**

In my opinion, engagement with jewellery is inherently based on interaction. Firstly, it involves touching and lifting, sometimes the opening and closing of a clasp, and the subsequent re-arranging of the object in front of a mirror. Secondly, through this social ritual, the jewellery temporarily becomes one with the body of a wearer, whose gait, behaviour, and sense of self are all affected by it. These actions situate jewellery in a social context, integral to identity construction, with the body 'as a complicated [...] and mediating portable host'.<sup>203</sup> The inherent triangulation of jewellery as a practice deep-rooted in the relationships between maker, wearer, and witnessing viewer is heightened in this project through the need to have some of the chokers fastened around one's neck by an assistant. Thus, my creative work embraces contemporary jewellery's affective, tactual, and interpersonal impacts on human bodies. Maker, wearer, 'fitter' and viewer become collaborative accomplices in complex interrelations.

Acts of adornment that require help from another person historically occurred on a daily basis in aristocratic households, where handmaidens would dress the women of the house, including tightening bound corsets, arranging multiple layers of draped fabric, styling the hair, and helping with fastening jewellery pieces. This close experiencing of the other sets up an intimacy which has the potential to invert power relations. Momentarily during these rituals, the servant would assume full control of the master's or mistress's body. Rather than replicating this scenario, the tension that is created during the fitting of my work points to these complex interrelations by drawing on notions of collaborative care, complicity, and collusion.

Jewellery artist Gisbert Stach's video work, *Fitting*, explores the complex interaction between the adorer and the adorned, an encounter guided by affect and control (FIG. 53).<sup>204</sup> This short work begins with the act of a male protagonist placing a fine gold chain around the neck of a female model. She is seated in front of the camera; he is standing behind her, his face outside the frame. He then momentarily moves out of view to fetch another chain. This act is repeated, one chain at a time, each carefully fastened at the nape of her neck by the man. By repeating this ritualistic gesture, the amassing chains inevitably grow in diameter. At a certain point, one's reading of the scene flips from a form of possession marked by beautification to one marked by sheer weight and possible harm.



FIG. 53 (a), (b), (c). Gisbert Stach, *Fitting* (2008), 4:3, 30 min, performance by Sonia Ruiz de Arkaute and Gisbert Stach, stills captured from Klimt02TV.<sup>205</sup>

While Stach's work highlights jewellery's interactive attributes, it also articulates relationships of power, possession, and gender that belong to the nature and history of jewellery.<sup>206</sup> In the middle frame (FIG. 53(b)), the adorned figure has seemingly grown taller and, eyebrows raised, appears to accept the weight of responsibility conferred on her. This posture reverses the unfolding power relationship, insofar as the female assumes authority (albeit momentarily), rendering the adorer as servant.<sup>207</sup>

In a similar way, most of my collars and chokers physically restrict the free movement of the neck owing to their integral steel pins. As jewellery made by a female artist using sewing pins, their material history binds them into an hierarchical gender relationship, one that is inherent in the history of crafts, which are seen as belonging to the female. The mind-over-body duality which emerged during the Enlightenment relegated the knowledge of affect and craft to the domain of the domestic.<sup>208</sup> While the subject of gender is not paramount in this project, it is necessary to acknowledge that my work is intertwined in this Western tradition of hierarchical knowledge systems — that is, the observational experience of science and the lived experience of affective aesthetics.

For instance, the work expresses the subject of DNA sequencing as an integral aspect of my inquiry through a 'descriptive' approach, incorporating discernable traces of the tools after their exposure to kilns and open flames. Some chokers offer more clues than others, yet in the process of construction, one picked up information from the previous. To fasten the collars around a wearer's neck, I introduced additional materials, which bring their own resonances to the work. In operating between craft and bioart, the introduced materials have become integral in drawing out affective experiences. The glass headed sewing pins were preceded by solid blackened steel pins I received as part of my tool kit at the beginning of my apprenticeship in Germany. During my training these were the only devices used to hold intricate components in place during soldering, as they don't draw heat away. The first time I encountered other commercial devices was upon teaching in New Zealand. At the beginnings of this investigation in Sweden, I secured the stacks of smooth flow cell glass with these familiar tools, to find them incorporated within the ensuing molten glass objects. The coins and precious metals were equally familiar materials, which in this project highlighted the entanglement of the capitalist production of value with the scientific production of knowledge. I trialled a range of red cords to connect individual elements into a strand, inspired by the thin red ribbons and coral or ruby chokers worn by aristocratic

women to imitate a cut throat as a political stance in opposition to the new republican regime. I ended up using red metal beading wire, twisted into a cord, employing the technique of entwining multiple strands of steel binding wire for soldering. My small silver-coloured crimps also draw on the history of beading. The first collar I completed used magnets as a clasp, another jewellery tradition, which in this project connects to the invisible force fields of affect. The silicone wrap is made from SkinTite, given this material a tactile and affective nature, not present in its prior use for Protean Beings. And last but not least, the playful and interactive translucent double-sided tape inverts the mode of attachment to the outside, with an association to choking.

In summary, as an exhibition site for this doctoral project the studio invites tactile engagement, close observation, collaborative care, complicity and collusion, and an affective and interpersonal embodied experience. This process is less about observation, and more about literally attaching oneself to the object of affect, through the processes of handling, wearing, witnessing, and responding to the work. This approach highlights the interactive dimension of contemporary jewellery as a visual arts practice that literally affects one's embodied experience through a haptic perception that operates beyond sight.



FIG. 54. Johanna Zellmer, *Caught* (2023) detail, NovaSeq flow cells, NextSeq2000 plastic tabs, silicone gaskets, glass-headed steel pins, beading crimps, 145 × 145 × 45mm.

## 8. Conclusion

This exegesis is a critical reflection and interpretation of my creative work, which takes the form of a series of collars and chokers primarily made from used DNA sequencing tools. I have considered contemporary jewellery as an affective experience by drawing on its inherent aesthetic and haptic responses via an engagement with the bare skin of the human neck. Informed by science and multidisciplinary by nature, this project is firmly situated in both a material and studio history. Positioned between craft and bioart, my practice-led research operates at the interface of technological objects and epistemic things, material and immaterial.

Relevant ethical imperatives have guided this creative research from the beginning. Living in Aotearoa, I have come to understand that my jewellery connects a person with their ancestors, not only in an immaterial, spiritual sense, but also (in this case) by means of the physical DNA contained in the project's collars and chokers. These traces bear the same code as us and consequently share our whakapapa, which binds all animate and inanimate things.<sup>209</sup> Fused and layered, the work maps relationships. By emphasising the act of adornment as a collaborative interaction, I attribute jewellery's affective agency to its role in actual embodied encounter. The project points up the need for a collective awareness of the reality and immensity of biopower through the process of becoming aware of one's own biopolitical conditioning. In taking this path, my practice-led research seeks to highlight the necessity for resistance.

I commenced this study by asking: What new socio-political knowledge could contemporary jewellery produce from the interstitial space of scientific enquiry — specifically DNA sequencing — and aisthēsis or 'aesthetics perceptible by feeling'?<sup>210</sup>

During this doctoral project, I recognised several key moments that have the potential to contribute new elements to our understanding of adornment, affect theory, science, and ethics in a biopolitically infused world. I outline these observations below in light of what this creative, practice-led research has revealed. Each of these contributions have in turn generated new questions and concerns, which have positioned me to pursue future work after the completion of this project.

## 1) Building relationships

One of these key moments involved moving beyond jewellery's symbolic registers, which I perceive as the discipline's continuing primary concern, and towards an affective aesthetics. This shift in my practice constitutes a new contribution to affect theory, which has so far hardly succeeded in establishing a relationship with jewellery art. Through speculative experimentation in the studio, I recognised the affective force of a piece of gooey grey plastic oozing over the golden chain link of *My Great-grandmother's Bones*. The ensuing compilation of Illumina glass and plastics, layered with steel pins and fused by the forces of gravity and heat, transformed my work into phantastic organic objects of technology and flesh. In this process I discovered that the function of heat and fire was not to erase entirely, but in some cases to harbour lingering bits of DNA in an immaterial sense. The new objects' affective experience as jewellery proved to be a powerful aid in comprehending the immensity and complexity of the world of biopower at a bodily level. As a result, my research highlights contemporary jewellery's ability to connect affective aesthetics, genomics and biopolitics through objects that physically attach to a body. This reflection could have the potential to infiltrate and advance discussions between these disparate fields. This shift in my practice positions me to shape these relationships in my future work. The facilitation of multidisciplinary panel debates, such as the 2023 debate that formed a part of this study, 'The Body is a Draft', constitute valuable avenues to move in this direction.

## 2) Between craft and bioart

During my practice-led research using the tools of biotechnology, I recognised that I was working in an unnamed space between the disciplines of craft and bioart. An extensive survey of contemporary jewellery's use of DNA sequencing materials revealed a lack of previous research at this interface. My observations are consistent with Pravu Mazumdar's view that jewellery art has as yet hardly begun an exchange with genetic science and technology.<sup>211</sup> I wondered whether another, new, term — neither craft nor bioart — may be needed, which would imply a new practice. While such questions go beyond the limitations of this creative research, they position me to work on defining the nature and naming of this practice in the future.

### **3) Beyond difference and separation**

The processes utilised in this study have pushed the boundaries of contemporary jewellery. My initial use of SkinTite silicone to affix objects made from DNA sequencing tools directly to the skin of a wearer contributed new knowledge to our understanding of bodily adornment and wearing. My interactive exhibition event revealed the powerful psychological hold that this jewellery could have over its hosts, subverting the known experience of wearing neck adornment. This collapse of difference and separation, life and non-life — dualities which biopolitical power relies on — is mirrored in my fusing of multiple stacked flow cells. With the source of the contained DNA fragments remaining unknown, this process nullifies the separations induced through biotechnological means and conjures the entangled existences of plant, animal, viral, and human DNA. In returning bare life to a social and political existence, my new work embodies the all-encompassing and intertwined structures of life. In this project, the histories of science and jewellery, physically and metaphorically part of the existence of our species, converge.

### **4) Responsible actions**

In Aotearoa's bicultural context this convergence has significance for Māori, its indigenous people. The coming together of the relatively new field of genetics with much older indigenous knowledge and art practice solicits further discussion and discourse. Studying *Te Mata Ira: Guidelines for Genomic Research with Māori*, I realised that Illumina flow cells ought to be treated as taonga, given that they contain traces of genetic origins that connect to one's ancestors in genealogical, terrestrial, and spiritual ways — what in te ao Māori is known as whakapapa. While this was a subject which remained on the periphery of my research, I am hoping that this project might lead to further studies investigating the complex responsibilities involved in dealing with the DNA residue left in flow cells. And perhaps even to new processes, so that flow cells will eventually no longer be regarded as simply hard waste. The recognition of culturally appropriate actions to be taken at the completion of this project, such as the burial or incineration of the work at a culturally appropriate site, will form an apt closure to the research. Such an ethically responsible 'completion' will also provide a basis for future work. In this sense, the project

has shaped and changed my own practice and, I hope, has made a contribution to our collective awareness of the complexities of biotechnological issues.

## **5) A cultural lens for bioethics**

My research has sought to raise awareness of the current, institutionally dominated nature of bioethics from an arts perspective. My project doesn't give answers on specific issues, but rather presents an opportunity to discuss questions at the intersection of ethics, science, biopolitics, and contemporary jewellery, questions that don't belong to any one of these disciplines alone. In pursuing conversations, interactions and study towards building an appropriate and responsible ethical framework, I have attempted to engage a cultural lens that extends beyond the polarised debates that characterise the bioethical framework of the life sciences. I have adopted the methodological framework of speculative experimentation as an analytics of biopolitics — an effective way of critiquing it. In a meeting with Thomas Lemke, Professor of Sociology at the Faculty of Social Sciences at Goethe University Frankfurt, I came to see how future work might explore how creative, practice-led research can progress socio-political change through multidisciplinary projects involving the natural and social sciences and philosophy. In such collaborations, new jewellery objects could facilitate further affective knowledge and lead to new critical questioning and understanding of biopolitical governance by the wider public.

During this research project I have learned the importance of asking questions over seeking answers. By maintaining a state of tension and speculation, without pursuing resolution, one resists the biopolitical reliance on the production of verified knowledge, separation, and evidence. By focusing on interactions and affective encounters, the tactility and speculative nature of contemporary jewellery objects can contribute new spaces of resistance through the autonomous experience of self against the norms of biopolitical conditioning.

## Endnotes

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<sup>1</sup> Pravu Mazumdar, 'Jewellery and Hybridity: On Human Nature and the Future of Jewellery', *Junctures: The Journal for Thematic Dialogue*, 17 (2016), pp. 96–107 (p. 99).

<sup>2</sup> According to affect theory, affective experiences are encounters with objects, environments, or people. The initial sensation takes the form of a gut-reaction — a pre-critical, immersive experience that relies on a multitude of senses other than sight alone.

<sup>3</sup> Bioart is also known as *transgenic* or *wet art* and generally works at the level of an actual intervention in living systems; by contrast, my practice involves the transformation of the instruments of biotechnology.

<sup>4</sup> Foucault's term *technology of the self* refers to the socially constructed appearance of the self, achieved by using tools and devices to create a personal identity.

<sup>5</sup> Biopolitics, or biopower, is a term coined by French philosopher Michel Foucault to describe a system that encourages societal compliance, using mechanisms like data and surveillance.

<sup>6</sup> Martin Savransky, 'For Speculative Experimentation', in his *The Adventure of Relevance: An Ethics of Social Inquiry* (Palgrave Macmillan 2016), pp. 181–207.

<sup>7</sup> The term *kōrero* means speech, narrative, story, news, accounts, discussion, conversation, discourse, statement, or information <<https://maoridictionary.co.nz/>> [accessed 9 June 2024].

<sup>8</sup> Damian Skinner, 'What is Contemporary Jewelry', in *Contemporary Jewellery in Perspective*, ed. by Damian Skinner (Stuttgart: Sterling Publishing, 2013) pp. 7–15.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ilaria Ruggiero, 'Nuda Vita: The Practice of Collective and Political Body', lecture presented at 'ŠperkStret 2020: Body Politics and Jewellery', ŠperkStret International Conference of Contemporary Jewellery (Bratislava, 5 November 2020) <<https://sperkstret.sk/en/sperkstret-2020/#lectures>> [accessed 22 January 2022].

<sup>12</sup> Simon O'Sullivan, 'The Aesthetics of Affect: Thinking Art beyond Representation', *Angelaki*, 6.3 (2001), pp. 125–35, p. 126.

<sup>13</sup> Flow cells are laminated glass slides equipped with hollow channels and a coating displaying barcodes, ranging from 30mm to 150mm in size. They are secured in a variety of plastic frames containing RFID (radio-frequency identification) chips, which correspond to the barcodes for identification and tracking purposes. The encrypted data of each entity is inaccessible to the public and is only made available (with reference to the flow cell's barcode) to the sequencing specialist for a set period of time, mitigating ethical issues. The various units are placed into their respective sequencing machines, where the target DNA is copied many times and subsequently read using the Sanger sequencing method. Developed by Nobel Laureate Fredrik Sanger and colleagues in 1977, this method determines the nucleotide sequence

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of DNA using fluorescence. Flow cells are single-use only and discarded as hard waste after each sequencing. See 'Illumina MiSeq Waste Disposal', Next Generation Sequencing Quality Initiative, 2023 <[https://www.cdc.gov/labquality/docs/ngs-qses/facilities-and-safety/Illumina\\_MiSeq\\_Waste\\_Disposal\\_SOP.docx](https://www.cdc.gov/labquality/docs/ngs-qses/facilities-and-safety/Illumina_MiSeq_Waste_Disposal_SOP.docx)> [accessed 25 January 2024].

<sup>14</sup> In this context I use the term accomplices to refer to those who embrace 'differing' through experiencing jewellery beyond its symbolic, inert, and conventional function as ornament. According to Elizabeth Povinelli, Michel Foucault considered that people could break the consensus of biopower by positioning themselves as a 'noise' or 'irritant'. See Elizabeth A. Povinelli, *Geontologies: A Requiem to Late Liberalism* (Duke University Press, 2016), p. 196, with reference to Michel Foucault, *The Government of Self and Others: Lectures at the Collège de France 1982–83*, trans. by Graham Burchell (Picador, 2008).

<sup>15</sup> Technological advances bring both risks and benefits. The benefits of biotechnology may be found in personalised medicine, for example, with its promise of including marginalised groups. However, Agnieszka Wołodźko, among others, shows how economic and political pressures influence social, cultural, and scientific practices that militate against this. She analyses 'personalised medicine's reliance on extensive databases from multiple bodies of social, political and biological states, emphasising fixed identity and autonomy over the collectivity and relationality of bodies.' According to Wołodźko, the biotechnology industry restricts data sharing due to fear of competition, while its persistent unaffordability makes its products inaccessible to many, strengthening inequality and existing socio-economic hierarchies. See Agnieszka Wołodźko, *Affect as Contamination: Embodiment in Bioart and Biotechnology* (Bloomsbury Publishing, 2023).

<sup>16</sup> T. Lemke, *Bio-Politics: An Advanced Introduction*, trans. by Eric Frederick Trump (New York University Press, 2011), back cover.

<sup>17</sup> The threat posed by genetic data in the hands of capitalism is seen in its ability to determine our identities according to algorithms. See also Heather Dewey-Hagborg, 'Hacking Biopolitics', *E-flux Conversations*, 2017 <<https://conversations.e-flux.com/t/heather-dewey-hagborg-hacking-biopolitics/6045>> [accessed 2 September 2021].

<sup>18</sup> Science correspondent Pallab Ghosh illustrates the advancement of archaeological and medical knowledge in his report 'DNA Sleuths Solve Mystery of the 2,000-Year Old Corpse'. See Pallab Gosh, 'DNA Sleuths Solve Mystery of the 2,000-Year Old Corpse', *BBC News*, 20 December 2023 <<https://www.bbc.com/news/science-environment-67755415>> [accessed 15/01/2024].

<sup>19</sup> More than 90% of all sequencing performed to date has been generated using Illumina technology. The capacity to sequence all 3.2 billion bases of the human genome has increased exponentially since the 1990s. In 2005, with the introduction of the Illumina Genome Analyzer System, 1.3 human genomes could be sequenced annually. In 2014, with the introduction of the Illumina HiSeqXTen fleet of sequencing systems, the number climbed to 18,000 human genomes a year. The latest NovaSeq technology was released in 2017. See <[https://www.illumina.com/content/dam/illumina-marketing/documents/company/investor-relations/ILMN\\_at\\_William\\_Blair\\_%2013\\_June\\_2018.pdf](https://www.illumina.com/content/dam/illumina-marketing/documents/company/investor-relations/ILMN_at_William_Blair_%2013_June_2018.pdf)>, <[https://www.illumina.com/content/dam/illumina-marketing/documents/products/illumina\\_sequencing\\_introduction.pdf](https://www.illumina.com/content/dam/illumina-marketing/documents/products/illumina_sequencing_introduction.pdf)> [accessed 22 January 2022]. The ethics of biotechnology are consistently evolving in response to social and cultural changes as well as technological advances. Denmark's national biobank is collecting the DNA of every baby born since 1988. Such bio-surveillance is only made possible through a high level of trust in government and is unlikely to happen in Germany, for instance, due to the country's precarious history under the Nazi regime.

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<sup>20</sup> Typically, the data collected in databases is only a minute representation of a given population, a development which has major social implications including increased discrimination. Bio-surveillance has the potential to compound the problems of an already inequitable society; it can impact matters as diverse as employment, parenting, and health insurance. These issues were highlighted in paper delivered at the CEPE/IACAP Joint Conference 2021, 'The Philosophy and Ethics of Artificial Intelligence' (University of Hamburg, Department of Informatics, 5–9 July 2021) <<https://www.inf.uni-hamburg.de/en/inst/ab/eit/cepe-iacap2021.html>> [accessed 22 January 2022].

<sup>21</sup> The resulting touring exhibition 'forged' was accompanied by a limited-edition book of the same name: Johanna Zellmer, *Forged* (Darling Publications, 2015).

<sup>22</sup> In the history of minting, silver and gold were linked to deities and considered sacred, while the embossed stamp acted as a symbol of metaphysical and political power. Pravu Mazumdar details the history of coinage in his published keynote speech, 'Understanding Surfaces: On Jewellery and Identity' (section III, 'Subverting Material and Object Identities'). See Pravu Mazumdar, 'Understanding Surfaces: On Jewellery and Identity', *Collection Haus N*, 2014 <<http://sammlung-haus-n.de/publikationen.html>>.

<sup>23</sup> A good example is a quote from an interview with renowned jeweller Norman Weber, jewellery artist and winner of the Friedrich Becker Prize 2023, and curator of the special show SCHMUCK 2024 as part of Handwerk & Design at the Internationale Handwerksmesse in Munich. Referring to the selection session and his artistic point of view, he states: 'What I find important is that the perception and contextualisation of jewellery is actually always determined by form, colour and surface quality.' See Norman Weber, Interview with Julie Metzdorf, *Klimt02*, 20 November 2023 <[https://klimt02.net/forum/interviews/norman-weber-curator-schmuck-2024-interviewed-juliemetzdorf?utm\\_source=phplist2395&utm\\_medium=email&utm\\_content=HTML&utm\\_campaign=The+cosmos+of+jewellery+definitely+has+something+all-encompassing+about+it...+and+](https://klimt02.net/forum/interviews/norman-weber-curator-schmuck-2024-interviewed-juliemetzdorf?utm_source=phplist2395&utm_medium=email&utm_content=HTML&utm_campaign=The+cosmos+of+jewellery+definitely+has+something+all-encompassing+about+it...+and+)> [accessed 3 May 2024].

<sup>24</sup> This collaborative work was shown as part of the Art & Genetics exhibition at the Otago Museum alongside the international conference on genetics held in Dunedin in July 2017 — hosted by the Genetics Society of Australasia with the NZ Society for Biochemistry and Molecular Biology. See 'Art & Genetics: He Toi Iratanga', cur. by Peter Stupples (exhibition, HD Skinner Annex, Otago Museum, 2017) <[https://issuu.com/dunedinschoolofart/docs/art\\_and\\_genetics\\_2017\\_catalogue](https://issuu.com/dunedinschoolofart/docs/art_and_genetics_2017_catalogue)> [accessed 3 May 2024].

<sup>25</sup> The three-letter nucleotide codon for an amino acid translates to single letter proteins, which cover almost the entire alphabet. Each three-letter codon thus represents a letter of the alphabet. Those familiar with this code can therefore decipher messages. The table of amino acids and their abbreviations is accessible at Courtney Simons, 'Structure of Amino Acids and Proteins', Food Science Toolbox, n.d. <<https://foodsciencetoolbox.com/structure-of-amino-acids-and-proteins/>>. [accessed 18/03/2024].

<sup>26</sup> Alfredo Jaar, *The Silence of Nduwayezu*, 1996, light table, slides, slide magnifiers, light box with B/W transparency, 15' x 40' x 28' <<https://imaginarymuseum.org/MHV/PZImhv/JaarRwandaProject.html>> [accessed 25/08/2023].

<sup>27</sup> Grace Lai, curator of decorative art at the Auckland Museum, discusses the work undertaken during the residency in 'A Question of Identity', *Contemporary Hum*, 2019 <<https://www.contemporaryhum.com/grace-lai-on-johanna-zellmer>> [accessed 22 January 2022]. Further information about this residency can be found at 'Konstepidemin Guest Artist Johanna Zellmer', Konstepidemin, 5 March 2019 <<https://konstepidemin.se/en/guestartist/johanna-zellmer-2/>> [accessed 25/08/2023].

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<sup>28</sup> Bridie Lonie, *The Complete Entanglement of Everything* (Dunedin School of Art, Otago Polytechnic, 2020) <[https://issuu.com/dunedinschoolofart/docs/the\\_complete\\_entanglement\\_of\\_everything\\_exhibition](https://issuu.com/dunedinschoolofart/docs/the_complete_entanglement_of_everything_exhibition)> [accessed 19 July 2024].

<sup>29</sup> I am considering here the premodern meaning of the term aesthetics: aisthēsis, which is etymologically and conceptually linked with sense perception. David Vichnar and Louis Armand, 'Aisthēsis', *Oxford Research Encyclopedia of Literature*, 2017 <<https://oxfordre.com/literature/display/10.1093/acrefore/9780190201098.001.0001/acrefore-9780190201098-e-104>> [accessed 25/08/2023]. Its contemporary relevance is discussed in an interview with Susan Buck-Morss: Grant H. Kester, 'Aesthetics After the End of Art', *The Art Journal*, 56.1 (1997) pp. 38–45.

<sup>30</sup> Jennifer Fisher, 'Tactile Affects', *Tessera*, 32 (2002), pp. 17–28 (p. 18).

<sup>31</sup> Ibid.

<sup>32</sup> The collar depicted here was completed one month before beginning this creative practice PhD. It was made for *CLINKProject6*, and exhibited under the umbrella of Radiant Pavilion, part of Melbourne's jewellery biennial. In 2021 the *CLINKProject* collective worked in conjunction with the Grainger Museum, a collection owned by the University of Melbourne dedicated to the life and work of Australian musician and composer Percy Grainger. Each collective member responded to a piece in the collection. In the context of this project's concern with identity construction, it is of interest that this piece was my response to Grainger's military dog tags.

<sup>33</sup> I refer to Liesbeth den Besten's seminal publication *On Jewellery: A Compendium of International Contemporary Art Jewellery*, in which she argues that author jewellery can never be worn naively, but demands understanding, involvement, and commitment. Because 'the work is loaded with a meaning that is neither commonplace nor middle-of-the-road [...], it can be confusing and confronting.' In chapter VI, 'Reading Jewellery', she cites an email she received in 2009 from contemporary jeweller Melanie Bielenker, who wrote: 'I see jewellery as a confrontation by its very nature. When I wear a brooch on my body I am making a larger commitment to it than if I were to hang a painting in my home.' While this may be a matter for discussion, I agree with den Besten and Bielenker insofar as wearing or responding to a confronting piece of contemporary jewellery, such as one of my chokers, does require varying levels of commitment. See Liesbeth Den Besten, *On Jewellery: A Compendium of International Contemporary Art Jewellery* (Arnoldsche, 2011), p. 63.

<sup>34</sup> Karen Pontoppidan, 'Time and Again, the Personal is Political', in Angelika Nollert, *Schmuckismus* (Arnoldsche Art Publishers, 2019), pp. 11–18.

<sup>35</sup> Douglas Harper, 'Choker (n.)', *Online Etymology Dictionary*, n.d. <<https://www.etymonline.com/word/choker>> [accessed 24 January 2024].

<sup>36</sup> Jessica Larson, 'Usurping Masculinity: The Gender Dynamics of the Coiffure à la Titus in Revolutionary France' (unpublished BAHons thesis, University of Michigan, 2013), pp. 1–98.

<sup>37</sup> Cristina Barna, 'Cognitive Psychology, or the Deconstruction of Subjectivity', *International Journal of Advances in Social Science and Humanities*, 4.8 (2018), pp. 18–22 <<https://ijassh.com/index.php/IJASSH/article/view/50>> [accessed 5 May 2024].

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<sup>38</sup> Ibid.

<sup>39</sup> *Necklace*, c. 1840-1870, silver, garnets, imitation pearl, 47 x 120 x 77mm, V&A Collection <<https://collections.vam.ac.uk/item/O139850/necklace-unknown/>> [accessed 15 November 2021].

<sup>40</sup> Ibid.

<sup>41</sup> Clare Phillips, *Jewelry from Antiquity to the Present* (Thames and Hudson, 1996), p. 156. It is noteworthy in the context of this project that collars and chokers as a specific form of adornment tend to be sized and fashioned to individual necks.

<sup>42</sup> Colin McDowell, *The Anatomy of Fashion: Why We Dress the Way We Do* (Phaidon Press, 2013), pp. 68–69.

<sup>43</sup> Jeff Hays, 'Padaung Long Neck Women', *Facts and Details*, n.d. <<https://factsanddetails.com/asian/cat66/sub417/entry-2761.html>> [accessed 21 March 2024].

<sup>44</sup> Edith Mirante, 'The Dragon Mothers Polish their Metal Coils', *Guernica: A Magazine of Art & Politics*, 2006 <[https://web.archive.org/web/20081212153427/http://www.guernicamag.com/features/229/the\\_dragon\\_mothers/](https://web.archive.org/web/20081212153427/http://www.guernicamag.com/features/229/the_dragon_mothers/)> [accessed 10 January 2022].

<sup>45</sup> Observations gathered from my anatomical studies and a conversation with German friend and physician, Dr Cornelia Goetze, during her working holiday in Dunedin, November 2023.

<sup>46</sup> Wołodźko, *Affect as Contamination*; Povinelli, *Geontologies*. See also Lieta Marziali, 'Intimate Revolt and the Need to Create Dangerously', two-part keynote lecture delivered at 'Nuda Vita 2021 – The Conference' (Munich Jewellery Week, 2021) <<https://www.adornment-jewelry.com/single-post/nuda-vita-2021-the-conference>> [accessed 5 May 2024].

<sup>47</sup> Kathy Steinemann, '600+ Ways to Describe Necks: A Word List for Writers', Kathy Steinemann, n.d. <<https://kathysteinemann.com/Musings/necks/>> [accessed 3 May 2024].

<sup>48</sup> Geneticist and Nobel Prize winner Paul Nurse explains this clearly in his publication *What is Life?: Understand Biology in Five Steps* (David Fickling Books, 2020). Andrea Daly further contextualised this knowledge in her panel debate presentation 'The Body is a Draft', presented at the second New Zealand Jewellery Biennial. Drawing on her research on extended mind theory, she detailed how stress levels release different chemicals into our system, impacting our wellbeing and in some cases triggering specific expressions of genes, which can be inherited. Johanna Zellmer and others, 'The Body is a Draft', unpublished panel debate presented at Nelson Jewellery Week 2023 (Nelson Marlborough Institute of Technology, 2023) <[https://drive.google.com/file/d/19xYzABff-YjKXqRHAP9LsZm0G\\_u1Hbfx/view?ts=64ff6f25](https://drive.google.com/file/d/19xYzABff-YjKXqRHAP9LsZm0G_u1Hbfx/view?ts=64ff6f25)> [accessed 5 May 2023].

<sup>49</sup> Ibid.

<sup>50</sup> Skinner, *Contemporary Jewelry in Perspective*, p. 68.

<sup>51</sup> Liesbeth den Besten, *On Jewellery* (Arnoldsche, 2011), p. 139.

<sup>52</sup> Ibid.

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<sup>53</sup> Ibid.

<sup>54</sup> den Besten, *On Jewellery*.

<sup>55</sup> Ibid. The affective character of imprints that mark a human neck is discussed below.

<sup>56</sup> Ibid.

<sup>57</sup> Ernst Van Alphen and Tomáš Jirsa, *How to Do Things with Affects: Affective Triggers in Aesthetic Forms and Cultural Practices* (Brill, 2019).

<sup>58</sup> Mazumdar, 'Understanding Surfaces'.

<sup>59</sup> According to philosopher Giorgio Agamben, the fundamental categorial duality in Western political thought is rooted in the Greek terms of *zoé* and *bios*. In the classical world, *zoé* is natural bare life, common to all living beings, while *bios* is a mode of living that constantly adapts itself to the conditions of social existence. In my use of these terms, *bios* refers to the anonymous DNA of animal, plant, human, and viral life forms — as such 'bare' and under scientific observation — and *zoé* as experiential and embodied life. See Giorgio Agamben, 'Sovereign Power and Bare Life', in *Biopolitics: A Reader*, ed. By Timothy Campbell and Adam Sitze (Duke University Press, 2013), pp. 135–44 (p. 136).

<sup>60</sup> Lemke, *Bio-Politics*, pp. 122–23.

<sup>61</sup> Lemke, *Bio-Politics*.

<sup>62</sup> Ibid., p. 117. Emphasis mine.

<sup>63</sup> Lemke, *Bio-Politics*, pp. 119–120.

<sup>64</sup> Paul Komesaroff, 'Introduction: Postmodern Medical Ethics', in *Troubled Bodies: Critical Perspectives on Postmodernism, Medical Ethics, and the Body*, ed. by Paul Komesaroff (Duke University Press, 1995), pp. 11–19 (p. 2).

<sup>65</sup> Donna Dickenson, *Property in the Body: Feminist Perspectives* (Cambridge University Press, 2007), p. 3; cited in Wołodźko, *Affect as Contamination*, p. 15.

<sup>66</sup> 'Man cannot dispose over himself, because he is not a thing. He is not his own property — that would be a contradiction; for so far as he is a person, he is a subject, who can have ownership of other things. But now were he something owned by himself, he would be a thing over which he can have ownership. He is, however, a person, who is not property, so he cannot be a thing such as he might own; for it is impossible, of course, to be at once a thing and a person, a proprietor and a property at the same time.' Immanuel Kant, *Lectures on Ethics*, ed. by J. B. Schneewind, trans. by Peter Heath (Cambridge University Press, 1997), p. 157.

<sup>67</sup> Andorno identifies human dignity as *inseparable from the human condition* and as the shaping principle of international bioethics. For him, the dignity of the human person is an expression of philosophical ideals that transcend biology. He stresses that the object upon which the new biotechnologies operate is not something external to us, but ourselves, and that technological inventions

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could degrade our status as *subjects* to mere *objects* designed by others. See Roberto Andorno, *Principles of International Biolaw: Seeking Common Ground at the Intersection of Bioethics and Human Rights* (Bruylant, 2013).

<sup>68</sup> Dr Craig Hilton, genetic scientist, artist, and educator, and external advisor to this research project, commented to me that 'experience is a result of material things, very complex material things, but material'.

<sup>69</sup> Elizabeth Ann Martin and Alan Isaacs, 'Human Genome Project', *A Dictionary of Science*, 4th edn, ed. by Alan Isaacs (Oxford University Press, 2003).

<sup>70</sup> Roxanne Khamisi, 'A More-Inclusive Genome Project Aims to Capture All of Human Diversity', *Nature*, 603.7901 (2022), pp. 378–81.

<sup>71</sup> *Ibid.*

<sup>72</sup> CNVs, insertions, deletions, and duplications of DNA sequences may be significant for human health. Craig Hilton, conversation with the author, 27 March 2024.

<sup>73</sup> Khamisi, 'A More-Inclusive Genome Project'.

<sup>74</sup> *Ibid.*

<sup>75</sup> *Ibid.*

<sup>76</sup> *Ibid.* Two years earlier, *Nature Review Genetics* had published the article 'Pan-genomics in the Human Era', which reviewed the computational methods utilised in the effort to collect all the DNA sequences that occur in a single species. See Rachel M. Sherman and Steven L. Salzberg, 'Pan-genomics in the Human Genome Era', *Nature Reviews Genetics*, 21.4 (2020), pp. 243–54  
<<https://www.nature.com/articles/s41576-020-0210-7>> [accessed 22 March 2024].

<sup>77</sup> In 2024, the Human Pangenomic Project included a total of 47 individuals, suggesting that its efforts to collect all the DNA sequences occurring in a single species are still based on a narrow, non-inclusive set of data, unlikely to take in the diversity of humanity. Craig Hilton, conversation with the author, 27 June 2024.

<sup>78</sup> Lemke, *Bio-Politics*, pp. 122–23.

<sup>79</sup> *Ibid.*

<sup>80</sup> Foucault's three main works that deal with this topic are *Discipline and Punish: The Birth of the Prison* (Pantheon Books, 1977); *The Will to Knowledge: The History of Sexuality Volume 1: An Introduction* (Gallimard, 1976); and *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979* (Picador, 2010).

<sup>81</sup> Foucault, *The Birth of Biopolitics*.

<sup>82</sup> Personal notes from a recording of an online lecture by Pravu Mazumdar, 'Teil 1: Ein Cocktail der Machtformen – Unterscheidungen und Spezifizierungen' (unpublished seminar, presented to students at

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the Johannes Kepler Universität Linz, Institut für Philosophie und Wissenschaftstheorie, Linz, Austria, 11 December 2020).

<sup>83</sup> From a conversation with Munich-based, Indian philosopher Pravu Mazumdar on the connection between identity and biopower. Pravu Mazumdar, conversation with the author, 16 January 2022.

<sup>84</sup> The constructed subjectification is the result of a methodical process of self-transformation.

<sup>85</sup> In this context it is interesting to note that contemporary jewellery was founded on the critique of 'preciousness', advocating jewellery's artistic value, rather than reducing it to its monetary worth. See Kevin Murray, 'Questioning Preciousness in Jewellery', in *Crafting Aotearoa*, ed. by Karl Chitham, Kolokesa U Māhina-Tuai, and Damian Skinner (Te Papa Press, 2019) <<https://www.aucklandmuseum.com/discover/research/crafting-aotearoa/questioning-preciousness-in-jewellery>> [accessed April 2024].

<sup>86</sup> Povinelli, *Geontologies*, p. 196, in reference to Michel Foucault, *The Government of Self and Others* (see n. 14 above).

<sup>87</sup> Povinelli, *Geontologies*. She refers to Foucault's description of biopower as possessing the lawful right 'to make live and to let die', as opposed to the law of sovereign power to 'take life or let live'. The definition of life and non-life is fundamental to biopolitics.

<sup>88</sup> Povinelli's survey of new models and voices since Foucault is mirrored in Timothy Campbell and Adam Sitze (eds), *Biopolitics: A Reader* (Duke University Press, 2013). See also Lemke, *Bio-Politics*; and Beatriz Da Costa and Kavita Philip, *Tactical Biopolitics: Art, Activism, and Technoscience* (MIT Press, 2010).

<sup>89</sup> Agamben's position has been critiqued as being based in the historical realm and as catastrophist. Further, that the duality *zoé* and *bios* does not adequately reflect the modern paradigm of governance, with people being stripped of their political, economic, and religious rights during the Covid pandemic, essentially reducing them to bare life. However, as Simone Anders points out, a life stripped of rights still sits within the sphere of the political. For Anders, among others, the dualism of Agamben's vocabulary and his definition of 'being' using the analogy of the machine is problematic. Anders further points out that modern technology has produced another form of slavery: The use of a body as a productive system. See Simone Anders, 'What Are We Going to Do with Giorgio Agamben?', *Overland*, 2022 <<https://overland.org.au/2022/10/what-are-we-going-to-do-with-giorgio-agamben/>> [accessed 4 May 2024].

<sup>90</sup> Povinelli, *Geontologies*.

<sup>91</sup> For Agnieszka Wołodźko, rather than enacting one's own body as if it was autonomous, with defined and unambiguous borders, bodies are assemblages of 'organic corporality; chemical compounds; non-organic particles; animal, bacterial, viral and fungal bodies; thoughts, beliefs, rituals and ideologies conditioned by technologies, histories, politics of signification and classification'. See Wołodźko, *Affect as Contamination*.

<sup>92</sup> Agnieszka Maciejewska, Renata Włodarczyk and Ryszard Pawlowski, 'The Influence of High Temperature on the Possibility of DNA Typing in Various Human Tissues', *Folia Histochemica et Cytobiologica*, 53.4 (2015), pp. 322–32.

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<sup>93</sup> 'The concept of taonga refers to something precious or significant. The term taonga can be applied to valued objects, significant resources, or important entities. This includes genomic data as a representation of peoples' biological material and a precious asset for Māori. Iwi recognise the value of DNA for its cultural and spiritual significance, as well as its usefulness as a resource for research. Taonga should be looked after in an appropriate manner to preserve integrity and value, as well as respect the tapu that has been imbued into them. Tapu refers to the sacred or special nature of an object and implies that the object must be actively protected or managed.' Maui Hudson and others, *Te Mata Ira: Guidelines for Genomic Research with Māori* (University of Waikato, Te Mata Hautū Taketake, 2016), pp. 8–12.

<sup>94</sup> 'Whakapapa – Genealogy', Te Ara <<https://teara.govt.nz/en/whakapapa-genealogy/page-1>> [accessed 9 June 2024].

<sup>95</sup> Ibid.

<sup>96</sup> Hudson and others, *Te Mata Ira*.

<sup>97</sup> Ibid.

<sup>98</sup> Ben Hurlbut, Françoise Baylis, and Josephine Johnston, 'Toward Navigating Danger and Promise Together – Editing the Human Genome', *The Hastings Center*, 2023 <<https://www.thehastingscenter.org/hastings-center-event/toward-navigating-danger-promise-together-editing-the-human-genome/>> [accessed 8 February 2024].

<sup>99</sup> Ibid.

<sup>100</sup> Lemke, *Bio-Politics*, p.115.

<sup>101</sup> Luke Groskin, 'These Researchers Used AI to Design a Completely New "Animal Robot"', *Scientific American*, 6 March 2023 <[https://www.scientificamerican.com/video/these-researchers-used-a-i-to-design-a-completely-new-animal-robot/?utm\\_source=Master+List&utm\\_campaign=e1e362e4e9-EMAIL\\_CAMPAIGN\\_2020\\_10\\_26\\_05\\_57\\_COPY\\_01&utm\\_medium=email&utm\\_term=0\\_5c9274ec4d-e1e362e4e9-62174979](https://www.scientificamerican.com/video/these-researchers-used-a-i-to-design-a-completely-new-animal-robot/?utm_source=Master+List&utm_campaign=e1e362e4e9-EMAIL_CAMPAIGN_2020_10_26_05_57_COPY_01&utm_medium=email&utm_term=0_5c9274ec4d-e1e362e4e9-62174979)> [accessed 5 February 2024].

<sup>102</sup> They include Professor Robert Jahnke (Te Pūtahi-a-Toi / School of Māori Art, Knowledge & Education, Massey University); Scott Klenner, who is tumuaki: rakahau Māori at Otago Polytechnic; Emeritus Professor Dr Khyla Russell (Kāi Tahu, Kāti Māmoe, Waitaha, Rapuwai), who was on the advisory group for the publication *Te Mata Ira: Guidelines for Genomic Research with Māori*; Dr Gerard O'Regan (Kāi Tahu), curator Māori at Otago Museum in Dunedin; and established artists Ross Hemera (Pou Tokomanawa, Waitaha, Ngāti Māmoe, Ngāi Tahu) and Areta Wilkinson (Ngāi Tahu). Wilkinson gives a detailed account of mātauranga Māori in her booklet *Whakapaipai*, published on the occasion of her exhibition 'Whakapaipai: Jewellery as Pepeha', Objectspace, 6 June–4 July 2015. See Areta Wilkinson, *Whakapaipai* (Objectspace, 2015).

<sup>103</sup> Tikanga refers to the customary system of values and practices that have developed over time and are deeply embedded in the social context. The term can be translated variously as correct procedure, custom, habit, lore, method, manner, rule, way, code, meaning, plan, practice, convention, or protocol <<https://maoridictionary.co.nz/>> [accessed 9 June 2024].

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<sup>104</sup> Octavio Paz, 'Octavio Paz Quotes', PoemHunter.com, n.d. <<https://www.poemhunter.com/octavio-paz/quotations/>> [accessed 3 February 2024].

<sup>105</sup> Pravu Mazumdar, 'The Dual Matrix of Life: On Genetic Science, Art and the Truth Games of the "Third Culture"', *Junctures: The Journal for Thematic Dialogue*, 18 (2017), pp. 138–61. Mazumdar refers to Charles Percy Snow's 1959 hypothesis of a 'third culture', an idea developed further by American literary agent and author John Brockman in 1995 <[https://en.wikipedia.org/wiki/The\\_Third\\_Culture](https://en.wikipedia.org/wiki/The_Third_Culture)> [accessed 9 July 2024].

<sup>106</sup> Mazumdar, 'The Dual Matrix of Life', p. 145.

<sup>107</sup> *Ibid.*, p. 146.

<sup>108</sup> Mazumdar, 'The Dual Matrix of Life'.

<sup>109</sup> *Ibid.*, pp. 155–156.

<sup>110</sup> *Ibid.*, p. 150.

<sup>111</sup> Hans-Jörg Rheinberger, *Experimentalsysteme und epistemische Dinge. Eine Geschichte der Proteinsynthese im Reagenzglas* (Suhrkamp Taschenbuch Wissenschaft, 2006).

<sup>112</sup> Mazumdar, 'The Dual Matrix of Life'.

<sup>113</sup> See n. 59 above on *zoé* and *bios*.

<sup>114</sup> Savransky, 'For Speculative Experimentation'.

<sup>115</sup> *Ibid.*, p. 203.

<sup>116</sup> *Ibid.*, p. 204.

<sup>117</sup> *Ibid.*

<sup>118</sup> Jürgen Mittelstraß, 'Art and Research: An Introduction', in *Art and Research – Can Artists Be Researchers?*, ed. by Gerald Bast (Springer, 2011), pp 17–20.

<sup>119</sup> Henk Borgdorff, 'Where Are We Today? The State of the Art in Artistic Research', in *Art and Research – Can Artists Be Researchers?*, ed. by Gerald Bast (Springer, 2011), pp. 73–74.

<sup>120</sup> Bruce Metcalf, 'On the Nature of Jewelry (Part 2): Restriction & Reparation', *Bruce Metcalf*, 1994 <<https://www.brucemetcalf.com/on-the-nature-of-jewelry-part-2>> [accessed 26 January 2024].

<sup>121</sup> The first automatic *Biosystems* sequencer became available in the mid 1980s. Prior to this, sequencing was done manually, in a method known as dideoxynucleotide chain termination that involved using gels and rulers. I learned about the history of sequencing during my collaboration with Aaron Jeffs, then sequencing specialist at Otago University's Genome Facility. During my studies, my external supervisor Craig Hilton reaffirmed this history. Both Jeffs and Hilton had studied at Otago University, using dideoxynucleotide chain termination. It is noteworthy that the late Professor George Petersen, also of

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Otago University, worked in the Nobel prize-winning lab of Frederick Sanger, who developed the Sanger sequencing method commonly used at the present.

<sup>122</sup> Pravu Mazumdar, 'Gathering Being: On Collecting and Making', *Klimt02*, 2021 <<https://klimt02.net/forum/articles/gathering-being-collecting-and-making-pravu-mazumdar>> [accessed 26 January 2022].

<sup>123</sup> '10 Kronor – Carl XVI Gustaf', Numista, n.d. <<https://en.numista.com/catalogue/pieces2750.html>>; 'Nordic Gold', *Currency Wiki: The Online Numismatic Encyclopedia*, n.d. <[https://currencies.fandom.com/wiki/Nordic\\_gold](https://currencies.fandom.com/wiki/Nordic_gold)> [accessed 26 January 2022].

<sup>124</sup> 'Through digitization, banks also get to collect perhaps the greatest datasets ever on consumer behaviours, which many consider a breach of privacy and which unscrupulous banks could sell off to invasive advertisers or worse'. Mark Hay, 'Sweden is Developing the World's First Cashless Economy', *Good*, 11 October 2015, <<https://www.good.is/articles/sweden-becoming-first-cashless-modern-society>> [accessed 26 January 2022].

<sup>125</sup> Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (Profile Books, 2019).

<sup>126</sup> Thomas Lemke dedicates a chapter to bioeconomy in *Bio-Politics: An Advanced Introduction*. Here, he draws on the work of sociologist Melinda Cooper and anthropologist Kaushik Sunder Rajan to unfold the interconnected systems linking the scientific production of knowledge and the capitalist production of value, resulting in new forms of exploitation. See Lemke, *Bio-Politics*.

<sup>127</sup> By using the term *eradicated*, I am alluding to the denaturing of DNA from its readable polymer structure to base components.

<sup>128</sup> Both James Lovelock and Donna Haraway explore the history of the relationship between humans and machines and the ensuing age of technological bodies, or cyborgs, in their influential publications: James Lovelock, *Novacene: The Coming Age of Hyperintelligence* (MIT Press, 2019); and Donna Haraway, 'A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980's', *Socialist Review*, 80 (1985), pp. 65–108.

<sup>129</sup> Viruses are keen DNA collectors. The genetic exchange between virus and host or between virus species is called horizontal gene transfer (HGT). According to Moriah L. Szpara and Koenraad Van Doorslaer, this process has driven the evolution of DNA viruses as well as their host organisms. The title of this early work was influenced by a comment made by my external supervisor, Craig Hilton, regarding its physical collecting of DNA. Subsequently, during my final years of study, my research made me curious about my work's exchange potential (discussed in chapter 5) in view of the energetic force of jewellery. See Moriah L. Szpara and Koenraad Van Doorslaer, 'Mechanisms of DNA Virus Evolution', *Encyclopedia of Virology*, 4th edn, 5 vols, ed. by Dennis H. Bamford and Mark Zuckerman (Elsevier, 2021), I, pp. 71–78 <<https://doi.org/10.1016/B978-0-12-809633-8.20993-X>> [accessed 23 April 2024].

<sup>130</sup> Savransky, 'For Speculative Experimentation'.

<sup>131</sup> The mercurial process derives its name from the Roman god Mercury, the guide to the classical underworld. The process involves a fluid, swiftly changing mode of working, in a continuous state of change and evolution, and is often referred to by artists as 'being in the zone'.

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<sup>132</sup> Suede thonging is a narrow, flat jewellery stringing material made from suede leather.

<sup>133</sup> O'Sullivan, 'The Aesthetics of Affect'.

<sup>134</sup> Barna, 'Cognitive Psychology'.

<sup>135</sup> Caitlin Devoy is a contemporary Aotearoa (New Zealand) artist. Born in London (1976), she grew up in Omārōrō (Newtown), Whanganui-a-Tara (Wellington), where she lives and works. Her practice examines sculptural materiality in relation to the body. See Caitlin Devoy <<https://www.caitlindevoy.com/>> [accessed 26 March 2024].

<sup>136</sup> This project was completed with the approval of Massey University's human ethics committee. The appendix contains the full human ethics approval that I obtained as a condition of public engagement in this project at Nelson Jewellery Week in 2023.

<sup>137</sup> Léo Pio-Lopez, 'The Rise of the Biocycborg: Synthetic Biology, Artificial Chimerism and Human Enhancement', *New Genetics and Society*, 40.4 (2021), pp. 599–619.

<sup>138</sup> Excerpt from a recorded conversation at g\_space gallery, Nelson Marlborough Institute of Technology. Conversation with the author, 14 April 2023.

<sup>139</sup> Douglas Harper, 'Protean (adj.)', *Online Etymology Dictionary*, n.d. <<https://www.etymonline.com/word/Protean>> [accessed 10 April 2024].

<sup>140</sup> Savransky, 'For Speculative Experimentation'.

<sup>141</sup> Ibid.

<sup>142</sup> I am using the scientific definition of the term *tertiary* here, with reference to the changing aesthetics of my jewellery pieces over the course of this study. A visual description can be found in Simons, 'Structure of Amino Acids and Proteins'. A visual overview of the four stages of protein structures can be accessed at Eric Martz, 'Protein Primary, Secondary, Tertiary and Quaternary Structure', Proteopedia: Life in 3D, 2022 <[https://proteopedia.org/wiki/index.php/Protein\\_primary,\\_secondary,\\_tertiary\\_and\\_quaternary\\_structure](https://proteopedia.org/wiki/index.php/Protein_primary,_secondary,_tertiary_and_quaternary_structure)> [accessed 10 April 2024].

<sup>143</sup> From a conversation during a joint supervision session. Craig Hilton, conversation with the author, 10 October 2023.

<sup>144</sup> Geneticist and Nobel Prize winner Paul Nurse explains the fact that our genes are capable of expressing differently in his publication *What is Life?*. See Nurse, *What is Life?*

<sup>145</sup> Metcalf, 'On the Nature of Jewelry (Part 2)'.

<sup>146</sup> Douglas Harper, 'Translucent (adj.)', *Online Etymology Dictionary*, n.d. <<https://www.etymonline.com/word/translucent>> [accessed 26 March 2024].

<sup>147</sup> Ibid.

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<sup>148</sup> Barbara Maria Stafford, 'The Jewel Game: Gems, Fascination and the Neuroscience of Visual Attention', in *Contemporary Jewelry in Perspective* (Sterling Publishing, 2013), pp. 189–94.

<sup>149</sup> Ibid.

<sup>150</sup> To be discussed in depth in the following chapter on affective experience.

<sup>151</sup> Renée C. Hoogland, *A Violent Embrace: Art and Aesthetics after Representation* (Dartmouth College Press, 2014), pp. 38–39.

<sup>152</sup> Ibid., p. 39.

<sup>153</sup> *Strung* is a strand made up of a multitude of elements created over the course of the three years of this study, including some of the former *Protean Beings*.

<sup>154</sup> O'Sullivan, 'The Aesthetics of Affect'.

<sup>155</sup> Ibid.

<sup>156</sup> Pravu Mazumdar discusses the chain's effect on people, rendering it fundamentally *un-wearable*, in his chapter 'The Cartogram of Reversals', in *Otto Künzli: The Book*, ed. by Florian Hufnagl (Arnoldsche, 2013), pp. 70–89 (pp. 78–80).

<sup>157</sup> Elizabeth Ann Martin and Alan Isaacs, 'Fundamental Interactions', in *A Dictionary of Science*, 4th edn, ed. by Alan Isaacs (Oxford University Press, 2003).

<sup>158</sup> Ibid.

<sup>159</sup> Mazumdar, 'Gathering Being'.

<sup>160</sup> Ibid.

<sup>161</sup> Zellmer and others, 'The Body is a Draft'.

<sup>162</sup> Correspondingly, K. E. Thorp gives a detailed account of recent research into bioelectric fields. He suggests that it is the physio-mechanical forces of energy currents beyond chemical processes which facilitate organisation and gene expression. See K. E. Thorp, 'Morphogenic Fields: A Coming of Age', *Explore*, 18.2 (2022), pp. 187–94.

<sup>163</sup> The power invested by the material of Bevan's *Burial Necklace* is discussed by Victoria Wynne-Jones in her article-style forum post 'Attuning to People, Places and Things: Neck Adornment and Contemporary Art', *The Pantograph Punch*, 1 June 2018 <<https://pantograph-punch.com/posts/contemporary-neck-adornment>> [accessed 21 December 2021]. And the concerns behind Teresa Margolles' installation are canvassed in Jonathan Barrett, 'So it Vanished: Art, Tapu and Shared Space in Contemporary Aotearoa New Zealand', *PORTAL Journal of Multidisciplinary International Studies*, 10.2 (2013), pp. 7–9.

<sup>164</sup> Stafford, 'The Jewel Game'; Hoogland, *A Violent Embrace*.

<sup>165</sup> Wołodźko, *Affect as Contamination*; Povinelli, *Geontologies*.

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<sup>166</sup> Nurse, *What is Life?*

<sup>167</sup> I refer here to Agnieszka Anna Wołodźko's notion of embracing contamination as a tool with which to think about relations and the unpredictable character of the changes that bodies are conditioned by. See Wołodźko, *Affect as Contamination*.

<sup>168</sup> Heather Dewey-Hagborg, 'Hacking Biopolitics'.

<sup>169</sup> Heather Dewey-Hagborg, *Stranger Visions*, 2013, mixed media, Clocktower Gallery artist residency. See Heather Dewey-Hagborg, 'Stranger Visions' <<https://deweyhagborg.com/projects/stranger-visions>> [accessed 30 November 2021]. 'All technology is political, and as an artist working with biotechnology I find it crucial to engage these biopolitics directly. This is also the site I find most exciting artistically, to show the embedded politics in technologies and social structures that might otherwise be missed'. Heather Dewey-Hagborg, 'Statement' <<https://deweyhagborg.com/statement>> [accessed 13 January 2022].

<sup>170</sup> In the context of biopolitics, one might also ask what is so special about being human? I don't know if any of the flow cells I collected carried human DNA, but they did contain DNA that is related to us, bearing the same code and consequently sharing the same ancestors.

<sup>171</sup> 'DNA Surveillance: IMPAKT TV Episode with Heather Dewey-Hagborg', IMPAKT.nl, 2 September 2021 <<https://impakt.nl/events/2021/impakt-tv/dna-surveillance/>> [accessed 2 September 2021].

<sup>172</sup> 'Parabon Snapshot Forensic DNA Analysis Services', Parabon Nanolabs <<https://snapshot.parabon-nanolabs.com/>> [accessed 02/09/2021].

<sup>173</sup> Objects can do things in a variety of ways — symbolically, formally, by means of an instrument, or as a memory device. Mazumdar has unpacked the role of objects via a linguistic idea, where grammatical forms become performative actions, generating affect. He focuses on the semiotic, performative, and social acts of objects — deeming them inseparable from the daily politics of appearance — as forces that spontaneously align things and humans in a network of relations. See Pravu Mazumdar, 'On the Power of Objects: Some Reflections on and around Jewellery', lecture presented at 'ŠperkStret 2020: Body Politics and Jewellery', ŠperkStret International Conference of Contemporary Jewellery (Bratislava, 2020).

<sup>174</sup> Ruggiero, 'NUDA VITA'.

<sup>175</sup> See 'EXHIBITION – NUDA VITA – The Practice of Collective and Political Body', A/dornment – Curating Contemporary Art Jewelry, 2019 <<https://www.adornment-jewelry.com/single-post/2019/02/22/exhibition-nuda-vita-the-practice-of-collective-and-political-body>> [accessed 3 May 2024].

<sup>176</sup> Stephen Muecke, 'Resistance', *Overland*, 241 (2020) <<https://overland.org.au/previous-issues/issue-241/feature-resistance/>> [accessed 3 May 2024].

<sup>177</sup> Ibid.

<sup>178</sup> Michel Foucault, 'The Subject and Power', *Critical Inquiry*, 8.4 (1982), cited in Hubert L. Dreyfus and Paul Rabinow, *Michel Foucault: Beyond Structuralism and Hermeneutics*, 2nd edn (University of Chicago Press, 1983), p. 225, further cited in Muecke, 'Resistance'.

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<sup>179</sup> Muecke, 'Resistance'.

<sup>180</sup> Her argument positions the roots of *Nuda Vita* in Giorgio Agamben's 'Homo Sacer. Il Potere Sovrano e La Nuda Vita', originally published in 1995 in Italian ('bare life' translates to 'nuda vita'). See Giorgio Agamben, 'Homo Sacer. Il Potere Sovrano e La Nuda Vita', *Histoire*, 2 (1995). According to Marziali, Agamben uses the term for bodies subjected to a state of exception. She maintains that Agamben identified this state of exception, or suspension, as an instrument for control in biopolitics, whereby the rule of law is suspended by the ruling body to protect itself from scrutiny. See Marziali, 'Intimate Revolt'.

<sup>181</sup> This question emerged from a conversation with established New Zealand artist Ross Hemera (Waitaha, Ngāti Māmoē, Ngāi Tahu) in my Dunedin studio.

<sup>182</sup> Aesthetics relate to formal qualities, which signify and represent; it is rooted in theoretical premises, engaging the mind. Affect, on the other hand, is a bodily experience, precritical and preceding analysis. An object's aesthetic features and its affective force are intrinsically linked. The encounter of form and feeling can create ethical engagement.

<sup>183</sup> In the context of this project, many of these questions border on the theological, and it is beyond the confines of this creative research to answer them.

<sup>184</sup> Wołodźko, *Affect as Contamination*.

<sup>185</sup> Ibid.

<sup>186</sup> Ibid. In this context Wołodźko speaks of 'infection ethics', taking a stand for fluidity and change through affective encounters, against the rules of surveillance, boundaries, and risk management.

<sup>187</sup> <sup>187</sup> I use the term 'inert' with reference to the recorded conversation with a project participant at g\_space Gallery in Nelson, in March 2023. See n. 138 above.

<sup>188</sup> Lemke, *Bio-Politics*, pp. 119–20. See n. 63 above.

<sup>189</sup> Mazumdar, 'Jewellery and Hybridity', p. 99.

<sup>190</sup> As explained in chapter 4, 'Speculative Experimentation', 'Nordic Gold' is the name given to the non-precious aluminium-bronze alloy used in modern gold-coloured currency. I melted €0.10, €0.20 and €0.50 coins to cast MiSeq frames and lids in this metal. In this way, many of my chokers, including *Strung*, *Clipped*, and *Taped*, have removed Euros from circulation.

<sup>191</sup> Povinelli, *Geontologies*.

<sup>192</sup> Sarah R. Gilbert, 'A Widening Chromaticism: Learning Perception in the Collective Craftwork of the Encounter', in *Material Perceptions*, Documents on Contemporary Crafts No. 5, ed. by Knut Astrup Bull and André Gali (Arnoldsche, 2018), p. 52.

<sup>193</sup> Benjamin Lignel, 'Showtimes', in his *Shows and Tales: On Jewelry Exhibition-making* (Art Jewelry Forum, 2015), pp. 86–95.

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<sup>194</sup> Skinner, 'What is Contemporary Jewelry?'

<sup>195</sup> Skinner, *Contemporary Jewelry in Perspective*, p. 75.

<sup>196</sup> As Liesbeth den Besten explains, in jewellery the term 'installation' is a loan-word and is generally used to describe contextualised environments that aim to present the work. This differs from installation art which, according to den Besten, goes back to the 1950s when 'happenings', 'events', and 'environments' became popular concepts. Thus, an installation is a self-fulfilling work of art, while jewellery installations and events tend to be used to transmit a story and might be better described as *scenography*, a term used by Ben Lignel in his article 'Showtimes'. See den Besten, 'On Jewelry'; and Lignel, 'Showtimes'.

<sup>197</sup> The three most common exhibition settings for jewellery are the shop, the museum, and the gallery, all of which employ a variety of barriers to secure and heighten the status of the objects on display, in turn removing them from lived experience. 'Like air in a vacuum, display equipment and mediation material must rush to occupy the empty space that surrounds jewelry — to protect it, to stand in for the body of prospective wearers, to prop it up and offer it to our eyes, to classify it.' Lignel, *Shows and Tales*, p. 12.

<sup>198</sup> Ibid.

<sup>199</sup> The seven annual *CLINKProjects* were published in the journal *Scope: Contemporary Research Topics* every year from 2014 to 2021 (issues 9–22), often written up by the entire collective <<https://www.thescope.org/journal/art-and-design>> [accessed 4 May 2024].

<sup>200</sup> In its initial iteration, the *CLINKProject* collaborators took their jewellery onto the streets and encouraged the public to participate and engage by either wearing these pieces or making their own jewellery. For the second project we reflected on our intentions to hold a popup exhibition on the street. Were we seeking to promote engagement with or awareness of contemporary jewellery? Was performativity inherently part of our objective? What would be the most appropriate response to current exhibition practices? That year we arrived at the collective decision to form a mobile human gallery. Clink Collective 2015, 'Project #2', *Scope: Contemporary Research Topics (Art & Design)*, 11 (2015) <<https://www.thescope.org/journal/art-and-design/art-and-design-11/project-2>> [accessed 3 February 2024].

<sup>201</sup> Lignel, 'Showtimes', p. 94.

<sup>202</sup> I approached artist Elizabeth Thomson, who invited me to show my work in her studio. Elizabeth works in large-scale, sculpted photographic objects and series of small sculptural works, primarily drawing on scientific observations.

<sup>203</sup> Skinner, *Contemporary Jewelry in Perspective*, p. 68.

<sup>204</sup> Gisbert Stach, *Fitting*, 2008, video, 4:3, 30min <<https://www.gisbertstach.de/fitting/>> [accessed 20 December 2021].

<sup>205</sup> Ibid.

<sup>206</sup> The familiar portrayal of patriarchal wealth being enacted on the female body is in keeping with the ideas of the Enlightenment and those emerging from the French Revolution. See Komesaroff,

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'Introduction: Postmodern Medical Ethics', p. 6; Marjan Unger, *Jewellery in Context* (Arnoldsche, 2019), pp. 61–63 and p. 136.

<sup>207</sup> Philosopher Georg Wilhelm Friedrich Hegel discussed this dialectic in a passage on the master and his slave in *Phänomenologie des Geistes* (Phenomenology of Mind). 'The master', said Hegel, 'is only the master if he is recognised as such by his slave'. Cited in Søren Kjærup, 'Art as the Other? Reflections on Craft's and Fine Art's Places in the Aesthetic Field', in *Material Perceptions*, Documents on Contemporary Crafts No. 5, ed. by Knut Astrup Bull and André Gali (Arnoldsche, 2018), pp. 13–29 (p. 17).

<sup>208</sup> Hoogland, *A Violent Embrace*, p. 36.

<sup>209</sup> Te Ara, 'Whakapapa – Genealogy'.

<sup>210</sup> Fisher, 'Tactile Affects'.

<sup>211</sup> Mazumdar, 'The Dual Matrix of Life', p. 155.

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# Appendix 1 – Approved Ethics Application



MASSEY UNIVERSITY  
TE KUNENGA KI PŪREHUROA  
UNIVERSITY OF NEW ZEALAND

## Ethics Application

Application ID :	SOA 22/62
Application Title :	Defying biopower: When contemporary jewellery resists biotechnology
Date of Submission :	14/11/2022
Primary Investigator :	Johanna Zellmer (Applicant)
Other Personnel :	Prof Kingsley Baird (Supervisor) Prof Julieanna Preston (Supervisor)

## Initial Assessment

### Project Detail

#### Human Ethics Application Risk Assessment Form

Does your research fall within the scope of the Code? The scope includes:

- All research involving either the participation of human or where the research impacts on individuals, groups or communities. This includes consultancies, contract research, staff research and supervised student research.
- Any teaching which involves the participation of students for the demonstration of procedures or phenomena that have a potential for harm.
- Any evaluation of university services, organisational practices or teaching programmes where information of a personal nature may be collected, where participants may be identified, or where the performance of staff may be commented on. This does not include routine organisational quality improvement activities, e.g. academic programme evaluations or service delivery projects but does include activities which have a research component and may lead to publications.

NB: Where research involves a Massey staff researcher using their own students as participants please refer to the [Decision Chart](#) in Section 2 of the Code.

## Applicant Information- PEER REVIEW

If your application is deemed to be high risk after the risk assessment questions have been answered, there will be an option for you to have your full application peer reviewed, prior to submitting it for approval. (This could be a supervisor if you are a student, or a colleague in the case of academic research). The process is as follows:

- Click on the 'Send for peer review' action.
- Follow the instructions given.

#### Note:

This process will send an email to your peer reviewer which contains a pdf of the application. The peer reviewer comments by email outside of the RIMS process.

This **IS NOT** part of the approval process.

Following comment (if any) from your peer reviewer, you must **STILL** submit the final application by clicking on the "Submit" action.

#### 1 Project Title:

*(Please limit this to a maximum of 25 words)\**

Defying biopower: When contemporary jewellery resists biotechnology

#### 2 Recruitment / Data collection start date:

*This date must be in the future.*

*Data collection /recruitment cannot begin until notification of submission has been received.\**

13/04/2023

#### 3 What date do you expect data collection and analysis activities to be completed by?

*Note: this must be done within 3 years of ethics approval.\**

01/03/2024

#### 4 Project Type: \*

- Academic Staff Research
- Professional Staff Research
- Postgraduate Student Research
- Undergraduate Student Research
- Evaluation
- Teaching

#### 5 Aim of the project:\*

This creative practice-led research considers the act of adornment as a symbolic event of resistance. As a jeweller, I craft wearable objects from Illumina flow cells, DNA sequencing instruments used for AI data collection and analysis. To further the cultural engagement with the magnitude of biotechnology, I disintegrate and rebuild the flow cells with their anonymous animal, plant, viral and human DNA into layered molten objects, reminiscent of fictional life forms and cataclysms. For ages, humans have used the perceived properties of biological material like lockets of hair, insects encased in amber, mammals' teeth, pigments and plants to transform themselves. Rooted in the daily practice of fabricating one's own image, adornment delimits cultural identity. Accordingly, the wearing of jewellery is posited as public assertion of oneself for or against norms. The project stresses that the world is entering an era of mass genetic surveillance with an impulse towards biological determinism causing discrimination. It generates questions of bioethics and biolaw. As such, this practice-led research broaches the complexity of the lived material world at the cultural divide between humanities and science. I consider dignity as inseparable from the human condition, and one that transcends biology. Through creative translation, the jewellery resists a reduction of human life to mere scientific observation and retrieves intangible conditions of existence. Such experiences resist control, monitoring and optimisation and are garnered in these receptacles of charged energy. Accordingly, the project explores the capacity of contemporary jewellery to resist the biopolitical production of identity. Biopower is effectively depleted through the processes of making and wearing. Forming collars or chokers, they become materially and symbolically enhanced hybrid adornment that exposes and defies biopower.

#### 6 Project Summary:

*Please outline in no more than 2000 characters in lay language (What you're doing, how you're doing it, who you're doing it with)\**

I transform discarded DNA sequencing tools into adornments that sit on the skin of a human body at or near the neck. The Illumina flow cells used in this project come from Sahlgrenska Genomics at the Gothenburg University (SE) and Otago and Massey universities' genomics facilities (NZ). These facilities produce data from plant, animal, viral and human DNA for a wide range of research projects. More than 90% of all sequencing performed is generated on Illumina technology. Illumina flow cells are laminated glass slides with hollow channels which house the DNA. A coating on the glass surface displays barcodes. The glass slides are secured in a variety of plastic frames containing RFID chips to identify and track the instrument. The entire unit is placed into the sequencing machine, where the target DNA is copied many times and subsequently read using fluorescence. Flow cells are single use only and discarded after each sequencing. At the stage when I receive them, they still contain unspecified DNA residues which are broken up and unreadable with current technologies. I dismantle the units in my jewellery studio and expose each of the materials to the forces of gravity and heat. These processes transform instruments for measuring biological data into an organic state of their own in which DNA traces are erased, barcodes discolour and distort, and RFID chips sear, rendering them inoperative. Fashioned as contemporary jewellery, the layered fragments are adhered onto the skin of participants' necks with SkinTite®, a skin silicone designed for stage makeup and prosthetics. This performative process highlights the daily practice of fabricating one's own identity, accentuates an emerging era of mass biological surveillance and demarcates the act of adornment as a symbolic event of resistance.

**7 Describe the peer review process that has been used to discuss and analyse the ethical issues present in this project**  
(maximum of 4000 characters)\*

I have been working closely with my Toi Rauwhārangī PhD supervisors Kingsley Baird and Julieanna Preston, together with external consultant Dr Craig Hilton. Early on, we identified the issue of the incorporeal nature of the bodily traces transported by these objects. A material thing like the flow cell cannot be disassociated from its immaterial nature. As outlined in Te Mata Ira: Guidelines for Genomic Research with Māori, human tissue and DNA from any genetic origin that connects to whakapapa are considered taonga. As is genomic data, being a representation of peoples' biological material and a highly valuable asset for Māori. Iwi recognise the value of DNA for its cultural and spiritual significance as well as its usefulness as a resource for research. Typically, the collected data in DNA processes is uploaded into databases. These bio-surveillance records can have discriminatory social implications that tend to amplify an already inequitable society; it can impact matters such as employment, parenting and health insurance. The fact that my material contains DNA fragments creates anxiety and raises questions regarding the likelihood of individuals being implicated through this work. I have been fortunate to be able to talk with several leading Māori artists, anthropologists and academics. These conversations revealed that a disruption of tikanga or tapu does not seem to be an issue. Rather, they pointed to the importance of appropriate actions at the completion of the project when the new knowledge has been acquired. That is to say, the work must be disposed of aptly at a suitable site via burial or incineration. This provides a pertinent conclusion to research which aims to contribute and present ethical questions arising from the constantly evolving technological advances and their impact on social and cultural changes. In terms of fixing the work to the skin, the relationship between object and wearer changes to a performative collaboration, temporarily becoming one with the body. The sensation of this close contact is vastly different from putting on customary jewellery objects. I have worn several of my heat-transformed artworks on my own neck and have had two professional members of my whānau applying a couple of works to theirs. Both agreed that the objects feel very much a part of the body and offer a distinct sensual knowledge-discovery. This experience cannot be replaced by a visual encounter like a video, images or showcases. In his online article 'Gathering Being: On Collecting and Making' philosopher Pravu Mazumdar considers jewellery's attraction to be founded in the materials' perceived transfer of magic to the body of the wearer <https://klint02.net/forum/articles/gathering-being-collecting-and-making-pravu-mazumdar>. This process of 'gathering being' is innately linked to jewellery's role as an ancient and essential intermediary, able to highlight the conditions of a social existence. Provided with comprehensive information public individuals will need to reflect on their cultural beliefs and values to determine if they wish to participate in the project.

**8 Summarise the ethical issues considered and explain how each has been addressed:**  
(maximum of 2000 characters)\*

The kōrero with tangata whenua so far denoted that the project, as I have outlined it to them, upholds tikanga in terms of the incorporeal nature of the bodily traces transported by these objects. Conversations have pointed towards the importance of what happens to the work at completion. This resulted in planning to incorporate an appropriate clearance of the work into the project, such as a burial or incineration at an approved site. Concerning identification, the likelihood of an individual implicated through this work is minute. The DNA within the discarded Illumina flow cells is broken up at the completion of the sequencing process and unreadable with current technologies. My objects are then kiln-fired between 850° - 1200° degrees Celsius over an eight-hour cycle, by which the biological material is removed. Geneticist and external advisor Dr Craig Hilton emphasized the implausibility of a highly specialised forensic scientist succeeding in isolating and sequencing the fragments contained in an Illumina flow cell before its transformation in my studio through heat beyond recovery of information. He elaborated, if this was to happen, only a tiny piece of DNA would remain and the probability that a match to a person could be made is practically absent. Ethics considerations are an important element of biopolitics and at the heart of this project. It is important that there is cultural engagement with science and technology decision making. As to the exhibition event, visitors have a choice to participate in an encounter that finds them given a consent form and then have a transformed object applied to their skin at the neck. Participation will include disclosure of any known allergies to silicone. The attached Safety Data Sheet for SkinTite® lists no known toxicological effects. All objects would be sanitised between applications and in the unlikely event of a reaction, participants would be directed to consult their GP or call Healthline on 0800 611 116.

**9 With whom did you peer review the ethical aspects of your research?**  
(maximum of 2000 characters)\*

Prof Kingsley Baird (Toi Rauwhārangī / CoCA), Prof/Dr Julieanna Preston (Toi Rauwhārangī / CoCA), Prof Robert Jahnke (Te Pūhahi-a-Toi / School of Māori Art, Knowledge & Education) and Dr Craig Hilton who has a PhD in genetics and biochemistry from the University of Otago and a Master of Fine Arts from the University of Auckland. Hilton worked at Harvard Medical School and the University of Massachusetts Medical School in the USA and is currently the National Academic Director at The Mind Lab in Auckland, NZ. Also, Scott Klenner who is Tumuaki: Rakahau Māori at Otago Polytechnic Ltd and a current PhD candidate at the University of Otago. His research concerns Māori education, dialogic teaching and student agency. Further, emeritus professor Dr Khyla Russell (Kāi Tahu, Kāti Māmoe, Waitaha, Rapuwai) who was on the advisory group for the publication Te Mata Ira: Guidelines for Genomic Research with Māori. Khyla graduated from the University of Otago with a PhD in Anthropology and was selected as one of ten Māori women leaders for the 2011 New Zealand Families Commission report, Mātiro whakamua. Also, Dr Gerard O'Regan (Kāi Tahu) who has worked in New Zealand heritage management for 30 years. His PhD at the University of Auckland explored Māori belief of place through the archaeological context of rock art. He is currently Curator of Māori at Otago Museum, Dunedin. Additionally, forensic facial approximation researcher Dr Louisa Baillie (PhD; DFA Hons; and BHSc from Otago University), who combines scientific, artistic and historical research for facial soft tissue prediction. Louisa encourages kinetic and touch sensory learning to facilitate students' 3D understanding of anatomy. Lastly, Dr Andrew Shelling, Associate Dean (Research) at the Faculty of Medical & Health Sciences and Acting Director for the Centre for Cancer Research at Auckland University. His research focuses on understanding the molecular changes that occur during the development of genetic disorders.

**Applicant**

**1 Applicant Department:\***

College of Creative Arts

**2 Ethics Category:\***

Human

3 **Campus of Chief Applicant:**  
(or Campus of Supervisor for Student)

- Manawatu  
 Wellington  
 Albany

4 Internal Personnel:  
Please add any additional team members here. For student applicants, please also add your supervisor(s) here.

1	Surname	Zellmer
	Given Name	Johanna
	Full Name	Johanna Zellmer
	Position	Applicant
	Primary?	Yes
	Work Number	034731600
	Email Address	Johanna.Zellmer.1@uni.massey.ac.nz
	Department	
	College	
2	Surname	Baird
	Given Name	Kingsley
	Full Name	Prof Kingsley Baird
	Position	Supervisor
	Primary?	No
	Work Number	
	Email Address	K.W.Baird@massey.ac.nz
	Department	School of Art
	College	College of Creative Arts
3	Surname	Preston
	Given Name	Julieanna
	Full Name	Prof Julieanna Preston
	Position	Supervisor
	Primary?	No
	Work Number	
	Email Address	J.Preston@massey.ac.nz
	Department	School of Design
	College	College of Creative Arts

5 External Personnel:  
Please add name of co researchers if unable to locate above

1	Full Name	Dr. Craig Hilton, external advisor / consultant
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**Health and Disability Ethics Committee**

Is Health and Disability Ethics Committee (HDEC) review required for this study?

- No  
 Yes

If you are unclear about whether approval from HDEC is required, please click on the links below.

[Operating Procedures for HDECs \(NZ Government Health and Disability Ethics Committees website\)](#)

[Find out if your study requires HDEC review \(NZ Government Health and Disability Ethics Committees website\)](#)

Please click on 'Save' to continue, then click on the blue button that says "Next Page: Risk Assessment Questions".

### Risk Assessment Questions

Does your research include:

*Note: all of the risk assessment questions are mandatory*

- a) **Situations where the researcher may be at risk of harm.\***  
 No  
 Yes
- b) **Use of a questionnaire or interview, whether or not it is anonymous, which might reasonably be expected to cause discomfort, embarrassment or psychological or spiritual harm to the participants.\***  
 No  
 Yes
- c) **Processes that are potentially disadvantageous to a person or group, such as the collection of information which may expose a person / group to discrimination.\***  
 No  
 Yes
- d) **Collection of information of illegal behavior(s) gained during the research which could place the participants at risk of criminal or civil liability or be damaging to their financial standing, employability, professional or personal relationships.\***  
 No  
 Yes
- e) **Collection of blood, body fluid, tissue samples or other samples.\***  
 No  
 Yes
- f) **Any form of exercise regime or manipulation (e.g. sleep pattern or dietary).\***  
 No  
 Yes
- g) **Any form of physical examination (e.g. physical, radiation, ultrasound).\***  
 No  
 Yes
- h) **The administration of any form of drug (including alcohol), medicine (other than in the course of standard medical procedure), or placebo.\***  
 No  
 Yes
- i) **Physical pain, beyond mild discomfort.\***  
 No  
 Yes
- j) **Any Massey University teaching which involves the participation of Massey University students for a demonstration of procedures or phenomena which have potential for harm.\***  
 No  
 Yes
- k) **Participants whose identities are known to the researcher giving oral consent, rather than written consent, other than for cultural reasons.\***  
 No  
 Yes
- l) **Participants who are unable to give informed consent.\***  
 No  
 Yes
- m) **Research on your own students / pupils. For Massey Staff - refer to the Decision Chart in section 2 of the Code. [Code of Ethical Conduct - Decision Chart\\*](#)**  
 No  
 Yes
- n) **The participation of children (seven (7) years old or younger).\***  
 No  
 Yes
- o) **The participation of children under sixteen (16) years old where active parental consent is not being sought.\***  
 No  
 Yes

- p) **Participants who are in a dependent situation, such as nursing home or prison, or patients highly dependent on medical care.\***  
 No  
 Yes
- q) **Participants who are vulnerable.\***  
 No  
 Yes
- r) **The use of previously collected identifiable personal information or research data for which there was no explicit consent for this research.\***  
 No  
 Yes
- s) **The use of previously collected biological samples for which there was no explicit consent for this research.\***  
 No  
 Yes
- t) **Any evaluation of organisational services or practices where information of a personal nature may be collected and where participants or the organisation may be identified.\***  
 No  
 Yes
- u) **Deception of the participants, including concealment or covert observations.\***  
 No  
 Yes
- v) **Conflict of interest situation.**  
[Code of Ethical Conduct - Special Relationships](#)  
*e.g. Is the project funded or supported in any way that might result in a conflict of interest, do any of the researchers have a financial interest in the outcome, or is there a professional or other relationship between the researcher and the participants? \**  
 No  
 Yes
- w) **Payments or other financial inducements (other than reasonable reimbursement of travel expenses or time) to participants.\***  
 No  
 Yes
- x) **A requirement by an outside organisation (e.g. a funding organisation or a journal in which you wish to publish) for Massey University Human Ethics Committee approval.\***  
 No  
 Yes
- y) **I wish to submit a full application for Training / Education purposes.\***  
 No  
 Yes

#### Risk Level

Risk Assessment

Due to your responses to the risk assessment questions, your application will need to go before the [Human Ethics Committee](#). When you click on 'Submit' you will have access to the full application to answer additional questions. Note that you will not be able to change the Risk Assessment during that stage.

The pages in the full application details section may not appear in consecutive alphabetical order, because they depend on your answers to the risk assessment questions.

Please click on 'Yes' to confirm and click on 'Submit' Action to display the full application \*

- Yes  
 No

#### Full Application Details

##### A. Full Application

A 1 **Do you wish the protocol to be heard in a closed meeting (Part II)?\***

- No  
 Yes

A 2 Select any linked Massey University application numbers or HDEC application numbers already applicable to this application and their relationship.

*This question is not answered.*

A 3 **Will you be recruiting participants for your research?\***

- No  
 Yes

## B. Project Details

B 1 **Project Type:**

- Academic Staff Research  
 Professional Staff Research  
 Postgraduate Student Research  
 Undergraduate Student Research  
 Evaluation  
 Teaching

B 2 **Background of the project.\***

Science and technology endeavours urgently need informed cultural interaction. This is especially true in the exponentially growing fields of genomics and genetic manipulation. A good example recently in New Zealand, occurred when scientists called for discussions with the public, Iwi and other academic disciplines regarding the implications of GeneDrive, the application of genetic alterations to eradicate species (pests in this case).

Physicist-novelist C.P. Snow stated in his notable 1959 lecture and book *The Two Cultures and the Scientific Revolution* that the division between the sciences and humanities is a major handicap to both cultures. Snow did later predict more optimistically a third culture that could potentially bridge this divide. Unfortunately, this has not really happened to any real extent and has been reiterated, amongst others, by Indian philosopher Dr Pravu Mazumdar in 2017 in his article *The Dual Matrix of Life: On Genetic Science, Art and the Truth Games of the "Third Culture"*. In this context he turns to jewellery art and concludes

[...] it comes as a surprise that jewellery art has hardly yet entered the exchange with genetic science and technology, despite its anthropomorphism, expressed in the fact that it positions itself between the human body and the world at large to enhance the physical and spiritual being of the wearer. However, [...contemporary works...] scrape past the socio-cultural challenges posed by genetic science and [...] its impact on human self-understanding since more than half a century. [...] It can only be hoped that jewellery art [...] finds its entry into the kind of critical discourse that has been practiced by bio-art since almost four decades. For [...] in jewellery art, the reflection embodied by a piece is in a sense absorbed by the entire body through the act of wearing it.

This practice-led project advances the agency of contemporary jewellery to contribute to this critical discourse.

B 3 **Outline research/teaching/evaluation procedures including approach/procedures for collecting data and analysis.**

*If flowchart required, add to Documents section later.\**

The practice of making is intrinsic to the methodology of this creative, practice-led research project, in which artistic actions become research actions. This research through or in art is a knowledge-discovery through the perception and production of art objects, as outlined by philosopher Jürgen Mittelstraß in his introduction to *Art and Research* (Vienna: Springer, 2011). In his terms, artistic discovery leads to sensually organised knowledge, in distinction from research on art, which leads to conceptually organised knowledge. In the same publication, Professor Henk Borgdorff subsequently unfolds this further as a 'material thinking', which articulates non-propositional knowledge and experience embodied in art works and creative processes. I believe this methodology becomes amplified in contemporary craft research with its inherent material tradition.

The project aims to make technologies of biopower perceptible by drawing on jewellery's inherent aesthetic and haptic responses through an engagement with the bare skin of the human neck, a site known for the way power, possession, constraint, and affect are played out. These processes will be documented both visually, in writing and via voice recording during the application and removal of objects at the skin of a participant's neck. This documentation is collected at an exhibition venue and is limited to the duration of the exhibition. Voice recordings will be transcribed by myself. The data articulates experience embodied in art works and creative processes, such as one's own perception of identity and social existence triggered by the wearing of transformed Illumina objects. Its analysis will be published in a catalogue-style spreadsheet containing images and text, which captures the object / processes / images of it being worn, showing the necks of anonymous wearers only / associations / captions / descriptions / verbal, physical and haptic responses / traces / observations and intentions.

B 4 **To establish achieved trustworthiness, describe the experience of the researcher and/or supervisor to undertake this type of project. \***

Johanna Zellmer was born in 1968 in Germany, where she completed a formal apprenticeship as a goldsmith. She holds a master's degree from the Australian National University Canberra School of Art. Her work explores the paradigms of migration, national identity and surveillance by highlighting contemporary jewellery as a tool for socio-political knowledge and instrument of identity politics. Upon invitation she became a grant holder of Sweden's esteemed IASPIS programme in 2019. During her three months residency at Konstpedemin in Gothenburg, she curated Allotropic, an international showcase of jewellery and photography in Munich, Germany. Her work is held in public collections internationally, was presented in New Zealand's TVONE series Neighbourhood and has been selected for the national Parkin Drawing Prize. Her contributions are published by Springer Nature in their series Craft—The Hand of the Creator, Celebration and Revival: Educating in the Crafts—The Global Experience.

A particular research interest of Professor Kingsley Baird's is the mutability of memory and identity and how this characteristic can be expressed through objects, their materiality, and construction. Memory and national identity are longstanding areas of investigation for Professor Baird and central themes in his "Odyssey Collection" project, which also examines migration and surveillance. He is the chair of the College of Creative Arts research group, The Memory Waka. The Waka initiates and supports projects concerned with memory including conferences, symposia and the publication of the Memory Connection online journal.

Professor Julieanna Preston explores material agency in the context of site-responsive durational live art encounters. These works are supported by research on the political, geological, industrial and cultural dimensions of the material and its place. The performances conjure a relational and affective dimension. Professor Preston's project "Ha/Hau" addresses circumstances of identity associated with migrancy, alienation, belonging, ethnicity, nomadism, and gender in performance films, installation and performance writing. This is informed by auto-theory, language-based artistic research and sound/vocalisation.

Professor Baird's and Professor Preston's research interests include a longstanding involvement in anthropology – particularly the material culture aspects of that discipline – through which they have established links with University College London's Department of Anthropology researchers.

Independent advisor and mentor Dr. Craig Hilton's conceptual art practice explores the intersections between science and art, technology and biology. His works in collaboration with artist Billy Apple begin to ask questions about the future of genetic information: how it is stored, accessed, controlled or made public; and the ethical, social and cultural considerations that come to the fore. He is particularly interested in how art might be able to contribute to dialogue regarding science, molecular biology, biological discovery and biotechnology, and the cultural implications of these technologies. Dr. Craig Hilton is a New Zealand scientist, artist and educator. After completing a PhD in genetics and biochemistry at the University of Otago in New Zealand, he took a position at Harvard Medical School and then later at the University of Massachusetts as an oncologist and immunologist. He then returned to New Zealand in 2003 where he obtained an MFA at the Elam School of Fine Arts, Auckland University. He is the current National Academic Director of The Mind Lab and Tech Futures Lab in Auckland.

**B 5 Describe the location/setting in which you will collect data? \***

Initially, the Illumina flow cells are dismantled in my jewellery workshop where the various materials are then transformed on workbenches and in kilns. Their rebuilding into layered and fused wearable objects in this studio setting is the first stage of data collection through material research. Subsequently, data is collected in a public gallery space, within the frame of Nelson Jewellery Week. For this occasion, most participants will descend on Nelson from all over Aotearoa specifically to immerse themselves in a range of jewellery related events. Both the adorning and its documentation will be undertaken within a group exhibition at a specified time in the gallery, in a corner not immediately visible from the entrance, giving some sense of privacy. Participants are invited to wear the jewellery by applying it to their neck, at which point the objects temporarily become one with the body and offer a distinct sensual knowledge-discovery.

**B 6 Is the location:\***

- NZ  
 Overseas

**C. Participants**

**C 1 How many participants will be involved?\***

There is no minimum number of participants for the research to proceed, as the research is not collecting data to ascertain general experiences. Given the specialist audience for this event, it is likely that I will get more than one participant. The booking sheet for participation (uploaded) allows for a maximum number of 21 participants.

**C 2 Provide the reason for selecting this number or the statistical justification (if relevant).\***

The duration of this exhibition event determines available collection days. Plus, the performative nature of the project, i.e., the time required for applying the jewellery and collecting participants' responses, naturally limits daily engagement.

**C 3 How will potential participants be identified?\***

Event organizers invite the public via an online programme. The researcher will send email invitations to the exhibition and potential participants will be free to approach the researcher / artist either by email, phone or in person. The researcher contact details are provided on the Participant Information & Consent forms and the event's webpage <https://www.nelsonjewelleryweek.nz/exhibitions/event>.

**C 4 How will potential participants be recruited?\***

Paper copies of the Participant Information & Consent forms will be available at exhibition venues and seminars. Rather than distributing these to visitors as they arrive at the exhibition, potential participants will be able to view the jewellery objects and photographic images on the wall, showing work worn and stages of the application / removal process. They can familiarize themselves with the content of the participation in their own time by taking printed hardcopies of the Information and Consent forms. Participation in this research is entirely voluntary and won't involve any remuneration or koha. A jewellery koha was considered in an earlier iteration of this project, but decided against, as it added a layer of complexity.

**C 5 Who will make the initial approach to potential participants?\***

The researcher will make information about available participation times known to the public as part of the exhibition information / artist statement.

**C 6 Does the project include recruitment through advertising?\***

- No  
 Yes

C 7 **Does the project require permission of an organisation to access participants or information?\***

- No  
 Yes

C 8 **Describe the intended participants and any specific inclusion/exclusion criteria to select participants.\***

Participants sought must be 18 years of age or older; must be proficient in English; and must not have any known allergies to silicone.

C 9 **Will you be using a screening tool?\***

- No  
 Yes

C 10 **How much time will the participants give to the project?**

*Ensure that this time matches the detail provided to the participants in the information sheet.*

1 hour of direct engagement with the researcher, plus a few hours of wearing the work in public. Total time spent will be no more than 4 hours (please refer to the booking sheet in the document section).

#### **D. Treaty of Waitangi**

D 1 Describe how the Treaty of Waitangi, with reference to the principles of partnership, participation and protection, has been considered and how your research affects Māori.\*

As outlined in the initial peer review process, I have been fortunate to be able to talk with several leading Māori artists, anthropologists and academics. Conversations so far denoted that the project, as I have outlined it to them, upholds tikanga in terms of the incorporeal nature of the bodily traces transported by these objects. As such, the korero revealed that a disruption of tikanga or tapu does not seem an issue. Rather, it pointed to the importance of appropriate actions at the completion of the project when the new knowledge has been acquired. That is to say, the work must be disposed of aptly at a suitable site via burial or incineration. This provides a pertinent conclusion to research which aims to contribute and present ethical questions arising from the constantly evolving technological advances and their impact on social and cultural changes, particularly for minority groups.

D 2 **Are Māori the primary focus of this project, or is it more than likely that participants are Māori (and ethnicity is being collected)?\***

- Yes  
 No

D 2.e **If your research involves the general population, outline how the involvement of Māori participants will be managed.\***

Firstly, I have asked in writing for permission to refer to the kōrero that I had with each of the Māori experts. I will formalise this by using Massey University's consent forms and credit them appropriately. I will continue to communicate and consult regarding ongoing research findings and questions as they arise over time to maintain and support meaningful, ongoing relationships. Secondly, in terms of the performative exhibition part of the project, individuals will be provided with comprehensive written information and a consent form and will need to reflect on their cultural beliefs, wairua and values to determine if they wish to participate.

D 3 Please outline the relevance of your research to Māori communities.\*

Māori communities have a succinct understanding of the power of adornment in identity politics. For example, Rangi Kipa in his recent keynote at the Objectspace Jewellery Symposium regarded the public wearing of taonga in the 80s as a political statement and compared it to the wearing of moko today. Rooted in the daily practice of fabricating one's own image, adornment delimits cultural identity. Accordingly, the wearing of jewellery is posited as public assertion of oneself for or against norms. My practice-led research stresses that the world is entering an era of mass genetic surveillance with an impulse towards biological determinism causing discrimination. It generates questions of bioethics and biolaw. Typically, the data that gets into databases is only a minute representation of a population, which has social and discriminatory implications. Bio-surveillance has the potential to compound an already inequitable society; it can impact matters such as employment, parenting and health insurance. This is of relevance to Māori communities and stretches across many populations. The project considers the act of adornment as a symbolic event of resistance to these associations.

D 3.a **Identify the group/s with whom consultation has taken place, describe the consultation process, and how issues raised in the consultation process have been dealt with.**

Please refer to the initial sections of this application where I have outlined consultation and peer review in detail, by considering and addressing ethical issues raised.

D 3.b **Describe any ongoing involvement of the individuals or group/s consulted throughout the project.\***

Throughout the project I will endeavour to maintain and support meaningful, ongoing relationships with the following individuals:

- Dr Craig Hilton, who is the external consultant to this PhD project and will continue in this role;
- Professor of Māori Visual Arts Robert Jahnke (Ngai Taharora, Te Whanau a Iritekura, Te Whanau a Rakairo o Ngati Porou), who I knew prior to starting the project and who deems the project at present conceptually strong;
- Ross Hemera, whom I connected with in my role as Artist-in-Residence Coordinator at the Dunedin School of Art in 2015 and have begun consulting about this project;
- Dr Khyia Russell (Kāi Tahu, Kāti Māmoē, Waitaha, Rapuwai), who has generously devoted time to previous creative research and has made herself available for ongoing consultation;
- Dr Louisa Baillie, who continues to contribute critical insights to my art practice;
- Dr Andrew Shelling, who has accepted an invitation to a cross-disciplinary panel debate on biotechnology and identity, which I am curating and hosting in Nelson next April;
- this panel is also attended by Metiria Leanne Agnes Stanton Turei (Āti Haunui a Pāpārangi, Ngāti Kahungunu ki Wairarapa, Rangitane), who I have gotten to know as a Master of Fine Art candidate during my time as postgraduate coordinator at the Dunedin School of Art;
- another invited panel member is Alex Nathan (Ngāpuhi, Te Roroa, Ngāti Whātua), who has been instrumental in my education about Māori wairua and tikanga when I first arrived in Aotearoa in 1994;
- and last but not least Munich-based, Indian philosopher Dr Pravu Mazumdar, whom I met at a conference, has become a mentor and friend and is currently writing a book on biotechnology and the human condition.

D 3.c Describe how project findings will be disseminated to the group/s consulted.

Invitations to participate in the creative PhD project's exhibition will be sent out to all consulted parties. It is reasonable to expect that not everybody will be able to attend. I will provide a written and visual report and would value further engagement via kōrero and wānanga.

E Cultural Considerations

Does your research focus on any ethnic or social groups (Other than Māori)?\*

- No  
 Yes

F. Consent

F 1 Who will give information about the research to potential participants?\*

The key researcher, PhD candidate Johanna Zellmer

F 2 How will the information be given to potential participants?\*

Via paper copies within the exhibition events and as email attachments to event invitations.

F 3 How will consent be obtained?\*

- Oral  
 Written  
 Implied  
 No consent required

F 5 Are any participants under the age of 16?\*

- No  
 Yes

F 6 If participants include persons whose capacity to give informed consent may be compromised, describe the consent process that will be used.

Conversations will be held in English, and participants are welcome to bring family and friends for support. They can request not to have other members of the public present. Audience numbers will vary depending on the day of the week and the time of day.

F 7 Will the participants be proficient in English?\*

- No  
 Yes

G. Data Collection

G 1 Select the type of data collection.\*

- Questionnaire  
 Observation  
 Focus Group  
 Interview  
 Other

G 3 Describe the observation process.\*

During the application and removal of the jewellery, the researcher will record participants' verbal, physical and haptic responses by using a voice recorder, photographic camera and a notebook. Physical and haptic responses may be reactions such as goose bumps, temporary imprints / traces from the removed objects, reflexes or vibrations.

G 6

The perception and production of art objects and photographs (e.g. the processes of making and wearing), as well as themed, organic conversation, not including formal questions.

G 7 Does your project involve sound or image recording?\*

- No  
 Yes

G 8 Does the project require permission to access databases?\*

- No  
 Yes

G 9 Does your research require a Privacy Impact Assessment to be submitted to the Massey Governance and Assurance Office?\*

- No  
 Yes

## H. Invasive Procedures / Physiological Tests

H 1 Will you be conducting any physiological tests or procedures? \*

- No  
 Yes

H 2 Will participants be given a health-screening test prior to participation? \* No Yes

- No  
 Yes

H 3 Does the project involve the collection of tissue, blood, other body fluids; physiological tests or the use of hazardous substances, procedures or equipment? \*

- No  
 Yes

H 4 Does the project involve the use of radiation?

*x-ray, CT scan or bone densitometry (DEXA)\**

- No  
 Yes

## J. Recording

J 1 Does your project involve a non-researcher transcribing the recording? \*

- No  
 Yes

J 2 Will you be providing participants with transcripts of interviews for editing? \*

- No  
 Yes

J 3 Provide justification as to why you consider that the right of the participant to edit is appropriate/inappropriate. \*

It is appropriate for the participant to be given the right to edit the transcript of their own responses. Having the jewellery objects adhered to the skin of their neck will likely affect participants' own perception of identity and retrieve intangible conditions of their existence. I am aiming to collect observations and responses during the application and removal of the jewellery via voice recording, written notes and photographs. Transcriptions will become part of a comprehensive catalogue-style spreadsheet containing images and text. I am seeking to capture participants' own and others' impressions of the object being worn; processes; associations; descriptions; their verbal, physical and tactile responses; traces and intentions. This type of information may reveal very personal and intimate details which could provide clues with regards to the participant's own identity. Only information relevant to the project will be transcribed.

J 4 If your project involves sound or image recording, describe how this will be undertaken and how consent will be given by the participant. \*

Participation is at a one-to-one basis at set times of the day. A sound recorder will be placed next to the participant and researcher to capture verbal responses. The researcher will take a close-up photograph of the participant's neck showing the object/s worn. If they are unable to reveal their neck for cultural and/or religious reasons, the close-up photo of this area will include the material veiling the skin. These processes are outlined in detail in the Participant Information & Consent Form. Each individual session will take 1 hour, split into two parts: An initial 30 minutes for the adornment process, and a further 30 minutes later in the day when the jewellery is returned. Participants can schedule a time in the printed booking sheet available in the exhibition (uploaded in the documents section). When choosing to participate, participants will need to sign the consent form.

Add Transcriber agreements to the Documents section

## L. Privacy/Confidentiality Issues

L 1 List any information that will be obtained from any sources other than the participant.

Other than information from the participants, no information from other human sources will be obtained.

L 2 Identify any information that may be given to any person outside the research team that may describe participants.

Colour photographs taken of the participants' skin, only showing a close-up of the neck with the adhered objects worn. If they are unable to reveal the skin of their neck for cultural and/or religious reasons, the close-up photo of this area will include the material veiling the skin. Neither their name or contact details will appear in any of the collected material. However, the colour images taken of the neck may reveal some information with regards to age group, gender, skin colour and possibly religion. They may also include tattoos or birthmarks as identifying information. Participants won't be asked to remove any jewellery they might be wearing on the day of the event; should they choose to wear their jewellery and it appears in the photo, it inevitably could provide further clues with regards to their identity. Further, written notes on participants' physical and haptic responses and observations will be collected as part of the project's publication, such as goose bumps, temporary imprints / traces from the removed objects, reflexes or vibrations.

L 3 Will participants identities' be known to the researchers? \*

- No  
 Yes

L 3.a How will the confidentiality of identities be maintained in the treatment and use of data? \*

Neither participants' names nor contact details will appear in any of the published material. Only information relevant to the project will be transcribed for publication.

- L 4 If an institution (e.g. school) to which participants belong is able to be identified, explain how you have made the institution aware of this.

- L5 **Outline how and where data will be stored, particularly identifiable data.**

[Section 2: \(Accessing and Sharing Data\) pg 14](#)  
[Appendix B: \(Authorship and Ownership\) pg 21](#) \*

The data collected will be securely stored in such a way that only the key researcher will have access to it, e.g., on an external hard drive and the researcher's personal laptop. The laptop is secured with a strong password and has an up-to-date virus protection, eset Internet Security. Digital data will be backed up on the external hard drive monthly. This hard drive remains in the studio, while the laptop stays with the researcher. The researcher will also apply online for a Massey Network Diskspace Allocation as a third point of storage. At the end of the project any information not selected for publication will be destroyed and the transformed Illumina objects disposed of aptly at a suitable site via burial or incineration.

- L 6 Outline how and where consent forms will be stored.

Signed paper copies of the consent forms will be stored securely in a designated folder in the researcher's studio space.

- L 7 **Outline who has access to data and consent forms.\***

The principal researcher.

- L 8 **How will the data / consent forms be protected from unauthorised access?\***

Consent forms and artwork will be stored in a lockable private workshop. Any digital versions will be saved onto an external hard drive in the same space. Digital data will not be shared or stored online.

- L 9 **How long will the data be kept?\***

5 years

- L 10 **Who will be responsible for its safekeeping and eventual disposal?\***

- Principal Researcher  
 Supervisor (for student research)  
 Head of School / Head of Institute

- L 11 **Will the data be transferred to an official archive or data sharing location?**

[Data Sharing. pg 22](#)  
[Publishing and Sharing Sensitive Data. pg 24](#) \*

- No  
 Yes

#### O. Sharing Research Findings

- O 1 **Describe how information resulting from the project will be shared with participants and disseminated in other forums.**

*Note that receipt of a summary is one of the participants rights. \**

The information and knowledge gathered from the project will be summarised in an illustrated, catalogue-style spreadsheet, containing images and text. This document will be made available in a printed format to share the results of the research with participants. It will also be used in other forums and future presentations. Participants will receive invitations to confirmed exhibitions venues and lectures.

#### P. Benefits and Risks

- P 1 **What are the possible benefits (if any) of the project to individual participants, groups, communities or organisations?\***

This project aims to contribute and present ethical questions arising from the constantly evolving technological advances and their impact on social and cultural changes. It is important that there is cultural engagement with science and technology. Science, the humanities, the arts, and the public benefit from participating in constructive conversations that inform decisions that affect our own and others' lives. The division between the sciences and humanities is a major handicap to both cultures. This practice-led research broaches this cultural divide by aiming to have informed public conversations about biotechnology, its application and impact on our lives and those of generations to come.

- P 2 **Are participants likely to experience discomfort (physical, psychological, social), incapacity or other risk of harm?\***

- No  
 Yes

- P 2.a **What discomfort (physical, psychological, social), incapacity or other risk of harm are individual participants likely to experience as a result of participation?\***

Psychological discomfort may be experienced in relation to the incorporeal nature of the DNA traces transported by the project's material, the Illumina objects. A material thing like the flow cell cannot be dissociated from its immaterial nature. A participant may become upset due to the thought of wearing jewellery that used to contain another person's DNA. The human neck is at once an explicitly public site and yet deeply intimate, with its aptitude for heightened sensation and vulnerability, desire and fragility. The sensation of being touched by another person may also be experienced as discomfort. Further, the sensation of the objects temporarily becoming a part of the body may be experienced as physical discomfort. Age, heredity, work environment and health all impact on the shape and size of human necks, the condition of their skin and their physical comfort or discomfort.

P 2.b Describe the strategies you will use to deal with any of the situations identified above?\*

If participants become upset due to the thought of wearing jewellery that used to contain another person's DNA, I will respond by reassuring that all physical traces have been erased in the process of making the work, as outlined in the Participant Information sheet. I will also explain that jewellery by its very nature always contains other people's DNA. Further, if they prefer to adorn themselves, I will provide instructions and advice and will be available to help with placing and adhering the object/s to the skin of their neck. The adornment is easy to remove, as the silicone peels off the skin without risk of harm. Antibacterial, biodegradable wet wipes and baby oil will be available to remove any residues. All objects will be sanitised between applications.

P 4 Is discomfort (physical, psychological, social), incapacity or other risk of harm likely to be experienced by groups/communities or institutions as a result of this research?\*

- No  
 Yes

P 4.a Describe the strategies you will use to deal with this discomfort.\*

Public individuals will need to reflect on their cultural beliefs and values to determine if they wish to participate in the project. Photographs capturing the jewellery's application, wearing and taking-off will be shown in the exhibition to provide further visual information.

P 5 Is ethnicity data being collected as part of this project?\*

- No  
 Yes

P 6 If participants are children / students in a pre-school / school / tertiary setting, describe arrangements you will make for children / students who are present but not taking part in the research.\*

Both the adornment and photography will be undertaken in a public gallery space and participants are welcome to bring family and friends to the event.

## Documentation

### Q. Documents

- Information sheet
- Consent Form

## Participant Information Form

### Project title

**Defying biopower:** When contemporary jewellery resists biotechnology

### General Introduction

I am a jeweller with a keen interest in identity politics. With this project, I am drawing on jewellery's inherent aesthetic and tangible responses by engaging the bare skin of the human neck. Your participation involves having jewellery pieces made from discarded DNA sequencing equipment adhered to the skin of your neck with a skin silicone called SkinTite®. This product is normally used in stage makeup and prosthetics. The neck is at once an explicitly public site, yet deeply intimate. We consciously adorn our necks, being aware of its symbolic power and need for protection with its precarious connective function between our head and the rest of our body. Your participation is entirely voluntary and involves wearing this jewellery for the duration of one day.

The jewellery is made from flow cells, which are DNA sequencing instruments used for AI data collection and analysis. Typically, the data that gets into databases is very narrow and not representative of a population, which has social and discriminatory implications, not to mention its colonising potential. The advancement of biotechnology, especially genomics, is impacting, and will continue to impact, our sense of identity, even our own concept of life itself.

Yet, our social existence and identity can never be described by mere scientific observation. Life is filled with experiential knowledge that cannot be secured, monitored, and optimised. Our experiences are often intangible and elusive. In their original state flow cells contain animal, plant, viral and human DNA. I expose each of the materials to the forces of gravity and heat in my jewellery studio. These processes erase all DNA traces. Here, the instruments for measuring biological data are transformed into an organic state of their own and take on the appearance of fictional life forms. This adornment offers an awareness of our existence within a world that is filled with charged energy and becomes a symbolic event of resistance to biotechnological governance.

### Aim of the project

With this project, I am inviting you, the public, to help us culturally engage with biotechnology and bioethics. The wearing of jewellery is put forward as a public assertion of oneself for or against norms. With this adornment you are publicly resisting a reduction of human life to mere scientific observation. Having these objects adhered to the skin of your neck will likely affect your own perception of identity and retrieve the intangible conditions of our existence. I am aiming to collect your observations and responses during the application and removal of the jewellery via voice recording, written notes and photographs at the beginning and end of the day. I will transcribe voice recordings later and make a comprehensive analysis of the collated information in a catalogue-style spreadsheet containing images and text. I am seeking to capture your own and others' impressions of the object being worn / processes / associations / descriptions / your verbal, physical and tactile responses / traces / observations and intentions.

During the day of wearing the work in public you may find yourself having conversations about biotechnology, its application and impact on our lives. Your engagement with this project advances the agency of contemporary jewellery to contribute to this critical discourse.

### Participants

Participants sought must be 18 years of age or older; must be proficient in English; and must not have any known allergies to silicone. Participation in this research is entirely voluntary and won't involve any payment.

### What will participation involve?

Should you decide to take part in this project you will be asked to sign a consent form, agreeing to:

- A. Have a **jewellery object/s** made from *Illumina* flow cells **applied to your skin** at the neck **using skin silicone**.
- B. **Book** a suitable time to **wear** this adornment for 3-4 hours; e.g. arrive at the event at 8.00 am for a 30 min application session and return at noon to remove it and discuss your associations and physical responses. This will take another 30 min.
- C. Disclose **any known allergies to silicone**, as this will prevent participation. The Safety Data Sheet for SkinTite® lists no known toxicological effects. In the unlikely event of a reaction, you would need to consult your GP or call Healthline on 0800 611 116.
- D. Have a **close-up photograph taken** of your neck showing the object/s worn. If you are unable to reveal your neck for cultural and/or religious reasons, the close-up photo of this area will include the material veiling the skin.
- E. Have **your voice recorded** for the purpose of transcribing your verbal responses.
- F. Have **notes on your physical and haptic responses** jotted down as part of the project's publication, such as goose bumps, temporary imprints / traces from the removed objects, reflexes or vibrations.

Both the adornment and photography will be undertaken within a group exhibition at a specified time in a public gallery space, in a corner not immediately visible from the entrance, giving some sense of privacy. All objects will be sanitised between applications. Conversations will be held in English, and you are welcome to bring family and friends for support. You can request not to have other members of the public present. Audience numbers will vary depending on the day of the week and the time of day.

### How will confidentiality and/or anonymity be protected?

Neither your name nor contact details will appear in any of the published material. However, the colour image/s taken of your neck may reveal some information with regards to your age group, gender, skin colour and possibly religion. They may also include any tattoos or birthmarks that could identify you. You won't be asked to remove any jewellery you might be wearing on the day of the event; should you choose to wear your jewellery and it appears in the photo, it could also provide further clues with regards to your identity. Only information relevant to the project will be transcribed for publication.

### What data or information will be collected and how will it be used?

Results of this project are intended for publication. Your voice recording and physical and haptic responses will be written up in detail and exist as an individual file together with your photo. Selected material will be printed and may be published in the format of an exhibition and accompanying catalogue. Parts of transcriptions might also be used in lecture-style presentations and academic journals.

#### **Data Storage**

The data collected will be securely stored in such a way that only the key researcher will have access to it, e.g., on an external hard drive and password-secured personal laptop. Data will be kept for 5 years. Any information not selected for publication will be destroyed and the transformed Illumina objects disposed of aptly at a suitable site via burial or incineration.

**Selected printed material will become the property of the researcher.**

#### **Can participants change their minds and withdraw from the project?**

You can decline to participate without any disadvantage to yourself of any kind. If you choose to participate, you may withdraw from the project without giving reasons for your withdrawal. You can also withdraw any information that has already been supplied, up until two weeks from the day your edited transcript is returned to the researcher. You can also ask for the photographic camera and / or the voice recorder to be turned off at any stage.

#### **What if participants have any questions?**

If you wish to participate, or would like some further information about the project, either now or in the future, please feel free to contact me either by email [johnel@unifone.net.nz](mailto:johnel@unifone.net.nz) or [Johanna.Zellmer.1@uni.massey.ac.nz](mailto:Johanna.Zellmer.1@uni.massey.ac.nz). Alternatively you can call me on 02041865315 or 034731600.

Any additional information given, or conditions agreed to, will be noted on the consent form.

***This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 22/62. If you have any concerns about the conduct of this research, please contact Dr Negar Partow, Chair, Massey University Human Ethics Committee: Southern A, telephone 04 801 5799 x 63363, email [humanethicsoutha@massey.ac.nz](mailto:humanethicsoutha@massey.ac.nz).***

## Consent Form

### Project title

**Defying biopower: When contemporary jewellery resists biotechnology**

I have read the information sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

- My participation in the project is entirely voluntary.
- I am free to withdraw without giving reasons and without any disadvantage. I can also withdraw any information that has already been supplied up until two weeks from the day my edited transcript is returned to the researcher. Withdrawal won't be possible after this date if my contribution is selected for publication.
- Data will be kept for 5 years. The data (including photos) not selected for publication will be destroyed. **Selected printed material for the purpose of exhibitions will become the property of the researcher.** Participation in this research won't involve any remuneration.
- The results of the project may be exhibited, published in a journal, or used at a presentation in an academic conference, but my anonymity / confidentiality will be preserved to the degree outlined in the information sheet.

### Additional information given or conditions agreed to

My contributions won't be published as of right; I understand that the researcher will retain the right and responsibility of selecting the most suitable contributions for exhibition. If my contribution is selected for publication, I will receive a print of my photo and a copy of the text, alongside with confirmed venues for exhibitions and lectures and invitations to these. I will have the contact details of the researcher and it is my responsibility to inform the researcher if my own contact details have changed.

I agree to take part in this project under the conditions set out in the Information Sheet.

..... (signature of participant)

..... (date)

..... (signature of researcher)

***This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 22/62. If you have any concerns about the conduct of this research, please contact Dr Negar Partow, Chair, Massey University Human Ethics Committee: Southern A, telephone 04 801 5799 x 63363, email [humanethicsoutha@massey.ac.nz](mailto:humanethicsoutha@massey.ac.nz).***



*Insert Laboratory Specific Name Here*

## illumina MiSeq Waste Disposal SOP

### 1.0 Purpose

The following document acts as a procedure on the proper disposal methods for illumina MiSeq waste.

### 2.0 Scope

This document applies to all staff that operate the illumina MiSeq and supervisors that oversee these operations.

### 3.0 Related Documents

Title	Document Control Number
N/A	<i>Specify number</i>

### 4.0 Responsibilities

Position	Responsibility
All laboratory staff	<ul style="list-style-type: none"> <li>Ensure the MiSeq waste is disposed of in accordance with manufacturer recommendations or program disposal procedures</li> <li>Follow documented waste disposal procedures</li> </ul>
Laboratory Leadership	<ul style="list-style-type: none"> <li>Ensure personnel are trained on the documented procedures for the disposal of iSeq 100 waste</li> </ul>
Safety Staff	<ul style="list-style-type: none"> <li>Ensure that all safety procedures are established and followed</li> </ul>
Quality Manager	<ul style="list-style-type: none"> <li>Ensure documented MiSeq waste disposal procedures are available to the end user</li> <li>Review records of instrument maintenance / calibration, as required</li> </ul>

### 5.0 Reagents and Media

Reagent	Manufacturer	Catalog #
Deionized water	N/A	N/A

### 6.0 Supplies, Other Materials

Supply/Material	Manufacturer	Catalog #
Absorbent Material	N/A	N/A
Pipette, pipette tips	N/A	N/A
Storage Bags	N/A	N/A
Spill Proof Storage Tray	N/A	N/A

### 7.0 Safety Precautions

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- 7.1 All practices and safety equipment must comply with the recommendations for the specific biosafety level (BSL) and as listed in the most current version of Biosafety in Microbiology and Biomedical Laboratories (BMBL).
- 7.2 Appropriate personal protective equipment (PPE) must be worn at all times when working in the laboratory, including laboratory coat, gloves, and safety glasses.
- 8.0 Formamide waste will be labeled for chemical waste disposal through the *Laboratory Waste Management System (specify your laboratory's system/process here)*.
  - 8.1 For the MiSeq reagent cartridge, a small amount of formamide is present in well 8 of the cartridge.
  - 8.2 Place tape over cartridge well 8 and place the entire cartridge in a storage bag (e.g., Ziploc bags). The bags can be left to accumulate in a spill proof tray.
  - 8.3 The spill proof tray will need to have a satellite accumulation label if it accumulates material beyond the use day.
  - 8.4 Once ready for disposal, *create a label for pickup (specify your laboratory's process for indicating waste is ready for disposal)*.
  - 8.5 Liquid waste from a run must also be disposed of as hazardous due to formamide content.
  - 8.6 Select the appropriate waste profile (*specify to your laboratory's waste management system profile*) (e.g., "Toxic liquid, organic, non-regulated") when creating the labels.
  - 8.7 Appropriately trained Hazardous Waste Management Personnel (*specify the title for these personnel in your laboratory*) packages the formamide waste cartridges and plates into drums and sends them to be incinerated. Since this waste is not regulated the extra weight from the cartridges does not change the waste generator status.
- 9.0 The flow cell undergoes a wash cycle after formamide exposure. Illumina recommends that the flow cell does not need to be discarded as chemical waste.
  - 9.1 The flow cell can be discarded as "hard waste", following proper hard waste disposal procedures.
- 10.0 Please see below for information regarding how to determine the concentration of formamide.
  - 10.1 For MiSeq, overall volumes will change depending on which version and cycle kit is used.
    - a. V2 has 50, 300, and 500 cycles
    - b. V3 has 150, and 600 cycles
- 11.0 Formamide concentration in the final waste solution of each run varies depending on the instrument and the length of the run. To determine the concentration of formamide, measure the final waste volume and perform the appropriate calculations as explained in the following table.

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Instrument	Version	Formamide Reagent	Position	Formamide Reagent Fill Volume (ml)	Formamide Waste Concentration Calculation
MiniSeq	v1	Denature Reagent	9	5.47	(Formamide reagent*) / (Total waste solution) = %  *Use fill volume if remaining formamide is also manually poured or automatically purged into waste solution.
MiSeq	v2	LDR	8	2.48	
	v3	LDR	8	2.48	
NextSeq	v2-Mid Output	Denature Reagent	6	16.89	
	v2-High Output	Denature Reagent	6	27.09	
HiSeq 1000/1500/ 2000/2500	High Output-v3	AT2	15	5.50	
	High Output-v4	FDR	15	7.05	
	Rapid v2	FDR	15	5.04	
HiSeq 3000/4000	v1	HDR	15	10.56	
HiSeq X	v2	PDR	15	10.56	
NovaSeq	S1 & S2	Denature Reagent	30	9.00	10%
	S4	Denature Reagent	30	22.00	10%
iSeq100*	i1	unlabeled	N/A	2.00	2.0 mL/144.5 mL = 1.4%

**12.0 Quality Control**

N/A

**13.0 References**

**13.1** [Reference Laboratory Specific Waste Disposal Procedure](#)

**14.0 Appendices**

N/A

**15.0 Revision History**

Rev #	DCR #	Change Summary	Date

**16.0 Approval**

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

Author

\_\_\_\_\_  
Print Name and Title

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor

\_\_\_\_\_  
Print Name and Title

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

Quality Manager

\_\_\_\_\_  
Print Name

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## Appendix 2 – Documentation of creative work

image	date	title, medium	trace e.g. exhibited, worn
	March 2021	<i>Untitled</i> , MiSeq plastic frames, RFID chips, monofilament	Unexhibited, worn by author
	March 2021	<i>Ruffle</i> , MiSeq plastic frames, monofilament	Unexhibited, worn by author
	March 2021	<i>Untitled</i> , Nordic Gold, MiSeq plastic lids, entomological pins	Unexhibited, worn by author
	March-April 2021	<i>DNA Collector</i> , Nordic Gold, sterling silver, MiSeq plastic lids, steel wire, entomological pins	Unexhibited, worn by author
	April 2021	<i>Untitled</i> , MiSeq plastic frames, RFID chips	Unexhibited, unworn

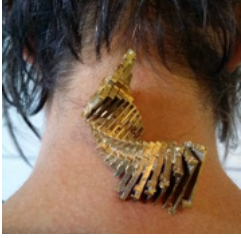




image	date	title, medium	trace e.g. exhibited, worn
	April 2021	<i>Helix</i> , Nordic Gold	Sold privately overseas, being worn
	May 2021	<i>Untitled</i> , NovaSeq plastic, waxed cotton	Unexhibited, worn by author
	May 2021	<i>Untitled</i> , NextSeq plastic frames, waxed cotton	Unexhibited, worn by author
	May 2021	<i>Untitled</i> , NovaSeq plastic frame, nylon ribbon	Unexhibited, worn by author
	May 2021	<i>Hard Cash</i> , Nordic Gold, suede thonging	Unexhibited, worn by author






image	date	title, medium	trace e.g. exhibited, worn
	May 2021	<i>Untitled</i> , NextSeq flow cell, binding wire	Unexhibited, unworn
	May 2021	<i>Untitled</i> , Illumina flow cells, Nordic Gold, RFID chips, sterling silver	Unexhibited, unworn
	June 2021	<i>Untitled</i> , Illumina flow cells, Nordic Gold, steel pins, sterling silver, NovaSeq plastic frame	Unexhibited, unworn
	June 2021	<i>My Great-grandmother's Bones#1</i> , NovaSeq and NextSeq plastic frames, Nordic Gold	Unexhibited, worn by author
	June 2021	<i>Repair</i> , sterling silver coin, Illumina plastic	Unexhibited jewellery object

image	date	title, medium	trace e.g. exhibited, worn
	September 2021	<i>My Great-grandmother's Bones#2</i> , NovaSeq and NextSeq plastic frames, Nordic Gold	Unexhibited, worn by several individuals
	September 2021	<i>Untitled</i> , Illumina flow cell, Nordic Gold, RFID chip, sterling silver, NextSeq plastic frames	Unexhibited, unworn
	September 2021	<i>Untitled</i> , Illumina flow cells, Nordic Gold, guitar string, beading wire, sterling silver, NovaSeq plastic frames entomological pins	Unexhibited, unworn
	September 2021	<i>Untitled</i> , RFID chips, self-adhesive silicone sheet	Unexhibited jewellery object
	September 2021	<i>Do not apply to body</i> , RFID chips, self-adhesive silicone buttons, cool pack	Unexhibited jewellery object

image	date	title, medium	trace e.g. exhibited, worn
	November 2021	<i>Untitled</i> , Nordic Gold, MiSeq plastic lid, rubber gaskets, stainless steel needle	Gifted at the Nelson Jewellery Week 2021 pin swap, Nelson, NZ, being worn
	November 2021	<i>Untitled</i> , NextSeq plastic frame, rubber gaskets, stainless steel needle	Gifted at the Alloy Collective pin swap, Dec 2021, Dunedin, NZ, being worn
	March 2022	<i>Untitled</i> , MiSeq plastic frames, RFID chips, steel pins	Unexhibited, unworn
	March 2022	<i>Untitled</i> , MiSeq plastic frames, Illumina flow cells, Nordic Gold, RFID chips, steel pins	Worn by author and exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2022	<i>Untitled</i> , MiSeq plastic frames, Illumina flow cells, Nordic Gold, RFID chips, steel pins	Unexhibited, unworn

image	date	title, medium	trace e.g. exhibited, worn
	March 2022	<i>Untitled</i> , sterling entomological pins, sterling Silver, Nordic Gold, MiSeq and NextSeq2000 plastics, RFID chips	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2022	<i>Untitled</i> , NovaSeq plastic frame, Illumina flow cells, glass headed pins	Unexhibited, unworn
	March 2022	<i>Untitled</i> , MiSeq plastic frames, RFID chips, steel pin, Illumina flow cell	Worn during validation step and exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2022	<i>Protean Being<sub>0</sub></i> , glass-headed pins, RFID chips, MiSeq and NextSeq2000 plastics, Nordic Gold	Worn by author and exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	August 2022	<i>Protean Being<sub>6</sub></i> , glass-headed pins, RFID chips, MiSeq and NextSeq2000 plastics, Nordic Gold, flow cells	Worn by author and exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ

image	date	title, medium	trace e.g. exhibited, worn
	August 2022	<i>Protean Being<sub>1</sub></i> , Nordic Gold, HiSeq and MiSeq flow cells and plastics, glass-headed pins	Exhibited and worn at <i>Talk 2023</i> (group show), g_space Gallery, NMIT, Nelson, NZ
	September 2022	<i>Untitled</i> , RFID chips, NextSeq2000 plastic clip, self-adhesive silicone buttons,	A section worn by author at the Objectspace Jewellery Symposium, 9 September 2022, Auckland, NZ
	September 2022	<i>Untitled</i> , glass-headed pins, RFID chips, MiSeq and NextSeq2000 plastics, Nordic Gold, flow cells	Worn as validation step towards exhibiting
	November 2022	<i>Hybrid Being<sub>1</sub></i> , Photographic print on Xray film	Exhibited at <i>Talk 2023</i> (group show), g_space Gallery, NMIT, Nelson, NZ
	November 2022	<i>Untitled</i> , sterling silver	Worn as validation step towards exhibiting






image	date	title, medium	trace e.g. exhibited, worn
	November 2022	<i>Untitled</i> , beef neck bone, sterling silver	Gifted at the Alloy Collective pin swap, Dec 2022, Dunedin, NZ, being worn
	November 2022	<i>There you are</i> , beef neck bone, sterling silver	Gifted to a panel member of the public debate, 'The Body is a Draft', NMIT Auditorium, Nelson, NZ, 15 April 2023, being worn
	March 2023	<i>Protean Being<sub>2</sub></i> , glass-headed pins, RFID chip, NextSeq2000 plastics, Nordic Gold	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being<sub>3</sub></i> , steel pin, sterling silver, Illumina flow cell, NextSeq plastic frame, plastic tab	Worn by author and exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being<sub>4</sub></i> , steel pin, Nordic Gold, NextSeq and MiSeq plastic frames, Illumina flow cell, RFID chip	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ

image	date	title, medium	trace e.g. exhibited, worn
	March 2023	<i>Protean Being</i> <sub>5</sub> , Nordic Gold, NextSeq2000 plastic clips, Illumina glass syringe, plastic tab, anodised aluminium	Exhibited and worn at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being</i> <sub>6</sub> , steel pins, RFID chip, sterling silver, MiSeq & NextSeq2000 plastic, Illumina flow cell	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being</i> <sub>7</sub> , glass-headed steel pin, Nordic Gold, MiSeq flow cell and frames	Exhibited and worn at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being</i> <sub>8</sub> , glass-headed steel pin, Nordic Gold, MiSeq flow cell and frame	Exhibited and worn at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Protean Being</i> <sub>9</sub> , steel pins, NextSeq and MiSeq plastic frames, Illumina flow cell glass	Exhibited and worn at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ






image	date	title, medium	trace e.g. exhibited, worn
	March 2023	<i>Hybrid Being<sub>2</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Hybrid Being<sub>3</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Hybrid Being<sub>4</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Hybrid Being<sub>5</sub></i> , photographic print on Xray film	Unexhibited
	March 2023	<i>Hybrid Being<sub>6</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ

image	date	title, medium	trace e.g. exhibited, worn
	March 2023	<i>Hybrid Being<sub>7</sub></i> , photographic print on Xray film	Unexhibited
	March 2023	<i>Hybrid Being<sub>8</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	March 2023	<i>Hybrid Being<sub>9</sub></i> , photographic print on Xray film	Exhibited at <i>Talk</i> 2023 (group show), g_space Gallery, NMIT, Nelson, NZ
	September 2023	<i>Untitled</i> , plastic tabs, glass-headed pins, flow cell glass, plastic clips	Unexhibited, unworn
	September 2023	<i>Untitled</i> , plastic tabs & frames, glass-headed pins, flow cells, Nordic Gold, RFID chips	Unexhibited jewellery object

image	date	title, medium	trace e.g. exhibited, worn
	September 2023	<i>Untitled</i> , plastic tabs, glass-headed pins, silicone gaskets, silver crimps	Unexhibited, worn by author
	September 2023	<i>Untitled</i> , Nordic Gold, HiSeq and MiSeq glass and plastics, glass-headed pins, plastic tags, gaskets and crimps.	Unexhibited, worn by author
	September 2023	<i>Untitled</i> , RFID chip, magnet, steel pins, plastic tabs, silicone gaskets, crimps, HiSeq glass	Unexhibited, worn by author
	September 2023	<i>Untitled</i> , RFID chip, magnet, steel pins, plastic tabs, silicone gaskets, crimps, NextSeq glass	Unexhibited, worn by author
	October 2023	<i>Untitled</i> , Nordic Gold, HiSeq and MiSeq glass and plastics, glass-headed pins, suction cups	Unexhibited jewellery object

image	date	title, medium	trace e.g. exhibited, worn
	October 2023	<i>Untitled</i> , Nordic Gold, SkinTite silicone, self-adhesive acrylic tape, glass-headed pins	Unexhibited jewellery object
	October 2023	<i>Clipped</i> , flow cells, silicone gaskets, RFID chips, plastics, aluminium, brass	Unexhibited, worn by author
	October 2023	<i>Strung</i> , flow cells, RFID chips, plastics, Nordic Gold, sterling silver, glass-headed steel pins, beading wire, magnets	Unexhibited, worn by several individuals
	October 2023	<i>Jugular RFID</i> , magnets, RFID chips, self-adhesive silicone buttons	Unexhibited, worn by several individuals
	October 2023	<i>Pinned</i> , flow cells, RFID chips, plastics, sterling silver, SkinTite silicone, glass-headed steel pins	Unexhibited, worn by author

image	date	title, medium	trace e.g. exhibited, worn
	October 2023	<i>Taped</i> , self-adhesive acrylic tape in varying work combinations	Unexhibited, worn by author
	October 2023	<i>Caught</i> , NovaSeq glass, steel pins, NextSeq2000 plastic tabs, silicone gaskets, glass-headed beading crimps	Unexhibited, worn by author
	October 2023	<i>Threaded</i> , glass-headed steel pins, MiSeq and NextSeq2000 flow cells, beading wire	Unexhibited, worn by author
	April 2024	<i>Untitled</i> , HiSeq and MiSeq flow cell glass, plastic clips, anodised aluminium, glass-headed steel pins	Unexhibited jewellery object
	April 2024	<i>Untitled</i> , HiSeq and MiSeq flow cell glass, plastic clips, anodised aluminium, glass-headed steel pins, Nordic Gold	Unexhibited jewellery object