



# FEMUFACTURE



# FEMUFACTURE

Masako Ban  
Rina Bernabei & Kelly Freeman  
Erina Kashihara  
Belinda Dunstan  
Aki Inomata  
Tricia Flanagan

Curated by Tricia Flanagan

**Computational Craft Practices** between Japan and Australia

The Japan foundation Gallery  
Level 4, Central Park, 28 Broadway  
Chippendale NSW 2019  
[www.JPF.org.au](http://www.JPF.org.au)  
February 6 - March 30 2019

Sydney Design Festival 2019  
[www.Sydneydesign.com.au](http://www.Sydneydesign.com.au)

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## INTRODUCTION

DR TRICIA FLANAGAN

FEMUFACTURE explores the hybrid space between traditional crafting techniques and contemporary digital fabrication technologies. The exhibition is a diverse showcase of experimental works created by merging traditional and new technologies across different mediums.

We are living in liquid times, in the post-digital age, where networked systems of logic are the undercurrent to our existence. The digital has not superseded the physical material

world, rather a digital mindset has entered our collective consciousness and it informs our systems of production.

FEMUFACTURE reveals design processes that supersede the mass reproduced widgets of the manufacturing era, to forms of production that enable reflexive rather than indexical design.

We have seen the rise of STEM (Science Technology Engineering Medicine) across academia. Recently the acronym has become STEAM with the addition of Art.

A materialist turn in the humanities has enlivened the debate about the notion of embedded material practice and we hear phases coming into the vernacular like critical crafting and digital fabrication and with it a recognition of their role within technology and innovation.

The title for this exhibition was born in conversation with Belinda Dunstan, and the works in the FEMUFACTURE exhibition continue the conversation suggesting three themes.

Designing hybrid forms that emerge between digital production and traditional crafting techniques are Masako Bans laser cut jewellery and bags, and Rina Bernabei and Kelly Freemans 3D ceramic printed vessels.

Designing future technologies by observation of new forms of movement of machines and bodies are Belinda Dunstan's soft robotics and Erina Kashiwara's LED light works.

Experimenting with forms of production that are not based on design as

dominant over material, but defining design process that engage with state changes, growth, erosion, calcification etc, as agents of change within the design process are embedded in Aki Inomata's collaboration with other species and in my own work with weather systems and walking.

## FEMUFACTURE

considers the experimental application of technology by female practitioners leveraging traditional crafting sensibilities. Through an exploration of processes

of creation, building and co-existing technologies the exhibition aims to formulate new understandings and expectations for the future of design.

## ESSAY

## To Make Up A Whole World

STEM disciplines and developments.

DR ELENA KNOX

For two and a half years I have been resident artist in the science and engineering department of a Tokyo university. Women consistently make up fifteen percent of the department's students.<sup>i</sup> Engineers are an influential group among society's makers: people who test and drive design, directing the mainstream from model to manufacture. For women to be adequately represented in this cohort, we must press further into the conversations of

The dialectic is familiar: if we don't include more women in these conversations, then we are missing out on perspectives and skills derived from the specific ways in which women are socialized; if women are included equally in the group, then potentially these differences might begin to vanish. We have yet to be able to test the latter hypothesis because we are just fifteen percent of the authoritative group (less, in the professional arena after graduation).

<sup>i</sup> Waseda FACTS 2014-2018, [waseda.jp](http://waseda.jp)

We can, though, examine the former hypothesis, as does the exhibition 'Femufacture' in highlighting the perspectives and skills of four Australian and three Japanese women who design and make.

Artist/curator Tricia Flanagan presents 'a synergy of digital and analogue craft', observing that 'although it is not an overtly feminist exhibition, we draw on knowledge of traditional craft - women's work - in each of our practices.'<sup>ii</sup> As digital methods increasingly suffuse design and fabrication, an urgent concern of feminist technoscience is to scrutinise how we digitise historic practices, and which social values are replicated, embedded,

mitigated or enhanced in the adoption of new technologies. Jennifer Robertson, an anthropologist of Japan's tech scene, has tagged some of this synergistic output 'retrotech': new tech with retrograde sensibilities.<sup>iii</sup> But instead of building retrotech, a scene of rapid change in approaches to production can be an opportunity to rebalance our values.

We must have a complicated relationship to the phrase 'women's work'. Standard classifications encompass work behind-the-scenes and the work of simply being seen. This polarity lends itself to deconstruction in performance art,

ii Email from curator, 21 January 2019

iii J. Robertson, *Gendering Humanoid Robots, Body and Society* 16.2 (2010)

wherein one knows one is the product and can rebel against this objectification, whilst also revealing the enabling labours of backstage and back-of-house.

As to object design, the *techne* is less literally performative, but the analogy can be drawn. To have a crafted work, or the design for such a work, take up limelight - to be observed as the work, not the worker, being neither the 'warm prop' nor the lead actor's apparatus - has not been women's work. Very generally speaking, women's manufacturing has played a supporting role.

Traditionally, women have made useful things that are wielded daily, worn down, worn

through and out. Low-status yet indispensable things, like clothes, bags and baskets, processed food and furnishings, without which humankind would be less civilized. These are things that are touched, held, worn, digested, implemented against other materials. They are prized for their facility to complement, produce and enrich other things.

In imagining a fifty-fifty conversational weighting, women are therefore bringing to bear expertise, forged over time, in crafting and designing for endurance, for material usefulness. We rethink and reposition expertise where it is not usually acknowledged. New-materialist theorists have suggested that

status in materiality should be – and indeed inherently is – non-hierarchical. The Japanese context is an intelligent context in which to explore this suggestion. Objects and raw materials are not conceived as so separate from living beings; they command care and respect. Considering this horizontality, the manufacture of peer parity across genders does not seem implausible.

The Japan-born discipline of *kansei kougaku* concerns the engineering of emotion in product design. Without at all advocating the ghettoization of women engineers into this field, one might observe that women bring

differential expertise to it.<sup>iv</sup> Having been schooled in a particular service – in this case sensitivity to others’ emotions – builds up skill, nuance and resilience. It is not that particular talents come ‘naturally’, but that a foundational, intersectional sophistication already exists.

Can we design diversity? A contemporary inclination in fine art toward ‘collaborating’ with non-human forms of agency almost caricatures a desire for non-hierarchy that is especially relevant for feminist artists, given such deficit in participation and influence as referenced at the top of this article. Art co-produced with

iv Y. Shimizu, 女脳と男脳のコラボレーションが創る感性工、学織維学会誌 Textile Society Journal 61.3 (2005)

non-human agents can be read as displaying our dis-ease with dominance. Invoking non-hierarchical affordance in art and design represents deep research into diversity (though non-hierarchy is perhaps only extant in realms of pure philosophy; it is moot in ecology or sociology). Composing with animals, plants, weather, generative algorithms and objects externalizes the problem of how a production system might thrive without subjugating any of its constituents.

Currently many creative women are tackling this problem; one might say they perform a relaxation of control. Aki Inomata's recent sculpting with beavers, Michaela Davies'

embodiment of seismic data, Caroline Sinders' machine learning, Hanna Saito's and Jenna Sutela's slime molds, Sputniko's and Vivian Xu's silkworms, and Robertina Šebjanič's sonic crystal lattice are but a few examples. Various, they express either that control is illusory, or that the grip is too tight and overbearing for the good of the planet and more than half its inhabitants. They celebrate expertise and creativity located outside the self.

Artist Yoshiko Shimada writes of being 'connected to others in many different, conflicting and organic ways. I imagine this multi-directional and multi-layered way of connecting oneself to

others and to society as the ideal of feminism, as opposed to the rigid, vertically structured social system.<sup>v</sup> In her notes for 'Femufacture', Inomata quotes Donna Haraway: *how to get on together is at stake*. Extending beyond compromise, existence in the networked digital age requires a fundamental acceptance of lived contradiction such as found in Japan's spiritual canon. We are organic and artificial; we sit with system/ disorder, code/chaos, constraint/freedom; we re-form the world anew each moment while embodying the ages. But as we remake the world, there are chances to notice where we have become rigid or too focused on narrow arbitrary criteria, rather

than fluid in making a generous adaptive life amidst complex conflicting forces.

In Japanese traditional philosophy, it is an object's privilege and wish to be used; use makes 'sense' of its 'life'. For women engineers, makers and designers, multi-valent involvement is crucial. To be of use in designing the future of things and their interfaces; to make up half the cogs in the machine of the world. The art in 'Femufacture' riffs on usefulness: from robotics to body ornamentation, there is nothing displayed that does not reference its own usual use. Its inclusion, its unique perspectives and also its general applicability need to be championed, as Japan

Foundation is doing here.

Dr Elena Knox is an artist and scholar.  
elenaknox.com

v Y. Shimada, *Escape from 'Oneself'* (Tokyo: Ota Fine Arts, 2002)



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# DIGITAL FABRICATION

The rapid growth of technology has brought the affordability of digital fabrication tools within reach for many, bringing a decrease in fabrication costs, and transferring the ability to produce design to the masses. Replacing *mass production*, we are seeing atomised and distributed *production by the masses*.

New ecologies of maker spaces, hacker spaces and fab-labs have disrupted traditional top-down manufacturing chains and offer more sustainable methods that are flexible and agile. Artefacts can be made on demand and customised pre-production. It is no longer necessary to stockpile widgets in warehouses, or for bodies to be



wing

categorised to fit generic size specifications. The fungibility of data enables production to be distributed avoiding environmental costly transportation infrastructure.

In FEMUFACTURE digital fabrication finds form, expressed through the seductive surfaces of 3D printed ceramic and laser cut materials by Masako Ban and Rina Bernabei / Kelly Freeman.

Their work is part of the fourth industrial revolution characterised by the emergence of hybrid forms that blend digital production and traditional crafting techniques.

ware milieu

apan Foundation

Modes of digital fabrication are constantly regenerating, born in the fuzzy periferal edges between physical, digital and biological spaces. From the fusion of emergent technologies, additive manufacturing, sustainable systems and smart materials - bespoke artefacts herald a future of *crafted mass production*.

■ University of New...

■ Weaving

■ Brazing

## MASAKO BAN

Bracelet Bag RENZ  
White + Honeycomb, 2018  
(basic design 2007).

Photo credit: Seiji Oguri  
© acrylic 2018

I am attracted to industrial materials. Their special atmosphere, which is created by the fact that each of them is invented for a particular purpose, fascinates me. The material itself is the main character. Keep the design simple. For example the main material of the Bracelet Bag RENZ is PVC fabric used for furniture which is red wine stain proof. The bag handle is made with aluminium honeycomb which is also used for spacecrafts; this is put in an acrylic mould. From the materials to production, all made in Japan.

Masako Ban creates jewellery and accessories through the manipulation and refiguring of industrial materials. The material itself is the principle feature of her pieces. From the materials to production, she makes her work entirely within a Japanese vocabulary. With a background in architecture and graphic design, Ban began designing accessories in 2001. She established "acrylic" in Tokyo in 2003, and by 2005 her first collection has been selected for the MoMA Design Store, New York. Her works are available in international art and design institutions and retailers.  
<http://www.acrylic.jp/>



## RINA BERNABEI / KELLY FREEMAN

Variations: Crafting digital  
decoration, 2019

Vessels 1-5: 3D printed  
tinted stoneware ceramics,  
fabricated brass sheet.

Photo credit: Rina Bernabei  
© 2019

Variations (2019) examines the relationships between handmade craft practices, digital technologies and manufacture. Through the immediate and intricate design process of these digital fabrication modes, we explore how new and old forms, decoration and crafting can create 'hybrid' forms and languages, applications and emotional values.

In this series of vessels, Bernabei/Freeman investigate how to merge traditional decorative design and craft qualities, with those of digital fabrication. Using domestic ceramic decoration of the 60s and 70s as a reference point, and reinterpreting these through digital design software and

3D ceramic printing fabrication; completed with handmade and lasercut brass components. The design and production process examines the contradictions and similarities of traditional decoration and forms with the new visual and formal language of 3D ceramic digital fabrication.

<http://www.bernabeifreeman.com.au/>



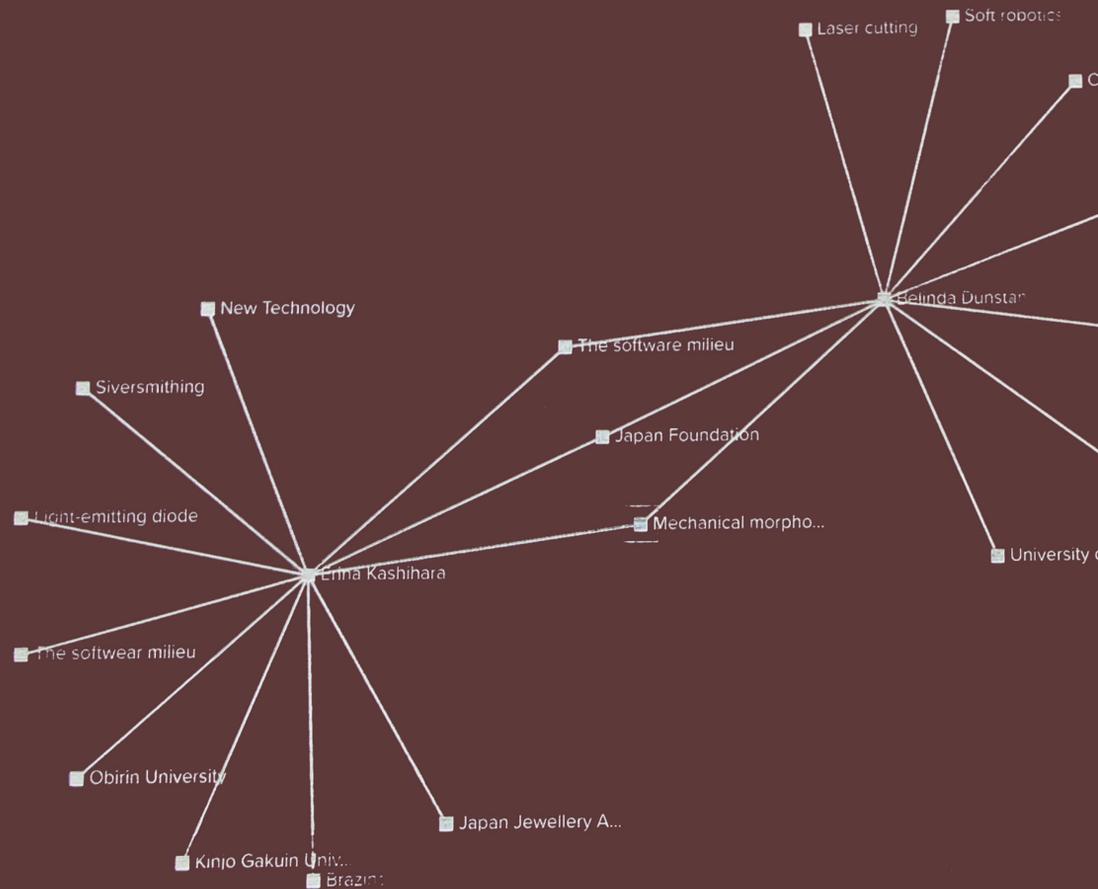


470K

# MORPHOLOGIES OF MECHANICAL MOTION

Thomas Haring once wrote that... "The body is not an unreliable machine, it can be a generative tool, an evaluative sensibility, a transformative site and a source of knowledge and creativity."

The boundaries between the body of human and machine are increasing harder to define. Human capacity is augmented and extended and machines are smaller, mobile and intelligent. The camera profoundly altered our perception by enabling us to see in new ways, and now, mobility of the machine, body and cyborganic other are forging new ways of moving in the world.



reative Robotics...

Erina Kashihara and Belinda Dunstan explore the gestures and bodies of the machine age, to develop morphologies of mechanical motion in soft robotics and expression of LED light.

New technologies are disrupting traditional linear cause and effect interactions, reconfiguring human, non-human and posthuman perspectives, in which case design becomes a conversation between two entities - human and machine intelligence.

■ Social robotics

■ Casting

■ mould making

of New...

i. Flanagan, Patricia;  
Frankjaer, Raune. Bamboo  
Whisper - A Cyborganic,  
Reconfiguring Human and  
Non-Human: *Texts, Images  
and Beyond*, University of  
Jyväskylä, Finland, October  
29-30, 2015

## ERINA KASHIHARA

Light Shawl "Geometric Nerve", 2019

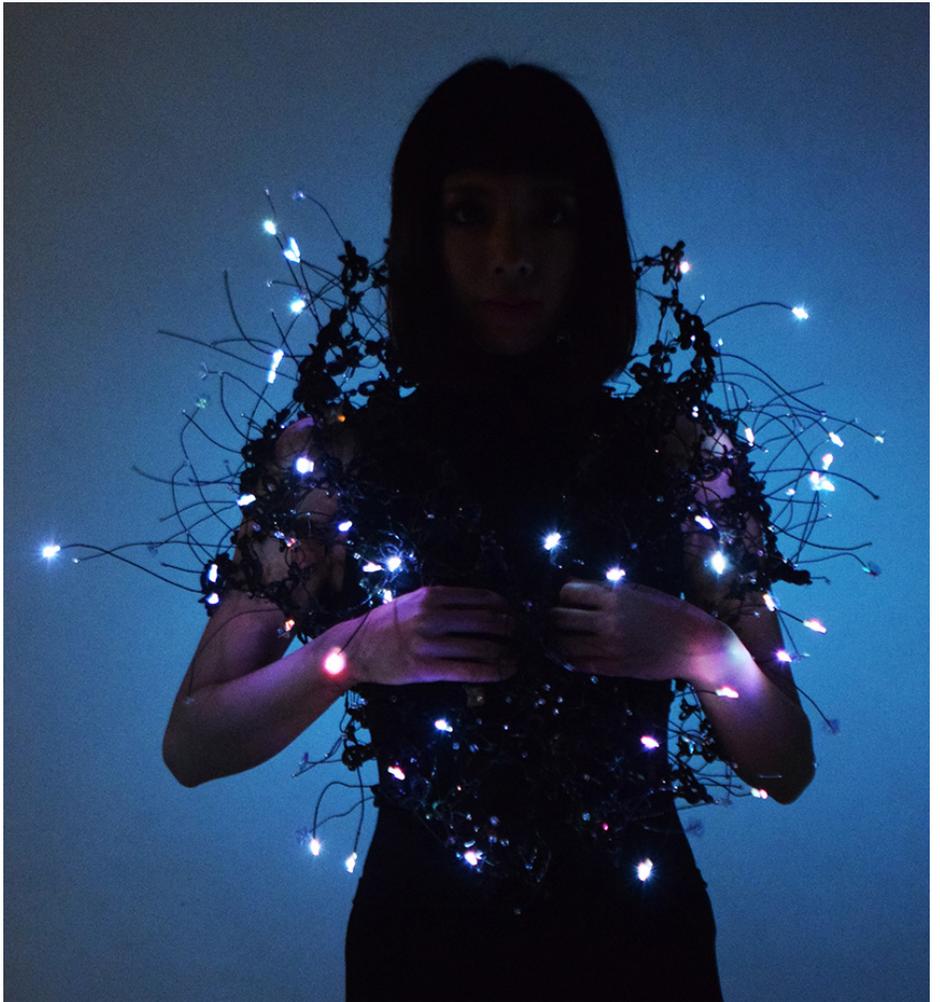
3D Printer parts (ABS), electric wire, glass beads, LED, electronic circuit, video projection

Photo credit:  
Erina Kashihara 2019

We can't usually see the energy our bodies produce. This flexibly structured work converts the wearer's body heat into light, making it visible to people around them. The wearer's energy is seen to surround their body in the form of small and constantly changing points of light.

Electrical wires are connected like nerve fibres, and organically shaped parts made with 3D printing are arranged together like synapses. The shawl is fitted with heat sensors and can be operated with a mobile battery pack for use in performance contexts.

<https://k-onespace.com/>  
[@lightart.erina](#)



## BELINDA DUNSTAN

Still, Life, 2019

Silicone Eco-Flex rubber compound, fabric, rubber adhesive. Formed from laser-cut Perspex moulds

Photo credit:  
Tricia Flanagan  
© Belinda Dunstan 2019

There are two variant media approaches to Dunstan's work in critically rethinking the morphologies of robotic agents that may soon share social spaces with us.

By returning to analogue pneumatics and gestural diagramming of movement, the artist works through iterative material reconfigurations, examining the gesture, shape and form of emotive movement, for example sketching Guy Hoffman and Oren Zuckerman

robot, Kip1, in his emotional states of calm, curious and fearful.

Through this process Dunstan generates new morphologies that may position these agents as complementary to human life, rather than competitive.

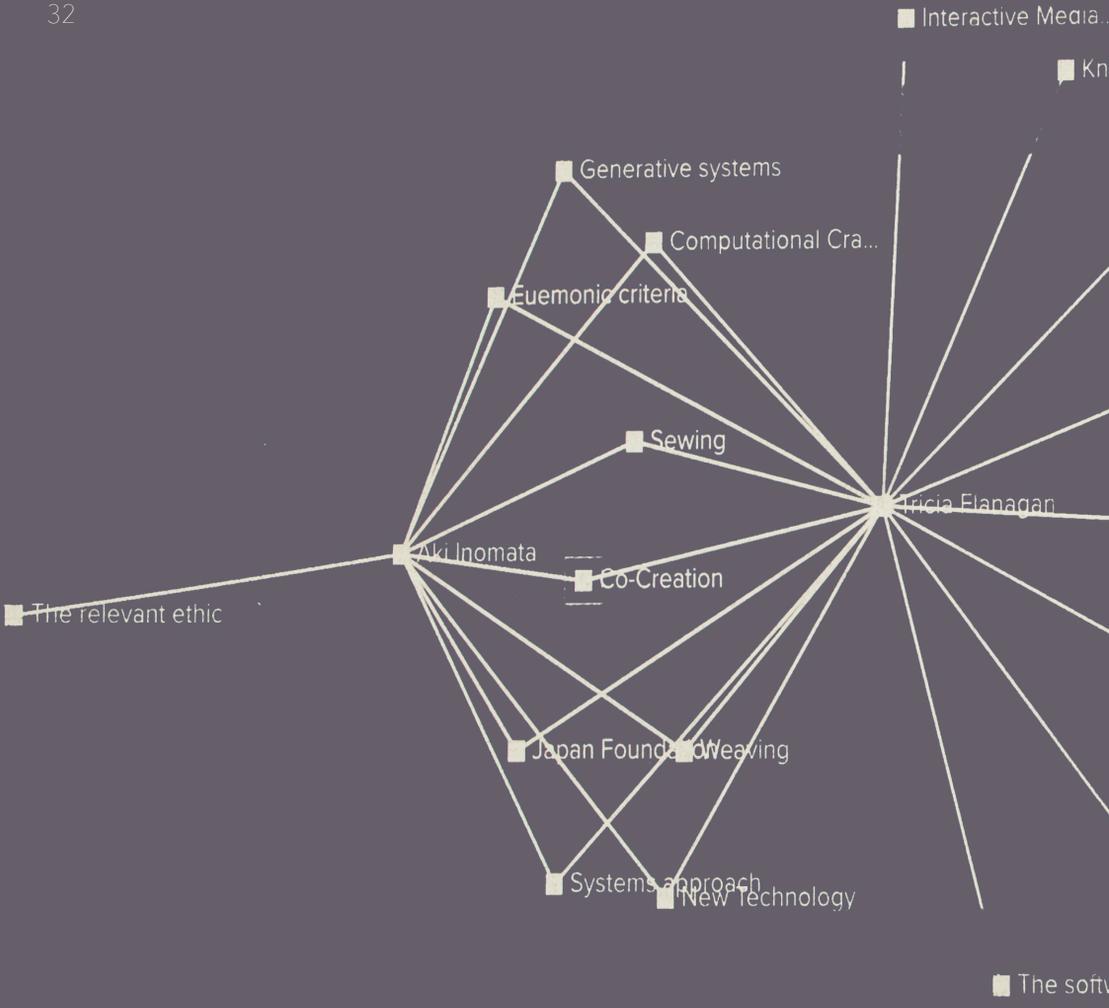




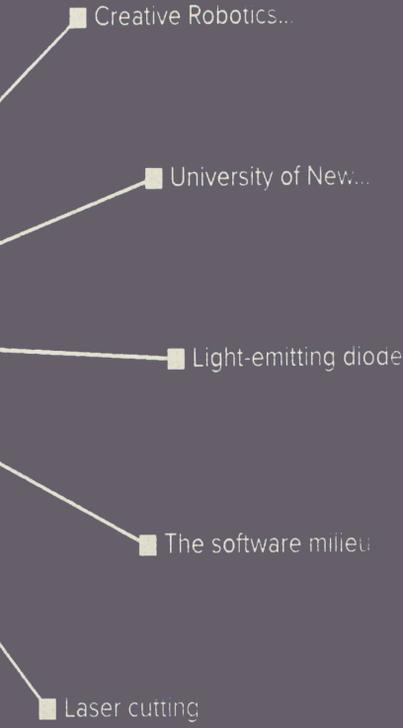
# CO-CREATION

We have dramatically changed the geology and ecology of the planet, and forms of traditional manufacture that exploited the wealth of resources of a former age of plenty are no longer viable.

Artists and designers are pioneering forms of production that are not based on design as dominant over material. They are defining new forms of design processes, for example, that engage with state changes, growth, erosion, calcification etc. In re-thinking design as co-creation with other entities, collaboration with nature is akin to production methods that



cutting



wear milieu

question the existing hierarchies that dominate manufacture. In this way (traditional women's work) craft, basketry, give new insight to the more rigid forms of digital mass production that are prevalent today.

Aki Inomata and Tricia Flanagan have a "systems-thinking" approach to design which disrupts the linear hierarchy of thought that places mind over matter, brain over body, and head over hand, by production through experimental collaboration with other forms of agency. In the case of Aki Inomata - a cross-species exchange of hair; or work with bagworms to create protective cases; casting acrylic homes for hermit crabs to inhabit; and co-creation of work with animals that bite wood. In Tricia Flanagan's case co-design is with insects, plants and weather systems.

Experimental design processes are linking man-made and natural systems and ecologies. Engaging natural phenomena, that cannot be fully controlled, leverages the generative potential of plant, animal or insect ecosystems. The combination of new technologies and traditional techniques represent new forms of craft, other than human.

## AKI INOMATA

I Wear the Dog's Hair, and  
the Dog Wears My Hair,  
2014

Photo credit: Aki Inomata  
© Aki Inomata courtesy of  
Maho Kubota Gallery 2014

Whom and what do I touch  
when I touch my dog?  
How is becoming with  
a practice of becoming  
worldly? When species  
meet, the question of  
how to inherit histories is  
pressing, and how to get  
on together is at stake.

Donna J. Haraway  
*When Species Meet*

A cape made of dog's hair  
for a human and a cape  
made of human hair for a  
dog. Plus a two-channel  
video installation.  
Inomata collected the  
fur of a dog called Cielo  
and her own hair over a  
number of years, and then  
made clothes out of her  
hair for the dog and out of  
the dog's hair for herself so  
that they could exchange  
coats. The two species,  
human beings and dogs,  
have developed together  
over the ages. This is a  
work that examines the  
relationship between a  
human and her pet, giving  
form to this concept.

<http://www.aki-inomata.com/>



## TRICIA FLANAGAN

Generative Textile Systems,  
2019

Merino wool, cotton/  
polyester, wood, steel,  
knitting machine, acrylic,  
LCD screens, wire, data,  
code, electronics (Fitbit,  
Arduino, Rasberry Pi,  
Neopixles, foot pedal  
switch, SD mini).

Photo credit:  
Tricia Flanagan

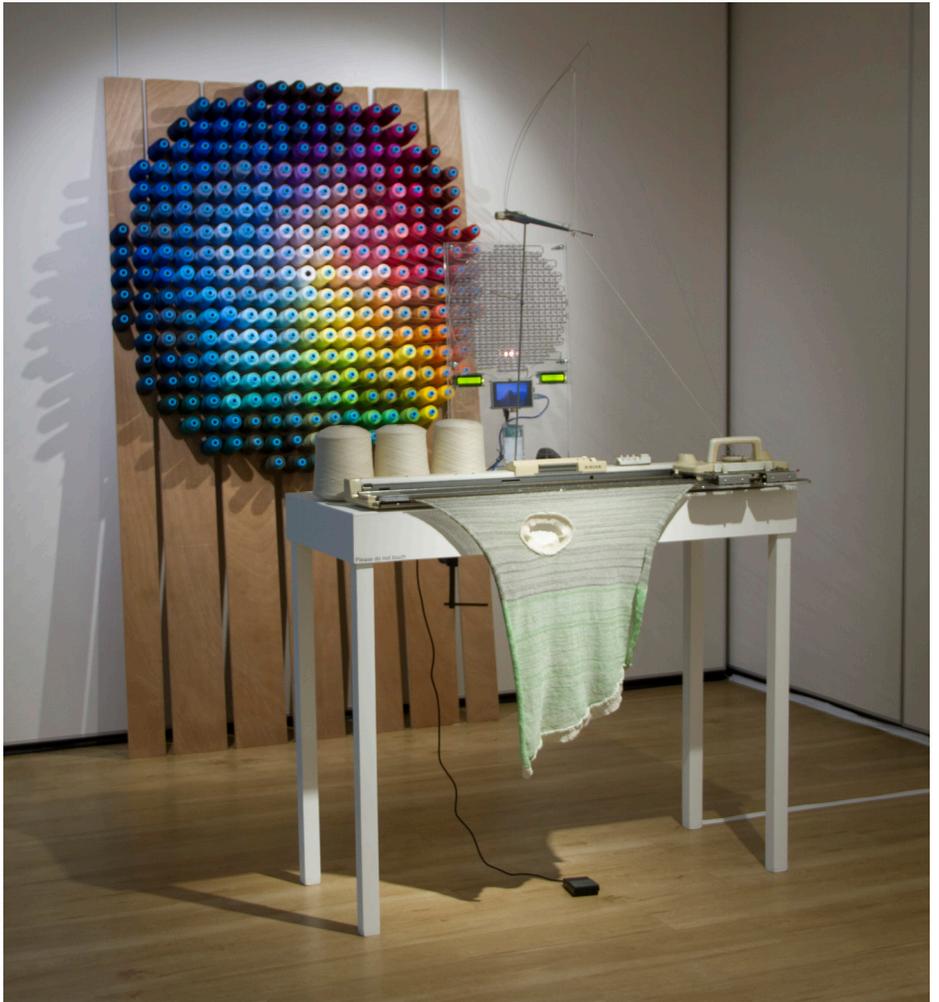
© 2019

Flanagan's work articulates an aspiration for forms of technology that are reflexive rather than indexical. Generative Textile Systems (GTS) is a human-computer interface based on reciprocity rather than reproduction, transforming systems predicated on ontology and materiality into cybernetic systems of communication, prediction and virtuality(1). In GTS the cloth is the embodiment of the pedestrian stride, coded with the stain of colour from the weather and the texture of the temperature. Holes in the knitting are punctuation marks that articulate a phrase - the duration of the day - determined not by the ticking of minutes

but the pace of steps. The walker's body becomes a node in a system, a conduit for data to flow through. The artist's body also acts as a node. Both perform repetitive actions - the object of information, never a subject in communication. The projects begin with a thread that creates a line, through gestures of the body walking and through prosthetic extension the interloping and interlacing of the thread forms cloth. Textiles grows from this conversation of the body in the world.

1 Orit Halpern, Beautiful data (2014)

[http://triciaflanagan.com/  
com/](http://triciaflanagan.com/com/)



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Flanagan's research has been supported by the Interactive Media Lab, Art & Design, University of New South Wales. Special thanks to Mari Velonaki and Michael Blake.

## EVENT PROGRAMME

PRESENTED BY



### FEMUFACTURE EXHIBITION

**February 6 -  
March 30, 2019**

The Japan Foundation  
Gallery, The Japan  
Foundation, Sydney  
Level 4, Central Park  
28 Broadway, Chippendale  
NSW Australia

**February 8 (Friday)**

Opening Event  
6:00pm-8:00pm

**March 7 (Thursday) Artist**

Talk with  
Erina Kashihara  
6:30pm-7:30pm

Erina Kashihara discusses  
her wearable light art  
practice alongside digitally  
fabricated art and design  
within Japan.

**March 8 (Friday)**

Panel Discussion: Women  
and Digital Fabrication in  
Australia and Japan.  
6:30pm-8:00pm

Rina Bernabei, Belinda  
Dunstan, Tricia Flanagan  
and Erina Kashihara  
discuss their practices.  
Moderated by Kathryn  
Hunyor.

© Flanagan, Dunstan,  
Bernabei, Kashihara,  
Inomata, Ban 2018

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## Legend

- person
- system
- Culture
- M
- culture
- rational
- organisation
- ecology
- ethics
- null
- technology

