

# Transformative Repair

## × ADC: Visual Analysis *of Works*

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**'More-than-textual' Original Article**

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This visual essay evidences how visual arts professionals from art, craft, and design disciplines are able to transform broken and waste materials in ways that are complementary, but not usual, to their current professional practice. Photos, sketches, and technical drawings illustrate a collection of case studies concerning the transformative repair and reuse of a range of categories, including furniture, homeware, model airplanes, clothes, tools, and vehicles. The article concludes that this collection of works contributes knowledge to creative forms of repair and reuse as an underdeveloped and under-researched practice within circular design and economy.

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**Keywords**


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 repair

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 reuse

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 transformative design

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 circular economy

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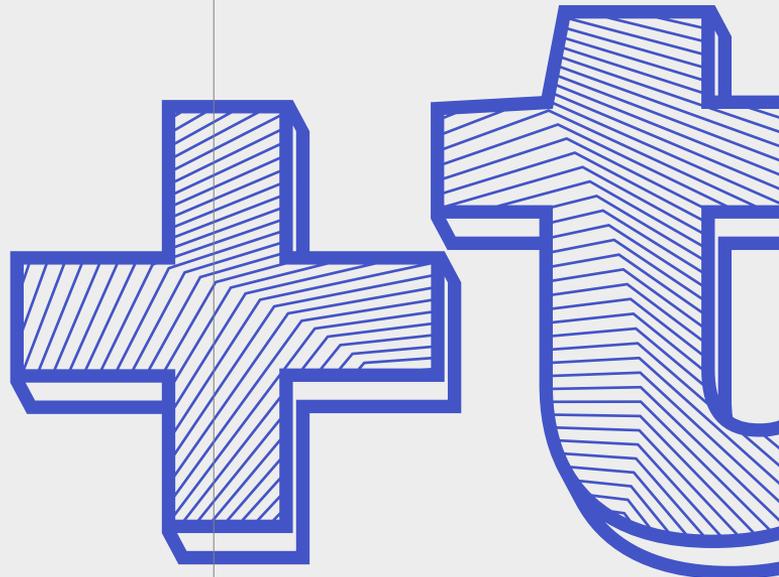
 waste crisis

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## Transformative Repair x ADC: Visual Analysis of Works

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## INTRODUCTION: TRANSFORMATIVE REPAIR AND THE NEED FOR CHANGE IN CIRCULAR ECONOMY

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Transformative Repair x ADC was a collaboration between the Australian Design Centre (ADC), the University of South Australia (UnISA), and the University of New South Wales (UNSW), part of a broader project including JamFactory Craft and Design Centre. The project develops and tests new approaches for the sustainable use of materials and products, testing new opportunities for repair and reuse services for the benefit of consumers and industry.

For this research, we hypothesized that visual arts professionals can transform broken and waste materials with great skill in ways that are complementary to, but not reflected in, their current professional practice, potentializing innovation in repair and reuse. To test this hypothesis, we obtained broken and waste products from specific people; for marketing advantage, these people were notable and/or had public profiles related to environmental causes. The broken and obsolete objects were then assigned to a range of visual arts professionals across design, craft, and art. Our brief was to apply 'transformative repair': a process or repair that transforms the function, appearance, or significance of a broken or obsolete object. This is a conceptual term that our first author developed across several projects (Keulemans, 2015, 2016; Keulemans et al., 2017; Keulemans & Rubenis, 2019) to categorize the creative reworking of broken or discarded consumer materials and objects in ways that revitalize their aesthetic appeal and cultural value.

The intention of these projects is to innovate the craft and design industry's response to unsustainable consumption by directing professional efforts towards the problem of broken and/or obsolete materials and products. Such objects, including clothing, electronic products, furniture, homeware, office products, and textiles, are not historically nor typically designed for circularity. Many consumer products are ill-suited to recycling, the most common circular process in the 21<sup>st</sup> century, due to the use of composite materials unable to be disassembled, or because recycling infrastructure doesn't exist. Nonetheless, when possible, recycling is a destructive process that requires high energy and often creates more waste by-product than repair and reuse (King et al., 2006).

Conversely, transformative repair can potentiate local low-energy transformations that preserve the integrity of the object or material, thereby addressing sentimental and cultural significances additional to values of function, aesthetics, or environment. In this project, the repairers were requested to not limit their creative processes to conventions of repair, and so the responses incorporate a range of slight to radical transformations that might be identified as customization, visible mending, up-cycling, or adaptive reuse. Transformative repair is, therefore, part of the broader emergent discourse on circular design and circular economy, albeit one with a less rigorously argued rationale due to the highly diverse range of possible transformations that can be applied to an already diverse range of products in post-consumer waste.

This visual essay illustrates, through photos, renders, sketches, and other imagery, that visual arts professionals apply their expertise to transformative repair in a highly considered and resolved manner. We provide a basic introduction to the works with additional information when required, to explain contexts and concepts—though these are largely self-evident from photos and illustrations. In the later discussion, we compare the project with precedent events concerned with repair and reuse, rationalizing our method and evaluating the outcomes.

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### **1. SALLY DAN-CUTHBERT × LIZ WILLIAMSON WITH TULLA CARSON**

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Australian weaver Liz Williamson and collaborator Tulla Carson were tasked with the challenge of restoring two 'Plan-o-spider' chairs provided by Sydney gallerist Sally Dan-Cuthbert. These chairs, designed in France by Hoffer and manufactured by Plan in the 1950s, presented a range of technical challenges, for example, removing and preserving the original manufacturer's sticker so that it could be re-applied after the chairs were stripped and repainted.

A more intractable problem occurred when attempting to reconstruct the webbing pattern on the chair. Despite using one chair for reference while working on the other, the design proved difficult to replicate. Leveraging her professional network, Williamson contacted fiber artists and basketry experts Nicole



→ **Figure 4.4:** Detail of the label on the rear leg, before and after repair. Plan, supplied by Sally Dan-Cuthbert, 2024. Liz Williamson and Tulla Carson, 2024.

→ **Figure 4.2:** Damaged 'Plan-o-spider' chairs. Plan, supplied by Sally Dan-Cuthbert, 2024.



1 For a technical explanation of the differences between weaving and interlacing, see Carr & Maslowski, 1995.

Robins and Chris Hitch, who noted that the design is not technically a weave, nor macramé, but rather a rotational interlace: a pivotal clue that helped Williamson and Carson discover the method to reverse engineer the 13-pointed star pattern. We see this as an example of repair expertise permeating across subtle disciplinary boundaries that even experienced practitioners may not distinguish at first review.<sup>1</sup>

Additionally, Liz Williamson made a series of four weavings from stretched elastic removed from the damaged chairs.



➤ **Figure 4.3:** Development materials. Liz Williamson and Tulla Carson, 2022.

➤ **Figure 4.4:** Left, replacing the rotational interlace, 2022. Right, detail of new swing tags woven by fiber artist Nicole Robbins, 2022.





➤ **Figure 4.5:** Transformed 'Plan-o-spider' chairs. Liz Williamson and Tulla Carson, 2022.

➤ **Figure 4.6:** First author with waste elastic from the damaged 'Plan-o-spider' chairs, 2022.

➤ **Figure 4.7:** Transformed elastic waste. Liz Williamson, 2022.



## 2. HUGO GRUZMAN × KYOKO HASHIMOTO & EBONY FLEUR

A 1:10 scale model airplane was the first of two damaged models provided to the project by musician Hugo Gruzman of the band Flight Facilities. Inherited from his grandfather Laurie Gruzman, an air-sea rescue aviator and inventor, this model was repaired in two different ways. The physical model was repaired by contemporary jeweler Kyoko Hashimoto using jewelry techniques in a simulation of the aluminum plate riveting repair technique used on full-size aircraft. Hashimoto noted that this repair was akin to an archaeological analysis, as she discovered the model had already been repaired many times before. She also embellished the model with contextual details gleaned from the history of the air-sea rescue airplane on which it was based.



**Figure 2.4:** Damaged model Cessna 310. Unknown maker, supplied by Hugo Gruzman, 2021.



↑ ↗ **Figure 2.2:** Media on Flight Facilities' Precision Aerial Delivery System (PADS), circa 1970-1990. Source: ABC News Archives. © Australian Broadcasting Corporation Public Access Archives.

→ **Figure 2.3:** Transformed model Cessna 310. Kyoko Hashimoto, 2022.

↘ **Figure 2.4:** 3D scan of the model Cessna 310 (hybrid LiDAR/photogrammetry, mesh with texture map). Guy Keulemans, 2021.



**Figure 2.5:** Flight Facilities Sea Air Rescue paraphernalia. Circa 1970-1990. Courtesy of Hugo Gruzman.



↳ **Figure 2.6:** Left, image of Flight Facilities, home of the Cessna 310 at Merimbula airport, date unknown. Source: ABC News Archives. © Australian Broadcasting Corporation Public Access Archives. Right, digital re-modeling of the Cessna 310, work in progress. Ebony Fleur, 2022.



The Cessna 310 model was also 3D scanned and sent to Texas-based Australian visual artist Ebony Fleur for a virtual repair, along with conceptual notes from Hashimoto. Fleur chose to reconstruct the plane using the 3D CAD modeling software Rhino, employing the 3D scan only as a reference to understand the plane's geometry and livery. She noted that clean models are preferred, and that "if you start with a mess in the beginning, then you end up with a gazillion headaches later down the road" (E. Fleur, personal communication, May 14, 2022). Photos of the 1:10 model and the real airplane were also used as references, although Fleur noted that these have issues due to distortion from depth of field and shooting angles. Her design is minimal; subtle and highly selective in terms of which visual elements to include. Fleur took inspiration from historical artifacts such as badges and paraphernalia provided by Gruzman, and from her own childhood living near the regional airport from which the sea-air rescue aircraft operated. Aspects of Hashimoto's repair of the 1:10 physical model were included, connecting the two different repairs. The final outcome was an animation, soundtracked by Gruzman, and published as a non-fungible token (NFT).

**Figure 2.7:** Transformed model Cessna 310, still from the digital artwork. Ebony Fleur, 2022.

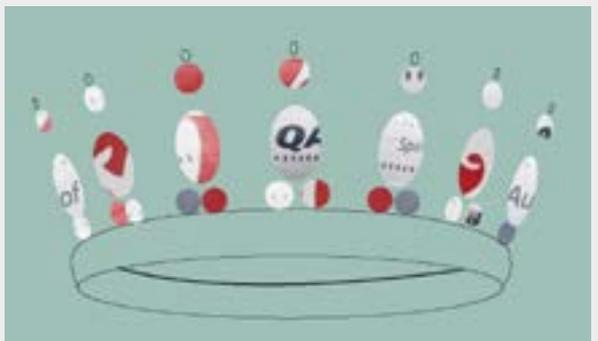
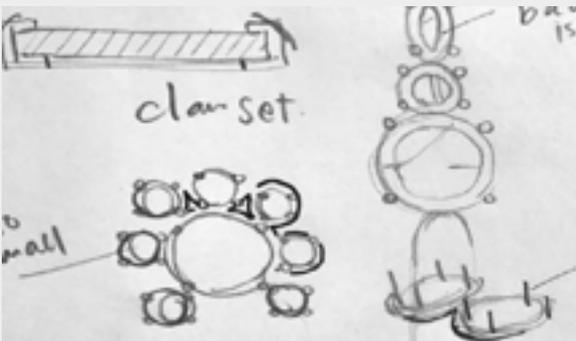




↑ **Figure 2.8:** Damaged scale model of a Qantas Boeing 747. Skyland Models, Slough, supplied by Hugo Gruzman, 2021.

↘ **Figure 2.9:** Conceptual development. Kyoko Hashimoto, 2022.

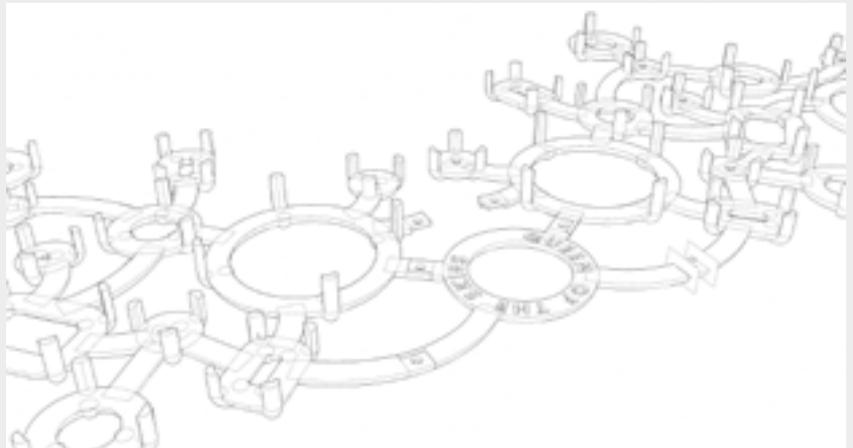
The second airplane model Gruzman provided to the project was based on a Qantas Boeing 747, a globally successful passenger jet only recently retired from service. As the jet was nicknamed in Australia 'the Queen of the Skies', Hashimoto used this title as a metaphor to transform the model into a crown. Computer-aided design and the contemporary technique of 3D wax printing were used to fabricate a positive of the crown for investment casting, followed by traditional jewelry techniques of hand-saw piercing, riveting, and claw-setting.





➤ **Figure 2.10:** Transformed model Qantas Boeing 747 'Queen of the Skies' crown. Kyoko Hashimoto, 2022.

➔ **Figure 2.11:** 3D CAD model of the crown flat before flowing into a cylindrical shape. Kyoko Hashimoto, 2022.



⤵ **Figure 2.12:** Left, a crown section in progress before final riveting. Kyoko Hashimoto, 2022. Right, the crown being worn. Kyoko Hashimoto, 2022.



### 3. **TIM FLANNERY** × **ILLIAM NARGOODAH**

Nyikina artist and craftsman Illiam Nargoodah, from Fitzroy Crossing in the remote Kimberley Region of Western Australia, received a broken axe from scientist, explorer, and conservationist Tim Flannery. Nargoodah was influenced by the imagery of colonial Australian lumberjacks, creating a visual narrative expressing the axe as an instrument of forestry production. The metal welded onto the axe to make the cabin and trees is sourced from derelict farm equipment. Nargoodah explained in interviews that his ‘make-do’ sensibility developed at a young age: “I always lived by this little coda. If I can’t buy it, I might as well make it. And if I can’t get the materials I need, you know, like (...) a plank of wood, and iron, it costs money, [but] there is heaps of metal in the bush” (I. Nargoodah, personal communication, May 6, 2020).

Nargoodah also used a small off-cut from his metalsmithing to create a replica miniature axe of the original, as a gift for Flannery.



➤ **Figure 3.1:** Broken axe, supplied by Tim Flannery, 2021.

➤ **Figure 3.2:** Man and woman in front of crude slab hut. Glass plate negative (dry plate). c.1900. Author unknown. Source: Art Gallery of South Australia, R. J. Noye Collection, gift of Douglas and Barbara Mullins, 2004.





↗ ↘ **Figure 3.3:** Left, transformed axe 'Unbranded'. Right, detail. Illiam Nargoodah, 2022.



→ **Figure 3.4:** Transformed axe, 'Miniature Axe for Tim Flannery'. Illiam Nargoodah, 2022.



#### 4. **Yael Stone** × **David Caon**

Australian industrial designer David Caon repaired and transformed a broken Piaggio Vespa motor scooter donated by actor and climate change activist Yael Stone. Caon describes this modification as a more useful and functional version. The process began by laser scanning the scooter while it was being dismantled, capturing the geometric data for attachment points so that new components could be accurately designed and fabricated. The scooter was also scanned with an iOS app, generating a less useful but cosmetically more complete 3D model of the scooter. Conversely, the initial laser scan with an Einscan Pro+ was more geometrically accurate, but struggled with resolving an integrated, complete model.

For Caon, the process combined aspects of his home life, such as his experience of fixing toys for his kids and repairing other things around the house, with his professional life designing products and airplane interiors. Caon's intensive ideation and concern for comprehensive designing are well documented in his concept proposal sketches and collages. The final scooter includes custom-made components for many features, including footwell runners, handgrips, racks, and decals.

**Figure 4.1:** Vespa LX125 (2006). Piaggio Vespa, supplied by Yael Stone, 2021.





➤ **Figure 4.2:** Left, 3D scanning of the Vespa using Einscan Pro+ on Windows 10 OS, 2021. Right, painting the Vespa, 2021.

➤ **Figure 4.3:** ios app 3D scan of the Vespa. David Caon, 2022.

➤ **Figure 4.4:** Above and below, before and after Vespa repair, detail. David Caon, 2021.





## 5. EDRA & CAMPANA BROTHERS × ADAM GOODRUM

Furniture designer Adam Goodrum obtained a large aluminum lamp designed by the Campana Brothers and manufactured by the Italian company Edra. The damage was relatively minor—some scratches and loose plates—but sufficient to prevent sale. The pendant lamp was changed into a floor-standing lamp: a simple yet deft transformation that was initially modeled and rendered in CAD. The remainder of the process was handcrafted, requiring a slow disassembly and re-assembly of hundreds of pieces of aluminum sheet by Goodrum and his studio assistant Xavier Taftt.



↗ **Figure 5.4:** Damaged Campana Brothers' lamp, manufactured by Edra.

→ **Figure 5.2:** Detail of broken rivet on damaged Campana Brothers' lamp, manufactured by Edra.





↗ **Figure 5.3:** Proposal renders, Campana Brothers' lamp, manufactured by Edra. Adam Goodrum, 2022.

→ **Figure 5.4:** Campana Brothers' lamp, manufactured by Edra, transformed into 'Displace Floor Lamp' by Adam Goodrum, 2022.



## 6. **BIANCA SPENDER** x **LUCY MCRAE**

The final work in the Transformative Repair x ADC project began as a box of un-saleable clothes provided by fashion designer Bianca Spender. Though Spender's studio has an active repair process for both pre- and post-consumer garments, these had defects and imperfections considered unrepairable. The garments were posted to Los Angeles-based Australian artist and self-described body architect Lucy McRae, who transformed the garments into cladding for a re-imagined sculpture constructed on top of a secondhand sunlounge. This sunlounge, which McRae purchased from Craigslist, was originally designed by Richard Schultz in 1966 and manufactured by Knoll. McRae develops her concepts using sketching and computer-aided design, but noted natural variation in textiles required a high level of craft in the fabrication stage. It was this workmanship, McRae's upholstery expertise and 'intense detailing' of labels and stitching, that drew Spender's attention and praise (B. Spender, personal communication, April 26, 2022).

**Figure 6.4:** Damaged garments, by Bianca Spender, 2021.



The work is aligned with McRae's interest in speculative futures, combining elements from her artistic themes of compression, emotional well-being, and survival in extreme environments. This work in particular mixes sea-rescue materials with Spender's garments. The lounge is a kind of 'machine' that can be entered for full-body immersion. During her interview, Spender lay down inside the lounge and reflected on the co-authorship of the work, materialized by McRae sewing her label adjacent to Spender's:

Labels are really interesting things, and I don't know if I ever imagined seeing my label on an object like this. I would love to see someone who wasn't

me trying to find the elements of the work in it. And I think it's very kind that she feels like I am a collaborator. (B. Spender, personal communication, April 26, 2022)

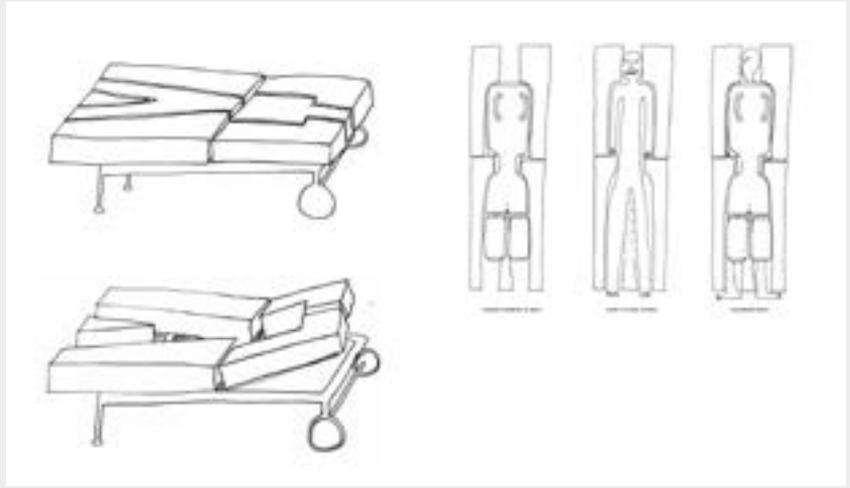
It is, however, not just the co-authorship of McRae and Spender expressed in the chair, but also that of Richard Shultz, the designer of the lounge infrastructure. We propose this co-authorship is one of the particular features potentialized by transformative repair that distinguishes it from normative or orthodox production, in which designers and creatives assert authorship over 'neutral' raw materials.

→ **Figure 6.2:** Secondhand purchased Richard Shultz sunlounge, manufactured by Knoll. Lucy McRae, 2021.

↳ **Figure 6.3:** Development mock-ups. Lucy McRae, 2021.



**Figure 6.4:** Concept sketches.  
Lucy McRae, 2021.

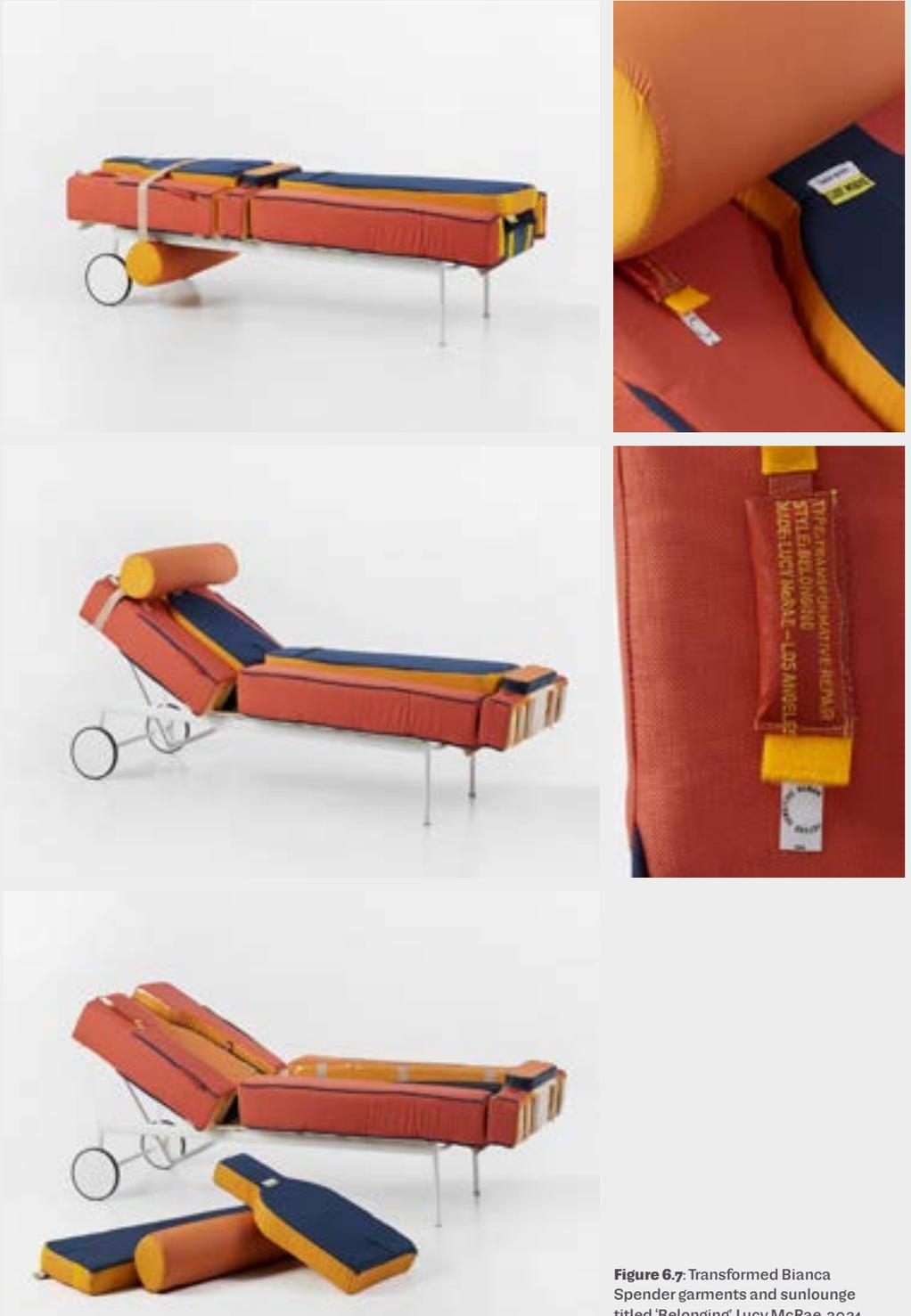


**Figure 6.5:** 3D render. Lucy  
McRae, 2021.



**Figure 6.6:** Bianca Spender  
inside the transformed  
sunlounge, still from the video  
interview, 2022.





**Figure 6.7:** Transformed Bianca Spender garments and sunlounger titled 'Belonging', Lucy McRae, 2021.

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## CRITICAL DISCUSSION AND REFLECTION

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This visual essay illustrates the innovation and novelty that can arise from the transformative repair practices of visual arts professionals with well-developed skill sets. The project has some similarities to precedents concerned with creative practices of repair and reuse, such as those dating from 2009's Repair Manifesto at Platform 21 in Amsterdam, or 2011's State of Design Festival's Repair Workshops in Melbourne. However, these events included do-it-yourself (DIY) non-expert practices among the general public. It has been noted in repair workshops that participants without visual arts or craft expertise struggle with the 'meta-design' aspects of transformation through repair, suggesting the need for experienced practitioners to lead and innovate repair craft (McClaren & McLaughlan, 2015).

Events that involved skilled participants include Broken But Not Defeated in Istanbul (2012) and the University of the Arts London's The Department of Repair (2015); but those events invited practitioners already versed in creative forms of repair, rather than introduce repair and reuse as a new practice to professionals. Object Therapy (2016) introduced transformative repair practices to visual arts professionals and used qualitative methods to capture the public perceptions of the results, but did not capture in-depth perceptions of the repairers, nor visually documented their development processes. The project Transformative Repair x ADC discussed in this article addresses that gap in the method.

There is a visually apparent 'expertise' in this case study's works, but this should not be conflated with 'ease'. The repairers considered the work complex and time-consuming; the imagery indicates as much. Some participants claimed the brief was both technically and conceptually arduous. Though compensated via research funding, some participants noted the work was not well aligned financially with their market or clientele. There is clearly a complex problem concerning the difficulty of repair and reuse (as an outcome of cost, time, and labor) in relation to the market perception of its value, which inhibits broader uptake by the industry. We reserve analysis of this problem for a paper of greater length.

Nonetheless, despite some difficulties in the process, the works here illustrate how visual arts professionals are able to apply stylistic and formal modifications to broken objects, repairing them in particular ways. They are shown to: a) restore function and improve appearance (Williamson and Carson's chairs, Goodrum's lamp, Caon's motorscooter); b) unearth and communicate personal or cultural narratives (Fleur's NFT, Hashimoto's crown, Nargoodah's axe); and c) discover and convey intrinsic properties of transformative repair itself (such as McRae's expression of co-authorship through labels). We believe these works express qualities of transformative repair that are yet to be fully articulated in the discourse on circular design and economy, but are conveyed here through visual

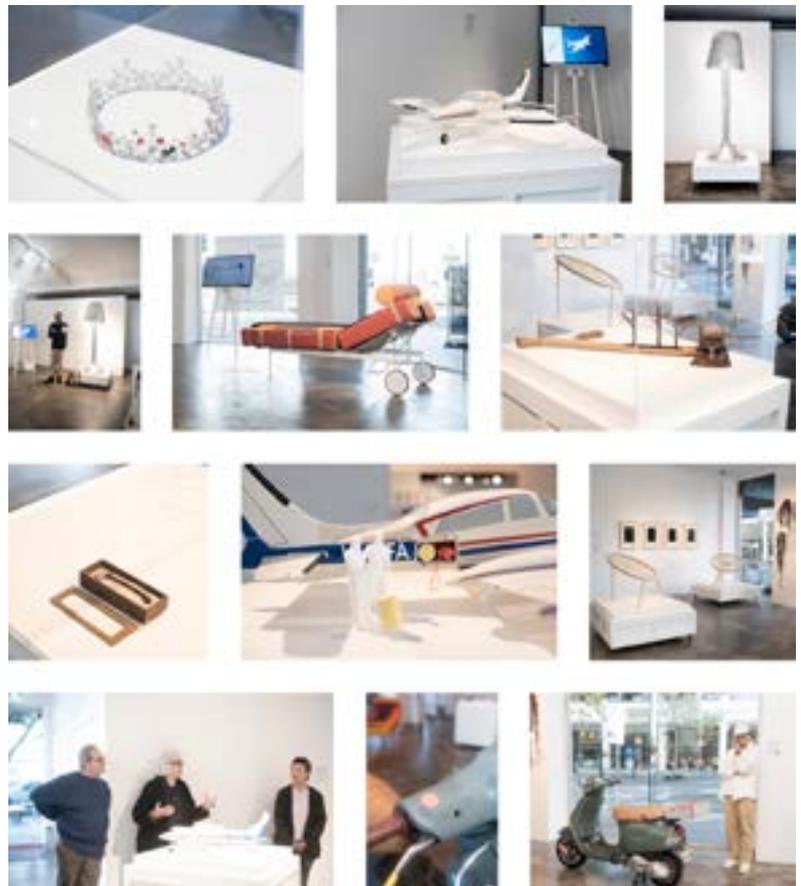
evidence, establishing foundations for further analysis, and expanding the theory and methods of sustainable design and craft. **D**

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Studio photographs: Traianos Pakioufakis and Carine Thevenau.

**Figure 7:** Exhibition photographs for Transformative Repair x ADC. Australian Design Centre, 2022. Photographs: Carine Thevenau.



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