

RIGHT RESEARCH



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MODELLING SUSTAINABLE

RESEARCH PRACTICES

IN THE ANTHROPOCENE



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14. Sustainability, Living Labs and Repair

Approaches to Climate Change Mitigation

*Hart Cohen, Francesca Sidoti, Alison Gill,
Abby Mellick Lopes, Maryella Hatfield
and Jonathon Allen*

The year 2020 started with a massive bushfire crisis in south eastern Australia, resulting in disruption to many communities, the loss of lives and businesses, an estimated loss of a billion animals and the dirtiest air on the planet in the cities of Sydney, Newcastle and Canberra. With record-high temperatures and a punishing drought lasting several years, the Australian bush was primed to explode into flames. With lightning strikes in national parks, the spontaneous eruptions of bushfire spread from the north coast to the south and inland towards the alpine regions of New South Wales and Victoria. With the very hot year of 2019 affecting other parts of the planet in 2020, the Antarctic Peninsula reached a record 65 degrees Fahrenheit. The chapter that follows reflects the new progressive politics of climate change that emerged in 2019 with large mass demonstrations taking place in Australia and around the world and examines the critical role of universities in the mitigation of climate catastrophe. The following interventions are variably focused on the concept of 'Living Labs' where thinking is developed within a problem-solving ethos. The three contributions here offer ways to think about sustainability

with specific reference to waste recovery, environmental awareness in urban settings and the contribution that a ‘repair’ mentality can make to a shared and re-cycled economy. With a clear-eyed recommendation that mitigation of climate change starts locally, the premise of the paper is that people can work with what is available as local solutions to specific problems. The impact of this approach can be essential to people who sense the impending catastrophe and who may have experienced the crisis directly through compromises in their health outcomes, the experience of trauma and the loss of property and livelihoods, though through no fault of their own. The links through the Western Sydney University campus, common ground to the authors to both its small bushland outpost and further to the local community it serves, suggest that the boundaries of the campus are permeable—and that *Living Labs* are both a means and metaphor for thinking about how the campus opens learning and knowledge creation about sustainability for its students, staff and community constituents.

Introduction

The following collaboratively-written chapter emerged out of our panel for the *Around the World* online conference on the theme of environmental sustainability. We would like to contextualize our contribution with reference to our country of residence, Australia, and our academic work on the campuses of Western Sydney University (WSU). The university is located on never ceded Aboriginal land. We therefore acknowledge the *Dharug* and *Gandangara* peoples as the traditional owners and custodians of the lands on which our particular WSU campus is sited. We respect their ongoing cultural and spiritual connections to this country.

Our chapter is motivated by the thinking and activities that coalesce around the specific theme of environmental sustainability. We see this theme as the most critical long-term contemporary concern of our shared world. The most recent IPCC report gives the planet half a generation to make wide-spread transitions across society, if we

have any hope of limiting global warming to 1.5 degrees above pre-industrial levels.¹ Universities have an important role in tackling these transitions as stewards of lifelong learning and incubators of innovation. Our university supports the case that the resilience of its constituent region will be achieved by responding to local environmental and societal challenges across all elements of its core business: curriculum, operations, research and engagement.

In broad terms, we can break down the climate change crisis into problems and practices related to:

1. The context of human-induced climate change and global warming and the concomitant need for transitions across society and culture.
2. The need for our university to focus on its own region and to contribute to sustainable practices related to both water and land in broadly promoting livability.
3. The need for our university to support the transition to circular and share economies by championing new skills and practices and applying them to specific contexts with defined goals and outcomes.

No potential approach to the mitigation of climate change should be ruled out. Thinking our way out of this dilemma requires both a renewed sense of moral clarity and a move to a more profound way of thinking about the planet. In psychological terms, this is thought of as equivalent to a therapeutic recovery (for example, from addiction), in theological terms as equivalent to a religious conversion and in evolutionary terms to the survival of both human and non-human species.

According to Charles Taylor,² the eighteenth-century Enlightenment deemed the natural world, everyday life and the life of the mind as the key sources of human identity and self-formation. With climate change, what passed earlier for the essentials in the formation of a modern identity are now considered under threat. This chapter thinks about how to recover these essential elements for a twenty-first-century

1 IPCC, *Global Warming at 1.5° Celsius: Summary for Policy Makers* (Geneva: IPCC, 2018), report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

2 Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge: Harvard University Press, 1989), <https://doi.org/10.1177/004057369104800210>.

Enlightenment by addressing the concerns and impacts of climate change.

With the focus on environmental sustainability, a key research priority for this university is to reflect on the contexts of the campuses themselves: their facilities, their uses, the sources of energy and how research that its staff undertakes can address these aspects of university life.

There are troubling signs that climate change is ramping up extreme impacts in Australia, one of the most marginal countries in the world with respect to cyclical extreme weather events such as drought and flood. We believe we can now distinguish between weather and climate in the Australian context given the recent evidence of the hottest years on record (eight of the last ten—see Fig. 1). In 2019, there has been an unprecedented rain event and flood in Townsville and north-western Queensland. The fish kills on the Murray Darling River system have resulted by the mismanagement of scarce water resources exacerbated by a regional drought lasting eight years.

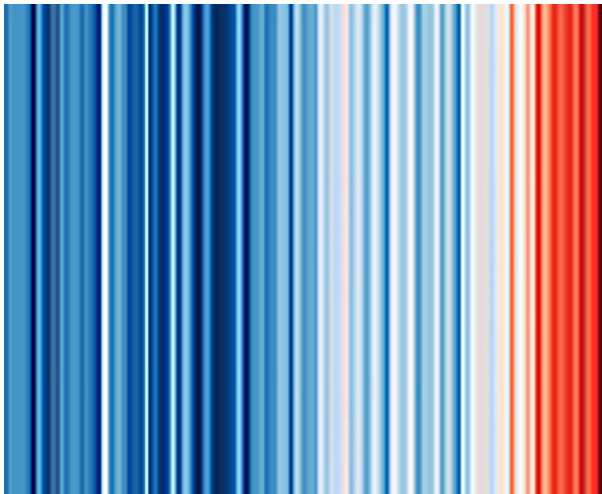


Fig 1. Prof Ed Hawkins warming stripes climate change visualizations of the world's average temperatures from 1850–2017.³

The fish kills are also a reminder of other threats to animal species through habitat destruction such as that experienced when fires raged

3 Ed Hawkins, 'Warming stripes' (May 22, 2018), <http://www.climate-lab-book.ac.uk/2018/warming-stripes/>.

in the high country of Australia. It is possible the demise of particular animal species as a consequence of more frequent fire events is tied to climate change. With these kinds of considerations, we have to think more deeply about the impact and effects of climate change. For example, in our area of the globe (southern hemisphere) the impact of climate change on Antarctica—particularly West Antarctica—is evidenced by ice melts into the sea. The effect of rising sea levels creates a crisis in our region with respect to habitability of low lying island nations and atolls in the Pacific. With a recently discovered ‘cavern’ below the land surface in Antarctica, the speed with which the ice melt is occurring appears to be accelerating.

The Australian bushfires of 2019–2020 were unprecedented in scope, scale, with costs in the loss of human life, livelihoods, dwellings, livestock and native animals. Centred largely on the east coast and parts of the inland, the bushfires burnt through an enormous amount of bushland—national parks, commonwealth estates and privately owned land. Now, the COVID-19 pandemic, coming on the heels of the fire catastrophe, has driven a deeper sense of crisis in the lives of those who had survived the fires but who were damaged emotionally and financially. We cannot but acknowledge the needs of those in the midst of this pandemic who, only weeks before the pandemic emerged, were struggling to find the resilience to recover from the worst bushfires known in Australia and indeed the world.

Despite Australia being precariously placed at the forefront of very serious climate challenges, it also has some excellent advantages. Australia has near-ideal conditions to enable access to non-fossil fuel sources for energy generation. The exponential take-up of rooftop solar as well as the development of solar farms on an industrial scale suggest an alternative scenario for energy generation. Given the inability of successive Australian governments to act on climate change, the stakes are high for politicians attempting to move toward stronger policy settings so that Australia might reduce its carbon footprint and deploy clean energy possibilities. Even with relatively small-scale undertakings such as the Carbon Pollution Reduction Scheme in which businesses can sell carbon credits, there is a long way to go towards neutralizing Australia’s carbon footprint. Coupled with government incentives for both rooftop solar and solar farm investment and a recent court ruling

that defeated the proposal for a new coal-fired power station, there are signs that change may be underway. The explosion of school-age children around the world engaging in climate change demonstrations (including Australian schools) is also a welcome sight where the point about generational impact is clearly made.

Our chapter is driven by the particular projects that WSU academics on the *Around the World* panel have recently developed. In the context of the university, our panel explores some of the alternative ways that environmental sustainability can be actioned. The chapter is in three parts and each part is linked by both an interest in activism as a mode of addressing the climate change crisis and as a manner of offering practical approaches to engaging with these concerns.

Part 1 of the chapter is by Associate Professor Abby Mellick Lopes and Professor Jonathon Allen, setting the scene for how universities can contribute proactively to the societal transitions that need to take place. They argue that sustainability is agenda-setting for universities, and call for a different disposition in relation to how universities enact and facilitate knowledge creation. Abby and Jonathon spotlight three project examples that give shape to this new disposition, which have occurred over the last decade: *FuturesWest 2031*, *Transitioning to Sustainable Sanitation Futures* and the *Transdisciplinary Living Lab* (TDLL). These examples demonstrate the value of a future focus in learning and teaching, the importance of providing a space of experimentation where failure is seen as an essential part of learning enterprise, and the centrality of collaboration, which breaks down division between disciplines and the competitive relationship between universities.

Part 2 of the chapter is by Maryella Hatfield, who extends the Living Lab concept by focusing on the role of storytelling in communicating, ideating and inspiring sustainability. This includes documentation of some of the cross-disciplinary processes underway on campus among staff, students and external stakeholders. In a specific example, Maryella describes the impact of discovering bush land on our campus including a creek—a small tributary of the Parramatta River, a project that commenced with an investigation of this bushland and water with the involvement of media production students in a process of interviewing experts about the area. Uncovering these environments on campus

and then working on their role in the mix of initiatives to sustainability provides a great opportunity for context-led and problem-based learning experiences.

Part 3 of the chapter is by Dr Alison Gill, Associate Professor Abby Mellick Lopes and Ms Francesca Sidoti. Alison and Abby have been researching opportunities to repair everyday things that could be put on an alternative life path to an end in landfill, and to share design strategies of reuse, remake, maintenance and repair critical to sustainability, rather than promoting new objects. Recently it has become more urgent to reframe the role of repair as part of a community response to a waste crisis, as local councils struggle to cope with new responsibilities—material, socio-cultural, educational—in light of China’s precipitous withdrawal from its role as the world’s global recycler. Following an initial survey by Francesca of repair businesses and initiatives in the City of Parramatta, the community of interest to the university, the ‘Re-pair’ project turns to how the university could champion specific learning and cultural practices of sustainability with the potential to connect communities to more resilient futures with materials and reparative skills. This section of the article will outline a few key findings from the survey of local enterprises, and particularly the aspirations and challenges in transitioning from linear take-make-use-waste to closed loop and share economies.

These three projects are not mutually exclusive in either the thinking that drives them or the knowledge interests that guide them. The links through the university campus to both its small bushland outpost and further to the local community it serves suggest that the boundaries of the campus are permeable—and that *Living Labs* are both a means and metaphor for thinking about how the campus opens learning and knowledge creation about sustainability for its students, staff and community constituents.

A Decade of Design-led Sustainability Projects at Western Sydney

Abby Mellick Lopes and Jonathon Allen

The Living Lab concept—collaborative learning in a living, social setting—has its roots in the experiential, problem-focused approach to learning championed by John Dewey in the early years of the twentieth century.⁴ His key claim of a continuity between learning and society has underpinned recent developments in Living Labs, engaged research, ‘work-integrated learning’ and the development of a research and teaching nexus. These developments attempt to roll back the abstraction of knowledge in academic institutions, to enhance the contemporary relevance of knowledge in applied contexts.

The critical and all-encompassing concerns of sustainability underscored by the Sustainable Development Goals (SDGs) and their associated 169 targets, to which Western Sydney University became a signatory in 2017,⁵ bring a new urgency to these developments. However, rather than making education more socially relevant, there is now an unprecedented need for learning to be brought back to society, at multiple scales—local, societal and global. As Ezio Manzini, design theorist and champion of the social role of the design school in the transition to sustainability, remarks:

The transition toward sustainability is a massive social learning process. The radical nature of the objective (learning to live better while leaving a light ecological footprint) requires vast experimentation, a vast capacity for listening and an immense degree of flexibility in order to change. Sustainability and the conservation and regeneration of environmental and social capital means breaking with the currently dominant models of living, production, and consumption, and experimenting with new ones. A social learning process on this vast scale must involve everybody.⁶

4 John Dewey, *Experience and Education, The Kappa Delta Pi Lecture Series* (New York: Touchstone, 1997).

5 Western Sydney University, ‘Sustainable development goals 2030’ (2017), https://www.westernsydney.edu.au/learning_futures/home/learning_transformations/re_developing_new_curriculum_courses/education_for_sustainability/sustainable_development_goals_2030

6 Ezio Manzini, ‘Design context: Enabling solutions for sustainable urban everyday life’, in *Enabling Solutions for Sustainable Living: A Workshop*, ed. by Ezio Manzini,

The role of the university in this social learning process is critical. The university is a repository of knowledge and memory, held both by people and in the durable records of knowledge created over time. The pursuit of new knowledge is a key concern of the university, which lends to it a unique, experimental disposition in the culture, and a capacity to facilitate the massive social learning process demanded by sustainability.

Leading design thinker Tony Fry has commented that as Australian universities took on a functional role in relation to the economy with the introduction of the Higher Education Contribution Scheme (HECS) in the late 1980s, learning was replaced by a culture of earning. We see evidence of this in the language of mainstream public discourse, where universities are primarily understood as service-providers to the labour market. The precarity evoked by the current COVID-19 crisis, has caused universities to double down on their efforts to market their offerings. However, contrary to negative, narrowly-formed economic views about the relevance of the university, the context of the crisis tells us that the university has never been more relevant. Universities must turn toward sustainability in their efforts to 'create the knowledge necessary to support a world that is livable for humanity'.⁷

In what follows, we provide some evidence for these claims of the relevance and importance of the role of the university by spotlighting three design-led sustainability projects conducted within Western Sydney University, and in partnership with other universities in the last decade. In selecting these few examples, we are in no way suggesting they are the only sustainability projects of note that have or are occurring at the university.⁸ Instead, we highlight those projects that were particularly design-led, and that showcase an affinity between design and the social learning process advocated by Manzini amongst others.

The first project is *FuturesWest 2031*, a design-led initiative that aimed to generate a conversation about how Western Sydney could adapt to a

Stuart Walker and Barry Wylant (Calgary: University of Calgary Press, 2008), pp. 1–24 (p. 16), <https://doi.org/10.2307/j.ctv6gqw0z.5>.

7 Tony Fry, 'Confronting the Humanist Question', *The Australian Higher Education Supplement* (January 31, 2007), p. 26.

8 To get a sense of some of the many Living Lab projects that have occurred or are currently underway at Western Sydney, see https://www.westernsydney.edu.au/driving_sustainability/sustainable_futures/living_labs.

climate-changed future, which was held at the University of Western Sydney (now Western Sydney University) in the winter of 2009.⁹ At this time, there was vital sustainability research going on at the university in various disciplines, however there wasn't the social license or cultural imperative that exists now, and the cross-university conversation was only in its early stages. We can recall there were still debates about the reality of human-induced climate change going on in the classroom and also on occasion in the staff room! *FuturesWest 2031* attempted to think about sustainability transitions for Western Sydney using an approach called 'design futuring',¹⁰ which was also being championed in the design classroom via hybrid methods of future scenario planning.¹¹

The project involved substantial baseline research on pressure points facing the region such as the future of food, urban mobility and population expansion. It used trends analysis and educated speculations about how these converging challenges might be met to develop scenarios of sustainable futures. This process was led by Dr Tony Fry in a 'hot house' workshop involving academics, students and local stakeholders. Graphic design was used to visually communicate emerging ideas in a community workshop promoting themes for ongoing conversation, examples of which are presented below in relation to two of the key themes explored at the event: the Western Sydney Food Bowl and Co-Housing.

FuturesWest 2031 was a catalyst for transdisciplinary conversations around sustainability, and had a strong influence on the project-based curriculum in design which continues to this day. In the above example, redundant car parks (on the presumption that by 2031, we've transitioned away from personal cars using internal combustion engines, to a greater dependence on public transport) are seen in three stages of their transition to urban agricultural and aquacultural food precincts—a zero-kilometer café appearing in the last image of the sequence.

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- 9 Jonathon Allen, Abby Mellick Lopes and Tara Andrews, 'Futures west: A design research initiative promoting sustainable futures for Western Sydney', *Cumulus 38° South 2009 Conference* (Melbourne: Swinburne University of Technology/RMIT University, November 12–14, 2009).
 - 10 Tony Fry, *Design Futuring: Sustainability, Ethics and New Practice* (New York: Berg, 2009), <https://doi.org/10.2752/204191211x12980384100355>.
 - 11 Abby Mellick Lopes, Stephen Clune and Tara Andrews, 'Future scenario planning as a tool for sustainable design education and innovation', *Connected 2007: International Conference on Design Education* (University of New South Wales, Sydney, July 9–12, 2007), <https://doi.org/10.1016/j.destud.2011.08.005>.



Fig. 2 A future imagined: a car park becomes a site for local food production.
Image credit: Jonathon Allen/ Paul Kouppas, *FuturesWest 2031*, 2009.

The role here of visualizing potential futures in the context of this project was twofold: firstly, to explore options that were hitherto unthought of, and secondly to provide seductive visions of the future in order to engage stakeholders and to generate, hopefully, provocative conversations with those stakeholders. An image is powerful in that it has the ability to focus discussion and ensure there is a consensus of understanding, whereas ideas and futures presented solely in written form are typically more open to interpretation. The image evokes the change as a 'concrete hypothesis': 'Not yet a reality, but that could be

made real if the necessary moves were made'.¹² Visualizing potential futures allows deeper, detailed discussion as, whilst stakeholders may have different opinions and priorities, they are at least focused on the same point at hand rather than upon their own, often differing, interpretive visions.

The Food Bowl theme recognized that while the region has an agricultural history, much viable agricultural land had been claimed by suburban sprawl and industry in recent decades. With growing concerns about food security and the decline of manufacturing and jobs in the West, an opportunity was framed to revisit this agricultural legacy and think about urban food in new ways for the region. This theme recognized the extensive expertise in water, soil and food sustainability at the university, and a promising cultural momentum around urban agriculture.

The co-housing theme addressed the momentum of poor housing development in Western Sydney, drawing attention to the car-dependency implicated by its diverse geography and inadequate public transport infrastructure, and built into the fabric of the buildings, as can be seen in the expansive space given over to the car in the image at left above. Building on the Food Bowl observations, the co-housing theme attempted to think through how Western Sydney might 'receive' a future population of migrants including climate refugees from nearby countries, facilitating greater density and a more climate-appropriate future everyday life.

In addition to raising questions about better climate-defensive and passive-thermal built forms, this theme brought into the conversation the importance of *social* innovations. For example, platforms, tools and 'starter packs' could support the take up practices such as food gardening. Equally, opportunities for new settlers to express and share culturally-specific knowledge and expertise, need to be created and expanded. Reciprocal and regenerative learning cycles are a critical aspect of the wider social learning process that *FuturesWest 2031* aspired to initiate. Rather than technical solutions or fixed realities, the visual scenarios we presented were meant to function in an innovative way as propositions and conversation starters. As it turned out, the conversation we were attempting to start with stakeholders was probably a little

12 Manzini (2008), p. 26.



Fig. 3 A future imagined: a 'McMansion' becomes a co-housing retrofit and hot tarmac is de-paved to make way for food gardens. Image credit: Jonathon Allen/ Paul Kouppas, *FuturesWest 2031*, 2009.¹³

ahead of its time. The event was, however, a significant learning exercise for everyone involved, and provided an experience of the university in the role of facilitator of social learning for sustainability, and as a hub for facilitating sustainability transitions.¹⁴

The second example was a research partnership led by the Institute for Sustainable Futures (ISF) at University of Technology, Sydney

¹³ The 'McMansion' is a reference to the fashion for excessively large dwellings that tend to parade codes of affluence whilst often being cheaply constructed and expensive to run.

¹⁴ Allen, Lopes and Andrews (2009).

(UTS) in collaboration with Western Sydney University (WSU), called *Transitioning to Sustainable Sanitation Futures*, and also known as The Funny Dunny Project¹⁵ (2010–2011). This project established a transdisciplinary community of practice, involving academics from three universities, a water utility, industry and local government partners all working together to explore the problems and opportunities involved in implementing a novel system of sanitation across the two universities. This was very much conceived as a social learning initiative from the outset, creating a space to encounter and explore the many ‘unknown unknowns’ likely to emerge in the process.¹⁶

Taking the multi-level perspective promoted by transition management theory to understand changing socio-technical systems,¹⁷ the global decline in the quality of mined phosphate rock used for food production¹⁸ can be understood as a ‘macro-level’ or landscape event, outside the realm of direct human experience. The polluting and aging waterborne sanitation system in Sydney exists at the ‘meso’ (or regime) level,¹⁹ to which everyday system ‘actors’ have some access. This project sought to create a ‘micro’ version of a complete ‘closed loop’ alternative system, make it operational and learn from what transpired from technical, social, legal and environmental perspectives. The system involved the installation of a number of urine-diverting toilets on campus at UTS for use by members of the campus community, the collection, storage and transportation of collected urine to Western Sydney, and its reuse as a partial substitute for phosphorus fertilizer in plant pot trials within the Agriculture Department at WSU, Hawkesbury.

15 ‘Dunny’ is Australian slang for toilet.

16 Here we reference Donald Rumsfeld’s well-known observation about the ‘knowns’ that ‘we don’t know we don’t know’, which was made during a Pentagon news briefing to frame risk in relation to defending the US war in Iraq. Sustainability research and practice demands that we embrace risk in pursuit of a just and liveable world.

17 Frank. W Geels, ‘Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case study’, *Research Policy*, 31.8–9 (2002), 1257–1274, [https://doi.org/10.1016/s0048-7333\(02\)00062-8](https://doi.org/10.1016/s0048-7333(02)00062-8).

18 Dana Cordell, Jan-Olof Drangerta and Stuart White, ‘The story of phosphorus: Global food security and food for thought’, *Global Environmental Change*, 19.2 (2007), 292–305.

19 Dena Fam et al., ‘An historical analysis of Sydney’s sewer systems to determine windows of opportunity for system change’, *Design Philosophy Papers*, 7.3 (2009), 195–208.

One of the most unique aspects of this project was the way it positioned the importance of visual communication design in facilitating system operation.²⁰ Previous research had shown that a highly technical approach to the problem of recovering and reusing urine had excluded the experience of everyday toilet users, undermining the new system's chances, as the success of every new technology depends on its socialization. The Funny Dunny Project gave the user a central role, inviting, via visual communication tools created by students in the design programs of both university partners, a chance to participate in the learning process.

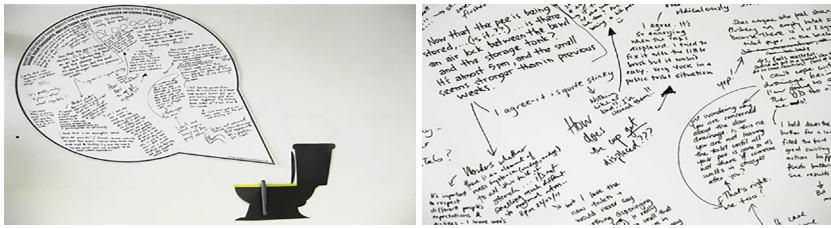


Fig. 4 A graffiti board designed to collect data for the Funny Dunny Project helped the researchers to track the socialization of the new 'closed loop' sanitation system. Designed by Yana Mokmargana (student of Visual Communications, WSU).

The Funny Dunny Project was conceived as a trial of a radical innovation at a 'niche' level, with the university acting as a critical research space to explore what was effectively a complex and future focused sociotechnical experiment. The 'niche' framing is interesting because it positioned the experiment ahead of what is actually happening in the culture at large—in what Frank Geels calls a space for radical innovations, where experiments are 'protected' and for which markets and preferences do not yet exist.²¹ The project modelled system change by involving those with a vested interest in sanitation and a desire to explore the potential for change, but with the cautious conservatism that characterizes risk-averse industry 'actors'. It is critical to note here that the way the university setting acts to protect and nurture

20 Abby Mellick Lopes, Dena Fam and Jennifer Williams, 'Designing sustainable sanitation: involving design in innovative, transdisciplinary research', *Design Studies*, 33.3 (2012), 298–317, <https://doi.org/10.1016/j.destud.2011.08.005>.

21 Geels (2002).

innovation and enshrines the 'right to fail' as an important component of social learning.²²

While this experiment created more research questions than it answered and there were many technical, regulatory and socio-cultural barriers preventing the immediate uptake of the new system, it certainly inspired the imagination of industry and government actors, and allowed important new conversations about phosphorus futures to germinate.²³

Our final example builds upon the Funny Dunny Project and its cross-university collegiality, to further explore how design can facilitate social engagement and learning. The Transdisciplinary Living Lab (TDLL) model was developed in 2016–2017 as a collaboration between Design at UTS, Design at Western Sydney University and the Institute for Sustainable Futures at UTS. The TDLL emerged out of a design studio at UTS exploring the problem of food waste at local, societal and global scales.²⁴ A new food waste system had recently been installed at UTS, which was designed to eventually process 100% of the food waste generated on campus. This system had the capacity to transform most organic materials including grains, coffee grounds and meat into a 'soil conditioner' that could potentially be reused in local gardens and parks, via a process of low-temperature dehydration. Students in the Interdisciplinary Design program at UTS were tasked with researching the problem context of global food waste whilst also examining and reflecting on their own food practices, and proposing new concepts for how the university community could learn about the value of the system and take responsibility for what were sometimes new practices of separating organics from other waste streams in an institutional setting. Finally, students considered the impacts of their designs in relation to the SDGs and 'planetary boundaries',²⁵ and reflected on how the Living Lab had influenced their thinking about their future design careers.

22 Dena Fam et al., 'Transdisciplinary learning within tertiary institutions: A space to skin your knees', in *Interdisciplinary and Transdisciplinary 'Failures' as Lessons Learned—A Cautionary Tale*, ed. by Dena Fam and Michael O'Rourke (London: Routledge, 2020), pp. 198–216, <https://doi.org/10.4324/9780367207045-16>.

23 The project was awarded an NSW Green Globe Award for Sustainable Innovation in 2012.

24 The lab process is explained in Alexandra Crosby, Dena Fam and Abby Mellick Lopes, 'Wealth from waste: A Transdisciplinary approach to design education', in *Cumulus Hong Kong 2016: Cumulus Working Papers 33/16: Open Design for E-verything*, ed. by Cecile Kung, Elita Lam and Yanki Lee (Hong Kong Design Institute, Hong Kong, November 21–24, 2016), pp. 51–55.

25 Johan Rockström, et al., 'Planetary boundaries: Exploring the safe operating space for humanity', *Ecology and Society*, 14.2 (2009), <https://www.ecologyandsociety>.

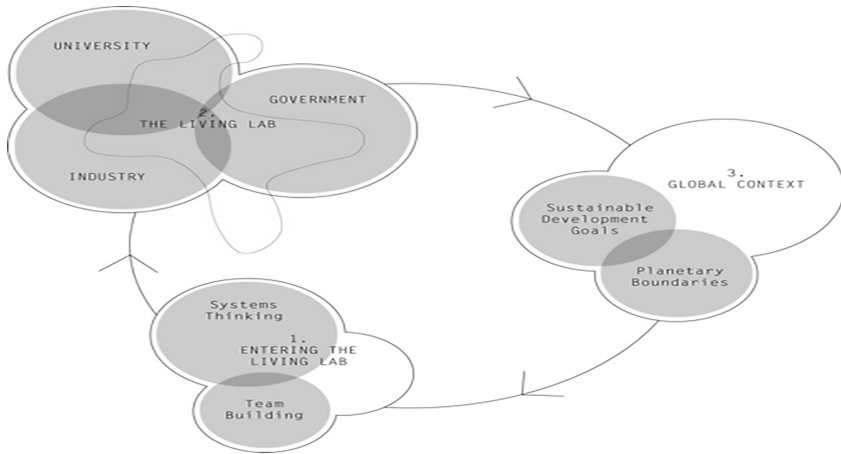


Fig. 5 Overview of key stages of skills development in the Transdisciplinary Living Lab model.²⁶

The TDLL supports an approach to learning that starts with the familiarity of personal experiences and practices, what Fry terms ‘digging where you stand’,²⁷ to learning with and from others (essential to a transdisciplinary approach) to propose appropriate systemic intervention, and finally through to global impacts, introducing the concept of SDGs and planetary boundaries, within which our most mundane everyday practices are ultimately nested. This approach highlights that social learning must always be transformative of self and shareable with others.²⁸

When Western Sydney became a signatory on the SDGs in 2017, sustainability lost any residual marginal or voluntary status and took centre stage. As the University Commitment Statement suggests, sustainability requires all core areas of the university—curriculum, operations, research and engagement—to be considered together:

org/vol14/iss2/art32/ and <https://doi.org/10.5751/es-03180-140232>.

26 Alexandra Crosby, Dena Fam and Abby Mellick Lopes, ‘Transdisciplinarity and the ‘Living Lab Model’: Food waste management as a site for collaborative learning’, in *Transdisciplinary Theory, Practice and Education: The Art of Collaborative Research and Collective Learning*, ed. by Dena Fam, Linda Neuhauser and Paul Gibbs Fam (Switzerland: Springer International Publishing, 2018), pp. 117–131, https://doi.org/10.1007/978-3-319-93743-4_9.

27 Fry (2009), p. 224.

28 Mark Reed et al., ‘What is social learning?’, *Ecology and Society* 15.4 (2010), <https://www.ecologyandsociety.org/vol15/iss4/resp1/> and <https://doi.org/10.5751/es-03564-1504r01>.

Universities will have a vital role to play in addressing (these) critical global challenges and achieving the Sustainable Development Goals. Universities have a responsibility through their teaching to equip the next generation of leaders, innovators and thinkers to understand the global challenges facing the world and the role they can play in rising to meet these challenges. Through their research and training of research leaders, universities are at the forefront of finding sustainable social, economic, environmental and technical solutions to global problems. Finally through their own operations universities can pioneer innovation and can set an example to other sectors and businesses.²⁹

Together, the three projects we've presented tell a story about the university's role in facilitating the broader societal project of transitioning to more sustainable cultures and economies. These projects demonstrate the importance of a future focus, of embracing an experimental approach that might entail failure and redirection as part of the learning process, and the importance of testing ideas with people, to produce more socially robust knowledge.³⁰ They also demonstrate a collaborative approach that transcends the competitive relationship between universities that is often exacerbated in a climate of funding cuts. Given the short time frame we have to make major transitions across many aspects of society if we are to limit global warming to 1.5 degrees celsius, it is important that we rapidly move toward the idea of a *knowledge commons*³¹ for sustainability, to which we all contribute and can draw on in remaking society within our own small spheres of influence, care and responsibility. Finally, we believe these projects also tell a story about a transition taking place in the discipline of design, which has been instrumental in the rise of unsustainable consumption across the twentieth century, and therefore perhaps more than most, is the discipline that needs to remake itself.

29 Sustainable Development Solutions Network (SDSN), *University Commitment to the Sustainable Development Goals* (2019), <http://ap-unsdsn.org/regional-initiatives/universities-sdgs/university-commitment/>.

30 Julie Thompson Klein, 'Transdisciplinarity and sustainability: Patterns of definition', in *Transdisciplinary Research and Practice for Sustainability Outcomes*, ed. by Dena Fam, et al. (London: Routledge, 2017), pp. 28–42, <https://doi.org/10.4324/9781315652184>.

31 J. K. Gibson-Graham, Jenny Cameron and Stephen Healy, *Take Back the Economy: An Ethical Guide for Transforming Our Communities* (Minneapolis: University of Minnesota Press, 2013), <https://doi.org/10.5749/minnesota/9780816676064.003.0002>

Case Studies in Sustainability: The South Vineyard Creek Story

Maryella Hatfield

This project started as a collaboration to explore some of the ways in which sustainability principles were being applied on Western Sydney University Parramatta campus. A group of academic staff from the School of Humanities and Communication Arts (including Alison Gill, Abby Mellick Lopes and Kate Richards) thought that a key focus of the Living Lab initiative could be to consider the role of storytelling in communicating, ideating and inspiring sustainability. This would include documentation of some of the cross-disciplinary processes underway on campus and among staff, students and external stakeholders. We learned from our initial scoping of these projects, that many of the initiatives happening on campus were not well-known. So we wanted to start the process of documenting some of these initiatives.

I started doing some documentary interviews with a number of people involved in sustainability initiatives on campus. We have green star buildings and a range of energy initiatives that are very effective, but one little project (which we didn't realize was going to unfold in such an interesting way) resulted from the discovery of a small piece of bushland on our campus located on the Parramatta River—quite a lovely location. This tiny patch of bushland is part of South Vineyard Creek, a small tributary flowing into the Parramatta River. Although we had begun doing expert interviews with people knowledgeable about this location, we also started taking students down into the area, getting them involved in their own process of interviewing experts about the area.

You can see in this photo (see Fig. 6), on the left-hand side stands Dr Roger Attwater, our campus sustainability expert and manager. He looks after all the campuses and the sustainability initiatives on this campus as well, so that is why he is with us, being interviewed by the students and me, about the ecosystems of the river. In his explanation, Roger describes the riparian zone—the different plant and animal communities in the area, and the different flora and fauna species

determined by the characteristics of the zones they occupy. I'm on the right behind the camera, with a student to the right-hand side.



Fig. 6 Dr. Roger Attwater, Media Arts Production students and Maryella Hatfield (behind camera, second from right) in South Vineyard Creek. Photographer unknown (2018).

The surprising thing about this little patch of land is that it was discovered almost by accident. It was not known as a part of university land nor as part of local council land, but nevertheless became an area of study and exploration. Here in the middle of a very busy urban environment, there are multiple pressures from development on all sides and there were also plans for a light rail system to be built above and to one side of the area. There is already a railway embankment up to the side of this little patch of bushland, so suspicions were raised on the part of locals as to what was going to happen to this little area. Currently there are various scoping studies underway aiming to conserve the area as much as possible because these patches of bushland are actually quite rare in the city.

So, with all these different levels of research in relation to this environment, whether it's looking at the issue of climate change, the issue of *Cooling the Commons*, which Abby discusses in her research on how people in urban environments will cope with rising temperatures,

particularly in areas like Western Sydney,³² we also considered a number of ways in which different disciplines can look at this example and learn from it. Our media and communication students for example (many of whom are not that knowledgeable at all about ecosystems or about even the value of natural systems) are becoming aware of these issues themselves simply by visiting the site and interviewing people about them. There is great value to be had for students in personally experiencing and developing research into the natural environment for themselves, first hand.



Fig. 7 Student Amy Xu shooting footage at South Vineyard Creek. Photograph by Maryella Hatfield, 2018.

We are also discovering interesting features of this area. For example, in the Parramatta River environs, the original indigenous name given by the Dharug people, the earliest inhabitants of this area, was Burramattagul, the meeting place of eels. We found that in this creek, eels are still thriving. While there are also turtles and tortoises, the eels have a particularly interesting life cycle related to the physical environment itself as known by Indigenous people of the region.

32 Abby Mellick Lopes, 'How People Can Best Make the Transition to Cool Future Cities', *The Conversation* (July 12, 2017), <http://theconversation.com/how-people-can-best-make-the-transition-to-cool-future-cities-80683>.

In addition to this, some of our students were about to start working on another project on sustainability. This was a New Colombo Plan initiative by the Australian Federal Government, led by colleagues Professor Juan Salazar and Dr Tanya Notley, documenting stories in Vanuatu in the South Pacific.³³ As it happened, in the process of talking to some of our experts, we found by sheer coincidence that the eels' life cycle takes them to the South Pacific on their breeding cycle. So this process of investigation revealed the global connectedness of ecosystems. It allowed students to then say, 'Oh that's a new angle, that's a new part of the story that we can explore and tell. Moreover, there are connections between local and global ecosystems which we can investigate further'.

So, these examples of the Living Lab foster exploration, investigation, documentation and storytelling, from many angles. For example, engineering students can visit the South Vineyard Creek area and consider it as a case study when looking at development processes. They can reflect on sustainability concerns and ask, 'Well, where do we put the light rail system? Wouldn't it be good if we can actually respect and conserve these ecosystems and allow things to go around?' Rather than thinking, 'We need to cut through and destroy no matter the cost to the environment'. These are some of the issues I think we are faced with in urban environments; 'How can we live in much more harmonious proximity to natural environments?'

This is likely an issue around the world, and not just local to us. Looking at these examples as case studies raises important questions, such as 'How can we learn, understand and proceed in a much more harmonious way in relation to the environment and allow there to be a much greater sense of balance and appreciation between various stakeholders'.

Resilient Cities and the Urban Environment

Out of such activities, further questions coalesce around the theme of resilient cities and the urban environment. When looking at all the big

33 Isabel Wagner, 'Student documentaries get close and personal with Vanuatu's climate change battle', News Centre, *Western Sydney University* (December 4, 2018), https://www.westernsydney.edu.au/newscentre/news_centre/more_news_stories/student_documentaries_get_close_and_personal_with_vanuatus_climate_change_battle.

issues together, whether it is climate change or urban development, they often seem an enormous cluster of problems. How do we respond to some of these really big challenges? How do we respond when we sometimes feel that the problems are insurmountable, in that, as ‘wicked’ problems, they are characterized by a high degree of complexity?

So, I come back here to a phrase that was raised at the Futures West event that Abby Mellick Lopes mentioned earlier in this chapter.³⁴ A *Future Scenario*³⁵ scholar, Tony Fry reiterates the idea of ‘Dig Where You Stand’.³⁶ The principle is to look into your local situation and to see how you can bring the awareness from that micro situation, case study or moment of realization to the fore. Can you then see if you can apply what you learn on this smaller scale to a larger one? Even with a case study like the South Vineyard Creek story, many lessons can be explored and learned. There are many community members involved, local council people, Aboriginal people, members of the Dharug community and others, including members of a nation-wide group *Clean Up Australia*. One of the local groups connected with *Clean Up Australia*, are people who call themselves the River Keepers. Site leader Paula Coleman reported on their activities in March 2019.³⁷ In short, a whole community has grown out from this place and with the university as well.

Originally this project came about because we were considering a concept called the ‘Sustainathon’ where we were looking at inviting a broad range of people onto the campus to participate in an ideation process. This was based on discussions with Professor Chris Ryan from the University of Melbourne’s Victorian Eco-Innovation Lab or VEIL.³⁸

34 Allen, Lopes and Andrews (2009).

35 In the ‘Methods of change 2: Designing in time’ section of *Design Futuring* (2009), Tony Fry writes: ‘Future scenario building not only requires a considerable amount of time and research but skill and practice. The basis of futuring scenario is not “what will be” or even “what might be” but “what potentialities beg interrogation”—this for possible precautionary design responses’ (pp. 145–155), <https://doi.org/10.2752/204191211x12980384100355>.

36 Fry (2009), p. 224.

37 Paula Coleman, *Clean Up Australia Day, Vineyard Creek, Burramatta* (2019), <https://www.cleanupaustriaday.org.au/fundraisers/paulacoleman/Vineyard-Creek--Burramatta>.

38 The Victorian Eco-Innovation Lab (VEIL) is a research-design-action group focused on innovation for more sustainable and resilient future cities. It is an interdisciplinary group whose work is engaged with and embedded in industry, government and communities. VEIL’s work aims to shift thinking about both what is possible and what is needed imminently to create a more sustainable future. The group’s projects

My initial contact with Professor Ryan arose from work surrounding my film *The Future Makers*, a documentary exploring possible futures based on environmental technologies and sustainability principles.³⁹ We had also discussed some of his ideas around the concept of ‘eco-acupuncture’, a way of considering how small examples can invigorate the larger entity exploring questions such as, ‘What kind of ideal urban scenarios would we like to create?’⁴⁰

As part of a WSU Sustainability Research initiative,⁴¹ we proposed to relate these ideas to our immediate situation and tell some of our local stories. Our aims are to document or capture our stories, and then to invite people to our campus, to explore and discuss some of the possibilities for Sydney and/or for Parramatta. In this way we hope to actually broaden this conversation around sustainability with more engagement in decision-making processes. There is currently much discussion about political culture; the idea that democracy is possibly in trouble because people feel left out of decision-making processes. Showing the ways in which people can engage meaningfully, can communicate and feel that they are being heard, and can then actually *see* that they’re being heard, will doubtless feed into political culture more broadly.

Resilience and Lessons for the Future

We’ve been having a range of conversations with Dr. Roger Attwater as the Campus Sustainability Manager, with the Riverkeepers, and with

frequently use scenarios, modelling and visualizations of alternative futures to help communicate these ideas (see *Victorian Eco Innovation Lab (VEIL)*, <https://veil.msd.unimelb.edu.au>).

39 *The Future Makers* tells the story of key Australians leading the way on the world stage in renewable energy. Some are designing a future based on models in nature. Others are creating a sustainable energy model for a 21st century economy (see Maryella Hatfield (dir.), *The Future Makers Film* (2008) http://thefuturemakers.com.au/about_the_future_makers_film.php).

40 Chris Ryan writes: ‘Eco-Acupuncture focuses on multiple small interventions in an existing urban precinct that can shift the community’s ideas of what is permissible, desirable and possible and provide transformation points for a new trajectory of development to a resilient low-carbon future’ (‘Eco-Acupuncture: Designing and facilitating pathways for urban transformation, for a resilient low-carbon future’, *Journal of Cleaner Production*, 50 (2013), 189–199, <https://doi.org/10.1016/j.jclepro.2012.11.029>).

41 The WSU Sustainability Research initiative at Western Sydney University is led by Juan Salazar and Jeff Powell (‘Research theme champions: Environment and sustainability’ (Western Sydney University, 2018), https://www.westernsydney.edu.au/dvcresearch/dvc_research/research_theme_champions).

many others. In relation to resilience, one of the stories that remained with me was told by one of the Riverkeepers, Paula Coleman. In the photo below, she is shown describing a number of tree species in the surrounding area from the riverbed through the mangroves, all the way up the creek, that have been there for hundreds of years. She pointed in particular to the swamp mahogany trees that have clearly been growing for many decades and possibly centuries.



Fig. 8 Riverkeeper, Paula Coleman, at South Vineyard Creek. Photograph by Maryella Hatfield, 2018.

This is a powerful image of resilience. Having the existence of these trees being made visible and the ecosystem being revealed, right next to our campus, was part of this research process. Becoming aware of this ecology in this way is very meaningful. We are therefore witness to both the trees' resilience and the eels' resilience in the face of intense levels of urban development around them—the light rail and the industrial sites—encroaching on the areas adjacent to the riverbed on one side with the campus sitting on the other side.

Paula also suggested that there are a number of powerful owls that live in the creek environment. Who would have thought that would be possible in such a densely populated urban environment? We know that in the creek there are tortoises, small turtles, eels and lizards. There are

the mangrove areas all the way up to the eucalyptus communities and there are eastern water dragons (lizards) in the creek bed. So there may be many creatures living there that we are not yet aware of. The flora and fauna are powerful symbols of resilience and we have much to learn from these environments.

Research continues to reveal the powerful value of ecosystems in supporting life forms on earth, with examples such as the recent findings on the role of mangroves and wetlands in mitigating climate change.⁴² Case studies such as these help students, academics and the community see how the broader principles apply through real examples in practice.

I think it's important that people have a sense of possibilities for the future, being able to see that we do have options and choices available to us, that decisions can be made in a more deliberative manner. Media, storytelling and documentation of these possibilities is a part of that process, and a theme that I explored in my film, *The Future Makers*.⁴³ Capturing stories of possible solutions and fresh ways of considering our relationship with the natural world gives us all a sense of agency and confidence in taking steps towards a future that is life-affirming in every sense.

Renowned biologist, E.O. Wilson describes the concept of 'biophilia' and the sense that humans have a natural affinity with all other life forms. Taking small scale experiences like this, applying them, and seeing how they relate to the greater whole can create powerful learning opportunities that may play out on many levels. He describes this principle eloquently here: 'I offer this as a formula of re-enchantment to invigorate poetry and myth: mysterious and little known organisms live within walking distance of where you sit. Splendor awaits in minute proportions'.⁴⁴

We may well apply this formula to examples such as South Vineyard Creek. Using these ideas, along with concepts such as eco-acupuncture, allows for an approach that ties in the benefit of micro-storytelling about sustainability, or small examples about social and community learning.

42 KerryLeeRogers, JeffreyKellewayandNeilSaintilan, 'Risingseasallowcoastalwetlandsto store more carbon', *The Conversation* (March 6, 2019), <https://theconversation.com/rising-seas-allow-coastal-wetlands-to-store-more-carbon-113020>.

43 *The Future Makers Film* (2008).

44 Edward O. Wilson, *Biophilia* (Cambridge: Harvard University Press, 1984), p. 139.

As Ryan observes, a focus on 'multiple small interventions in an existing urban precinct [...] can shift the community's ideas of what is permissible, desirable and possible and provide transformation points for a new trajectory of development to a resilient low-carbon future'.⁴⁵ Inviting participants on all levels, from the community, academia, students, policymakers, developers, and engineers, to observe what takes place on a micro-scale may allow for consideration of issues on a much larger scale. It may be possible to see how efforts to address some of the wicked problems related to climate change, may benefit from practical observation and application of solutions, ideas and strategies emanating from the local and extending to the global.

Some of these wicked problems have come into even greater focus more recently, with the bushfires in Australia over the 2019–2020 period, followed dramatically by the COVID-19 pandemic. Both of these events are revealing, even more, the value and importance of keeping natural environments intact as much as possible, especially in urban environments. Many wildlife species are under extreme pressure and threat, and having habitats to escape to becomes a matter of survival. Many people undergoing isolation at home are realizing the value of green spaces near their homes for exercise, health and well-being. So, it may become even more crucial to appreciate and recognize the value of these habitats and micro-stories as sites for learning and passing on knowledge for future generations.

45 Ryan (2013), p. 189.

Re-pair: An Open Project for Cultures and Economies of Repair in Western Sydney

Alison Gill, Abby Mellick Lopes and Francesca Sidoti

A baseline study about repair policy, services and infrastructure was conducted in 2017 by Francesca Sidoti, supervised by Abby and Alison as design researchers, with a focus on the Local Government Area of Parramatta, New South Wales (NSW), Australia. The study set out to investigate the capacities of repair services to respond to the problems of waste and the unsustainable rates of divesting unwanted goods, and identify strategic opportunities for connecting community, education, not-for-profit and local government sectors in Western Sydney in social learning about repair.

The preliminary report⁴⁶ identified repair services and community organizations, including commercial, government, charities and not-for-profits, currently in operation in Parramatta, uncovering rich and complex interactions and cultures of repair with a clear relationship to the cultural demography of the city and the rise of digital service platforms. A number of barriers to and motivations for community engagement with repair services were found, and attention turned to the role Western Sydney University could play in leveraging local initiatives and connecting people, resources and expertise.

Abby and Alison have a long-standing interest in groups of practices central to the handleability of household objects and to constitutive, life-extending maintenance and repair, as we hope to re-orientate design's focus from developing new, more energy efficient objects to instead support sustain-abilities of use and care. 'Re-pair' is a critical-political design practice of re-direction and re-materialization that gives time to things.⁴⁷ It takes place at precarious moments when the life potentials of the things we carry can be imagined, weighed and put

46 Francesca Sidoti, *Cultures of Repair* (n.p., 2018) [preliminary report].

47 Tony Fry (2009); Alison Gill and Abby Mellick Lopes, 'On wearing: A critical framework for valuing design's already made', *Design and Culture*, 3.3 (2011), 307–327, <https://doi.org/10.2752/175470811x13071166525234>; Abby Mellick Lopes and Alison Gill, 'Reorienting sustainable design: Practice theory and aspirational conceptions of use', *J. Design Research*, 13.3 (2015), 248–264, <https://doi.org/10.1504/jdr.2015.071456>.

on an alternative path to that of landfill. With this strategic disposition, we recognize that redirecting stuff back into life involves skillful diagnosis and the unearthing of practical knowledges and tools that are in social decline; this includes strategies of design that articulate the old and the new—such as retrofit, retool, refurbish, reuse and remake—which have the potential to create new, more diverse socio-economic relationships. Re-pair disrupts rapid product turnover and the unsustainable consumption of individually-owned consumables, and creates an alternative imagination from the linear take-make-use-waste trajectory, modelling the circular and share economies to which parts of the community aspire.⁴⁸ The barriers to more widespread engagement include the demands of time and skills-acquisition to take-up what are currently marginal, specialist and expensive practices, with poor recovery systems, and have limited capacity to compete with the speed and convenience of retail for new consumables.

In the last decade, several Western Sydney councils including Parramatta City Council in 2007, Liverpool City Council in 2012 and Fairfield City Council in 2017, have adopted 'zero waste' strategies. While the concept of zero waste is idealistic, it does represent an aspiration for a radical reduction in the amount of waste going to landfill. During this time, the centrepiece of the Parramatta City Council's waste avoidance strategy and non-organic waste diversion has been recycling. However, China's National Sword policy regulated from 2018 the importation of twenty-four categories of foreign solid waste—to better protect their environment and public health—triggering a local Government crisis as Councils have lost the income from on-selling recyclate for offshore processing to recover the cost of collection. In addition to this disruption of the recycling system, charitable donation and illegal dumping of unwanted and unfit items are forms of divestment on the rise. The Western Sydney Regional Organisation of Councils estimated that illegal dumping costs the region slightly over \$11 million in 2016.⁴⁹

48 Patrick Schroeder, Kartika Anggraeni and Uwe Weber, 'The relevance of circular economy practices to the sustainable development goals', *Journal of Industrial Ecology*, 23.1 (2019), 77–95, <https://doi.org/10.1111/jiec.12732>.

49 Western Sydney Regional Organisation of Councils 2016, 'Project: Litter and illegal dumping baseline' (May 4, 2020), <https://wsroc.com.au/projects/project-regional-waste/project-litter-and-illegal-dumping-baseline>.

'Dumping' of clothing, textiles and household waste is a major concern for charitable organizations with Charitable Recycling Australia reporting that Australian charity and social enterprise retailers are forced to send over 80,000 tons of unusable donations to landfill every year, costing these retailers \$18million in waste management costs and impacting staff morale and health.⁵⁰ These circumstances have created an opportunity to develop design's capacity to 'common'⁵¹ and reframe repair as a much bigger part of a response to the crisis and the waste management picture. Not all the things divested from households can be repaired but more assessment time is needed for the many still working and reusable things sitting between the categories of 'new' and 'waste', that have the potential to be kept going with maintenance and attention. Not only can repair sustain and even improve the functional life of portable and fixed goods and services; it also offers opportunities to attune to what we call the 'cultural timing' of repair within everyday practices of ridding, to develop local labour and skills development, and fulfill social and creative needs. It could contribute to community engagement and wellbeing in a way that recycling never did. As Nazlı Gökçe Terzioglu, Clare Brass and Dan Lockton have found, repair is not just a matter of fixing things but 'a generative process that is motivated by complex emotional drivers and behavioural aspects. It gives a sense of accomplishment, teaches how things are made and informs their material qualities'.⁵² This suggests that the role of repair extends beyond addressing waste management and environmental issues—it can serve as a platform for designing community engagement activities, creation of new skills and employment opportunities.

Our research study focused on a white/grey literature review of repair resources, policies and programs, plus the identification of repair businesses and services in Parramatta. Parramatta is a suburb twenty-four kilometres west of Sydney and home to approximately 245,000 people, and a focus of intense investment by public and private sectors, including

50 Charitable Recycling Australia, 'Advocacy', <https://www.charitablerecycling.org.au/advocacy/>.

51 Gibson-Graham, Cameron and Healy (2013).

52 Nazlı Gökçe Terzioglu, Clare Brass and Dan Lockton, 'Understanding user motivations and drawbacks related to product repair', *Sustainable Innovation 2015: 'State of the Art' Sustainable Innovation and Design* (University for the Creative Arts, Epsom, Surrey, November 9–10, 2015), p. 236.

the building, manufacturing and creative industries. Parramatta is undoubtedly important to the NSW and Australian economy, with Australian Bureau of Statistics estimating the city of Parramatta produces a gross regional product of \$28.88 billion annually, representing 4.84% of the state's Gross State Product.⁵³ Parramatta is also increasingly diverse, with 50% of the resident population born overseas and 52% of the population speaking a language other than English at home.⁵⁴ The economic vitality of Parramatta, combined with the growing population and the shift from majority low density housing to medium and high density housing,⁵⁵ ensures that policy and practice must manage rates of consumption with a focus on waste avoidance and disposal, with the opportunity to consider materials sorting, reuse and repair.

Of the commercial repair services based in Parramatta ($n = 122$), 104 were formal (a business, often with a shopfront or established mobile organization) and the remaining 18 were identified as informal (people working informally, on the side or after hours). These informal commercial enterprises were industry specific and exclusively associated with clothing (7) or Electrical and Electronic Products EEPs (10), with the exception of one informal automotive business. While this survey can tell us the range of product areas and number of services in the Parramatta area, more research is necessary to get a clearer picture of the communities of repair practices, and the take-up and roles of repair in social life. Since the first phase that scoped existing services, we have been exploring ways to activate this research as a searchable database of these services and geo-mapping the repair activity. The mapping has revealed very interesting geographic and cultural clusters—like the significant network of informal Sari repair—and invited further questions about what conditions gave rise to the informal economies of repair that are underway—mobile or pop-up services, and the co-location of shared resources and services.

One of the most magnetic repair initiatives in recent years has been the emergence of repair cafés, with one established in Parramatta at

53 id.community, 'City of Parramatta: Economic profile', <http://economy.id.com.au/parramatta>.

54 id.community, 'City of Parramatta: Community profile', <https://profile.id.com.au/parramatta/highlights-2016>.

55 Ibid.

the Bower Reuse and Repair Centre. Started in Amsterdam in 2009 by Martine Postma, there are now estimated to be approximately 1,400 repair cafés worldwide.⁵⁶ The concept is relatively simple: a repair café is a space where people can bring their broken items and repair them with the assistance or guidance of a volunteer. Tools and materials are available as is the expertise of an assortment of repairers. The cafés aim is to provide skill development, a social space, and support political activism and advocacy around repair as an effective intervention against consumerism and waste.⁵⁷

In Australia, there are sixteen repair cafés listed on the official Repair Café Foundation site.⁵⁸ In Sydney, this includes the Bower Reuse and Repair Centre, which has shopfronts in Marrickville and Parramatta, with a repair café on the last Saturday of each month at Parramatta, Banga workshop at Green Square and Zetland, and the Repair Café Sydney North, based in Chatswood. Expanding on the café concept, the Bower has an extensive program of events and workshops to encourage repair, and private online consultations with experts and group webinars were introduced in March 2020 as a digital community outreach program called RepairWorks Online during the COVID-19 shut-down. The Bower is careful to distinguish between paid repair services where items are left to be repaired, and skill development which is central to the Bower's community engagement and education program. Services include workshops on carpentry, upholstery, and furniture painting, repair services at an affordable price, access to workshop space, a collection and rehoming service for unwanted appliances and furniture. The Bower 'From House to Home' project, a partnership with other community groups, provides furniture for people in need—primarily asylum seekers and people who have experienced domestic violence—as they seek to set up a home.

Guido Verbist, manager of the Bower, outlined the key challenges for the charity around the community visibility of repair in the Parramatta Central Business District (CBD). In conversation, he mentioned that the 'Hunter Street location is in the business district, not the shopping

56 International Repair Cafe Foundation (2019), <https://repaircafe.org>.

57 *Sharing Cities: Activating the Urban Commons* (2018), <https://www.sharingcities.net/>.

58 International Repair Cafe Foundation, 'Want to start your own Repair Café? You can!' (2019), <https://repaircafe.org/en/start/>.

district. We find that we have fewer [walk-in] customers than in Marrickville, but those that come [to Hunter St] intend to come'. He speculates that it could simply be a matter of time to establish a stronger profile, as the initiatives have received strong support and promotion by Parramatta Council, however, he acknowledges the urgent need for an education framework about the multiple benefits of repair—i.e., repaired items can be better than the original—and a framework that separates repair from the idea of recycling as sorting and moving waste. Confirming our own and other research, Verbist sees the key barrier to embracing repair as the perception that 'buying new is best', and his strategy is to normalize secondhand and repaired goods by promoting the concept that 'buying secondhand is not second best'. Synthesizing our own and wider research, the following barriers to repair have been identified:

1. Finding a quality repair takes time and may be inconvenient, when the majority are time poor.⁵⁹
2. The need to skill-up and find the tools and materials to DIY.⁶⁰
3. Going against the grain of buying new, to love the pre-loved or worn object.⁶¹

Some of the motivations found for repair are:

1. Emotional attachment to an item.⁶²
2. A familiarity with the product and/or an unwillingness to buy and then familiarise oneself with new products or technology.⁶³ We have recognized this accrued familiarity

59 Emma Dewberry et al., 'A Landscape of repair', *Sustainable Innovation 2016: 'Circular Economy' Innovation and Design* (University for the Creative Arts, Epsom, Surrey, November 7–8, 2016), pp. 76–85; Terzioglu, et al. (2015).

60 E. Kalantidou, 'Handled with care: Repair and share as waste management strategies and community sustaining practice', *PLATE Conference* (Nottingham Trent University, June 17–19, 2015), http://www.plateconference.org/pdf/plate_2015_proceedings.pdf; Daniela Rosner and Morgan Ames, 'Designing for repair?: Infrastructures and materialities of breakdown', *17th ACM Conference on Computer-Supported Cooperative Work & Social Computing* (Baltimore, MA, February 15–19, 2014).

61 Gill and Mellick Lopes (2011).

62 Terzioglu, Brass and Lockton (2015).

63 Dewberry (2016).

and learning by referring to the intrinsic value of the ‘experienced product’ in contrast to the new.⁶⁴

3. As a means of empowerment, both in consuming and using items in an environmentally sustainable way and in developing the skills to truly ‘own’ an item.⁶⁵

In order to re-prioritize ‘experienced products’ over new ones and fully ‘own the already owned’, consumer legislation, design and manufacturing must change. Verbist describes the impact that the push by consumers and small-business for ‘right to repair’ legislative reform in the European Union could have on manufacturing, and the aspirations for Australian legislation and a design-led circular economy: ‘in the meantime manufacturers needed to move from “linear” to “circular” economies [...] Resources-to-waste products are the current model, but a circular economy is where you can time and time again use the parts [...] you can dismantle them and reuse them for new products. Some companies have started looking to that direction, but there’s a lot more room for improvement’.⁶⁶ A groundswell of community and government pressure has the potential to push back and hold design and manufacturing to account, for producing too many screw-free, glued objects under warranties that lock out the user to tinkering and skills acquisition. There are many challenges ahead for design, and when there is a mandate to design items that can be more readily disassembled, fixed and updated, the part played by repair could grow.

Recent developments indicate that growing repair is not a pipe dream. The NSW Environmental Protection Authority have identified the roles of repair, refurbishment and remanufacturing in drafting a State circular economy policy in the discussion paper ‘Too good to waste’,⁶⁷ and there will be impetus for local government to discuss

64 Gill and Lopes (2011).

65 Rosner and Ames (2014).

66 Cited in: Jemima Burt, ‘“Right to repair” regulation necessary, say small businesses and environmentalists’, *ABC News* (March 2, 2019), <https://www.abc.net.au/news/2019-03-03/does-australia-need-a-right-to-repair/10864852>.

67 ‘Too good to waste— a discussion paper on a circular economy approach for NSW’, *Sydney: NSW Environment Protection Authority* (October, 2018), <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/recycling/18p1061-too-good-to-waste-circular-economy-discussion-paper.pdf?la=en&hash=4217537474E04FA7DD4A2D3191FFBD1A78433FD2>.

these strategies in developing waste reduction and avoidance policy at Council level. A recent report prepared by Western Sydney University⁶⁸ recommends that our research on Parramatta's repair clusters indicates potential for Councils to leverage existing 'cultures of repair'; to model and embed circular economy principles in community engagement activities that not only recover waste materials but foster culturally diverse social, creative and economic opportunities.

68 Paul James et al., *Closing the Loop on Waste: Community Engagement, Cultural Diversity, and Shared Responsibilities in Waste Management in Canterbury-Bankstown* (Penrith, Australia: Western Sydney University, 2019), <https://researchdirect.westernsydney.edu.au/islandora/object/uws:53180/datastream/PDF/view>.

Coda

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Having recently visited the western High Arctic, the sense of it as a ‘barometer’ of climate change is due to its vulnerability to environmental change.⁶⁹ This features in the context of the discourses of both research institutions and so-called ‘non-state actors’, and is linked to the Anthropocene. Rapidly melting sea ice, as well as other impacts of climate change, have been documented in a report on recently completed comprehensive studies.⁷⁰ The results have led to the emergence of multiple sources such as non-state actors, NGOs, and research organizations (e.g., Canadian High Arctic Research Station or CHARs) as significant influences in understanding and informing policy relating to the complex issues of climate change.



Fig. 9 Arctic Ocean from Cambridge Bay (Ikalutuuttiaq), Western High Arctic.
Photograph by Hart Cohen, 2019.

69 Dorothea Wehrmann, ‘The polar regions as “barometers” in the Anthropocene: Towards a new significance of non-state actors in international cooperation?’, *The Polar Journal*, 6.2 (2016), 379–397, <https://doi.org/10.1080/2154896x.2016.1241483>.

70 Gary Stern and Ashley Gaden, eds., *From Science To Policy In The Western And Central Canadian Arctic: An Integrated Regional Impact Study (IRIS) Of Climate Change And Modernization* (Quebec City: ArcticNet, 2015), pp. 300–341, http://www.arcticnet.ulaval.ca/pdf/media/IRIS_FromScience_ArcticNet_Jr.pdf.

In this context, by way of example, research organizations have included Inuit Elders as consultants to gauge the impact of climate change on their activities such as hunting and fishing, the impact on animal behaviour and specifically on environmental changes they have been able to observe in recent times. This supports the view⁷¹ that the Anthropocene increases the likelihood for cooperation between non-state and state actors in the attempts to address climate change.

The logic of our contribution above bears out this view of the importance of non-state actors in assisting with this process of engagement with climate change. The examples of the engagement undertaken as part of the *Living Lab* suggest that students, academic staff and Aboriginal people—both stakeholders and rights-holders—have come to meet the complex and many varied challenges of climate change.

But the issues surrounding Anthropocene thinking and its intellectual horizons are anything but settled. Contemporary disputations include works by Dipesh Chakrabarty, who cites a historicist paradox in the anxieties that predict the end of humanity;⁷² as well as Bruno Latour's attacks on scientific practice, now reversed in the era of the Anthropocene, where he articulates something resembling a 'Living Lab': 'I am working on something like laboratory life—a combination of lab and field work in an area called the "critical zone"—the study of the earth's skin'.⁷³ The ideas developed in relation to the South Vineyard Creek above suggest a strong affinity to the 'critical zone' approach. And finally, Donna Haraway argues that the Anthropocene is a 'boundary' not an 'epoch'. As she says, the Anthropocene throws into relief the Holocene, whose epoch allowed for 'cheap nature' or a massive draw on the planet's resources. Haraway thus calls for participatory people-based action 'with intense commitment and collaborative work and play with other Terrans, flourishing for rich multispecies assemblages that include people'.⁷⁴

71 Wehrmann (2016).

72 Dipesh Chakrabarty, 'The climate of history: Four theses', *Critical Inquiry* 35.2 (2009), 197–222, <https://doi.org/10.1086/596640>.

73 Jop de Vrieze, 'Bruno Latour, a veteran of the 'Science Wars', has a new mission', *Science* (October 10, 2017), <https://www.sciencemag.org/news/2017/10/bruno-latour-veteran-science-wars-has-new-mission> and <https://doi.org/10.1126/science.aq1805>.

74 Donna Haraway, 'Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making kin', *Environmental Humanities*, 6 (2015), 159–165 (p. 160), <https://doi.org/10.1215/22011919-3615934>.

In a modest manner, we believe the projects found in this chapter emulate this call to commitment and action.



Fig. 10 Stop sign in Cambridge Bay (Ikalutuuttiaq). Photograph by Hart Cohen, 2019.

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