OCULUS

A publication of the
Research Students Association
Melbourne School of Design
University of Melbourne

2023

OCULUS 2023

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FOREWORD

We are delighted to welcome you to the 2023 edition of Oculus!

What a wonderful initiative that showcases and celebrates Graduate Researchers and their research. The inspiring thinking being undertaken by our community of Graduate Researchers is of the highest standard, and we are excited to see some of that great work represented in the pages of this edition.

As a Graduate Research-led initiative, Oculus represents a commitment to sharing the big ideas that this community is generating, and to provoking new thinking across the built environment. From thinking about home-work interrelationships and how it may 'tame us', the ritual of the wheely bin and its underlying connection to the circular economy, to stories about attachment and resistance in Indonesia, the transformation of historic buildings in Sri Lanka and the building of healthy built environments, this edition of Oculus has it all!

Reading across the works presented in this edition, the diversity of urban research, the exciting new methodologies, and connections that Graduate Researchers have with different communities of practice is self-evident. We are particularly struck by the openness to share field work experiences and the challenges and joys related to the research journey. However, we acknowledge the unevenness of this experience across the Graduate Researcher community, particularly as we emerge out of a time when field work was significantly hindered for many by a global pandemic.

The leading edge thinking on display in this edition of Oculus is exciting, and it reflects the incredible Graduate Researchers in the Faculty. The boundary-breaking and place-focused scholarship honours the depth of complexity that built environment researchers encounter as they inspire change towards greater levels of climate justice, healthy built environments and the cultivation of diverse epistemologies in urban settings.

Finally, we would like to congratulate the editors and authors of this edition of Oculus. With the demands on our time as high as they are – between teaching, research, and our private lives – it can be difficult to contribute, organise and lead a bookazine. We acknowledge the time and energy it takes to bringing Oculus together every year; in writing, editing and cheering on your fellow Graduate Researchers who may be sharing their work for the first time.

We are so grateful to the community of Graduate Researchers in the Faculty, and we are delighted to invite you to jump right in and join us in celebrating their work.

Crystal & Michele

A/Prof Crystal Legacy
Associate Dean (Graduate Research)

Prof Michele Acuto
Associate Dean (Research)

INTRODUCTION

It is an enormous pleasure for the MSD RSA to present Oculus 2023 to you!

Oculus is a Melbourne School of Design (MSD) Research Students Association (RSA) publication that celebrates a selection of the diverse research undertaken by postgraduate researchers within the Faculty of Architecture, Building and Planning. This year, the publication showcases the outputs of PhD candidates that cross architecture, landscape architecture, urban design, heritage conservation, planning and construction.

Following its resurrection in 2022, Oculus has again attracted an impressive selection of contributions from our MSD Graduate Researchers. This reflects not only the enormously interesting and high calibre scholarship within the cohort but is also symbolic of the hard work the Graduate Researchers have put into collectively regaining their stride post-Covid.

I would like to acknowledge that the Graduate Research experience is not a smooth path for all. Many of our colleagues have joined us from interstate or overseas, leaving support networks of family and friends, in order to undertake their research. For others, their Graduate Research experience has been impacted

by other forms of distress such as financial hardship, housing insecurity, or precarious employment. In acknowledging this, I would like to also celebrate the compassion, advocacy, and community engagement members of the RSA Committee, and members of our cohort, have provided each other this year. In doing so, I also thank the Graduate Research Support team for their passionate engagement with the RSA, as ultimately, the important research showcased here in Oculus 2023 would not be possible without this holistic support for Graduate Researchers.

I would like to thank everyone who has contributed to this edition of the MSD Oculus bookazine, including each of the contributors who have dedicated time to sharing their research and ideas. I would also like to especially thank to the RSA Research Committee members Dorsa Kafili, Dorsa Fatourehchi, and Uly Faoziyah who have worked tirelessly to make the publication possible, volunteering many hours to coordinate the process and design the final output.

Please enjoy, share and discuss this publication – and feel free to reach out to the contributors if you'd like any further information.

Rebeca Roberts
RSA President 2023

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PHD Research Projects 2023

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AMBIVALENT SELVES: RESISTANCE AND ACQUIESCENCE IN HOME-LOCATED WORK

Keywords: home-located work; housing; creative class; creative industries; technology; space

It was a candid winter morning. Windy, no doubt, as expected of Melbourne. But with a clear sky and chill temperature – not the 'miserable weather' Melbournians love to say. I realised that I was ahead of schedule as I was approaching Carol's home, so I decided to spend some time at the park in front of her abode. On that weekday morning, there was only a young mother pushing her daughter on a swing. The street was calm, as a good suburb is supposed to be, right?! Except for the muffled noise of cars desperately running along a nearby freeway. As I'm curious about creative work, at that moment questions started popping up in my head: don't artists enjoy living in bustling streets with cafes and cultural amenities? What is Carol, a multi-media artist, doing here? Yes, she does live at a short tram distance from Melbourne's main creative clusters. But, still…

When it came the time of my visit, I entered the low-rise compound towards Carol's flat. She lived on the ground floor, and thus immediately noticed my presence when I arrived. Carol gave me a heartfelt welcome. Lovely artist, she is. You know, as you move from the public realm of streets and parks to the intimate, private domain of home, you realise that life isn't simple. It is another universe. But bring work to domestic spaces, and you get a bonus of complexity! My home tour into Carol's workhome (Holliss, 2015) revealed the contradictions of being a home-located creative worker in a globalised system of neoliberal, post-industrial capitalism. Carol plays with resistance and acquiescence. Her home embodies how she navigates this virtual-material, creative world where demands for endless productivity clash with the 'being at ease' (Heidegger, 1993) that home empowers us to feel.

Daughter of immigrants, Carol loves her neighbourhood: abundant green spaces are a source of inspiration for her creative practice. It is also a place of connection to her childhood memories. Inside the home, a Mac emerges at the corner of her lounge room to connect her to the world. Looking at her work desk, I couldn't help but feel that these work artifacts were 'in-

truders.' Precariously integrated into the 'spiritous ambience' of her living room, her work intermingled with her life 'seamlessly' – paradoxically as it may seem. It is part of who she is, I heard her saying. As if she was trying to put under the gaze of her control a work precarity that is widespread throughout the creative industries. But life is bigger than a single occupational identity – and her home imprinted this contradiction audibly.

I bring Carol's story here because I think she epitomises the resistance and acquiescence one has to endure as a home-located creative worker in Melbourne. The latter, lauded as Australia's capital of culture, at the same time that pulls artists under its wings, doesn't offer them conditions to survive 'for art's sake.' Carol, like many others, must accommodate her creative practice with other occupations. Pragmatism prevails. But she uses her 'paid job' pragmatically as well. Armed with an earphone, she teleports her mind to creative universes while her body does the work. To me, it is a form of 'everyday resistance' (Scott, 1985) one finds to navigate the governmentality of today's capitalism – borderless, groundless, faceless –, but also an acquiescence in the form of continuous creative productivity. You cannot – and often do not want to – stop working.

Her *live-with* (Holliss, 2015) arrangements – where functions and uses of domestic and work life fuse into a single space – raise the question: does bringing work to home liberate or ensnare us? To answer this question, in my research, I converse with theories that try to explain the interaction between work, technology, and space. A lot of work has been done about housing for creative workers; and some literature also dealt with the intricacies of home-located work. However, I found a persisting gap in explaining and integrating how work interacts with infrastructure and space at various scales. Carol's home is one among thirty other home tours I conducted in the year 2023. She encapsulates the power struggle that they silently wage with and against non-humans (technology and space) and humans (employers, companies, etc.).

And there is also another variable: Carol lives with her partner and dog. How does one navigate relationships and the 'moral economy' (Silverstone & Haddon, 1997) of the home when work usurps hierarchies of uses of certain domestic spaces? Can you stream your favourite TV series when the person next door (or in the same room) requires Internet bandwidth and a silent environment for her creative work? Carol's creative practice has peaks. Especially when approaching deadlines for an art exhibition, her home morphs into a sweatshop – 'my partner don't mind,' Carol explains. For her, bringing her work to domestic spaces enhanced her connection to 'place.' It reinforced her ideal of home. But it also isolates. Ultimately, it is affordability that dictates much of her choices for housing and work arrangements.

Visiting Carol brought to light the ambivalent conditions of existence that arise with home-located work. We try to domesticate work, in both senses: it is an effort to tame or control labour relations that are bigger than us while we try and change the 'nature' of work, from a public endeavour to a (semi)domestic routine. But bringing work to home modifies how we use our private time and space – and this ultimately impinges on our housing and locational preferences. It also tames us. In the end, these interwoven relationships signal that better designing homes and neighbourhoods may not be sufficient. For me, home-located work is also contingent on major technological and labour dynamics. Above all, it is contingent on the meanings of work in our lives – the daily acts of resistance and acquiescence that position us in or out of the totalising neoliberal ethos.

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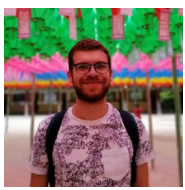

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RUBBISH AND GOVERNANCE

Keywords: Municipal Waste Management; Bin Night; Waste Governance; Australia

Every week, people across Australia participate in the 'bin night' ritual. The sound of 'wheely bins' scraping across the concrete combined with the faint whiff of bin juices is unmistakeable and serves as a timely reminder that tomorrow is collection day: time to put the bins out. Depending on where you live, you may have to sort your waste into two bins – general waste and mixed recycling – or three bins if you have FOGO (food and organics), sometimes even more. Each week, your household waste is collected by council contractors and taken somewhere else to be processed: out of sight, out of mind. Job done.

The weekly ritual of sorting rubbish from recyclables and putting the bins out for collection epitomises the modern Australian experience of municipal waste management (MWM). But underneath this familiar service lies a complex governance system with many moving parts and vested interests. It is also a system in crisis: a storm in a rubbish bin. So, let's look at what's going on behind the scenes of the weekly bin collection.

Municipal waste governance in Australia

MWM is an intricate process of separation, collection, and processing that requires multiple scales and forms of cooperation between governments, businesses, and – of course – community members like you. Most people in Australian experience the front-end operation of waste management: chances are you've seen, heard, or smelled at least one rubbish truck in operation. These rubbish trucks are usually operated by private companies, who are contracted by local governments to collect and manage municipal waste. Once collected, each municipal waste stream (landfill, recycling, and FOGO – sometimes glass too) is taken to a different facility to be processed.

Red bin 'rubbish' is sent directly to landfills, which are regulated by state governments through waste levies which range from $20/tonne in Tasmania to $163.20/tonne in New South Wales (WMRR, n.d.). This may seem expensive, but landfill levies discourage over-reliance on waste disposal (Shooshtarian et al., 2020). FOGO bins are taken to purpose-built composting facilities where organics are broken down and turned into mulch and fertiliser products. Yellow recycling bins are taken to processing centres for separation and resale. Now, this is where things get interesting.

What is the problem with municipal waste?

Until recently, Australia's recycling industry was reliant on sending recycled materials offshore to be processed. Recyclable material was separated, shredded, baled, and shipped off to developing countries: out of sight, out of mind. Job done. That all changed in 2017 when China banned waste imports from developed countries, triggering similar bans from other recipient countries. These international import bans sparked a waste management crisis in Australia (Jones, 2020). With nowhere to send recycled materials and limited onshore processing capabilities, our recycling systems collapsed, and local governments had no choice but to send yellow bins to landfill (Zappone, 2019).

Fast forward to 2023, and Australia's waste management system is still in disarray. Since 2018, we have seen numerous policy changes, advocacy campaigns and initiatives aimed at improving MWM. We have come a long way from sending yellow bins to landfill, but MWM in Australia is still grappling with pressures to reduce waste to landfill, increase resource recovery and keep costs down. These challenges are further compounded by infrastructure limitations, recycling contamination, contract lock-ins, market failures, and ongoing capacity constraints.

Everyone has a role to play in improving MWM in Australia – governments, industry, and you. The pathway toward a circular economy starts with your weekly bin collection. Proper waste management at home, like correct handling of soft plastics, rinsing residue from containers, and knowing how to compost, can help reduce contamination.
So, what can you do? Educate yourself. Check your council website to find out what materials can be recycled in your area.

Figure 1. Rubbish bins ready for collection in Melbourne, Australia (source: author)

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Amelia is an urban sustainability scholar who is passionate about healthy cities and good governance. Her research explores multilevel waste governance in Australia, focusing on the role of local governments in scaling action on waste.

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WHO WOULD WANT TO SHIFT TO CYANIDE? A TALE OF ATTACHMENT AND RESISTANCE IN AN ILLEGAL GOLD MINING VILLAGE IN INDONESIA

This is a story of people in a remote village on Java Island, Indonesia, who rely primarily on illegal gold mining for a living. In the framework of lowering and eliminating mercury usage, the government is attempting to divert the use of mercury that has taken root in the village to cyanide, which is thought to be more capable of purifying more gold and is more environmentally friendly. However, this was not a simple task. Starting with a close and never-ending chain of reliance, differences in power and influence, and strong resistance to government activities. What do they desire? Please listen to their stories.

One thing we know from generation to generation.
Keep digging into the darkness for light
No matter that our sky is prone to collapse
Never mind that we build endless holes on land that is supposed to be protected
Never mind that hard-to-penetrate legalities chase us
We want to get the light of livelihood
Light named gold
Yes, **this is our tale as illegal gold miners**.

If you ask, “what are our dreams?”
Gold miner
If you ask, “don’t we want to continue our education?”
For what? Eventually, we will become gold miners
If you ask, “are we not willing to change livelihoods?”
For what? We earn money easily
If you ask, “don’t we know that the job is unsustainable?’
Yes, we understand, but what can we do?
When **our lives are already tightly tied to an unbroken golden chain**

We do not deny that we use mercury in our gold processing
Do you want to say that the material is dangerous?
Yes, we've heard of it
But did you know that our men consume it as a sign of maturity?
And we're still fine
We didn't die as quickly as the report reported
So?

Why does the Government want to switch it to cyanide?
Because mercury is more dangerous than cyanide?
Sorry, it's hard for us to understand

As far as we know
Cyanide is a dangerous material that can kill people in an instant
Just look at the case of Vietnamese Coffee[1]
On the other side, we still survive despite using mercury
How can we entrust our lives to more dangerous objects?
Let's come to our village to prove it
Who dies faster?

We do not deny the results of research that say cyanide can purify more gold
However,
Did you know that using it requires 5 times more capital?
Did you know that using it requires 20% higher production costs?
Did you know that using it takes 3 times longer?
While,
We are just ordinary people working to earn a living today
There's not much we can save

Then,
Where do we get our capital and expensive production costs?
Where can we support our family when we don't earn money today?
It's not a matter of who is more effective
It's a matter of bondage that limits us

We appreciate the Government's efforts to build a gold processing facility with cyanide
Facilities that are said to cost hundreds of thousands of dollars
The facility is said to use imported machinery
Do you know?
There is only one facility in our village and it is located on land owned by the gold lord in our village.
Is it possible for us to easily access it?
Please, imagine it.
The facility was also far from our homes,
Then, who will secure the facility?
Who will fix the expensive machine if it breaks?
Yes, the machine has broken down, and we don't know how to fix it
And don't have access to ask people how
Is it wrong for us to let it become a monument?

We have been entangled in mercury chains for a long time,
It is easy for us to get mercury,
It is easy for us to sell the gold we produce,

Easy for us in every aspect..
Can cyanide guarantee the chain?
We're not sure
We don't believe in the dreams the government promises
We find it hard to believe in the government's windy policies
We are not the object of a short-term project

We believe that cyanide diversion policies have been reviewed at the government level,
But we doubt, whether it can be applied in our village?
Perhaps the intent of the policy is beautiful
To eliminate the use of mercury
But can't it replace it with something else safer?
Which is more affordable for ordinary people like us
Which can provide greater economic opportunities for us
We are not unwilling to change
We support change
We want to be empowered
We want to be more advanced,
But
Will you listen to our complaints?
Are you willing to involve us?
Are you willing to sincerely help us?
Because in the end,
We are ordinary people with hearts
A heart that wants to be cared for

Supported by the Research Training Program (RTP) Scholarship, Uly is completing her Ph.D. at the Faculty of Architecture, Building, and Planning, The University of Melbourne. Currently she is conducting research on spatial changes in investment during the pandemic in Indonesian Cities. She also has a high interest in research in the field of changes in the social capital of rural communities.

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PARTICIPATORY DESIGN FOR WELLBEING: ADOLESCENT MENTAL HEALTH AND THE PUBLIC REALM

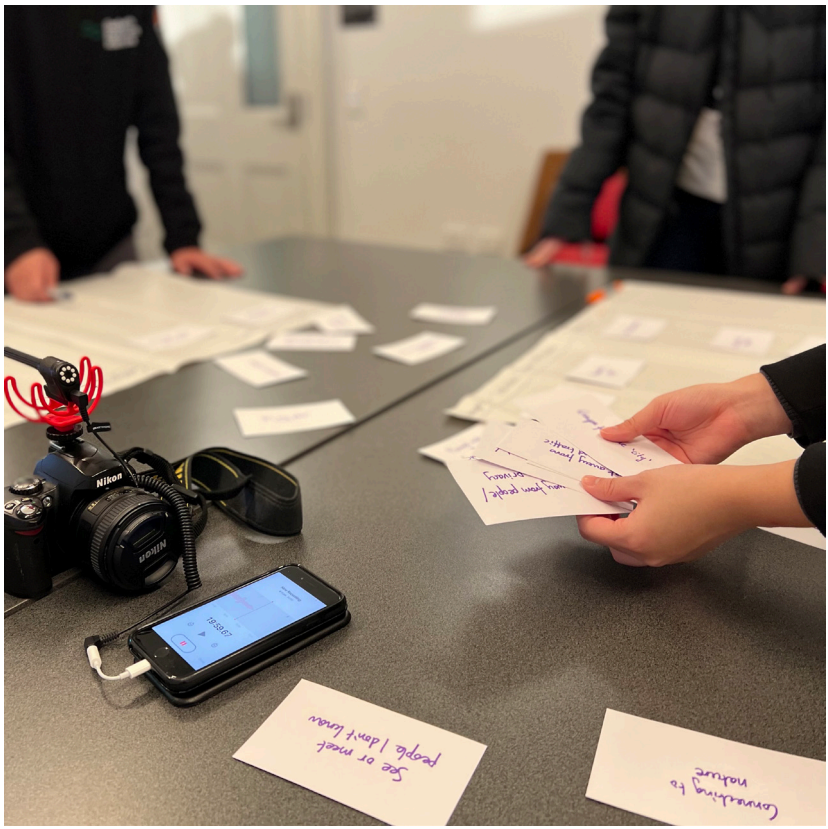
Keywords: Adolescents, Mental Health, Parks, Nature, Urban Design

The public realm is both a source of stress for young people, and a 'spiritual tonic' (Lofland, 1998, p. 233). In Australia, the role of the urban public realm in shaping youth mental wellbeing is pertinent given that most adolescents live in cities, and we are experiencing a youth mental health crisis. 47 % of females and 31 % of males aged 16–24 reported having a mental disorder in 2020–21 (ABS, 2022). 18- and 19-year-olds experience the highest mental illness rates of any age group (Mission Australia, 2017). Learning to navigate the public realm is especially important for adolescents' development because it is where they meet people they would not normally encounter, safely test out new identities and prepare themselves for adult life (Clark & Uzzell, 2006; Höglhammer et al., 2018; Lofland, 1998). Yet, studies show that young people are spending less time outdoors and are using public space less (Francis & Lorenzo, 2006; Höglhammer et al., 2018). The reasons for this are myriad and complex. They include the increasing significance young people attach to their digital lives (Knöll & Roe, 2017; Manzo, 2018); a decline in the availability of spaces where adolescents feel 'free to roam' (Jack, 2010; Roe & McCay, 2021); less time for unstructured play due to parental perceptions of risk and increasingly regimented schedules (Francis & Lorenzo, 2006); and the ongoing neoliberalisation of public space, which elevates the needs of capital over citizens' rights to the city (Harvey, 2003).

Addressing some of the reasons for adolescents' withdrawal from the public realm requires shifts in culture and policy. However, much can be done at the ground level. In particular, research can inform planners and designers on how to design public spaces to best cater for teenagers' psychological

needs. My research asks, what do adolescents need from the urban public realm to support positive mental health and wellbeing? In asking this, I seek to move the debate beyond traditional notions of the urban environment as deterministically pathogenic (Dubos, 1972; Sutcliffe, 1981) and instead embrace a salutogenic (health-giving) approach (Knöll & Roe, 2017; Sloan Devlin, 2018). I focus on the urban park, a public space typology familiar to most Australian youth, and one for which health-giving benefits have been known since at least the convergence of town planning and public health in the nineteenth century.

My research methods align with a constructivist sociology of childhood that positions young people as social actors and 'experts in their own lives' (Coyne & Carter, 2018, p. 2). If we want to understand young people's experiences of the public realm, we need to listen to them. I conducted in-depth interviews with 20 18- and 19-year-olds and invited them to attend a participatory workshop. Four came to a face-to-face workshop and another four



attended an online session. In the workshops, we collaborated to categorise and identify relationships between the themes uncovered in the interviews. I also invited participants to rank the themes in order of research priority and suggest appropriate research methods. My rationale was to expose participants to how research works; engage them in an interesting, empowering and fun co-creation process; and to invite their perspectives on my research question free from my biases and experiences.

I found that urban parks provide many mental wellbeing benefits for this cohort including feeling relaxed, calm, free, happy and focussed. While similar in many respects to adults, adolescents' experiences emphasise the significance of age-specific developmental needs in shaping their wellbeing outcomes. Drawing from Marselle et al. (2021), I developed a conceptual framework of urban parks and adolescent mental wellbeing, encompassing motivations for visiting, modes of experience (sensory, social, symbolic, spiritual), pathways to health, and wellbeing outcomes.

As of November 2023, I am in my third and final data collection phase, surveying urban planners to understand their perspectives on adolescents' wellbeing needs and to learn to what extent their organisations are planning parks and open spaces with those needs in mind. By highlighting the gaps between what young people say they need and what is provided on the ground, I hope my research will help built environment professionals design public spaces that provide diverse experiences through which adolescents can find pathways to wellbeing.

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REVALUING URBAN FOOD WASTE IN A CIRCULAR ECONOMY: AN EYE ON THE EXISTING

Keywords: circular economy, food waste, Global South, socio-material, urban sustainability

The circular economy (CE) concept has been popularly used by governments, businesses, and civil society to address the issue of food waste in cities. At the core of CE is the notion of a cyclical production system whereby resource inputs are minimised, and waste instead of being disposed is channelled back into production or utilisation, thus 'closing the loop' (Murray et al., 2017). CE as currently advocated has a strong economic rationale. Proponents seek to decouple economic growth from environmental degradation and depletion of finite resources (Ellen MacArthur Foundation, 2017; United Nations Department of Economic and Social Affairs, 2018). In other words, advocates of CE are optimistic in the ability to create economic value from this closing of material and energy loops.

Yet, food/waste seems difficult to be integrated into a CE (Halloran et al., 2014), despite the multitude of policy, will, and available technological options. Compared to other non-organic materials like plastics and metals, which have seen significant progress in CE (Thinking Circular®, 2021), food waste seems to be lagging behind and is largely untapped at scale beyond small- and local-scale innovations. Seeing that the value for food waste is not easily realised, I contend that there is a need to go 'on the ground' to study what is—or is not—actually happening in the process of revaluing food waste.

Despite CE's aim to revalue waste and rationalise its recovery and continued use, what remains under-theorised are the actual understandings of how waste becomes inscribed with value and the socio-spatial conditions and processes that enable or hinder this process of valuing. To date, much of the CE literature on food waste has focused on technological and market-driven solutions and have largely neglected the socio-material limits to

the movement and transformation of waste. Such limits are important to consider, particularly given the materiality of food waste and complex social relations in waste management.

For one, materially food is unstable and prone to decaying relatively quickly, thus managing food waste requires specific temporal and spatial strategies to negate or contain its qualities. As argued by Millington and Lawhon (2019), attention to such 'particularities' of waste is critical to understanding 'how specific materials can or cannot be rendered valuable within specific supply chains' (p. 1054). Two and more broadly, CE has been critiqued on its inadequate engagement with social and political dimensions in waste recovery (Corvellec et al., 2021; Friant, 2020). Implicit in processes of value creation are questions of power—who benefits and who does not—given that the act of rendering value from waste is never neutral nor apolitical (Ernstson et al., 2021). Without meaningful consideration of actually-existing practices, CE risks reinforcing present inequalities (Bassens et al., 2020). Lastly, much of the CE literature on food waste has focused on the Global North (Ouro-Salim & Guarnieri, 2022). Asia, being rapidly urbanising and also major producers of food and waste, would be interesting to study, given that urbanisation is said to contribute to the current unsustainable 'linear' economy (Andrews, 2015).

My thesis aims to understand how waste is revalued and explores the existing practices of urban food waste recycling in Malaysia. (I denote 'recycling' to mean any paths taken by food/waste at their point of disposal other than landfill). I undertake a qualitative and empirical research study, drawing data from interviews, published materials, and secondary literature. My research pays attention to the materialities, spatialities, and social rela-

tions involved in these recycling practices, to understand how food waste is moved and transformed and what drives these processes. Ultimately, my research seeks to contribute new knowledge to support a just and sustainable economy and provide empirical and place-specific evidence for better food waste management in urban societies.

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DOING FIELDWORK IN THE GLOBAL SOUTH: DIVERSE APPROACHES FOR A DIVERSE RANGE OF PARTICIPANTS

Keywords: Urban flood management, science-policy-practice interface, environmental challenge, tension, ethics.

For graduate researchers, conducting fieldwork can be both interesting and scary. It is interesting in the way that we test our research methods in the 'real world' and generate new knowledge. Yet it is also scary because we do not know what kind of practical and methodological challenges awaiting us, and how to navigate them with our limited experience.

My research delves into the collaboration between science, policy, and practice in the context of urban flood management in Ho Chi Minh City. I investigate the underlying processes of planning, approving, constructing, and operating in some flood management projects. The research requires connecting with and interviewing a diverse set of institutions, including government agencies, research institutes, design firms and private enterprises. Approaching this diversity of participants was challenging, yet it generated intriguing insights about different expectations, willingness to share, and ethics issues associated with this Global South context.

Difficulties in approaching the interviewees

In Vietnam, students aiming to contact government agencies for research purposes need to present a letter of introduction from their university. Yet not all the government agencies accepted my letter from The University of Melbourne. The responses from these agencies fell into three categories: some agencies accepted my letter, willingly agreed to participate in interviews, and provided the requested documentation; other agencies only provided the necessary documentation but did not grant permission for interviews; and, unfortunately, a few agencies totally rejected my introductory letter. The reasons for rejection were either because student research was not deemed significant by the agencies or due to a lack of trust in the introduction letter from a foreign university, especially given the sensitive period during which I conducted my fieldwork.

When selecting the projects to study, I was unaware of ongoing legal investigations in the city's construction sector that entangled some of the projects. Therefore, it was challenging to approach government agencies to talk about these projects. Some even warned me that they might perceive me as a disguised police officer investigating them. A similar situation happened for the enterprises - the investors in these projects. As it was a sensitive time, they refused to talk with a stranger about their collaborations with public servants. Furthermore, the legal investigations triggered a crisis in the city's real estate market, leading to significant layoffs within these enterprises. Even when I managed to contact someone within those companies, they informed me that the individuals responsible for the project were no longer employed there, making it impossible to obtain their contact information.

However, not all the challenges were unexpected and proper fieldwork planning should include backup plans. Repeated rejection required me to process all existing backup plans and create new ones according to the field. For instance, since public servants declined to discuss specific projects, my questions needed to focus on the general process of flood management process in the city. Besides that, I continued the attempt to contact key interviewees by forming new connections.

Building connections and trust

Although a direct approach to potential interviewees was challenging, I was fortunate to have some personal connections from which I could expand and create the chains of connection. Additionally, there were generous responses from government agencies and enterprises that I contacted via letter and email. They not only allowed me to interview them but also facilitated the expansion of my network. There were many occasions that I received a phone number, only for the person I called to redirect me to another number, and so on. In such cases, I persisted in making call after call until I successfully met the interviewees. Thanks to those chains of connections and phone calls, I got to interview the personnel in the government departments that rejected me before, as well as meet more new interviewees. I realised that, in the field, phone calls sometimes carry more weight than formal introduction letters due to the trust they convey.

Maintaining the connections after fieldwork is likewise crucial. Two valuable lessons emerged from my experiences: (1) building connections with interviewees extends beyond current data collection and can be vital for follow-up interviews, requesting additional documentation, or even future research in that context; (2) for firmer connections with the field, consider proposing collaborative research, which can increase participant's willingness to share and provide information. For instance, one public servant expressed interest in contributing to a paper on our interviewing topic.

Tidal flooding in Ho Chi Minh City. Image: Dinh Huynh

Consent

There are several experiences underscore the need for greater flexibility in ethics applications and consent forms to accommodate diverse participant expectations. When filling out the ethics application, I presumed that ensuring the anonymity of all participants was necessary to protect them from potential risks, as the application's questions strongly suggested. However, my experiences with one project in the field made me realise that not everyone wished to be hidden. While the policy actors avoid talking about this project, the contractors, engineers, and workers behind it expressed a desire for recognition and acknowledgement of their efforts. On the other hand, the fixed consent statement about recording hindered me from collecting consent from public servants, as many of them declined to have their interviews recorded. This necessitated a mid-fieldwork amendment to the consent form, introducing options regarding acknowledgment and recording preferences.

These were my experiences in conducting fieldwork in Vietnam. My key takeaways include the importance of diversifying backup plans and maintaining flexibility. Additionally, forming connections in advance and gaining a thorough understanding of the field's conditions prior to your arrival are crucial. If you come across this while preparing for your fieldwork else-

At the time of my fieldwork, legal investigations triggered a crisis in the city's construction sector. Image: Dinh Huynh

where in the world, I hope it provides you with some useful insights to help you prepare for the most interesting part of your graduate research journey.

Dinh has keen interest in water dynamics in natural and built environments, formed during a decade of study and practice of urban planning and landscape architecture in Vietnam and Italy. His PhD focuses on the flooding issue in Global South's delta cities, looking for solutions to tackle the challenges in flood management through the lens of trans-disciplinary interactions between the generation, policy formulation, and implementation of knowledge.

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WALKING VS VENDING? EXPLORING THE RELATIONSHIP BETWEEN INFORMAL STREET VENDING AND URBAN WALKABILITY

Keywords: Walkability, Street Vending, Informal Urbanism, Morphology, Urban Codes

Busy Shifen Old Street in Taiwan (Picture by Ervan Sugiana, 2018).

As car dependency increases throughout major global cities, walkability becomes an important keyword to approach various design policies as well as research studies. Walking has continued to persist as one of the main transport modes within major global south cities, even within environments that offer very little support for it. Sidewalks often compete with various other uses such as unsanctioned parking or informal street vending. These frictions are crucial because walking itself is heavily affected by the environment and interactions that exist around it—walking acts as an important mode for humans to experience the entirety of urban environments while shaping our sense of place and piecing together the identity of urban spaces based on our experiences with them (Wunderlich, 2008). Throughout our walk, our identities and selves constantly interact with the surrounding environments and other actors. These in turn shape the way we walk and how we interpret, appropriate, and respond to public spaces—including street traders, who act both as commonly occurring urban elements and as fellow actors within urban environments. However, there is still hardly any effort to pursue a better understanding of how the interactions between walking and vending coexist and their impacts in creating a walkable urban environment.

Street vending exists in every major city in the world and shapes distinct and diverse experiences of a place that sometimes become one of its defining characteristics. It has become an important part of the city's urban fabric, yet its existence is often victimized by the state and subjected to various suppression and displacement tactics. This is ironic because street vending has always been closely connected with walking and pedestrian culture. Various state and local governments often fail to recognize its influence on the cultural and social fabrics and its significant connection with the local

pedestrian culture. By viewing cities as an assemblage (Delanda, 2006), I am exploring urban places as constantly evolving complexities composed of human and nonhuman actors with their own agencies to influence and appropriate public spaces. Through them, the patterns of interactions, conflicts, and negotiations can be observed to better understand how street vending influences the behaviour of pedestrians. The observation will also consider the spatiotemporal elements of such interactions to unpack further the complexity of a walking assemblage and the multifaceted nature of informal urban appropriation in public spaces. This knowledge then will be reflected towards how urban planning and design tools could facilitate the environment that supports both of those activities.

This research uses a multi-case study, using the Southeast Asian context to compare different sites in different cities under diverse regulatory regimes. I am also subjecting them to a multi-scalar analysis to highlight the complex spatial nature of these interactions and their impacts towards the morphology. This can better reflect the extent of differing regional characteristics like the different social and cultural mix. It also attempts to examine the impact of varying local urban regulations towards the morphological aspects of public sites and how the actors respond to such regimes. The result will inform towards designing and regulating urban environments that account for the intertwining nature of urban informalities; a streetscape should be able to foster and sustain pedestrian movements while opening the possibilities and potentials of appropriations that could enrich the walking experience and urban diversity.

Acknowledgements

The author thanks Lembaga Pengelola Dana Pendidikan (LPDP) Indonesia Doctorate Scholarship Program.

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Landscape Architecture

THE ORCHARD AND ITS OCCUPANTS

Keywords: Landscape architecture, design research, creative works, creative research, constructive design research

The orchard and its occupants is a thematic episode within my PhD with creative works "The Landscape in Motion at Buxom Hills Farm". This episode was presented in October 2023 as a multi sensory immersive exhibit during the RhD "Under Construction" and staff "Research Impact" symposiums.

My research is a form of constructive design research which uses real world projects as the context for learning about the processes of design. My project is based around a series of designed and implemented works to afford sustainable living and primary production, as well as significant waterway and environmental restoration, on my own 32Ha establishing farm in rural Doreen (green wedge northeast of Melbourne). In 2016 the farm had no built form other than a cattle yard and basic fencing, and no access to power or running water apart from the then degraded creek. The episodes in my creative work range in scale from human centred domestic works to 'altruistic' works that might benefit wild nature or future generations. The Orchard and its Occupants falls at the midpoint between these in the category 'Agriculture and Design'.

I did not establish detailed research questions in advance. Instead, my research took an 'unfolding' approach. I used an expanded design journal, AV and photographic recording and a design and email archive, intending to capture design in action; my planting, building, and project managing processes, and the occurrences and experiences that subverted design intention or informed understanding (including contractor (mis)/interpretations, climate impacts, and wild and feral animal acts). My approach sought to capture experiential details that express richness and emotion and an unfolding of circumstances where the conclusion is not foregone until it

has actually been experienced and determined. Although this diverged from the 'conventional' research plan within academic design research, a growing number of practitioners in creative practice research, and constructive design research (within which boundaries blur) advocate that it is not always important to establish 'research questions, hypotheses, and null hypotheses'(Missingham, 2015) , but instead that success in design research might consist of capturing "fleeting moments and structures that others find ephemeral, imaginative, and unstable for serious research"(Mason & Sharr, 2022), or reframing ideas to mobilise innovation, solve 'wicked' problems and contribute to societal progress.

Dissemination of ideas and achieving real world impact are considerations that follow research. For the exhibition I aimed to use storytelling and provide a nonverbal experience to activate the sensuous 'frame of experience' consisting of emotions, imagination, and conceptual knowledge (Toadvine, 2010), offering a form of understanding which may be protected for the viewer 'within a richly conscious, nonverbal, nonreflectively conscious state' (Ednie Brown, 2017). For my exhibit I created three short films. 'The occupants' showed the sound, movements and experiences of the chickens and ducks in the creek flat space they initially inhabited. Components of this film included a feral cat and wombat captured on camera as well as evidence of fox break in attempts. 'The orchard under construction' dealt with the iterative, improv design of the orchard as a safe home for poultry. This progressed from initial selection of fruit trees and planting on a grid, earthworks works by me (and visits to the works by wild animals), design of the fenced spaces and sourcing of architectural salvage gates, and post construction fox proofing measures including laying of a locally sourced travertine 'skirt' at ground level and planting of a 'vicious-beautiful' rose barrier. The final film 'The orchard and its occupants' showed the orchard occupied by its dwellers in October 2023 having achieved substantial establishment and performing the design intents it set out to do.

The three short films were shown in sequence on a big screen, with two further screens dedicated to each of 'The Occupants' and 'The Orchard' including evocative site based audio. Artefacts from the orchard were exhibited including blue duck and chocolate brown Copper Marans hen eggs, travertine stone and pink granite rocks, and scented 'Nahema' roses. Used gloves were included to evoke the notion of self-construction work.

Two posters of scientific information, research for design (Frayling, 1993) expressed principles that informed much of my design work for the orchard and its occupants. Stories from the process of change and design made up the remainder of the exhibit. Of note I included a journal entry from late 2019 now dubbed 'on foxes and climate change' which dealt with a traumatic occasion where mitigation of extreme heat risks (by allowing poultry to free range without supervision) exposed the flock to an opportunistic fox, and a duck and rooster were killed whilst a further hen hiding died of heat stress. This event took place during a personal and family crisis as we signed up for a new lease following a 'no reason' eviction notice, and a national crisis as bushfires raged across the country during a severe heatwave. This (specific) episode informed planning and ultimately altered constructed outcomes for the orchard as planned works prior to the move were called off to permit a move to cooler and more climate-manageable conditions in the orchard. The episode highlighted the role of positionality (even within one person's own life course) in determining real world outcomes but also highlights how real world research can illuminate the unexpected ways that an intersection of factors, outside the theoretical or lab context, can alter design/build trajectories that appear clear.

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PRODUCTS THAT SERVE: TOWARDS A PERFORMANCE-BASED MODEL IN THE CONSTRUCTION SECTOR

Keywords: Circular Economy, Building Services, Product Service System

One of the greatest minds of our time – Albert Einstein defined insanity as 'doing something over and over again and expecting a different result.' While the concept of Circular Economy has received significant attention from government, businesses and international organizations, the way in which businesses operate remains the same. This raises the question: *Can we truly attain a circular economy with business-as-usual?*

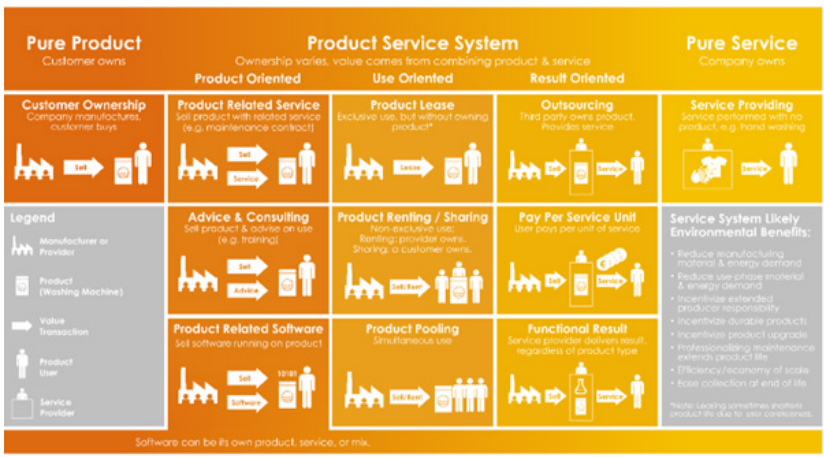
The current business setup in the construction sector has led to 40% of global resource consumption, 38% of Green House Gas emission and 35% of global energy utilisation (United Nations Environment Programme, 2020). Moreover, this trend is expected to increase to meet the growing infrastructure demands of cities, and its inhabitants. The current production and consumption systems are unable to cope with this demand, especially in light of the impending 'resource crunch' – a phenomenon caused by the shortage, scarcity and overuse of resources leading to its complete depletion. This points to the need for a better organization and management of resources and redefining the current ways of creating and capturing value. In other words, a new business logic that preserves the value of products and offers them rather as a service. This concept is often referred to as the Service-Dominant Logic, which aims to deliver the functionalities embedded in a product to the customer, rather than the product itself. Product Service Systems (PSS) is a notable example of a real-world application of this concept.

Product Service System: A Paradigm Shift in Construction

The emergence of Product Service System (PSS) model has been recognized as an alternative to the conventional goods-dominant logic. Instead of merely selling a physical product, intangible services including maintenance, operation and disposal are offered to the end-user. Thus, the main elements of transaction are the embedded attributes within the product. This model has proven successful in defense and aerospace contracting with prime example of Rolls Royce's "Power-by-the-Hour". Rolls Royce provides its highly-engineered jet engines to airlines on a service-basis, rather than outright ownership. Through this model, airlines can effectively focus on their core value proposition; flying passengers from point A to B with minimum downtime.

According to Baines et al. (2007), a PSS can take three forms. These typologies are briefly summarized as follows:

- *Product-oriented PSS* > promotes the sale of a product in a conventional manner while including after-sale services to ensure product functionality and durability.
- *Use-oriented PSS* > promotes the maximum use of a product through extending its lifespan and reuse potential while retaining ownership.
- *Result-oriented PSS* > promotes the outcome and benefits delivered to the customer rather than the physical product.



Product Service System typologies (Source: TU Delft, 2019 adapted from Tukker (2004)).

In recent years, the construction sector has also been transforming towards a performance-based model, with the emergence of Life Cycle Costing (LCC) and Life Cycle Analysis (LCA) tools. These metrics not only measure the initial cost associated with a building but their long-term environmental benefits and potential impacts. However, the fragmented nature of the construction value chain has made it difficult to integrate performance-based models across different stages of the construction process (Cox & Ireland, 2002). Goedkoop (1999) proposed the main factors driving the adoption of a PSS which include (Barquet et al., 2013; Goedkoop, 1999):

- *Shift of mindset from a product-centric to a system-centric approach.*
- *Enhanced customer engagement through direct and frequent contact.*
- *Production and delivery of products and services on a case-by-case basis.*
- *Increased company involvement and responsibility throughout the product's entire lifecycle.*
- *Higher engagement of stakeholders.*

The shift towards a performance-based economy in construction sector has ample areas for further development. Adopting new industry standards, educating professionals and overcoming change resistance will enable the successful transition towards performance-based models. This shift will not only improve the efficiency and sustainability within the built environment, but also create new opportunities to generate revenue for businesses and engage with their customer base.

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ARCHITECTURAL TRANSFORMATION OF HISTORIC BUILDINGS: AN ANALYSIS ON HYBRIDIZATION OF DETAILING

Keywords: CHistoric building transformation, representation, detail, hybridization

Aesthetic in buildings is due more to harmonious relationships among the elements in composition than to the elements themselves (Frederick, 2007). The idea implies that the building mechanisms and performances can be better understood when reading of a building as a clever composition of several parts instead of a mere monolith. In that context, in architecture, to achieve its needed experiential and performative realization, perceiving buildings as tectonic objects composed of parts and systems of operating is a greater acquirement than celebrating mere aesthetics.

Part to whole and whole to part must be considered a unified coherent in search of a proper realization drive towards obtaining maximum benefit out of a building, especially within any given time. Since building performances fade with time, buildings are abandoned, demolished, or adaptively reused. Indeed, adaptive reuse could value-add to left-over buildings with respect to time, cost and building's significance (historical, social, political and technological.) In that process, clever resolution of a building detail as a small-scaled part holds a considerable responsibility in the building's capacity to adapt and subsequently survive.

Accordingly, building 'detail' can be read as a construction representation or a meaning representation, which adds technical and semantic value to the building during its transformation process. 'Representation' is a variety of ideas, and therefore detailing a reused building is expected to preserve the representations of the old, as otherwise, it could misrepresent the original idea of the building whole. However, time concerns historic building transformation, depending on the ability of building parts to be adaptable and flexible, practically proclaims misrepresentations after transformation, even though it is expected to represent the same meaning and construction that

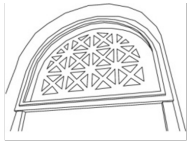
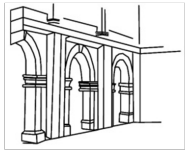
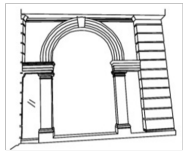
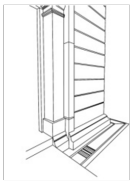
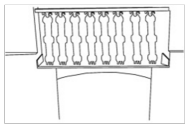
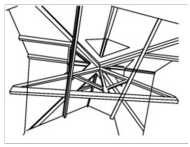
were originally there. These emerging irregular circumstances are neither old nor totally new representations; yet a byproduct of both old and new, which can be called a 'hybrid' situation.

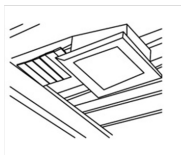
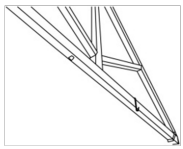
In an inquiry into the reuse of historic buildings with contemporary architectural features in colonial-influenced Sri Lankan maritime towns, the findings represent hybrid situations. The main intention of this inquiry was to identify buildings as the agglomeration of parts/ details and to evaluate representational possibilities related to their transformation process from 'old' to 'new', identifying alternative ways to read and design buildings comprehensively other than their spatial planning and aesthetic.

The outcome of the inquiry implies that, in the building transformation process, it is rarely a detail that transfers the pure original building representations from old to new. It is always an imminent situation, understood as 'hybridity'. In general, the biases – either by design or by default - are for 'displacement' and 'reaction' between the representations of new detail and its old parental ideas. Biases for fusion are lesser in the local building transformation process. Even though the intention was to preserve the building's original idea (representation), it is being lost during reusing. Nevertheless, no subversive activities that can cause misrepresentations have been followed, yet the current actions have already damaged the building's image.

The study is critical of Sri Lanka's approach to transforming historic buildings into contemporary use, as they seemingly deal with the 'conservation' task as a mere problem-solving exercise, thus patching up the problem at hand. Ostensibly, there is little effort to understand building details intellec-

tually and semantically and appreciate the relation, which smaller-scaled detail representations have formulated with the building whole. The notion and the process of adaptive reuse are being understood and dealt with within Sri Lanka is merely technical and performative instead of a delicate architectural reading on what buildings are explicit. This study has attempted to shed some light on this challenging conjectural position on building transformation, develop a theoretical framework to analyze such intellectual notion of detailing and evaluate the outcome of such reading of architectural detail by using the idea of 'hybridization' as the basis for investigation. Going back to the pragmatics of local buildings, it is apparent that the ideas and representations for the current process have been generated not by design but by default. This is the main reason for new building details to present isolated 'patching-up' solutions rather than evaluating such detailing as a substantial part of the building whole. This research seeks to reverse that approach and affirm the need to read buildings with a better understanding of what they demonstrate, whether that be construction representations or meaning representations. The study believes that imparting such approaches and attitudes to detailing is only possible if a proper dialogue about the building conservation/transformation process is generated in academia and practice.

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ENERGY RETROFITTING: UNDERSTANDING THE TRADE-OFFS

Keywords: Energy retrofitting, Trade-offs, MCDM, Buildings

On July 6th, 2023, the all-time record of the hottest global average temperature was broken with the temperature reaching 17.2°C (Shine, 2023). The trend indicates that we are on track for this year to be the hottest on record (Paddison, 2023). To limit global warming to 1.5°C by 2030 requires reducing global Green House Gas (GHG) emissions by around 45 per cent. This necessitates rapid yet robust transformation in multiple sectors to be more efficient, including the buildings sector (Emissions Gap Report 2022, 2022). The buildings sector, owing to its extensive energy and environmental loads, will play a major role in the fight against climate change and a transformation to a sustainable future. According to the International Energy Agency (IEA), the sector is responsible for 37 per cent and 34 per cent of Carbon Dioxide (CO2) emissions and energy demand globally, respectively (IEA, 2022). In addition to new developments being sustainable, existing buildings will play a crucial role in the transformation to a sustainable future.

According to the World Economic Forum (WEF), 80 per cent of the buildings present today will exist in 2050 (For Net-Zero Cities, We Need to Retrofit Our Older Buildings. Here's What's Needed, 2022). Majority of these existing buildings are inefficient. Therefore, the IEA have set a roadmap for countries calling for 20 per cent of the existing buildings to be decarbonized by 2030, 50 per cent decarbonization by 2040, and full decarbonization by 2050. To achieve this target, the United Nations Environmental Program's (UNEP) emissions gap report 2022 calls for several actions in the buildings sector including minimizing embodied carbon emissions and increasing retrofitting rates. The inevitable way forward for existing unsustainable buildings is to energy retrofit them to be more efficient.

Fundamentally, the definition of energy retrofitting is to upgrade a building's components that directly or indirectly contribute towards its energy use by implementing Energy Efficiency Measures (EEMs) (Asif et al., 2023). Three of the main objectives in energy retrofitting are to reduce the energy consumption, minimize the environmental impact, and maximize the economic value of the building (An et al., 2023). To achieve this, a wide

range of EEMs can be implemented with varying complexities, investment, and impact. The energy, environmental, and economic consequences of implementing these EEMs do not have a straightforward relationship and are considered as conflicting. Additionally, it is vital to analyse the energy, environmental, and economic trade-offs from a life cycle perspective as this provides decision makers with additional foresight and plan for future uncertainties. Life cycle trade-off analysis can have a major impact on the decision-making considering energy, environment, and economy.
For energy, quantifying the energy savings while considering the future global warming scenarios will lead to more robust retrofitted buildings (Liu et al., 2023). One model for global warming indicated that buildings energy retrofitted to zero energy now will be performing the same as they were before the retrofit in ten years' time. Hence, it is critical that the EEMs implemented today can perform with time.

For the environment, life cycle perspective is important to understand the embodied carbon emissions and achieving the carbon targets. Studies suggest, that while operational carbon is the focus, embodied carbon will be the more prominent factor in future for carbon emissions and needs to be considered during decision making (Dean, Tom, 2022; Sayce et al., 2023). Energy retrofitting is, ultimately, adding embodied emissions to the building. The higher the embodied emission of the EEMs, the more time it will take to offset them and reach net zero. Hence, it is important to quantify the embodied emission and select EEMs that have a short carbon payback time.

For the economy, the life cycle perspective can benefit in planning for the economic uncertainties such as increasing interest rates and carbon pricing. A study by (An et al. 2023) revealed that energy retrofitting options that did not consider economic value failed due to the lack of economic feasibility (An et al., 2023). Additionally, research shows that investing in EEMs that pays back quicker may have less net-present value if we consider the life cycle of the building, hence this will be considered as a short sighted investment (M et al., 2019).

Studies that have analysed the life cycle trade-offs between energy, environment, and economy have established that once multiple criteria are considered, the optimum solution for the energy retrofit changes significantly (Salem et al., 2020). For example, (Ongpeng et al. 2022) presented a case study of energy retrofitting a university building in the Philippines (Ongpeng et al., 2022). Their study investigated the energy, environmental, and economic trade-offs for EEMs applied to the university building. It was identified that the building can be upgraded to a net-zero scenario, however, this scenario was the least desirable considering the environmental impact and the economic value. Another study found that retrofitting an office building with the best thermal insulation option will result in a very

high carbon payback time, and thus it is not the best option (Alam et al., 2022). Thus, it is critical to analyse the proposed EEMS considering the life cycle trade-offs to ensure optimum selection.

Unfortunately, the existing decision-making process is based on simplification and intuition that does not consider life cycle trade-offs. This is because of several reasons including the fragmented nature of the building industry and lack of information structure needed to adopt life cycle trade-off decision making approaches. The resulting energy retrofitted buildings are suboptimal that may not successfully contribute to reaching the zero carbon targets and limiting global warming. Thus, it is of utmost importance for future research to focus on identifying ways to overcome the building sector challenges in adopting decision making approaches, such as Multi-Criteria Decision Making (MCDM) (Figure 1), that ensure optimum selection of EEMS considering the energy, environment, and economic life cycle trade-offs.

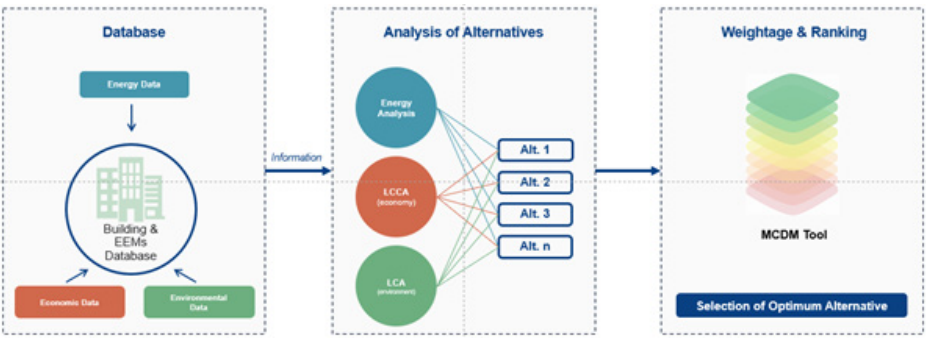

Figure 1. MCDM Process.

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THE SPACES BETWEEN: MATERIALS AND FORCES IN CONSERVATOR-RESTORER CRAFT PRACTICE

Keywords: Built heritage conservation, traditional craftsmanship, heritage trades, carpentry, green wood, cognitive ecologies

Workshop W07-CFR sits within a rural landscape in Nivillac, France. Outside the workshop, the October air is crisp as a weightless predawn mist rests like a lightly outstretched blanket across adjacent fields. Distantly, an engine is heard approaching. Inside, golden spindles of morning light stream through half-inch openings in the vertical timber clad walls that wrap the hand-built sawmill and workshop. An expert timber framer, skilled in working wood that is green, is setting out a truss for a domestic dwelling. He follows intricately intersecting lines of red chalk dust, transferred here from another place, and precisely applied to the workshop floor - traces of threads pulled taut (Ingold 2007: 159) - simultaneously textillic and tectonic. Vibrant matter (Bennett 2009) lines workbenches and walls, vestiges of expert practice, experimentation, tinkering, refining, collaborating, and resolving the complex. As the engine draws closer outside, the diffracted light flickers to life in an animated wave that scurries across the workshop floor synchronous with the arriving vehicle. The engine heaves before coming to rest and the vehicle's side panel door rumbles open. A collective crunch cracks through the hushed landscape as boots hit the ground, followed by the pulsating crackle of gravel surrendering beneath them as they traverse the carpark towards the workshop kitchen. The site dog barks, greeting their familiar forms excitedly. Inside, the kitchen table is partially decoupaged in tool catalogues, technical drawings, and handwritten estimating sheets. A patient pot of brewed coffee leaves the stovetop and hits the table, followed by a clatter of cups. An already half torn brioche, procured from a local woodfired bakery, is shared. The senior carpenter joins them as they peruse unfurled drawings and discuss the day's work ahead.

The practice settings of conservator-restorer craftspeople are densely populated with lively artefacts and activities - somewhat contrasting the moniker of 'dying trades' - providing evidence of the complexities of an industry that is 'both highly regulated and simultaneously underdetermined' (Jones and Yarrow 2013; Lamprakos 2015; Gao and Jones 2021). The networks within which heritage trades operate are connected through a heterogeneous collection of cognitive phenomena in an expanding web of finely spun threads

linking sociomaterial contexts and relations. To speak of cognitive ecologies is to employ a metaphor that explains cognitive systems as akin to biological ones. That is, networks of mutual dependence among the elements of a broader cognitive ecosystem (Hutchins and Johnson 2009). Understandings of cognitive phenomena compel us to consider the environments in which these processes develop and operate (Bateson 1972). Thus, this research activates notions of perception from the cognitive sciences - the peripersonal (within), extrapersonal (without), and interpersonal (between) - as a method of wayfaring with multispecies agents towards an enriched understanding of conservator-restorer practice in historic environments.

While there is renewed interest in the role of traditional artisanal crafts in conservation (Hassard 2009; Jones and Yarrow 2013; Gao and Jones 2021), there remain gaps in our understanding of the cognitive ecosystems particular to conservation, restoration, repair, and ongoing care of historic environments. Built heritage conservation is both an archaeological reading backwards, to identify agential intention within decaying, sometimes absent, forms, and a 'reading it forward' (Ingold 2010) in an ongoing, generative, itinerant, and improvisatory process of making. Likewise, this research is a reading backwards and forwards, thinking with theory and with participants, human and non-human. Rhythmically laying lines of string and pulling them taut, laying out more, pulling them taut - knit one, purl one - towards new knowledge.

Pointing to spatial stories of placemaking, scholar Michel de Certeau borrows from poet Christian Morgenstern a term to describe the 'space between'- Zwischenraum - a transitional state, a potential frontier, an 'in-between' concept and construct (de Certeau, 1984: 127). My research examines what goes on in these spaces between - the transitional lifeworlds (Husserl 1936) in-between de Certau's '(legitimate) space and its (alien) exteriority' (de Certeau 1984: 126) where specialist heritage trades and conservation craftspeople dwell in their practice. From large industrial workshops to discreet intimate studios, scaffolded facades, and prehistoric landscapes, to quarries, forests, and sometimes suspended on industrial rope systems multiple storeys above the everyday comings and goings of lifeworlds below.

Inside the workshop, bodies move in the spaces above, below and within the timber structure they are setting out on the chalk lined floor. One lays protracted beneath the frame, pencil and square in hand. Adjacent, another carefully hovers his body millimetres above the timber members in an expert manoeuvre, clearly well practiced, so as not to disturb the assemblage of timber and chalk lines beneath his suspended form. Togeth-

er, the four carpenters move with unchoreographed synchrony, purpose, and grace. Inside, outside, ducking, weaving, and folding into and out of the spaces framed by the timber and each other, into and out of the assemblage of materials and forces (Deleuze and Guattari 2004: 377), giving and receiving patterns (Haraway 2016). The senior carpenter provides instruction in quiet tones. Soon he will go to the forest with colleagues from Charpentiers sans Frontières where they will select trees to fell for the Notre Dame Cathedral restoration.

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Carpenters and apprentices setting out timber frame, Nivillac, France. Source: Author, 2022.

Rebecca is a doctoral candidate and academic tutor at the University of Melbourne. Her research examines the role of conservator-restore crafts in maintaining enduring, adaptable, and resilient identities through the conservation of historic environments, and draws on over twenty years' industry experience as a qualified stonemason, heritage consultant and project manager in Australia and Europe.

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De l'arbre à la maison
Charpentes scierie
bois local

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ACKNOWLEDGEMENTS

The editors and contributors would like to thank Prof Michele Acuto and A/Prof Crystal Legacy for their generous contributions to this edition. On behalf of the RSA, we would also like to acknowledge that the publishing cost of this round of OCULUS was not possible without the help of the ABP Graduate Research Support in the ABPfaculty of the University of Melbourne.