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Experimental Disobedience and Loose Collaborations: Unconventional material explorations that challenge existing architectural norms.

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Abstract

Human impact on the planet is often studied as separate environmental issues even though these anthropogenic activities are often deeply connected. By promoting experimental, project-specific partnerships and 'loose collaborations' between multi-disciplinary stakeholders, architectural research can address the complex interconnected challenges that the built environment imposes on planetary systems. By questioning something as fundamental as materials - and the steadfast imbalance caused by conventional construction - we can question social, cultural, economic, and environmental phenomena. This opens access to deeper leverage points for systems change. Properties of unconventional bio-based materials, typically seen as limitations, in fact present opportunities to question existing norms. This paper presents exploratory research and a pedagogical approach which uses an experimental, hands-on methodology to test the viability of unconventional bio-based materials. In-turn this creates a highly tangible focus point for interdisciplinary collaboration. The approach shows that universities hold unrealised potential to become incubators of alternative architectural trajectories. They can do so by bringing together like-minded academics and students and allowing for the cross over between disciplines and knowledge sharing. By deliberately transgressing established regulations and systems of power within architecture, we seek to shift design approaches to integrate a deeper understanding of place and its complex systems.

Keywords: Anthropocene; built environment; multi-disciplinary collaboration; environment, bio-based materials

Introduction

Anthropogenic disruption and an escalating planetary footprint

Human generated systems and materials produce significant planetary wide impacts, so much so that human made mass, referred to as 'anthropogenic mass', now outweighs the Earth's living biomass and is expected to almost triple the total dry biomass by 2040 (Elhacham et al., 2020). The global building and construction sector, with its widespread use of materials such as concrete, steel and aluminium, is a major contributor to these human-induced shifts. The Global Status Report for Buildings and Construction (Buildings-GSR) - published by the United Nations Environment Programme (UNEP) and the Global Alliance for Buildings and Construction (GlobalABC) in 2026, indicates that the building sector continues to account for 37 per cent of global emissions and nearly 50 per cent of global material extraction (UNEP & GlobalABC, 2026). Although progress continues, the sector remains off track to reduce overall emissions. Raw material extraction, energy demand and material supply chains associated with construction activities are placed under pressure as the demand grows (UNEP & GlobalABC, 2026). Questioning something as fundamental as the use of materials in conventional construction and the steadfast imbalance caused to the planet could lead to deeper leverage points for systems change.

Planetary boundaries and inherent overlaps

Anthropogenic perturbations of the global environment are often addressed as separate issues overlooking any inherent overlaps that take place between them (Richardson et al., 2023). Architecture has a tendency to exclusively focus on addressing construction's role in contributing to climate change without taking into consideration other deeply complex issues such as biodiversity loss or the impact on the planet's water systems. In 2009, Rockström et al. introduced a framework based on 'planetary boundaries' which defined a 'safe operating space' for human activity whilst respecting the Earth's biophysical thresholds. Climate change is only one of the nine planetary boundaries defined by Rockström et al. (2009). The others include the rate of biodiversity loss, interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading (Rockström et al., 2009). In 2025 the Planetary Health Check (PHC), a yearly report on the state of our planet by the Potsdam Institute for Climate Impact Research which encapsulates the most recent scientific advancements, concluded that we have now transgressed seven out of the nine of the Planetary Boundaries, 'with all of those seven showing trends of increasing pressure – suggesting further deterioration and destabilization of planetary health in the near future' (Sakschewski et al., 2025) (see Figure 1).

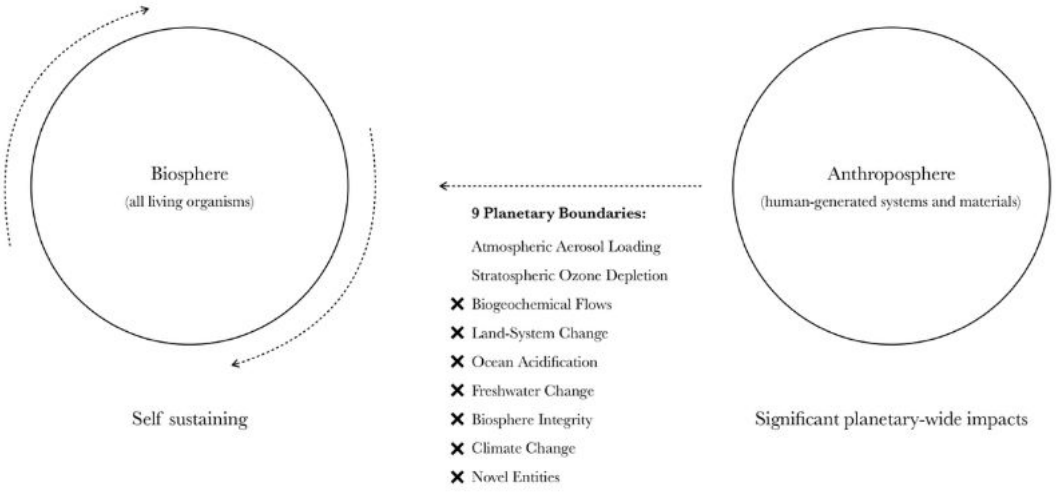

Figure 1: Biosphere versus Anthroposphere and Rockström et al.'s (2009) Planetary Boundaries crossed with updated data from the 2025 the Planetary Health Check (PHC) (Sakschewski et al., 2025).

The Planetary Health Check 2025, highlights that the transgression of the Earth's 'safe operating spaces' (Rockström et al., 2009) is not due to single drivers but rather a network of interconnected causes. Understanding these networks through a systems-based approach may reveal leverage points that can enable positive change (Sakschewski et al., 2025).

'Experimental disobedience' and 'loose collaborations' as framing concepts

Experimental disobedience is defined here as the deliberate testing of design assumptions, regulations, standards or disciplinary boundaries through controlled material experimentation. While it shares aspects of critical and speculative design, it differs in its primary focus on materials as the site of transgression. Unlike conventional experimental research, which typically seeks to optimise or validate within existing frameworks, experimental disobedience intentionally works against those frameworks to expose their limits and generate alternative trajectories.

Understanding the planetary crisis demands more than isolated fixes (Sakschewski et al., 2025). With interconnectedness at the root of the earth's anthropogenic disturbances, it is essential to respond with a multi-disciplinary approach that is project-specific, informal and non-hierarchical and is assembled around a common, tangible problem rather than institutional agreements or predefined roles. Unlike conventional research partnerships, which are often structured around contracts or disciplinary silos, 'loose collaborations', as defined by Pinho and Millis (2025), form and dissolve organically, allowing academics, students, practitioners and other experts from a variety of fields to contribute knowledge as the problem demands.

This interconnected understanding of the planetary crisis has already shaped a small body of architectural research seeking to highlight the reach of anthropogenic systems and the influence of design practice. Lydia Kallipoliti's work such as *Histories of Ecological Design* or

the more recent *Building Metabolism* urge the emergence of a novel network of life and death of materials and architectural strategies for engaging closed, self-reliant systems rather than isolated fixes (Kallipoliti & Shin, 2024; Kallipoliti & Markopoulou, 2025). *Design Earth*, the research practice of Rania Ghosn and El Hadi Jazairy, works at the opposite end of the same problem: through speculative projects such as *Geostories*, they use architectural drawing to render visible the usually unseen planetary-scale environmental externalities (Ghosn & Jazairy, 2019). Feifei Zhou's work and more specifically the contribution to *Feral Atlas: The More-than-Human Anthropocene* with Anna Tsing et al. extends this further still, examining the spatial and ecological impacts of the industrialised built environment through a more-than-human lens, insisting that anthropogenic infrastructure cannot be understood through human systems alone (Tsing et al., 2024).

Together this work confirms that treating the planetary crisis as interconnected is an active, ongoing architectural concern spanning material history, speculative representation, and multi-species ecology. The present research shares this concern but differs in method: where the existing work operates largely through archival, speculative or representational means, this research grounds interconnectedness in direct, hands-on and site-specific material experimentation.

In the same way that knowledge should bridge transdisciplinary boundaries, acquiring new knowledge should not limit itself to traditional methods but rather allow for deliberate, methodical transgressions of established regulations, standards and systems of power within architecture – not as an act of recklessness but as a carefully deliberated research strategy. Experimental disobedience, allows for the testing of materials, methods and processes that fall outside of the conventional construction norms, becoming a tool for exposing the norms that are outdated, arbitrary or complicit in unsustainable practice, allowing for new trajectories to be imagined.

Constructive experimentation as a form of responding to the climate crisis was highlighted in the 2022 conference *Constructive Disobedience* and later in the publication of the same name which demonstrates this approach as 'a methodological foundation that highlights the knowledge gained from experimental architecture for the coming era of building transformation' (Ballestrem et al., 2024). Disobedience is not new, Ballestrem et al. cite Brunelleschi's 1418 self-supporting design for the cupola of the Cathedral of Santa Maria del Fiore – built without external wooden supports - or Buckminster Fuller's Geodesic Dome as examples of experimentalism that became milestones in construction history.

While the recent architectural scholarship of Ballestrem et al. frames constructive experimentation as a legitimate methodological response to the climate crisis (Ballestrem et al., 2024), this body of work has focussed primarily on documenting individual material and structural experiments. Material experimentation has long been central to design practice, through iterative hands-on testing. Architecture has historically treated materials as fixed, code-compliant inputs. Recent research has begun adopting these open-ended processes enabling architecture to challenge the regulatory and systemic assumptions that keep certain materials dominant. This study is situated with this shift. The present research

extends this trajectory by foregrounding not only material experimentation itself, but the informal, cross-disciplinary collaborative structures – the 'loose collaborations' – that such experimentation makes possible.

Materials as a site of disobedience

Conventional construction and its steadfast imbalance

Conventional construction relies heavily on materials such as concrete, steel and aluminium which are 'the three largest sources of embodied carbon in the building sector' (UNEP, 2023). Their use is seldom interrogated despite their dominance and the weight of imbalance that they cause. Clear policy frameworks which are required to transform the building sector into a zero-emission, efficient sector are not pulling their weight. The Paris Agreement, which seeks to encourage a transformation in the way we build, has established the requirement of Nationally Determined Contributions (NDC's) which outline each country's plans to adapt to climate impacts. As of January 2026, not one country had submitted an extensive strategy under the new NDC 3.0 round (UNEP & GlobalABC, 2026). Codes, standards, insurance frameworks and professional training all evolve around a small set of industrialised materials that are valued due to their extensive documentation and low risk. Under business-as-usual the sector's carbon footprint is expected to double by 2050 (Li et al., 2025). Yet the material default persists. This is not due to a lack of alternatives, but because regulation, education and habit are heavily oriented towards reproducing what is already approved, without questioning.

Materials: a fundamental leverage point

Meadows (1999) argues that leverage points within a complex system range from simple parameters to deep structural elements capable of shifting an entire system's paradigm, with the deepest points being the most influential but the hardest to access (Meadows, 1999). Materials hold a unique position within this structure; they are tangible but also capable of transforming a whole system. Materials are physical, testable and immediately understandable – architects, students, and communities can hold them, experiment with them and learn from them. But because materials sit at the base of every regulatory, economic and professional structure in construction, questioning one inevitably pulls at the systems built around it – codes, supply chains, insurance, labour or cultural expectations. Materials therefore offer a tangible entry to deeper leverage points, becoming catalysts capable of transforming the wider system. Rethinking carbon-intensive materials in favour of bio-based alternatives can shift 'the construction industry's entire value chain, from material producers and suppliers to architects, contractors, and policymakers' (Li et al., 2025). Meadows (1999) cautions, however, that such positive feedback loops can both be sources of growth but also collapse, and that knowing when to let a leverage point go is sometimes more important than pushing on it.

Unconventional bio-based materials: limitations reframed as opportunities to disobey norms

The shift towards bio-based materials could lead to a reduction in emissions of up to 40 per cent by 2060 (UNEP, 2023). But bio-based materials are typically assessed against the same performance criteria as carbon intensive materials which are standardised benchmarks

established for materials like concrete and steel. What might initially be understood as a bio-material's limitation, could instead be an opportunity to design for adaptability rather than permanence, to embed local traditions, skills and knowledge rather than erase them and to work with natural cycles rather than against them. Approached this way, bio-based material's limitations become the very terms on which existing architectural norms are challenged. Variability unsettles the assumption that a safe material must be standardised and repeatable. Biodegradability challenges the idea that a building is permanent. Geographic dependency confronts the professional perception to specify materials whose behaviour is already known everywhere rather than materials whose value is precisely that they belong somewhere. This reframing is where disobedience becomes concrete rather than rhetorical. Challenging architectural norms is not simply an attitude, it plays out in specific, practical confrontations with the systems that hold conventional materials in place.

Case Study: *Typha Domingensis* as a leverage point

Wetlands, saltmarshes and *Typha domingensis*

Wetland ecosystems are a clear example of the interconnection of systems. They feature an entanglement of both biotic and abiotic systems 'defined by physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them' (Davis, 1993). Despite occupying only around 5% of the earth's surface, wetlands play a vital role in sequestering and storing carbon dioxide (CO2) from the atmosphere (Mitsch et al., 2013). *Typha domingensis*, typically known as cattail or bulrush, is a native species commonly found in wetlands around Perth and the world. It is a significant component of local ecosystems and has been used traditionally by indigenous communities for several purposes (Millis et al., 2025). Typha often forms part of saltmarshes, an intertidal community of plants found in coastal wetlands. Previously undervalued, saltmarshes are now understood to hold an extreme ecological value as they act as carbon sinks, provide feeding and nesting habitats for a variety of species, filter nutrients and sediments and provide storm and cyclone protection. These habitats are disrupted when they come into contact with stormwater discharge linked to nearby human generated environments (Department of the Environment and Energy, 2016). *Typha domingensis* thrives on the nutrients from stormwater run-off which allow it to grow prolifically and overshadow other species. This dominating behaviour leads to a management requirement that in turn makes it a potential bio-material resource (Millis et al., 2025).

The interconnection of a single material combined with human impact and the influence on a wider system is visible at a local scale at the Adenia Saltmarsh, in the Canning River Regional Park in Perth, Western Australia, where *Typha domingensis* used in this research's material experimentation was sourced through a partnership with the South East Regional Centre for Urban Landcare (SERCUL). The saltmarsh at Adenia is one of the last remaining examples of this unique habitat type along the Canning River and is recognised as a Threatened Ecological Community under both federal and state law. Its ecological value is inseparable from its 'systemic function': it stores 'blue carbon', that helps tackle climate change, provides breeding and feeding areas for fish and birdlife, improves water quality by filtering nutrients, and helps stabilise riverbanks. Yet the site also demonstrates how human

behaviour such as storm drains can destabilise this system and threaten the long-term health of the ecosystem (SERCUL, 2025). Harvesting Typha for material research from within this system therefore cannot be treated as a neutral extraction of raw material – it is itself an intervention into a fragile, legally protected ecology, and demands the same systems awareness this paper argues architecture should bring to construction more broadly.

Fieldwork, experimental methodology and the material testing matrix

The research methodology is deliberately structured around direct, hands-on engagement with the material rather than purely desk-based or theoretical investigation. Fieldwork began with the harvesting of *Typha domingensis* from the Adenia Saltmarsh, undertaken with attention to the site's status as Threatened Ecological Community – reflecting the paper's broader argument that even the extraction of raw materials is itself a systems intervention rather than a neutral first step (see Figure 2).

Figure 2: Fieldwork: harvesting *Typha domingensis* from the Adenia Saltmarsh, 28 February 2025.

Once harvested the plant was disaggregated into its constituent parts – leaf, root and seedwool – each treated as a distinct material with its own working logic rather than as interchangeable. These parts were then subject to a matrix of low-tech preparation methods (including blending, shredding or milling into variety of fibrous forms) combined with a range of reinforcement or adhesive additives (cornstarch, sodium hydroxide (NaOH), magnesium carbonate ($MgCO_3$), beeswax, earth) and finishing processes (hydraulic pressing, heat pressing, air drying, microwaving, open flame) (see Figure 3). Rather than testing toward a single predetermined outcome, the matrix structure allowed each variable – part, preparation, reinforcement and process – to be varied systematically and combined. This generated a wide field of material outcomes rather than a single validated result.

This exploratory structure reflects a methodological commitment central to the paper's argument. As Typha is not a standardised, code-compliant material in Western Australia, its properties could not simply be looked up or assumed. They had to be generated through

direct testing, part by part and process by process. Variation in outcomes was treated as data rather than failure, a deliberate departure from industrialised material testing, where deviation from a known standard signals defect. Here, variability was treated as information about the material's own logic, rather than a reason to be eliminated.

The experimental process also functioned simultaneously as a pedagogical structure. Students and collaborators were brought into the testing matrix directly, the 'field' and the 'lab' were not sequential stages but a single continuous site of shared discovery. This collapses the conventional distinction between researcher and student, or between fieldwork and experimentation, replacing it with a shared hands-on encounter with an unfamiliar material – the same tangible accessible quality that gives materials their power as a leverage point.

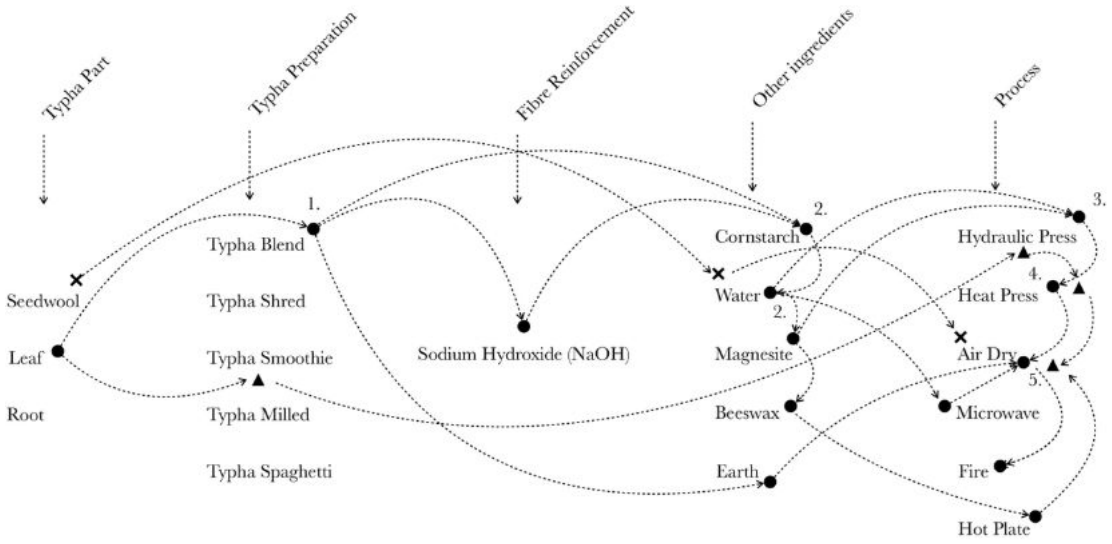

Figure 3: Material testing matrix demonstrating the range of variables.

Initial findings: properties, constraints and what they reveal

Early testing revealed productive lines of inquiry demonstrating that Typha behaves not as a single uniform material but as a cluster of related materials each with distinct properties depending on which part – leaf, root, seedwool – formed the base, how they were prepared, which materials were added and the process adopted. The material's behaviour predictably shifts according to the combination of variables applied, revealing a relational logic rather than a fixed logic. Constraints such as moisture sensitivity and mould growth or achievable fibre density were not treated as disqualifying flaws but as boundary conditions defining where and how the material might appropriately be used, outlining the rules for architecture built around Typha's actual properties rather than expectations (see Figure 4).

Figure 4: Material test samples combining different variables and producing different outcomes: (left to right) sample 0083 compressed mixture of earth, clay, sand and fibrous Typha leaf air dried; sample 0212 boiled fibrous Typha leaf, cornstarch and water air dried on cloth; sample 0168 seedwool soaked in water air dried on cloth; sample 0229 fibrous Typha leaf, cornstarch, water and beeswax, air dried under weight produced mould growth after 5 days covered.

This approach to constraint aligns with a broader shift visible in contemporary bio-based materials practice. *Material Cultures*, whose studio and research include Typha alongside other bio-regional materials such as hemp, reed, and eelgrass, similarly frame regenerative and bio-based construction as requiring new understanding and strategies rather than the retrofitting of natural materials into industrialised expectations (Material Cultures, 2023). Read alongside the wider practice, the present findings suggest that Typha's constraints are not a local peculiarity of the Adenia Reserve species but part of a more general condition of bio-based materials research: properties must be discovered on their own terms dependent on species and location.

Typha as the tangible focal point around which disobedience and collaboration coalesce
Typha domingensis functions as more than an ecological problem or a material to be tested. It becomes the tangible point around which both experimental disobedience and loose collaboration take shape.

Disobedience emerges through Typha material experimentation by transgressing the norms that govern material selection: unstandardised, absent from building codes, sourced from a protected ecological community, and resistant to assumptions of uniform behaviour.

Collaboration emerges from the same source, for the opposite reason. No single discipline can solve its viability alone. This draws in contributors across architecture, chemistry, ecology, and land management – reflected in a roster spanning bio-based materials students, a SERCUL partnership, and an international exchange with Mexican bio-based materials expert João Boto Caeiro.

This positions the research alongside a small but growing international interest in Typha as a construction material, notably *Material Cultures'* studio, teaching and paludiculture work (Islam & Moatazed-Keivani, 2023; Material Cultures, 2023). Where their work engages Typha as one material among several within a broader palette, the present research narrows to a single species, within a single protected West Australian site, tracing its disobedience and

collaborative demands in specificity.

Loose collaborations in practice

Defining 'loose collaboration': project-specific, unstructured and multi-disciplinary
Loose collaboration describes a mode of multi-disciplinary partnership that is project-specific, informal, and non-hierarchical – assembled around a shared, tangible problem rather than fixed institutional agreements or predefined roles. Where conventional research partnerships are often structured around long-term contracts or clear disciplinary boundaries, 'loose collaborations' arrange and disband freely: contributors join because the material problem intersects with their interests or expertise, and their involvement lasts as long as that intersection remains relevant or useful to all parties.

Given the present research with *Typha domingensis* sits outside of established codes, testing methods, and disciplinary expertise, no single actor – architect, ecologist, chemist or land manager – can resolve its viability alone. Experimental disobedience necessitates loose collaboration, drawing together whoever's knowledge the material demands.

This can be understood through Star & Griesemer's (1989) concept of the boundary object. Typha is plastic enough to be interpreted differently by architects, ecologists, and materials scientists, yet robust enough to hold a shared research focus. In the context of the Anthropocene and planetary boundaries, such boundary objects enable the temporary, non-hierarchical alignments needed to address the interconnected crises that no single discipline can resolve alone.

How Typha formed 'loose collaborations'
Adenia Reserve is also a site where systems thinking is already being practiced, rather than merely theorised. Research at the site has established baseline ecological data for Adenia Saltmarsh Threatened Ecological Community, with case studies creating opportunities for natural resource management officers, community volunteers, and university, TAFE and school students to participate in monitoring and rehabilitation activities while learning about saltmarsh ecology, restoration and conservation (Weerasinghe, 2022). This cross-sector model – government, community, and multiple tiers of education working around a shared, tangible ecological site – offers a local precedent for the kind of loose, project-specific collaboration this paper argues for, applied here to material rather than habitat restoration.

The research's roster of loose collaborations demonstrates a similar structure. Rather than informal institutional agreement, each contributor was drawn in by the material problem itself. Some worked independently on related threads: Jess Gibbs on seaweed, seagrass and bivalve molluscs alongside Typha; Juliette Isaacs on comparative work on straw versus brick; and Kathy Chapman on the wider understanding of wetland's living systems. Others worked directly with the Typha as part of a research programme: Susanna Che, Jack Choate and Wesley Peh's investigated waterborne materials and Typha as a bio-material, while Bradley Millis's early framing of short-life construction and bio-based materials helped establish the foundation from which this research developed. None of these threads were centrally

directed towards a predetermined outcome – each emerged from a contributor's own disciplinary entry point (see Figure 5).

This loose model of collaboration extended into formal teaching through architecture studios run at UWA in 2025: second year *Living Labs* Studios (Semester 1), which introduced the students broadly to the research's materials-first methodology, and a Masters-level *Invasive Wetlands* studio (Semester 2) which engaged directly with the Adenia Saltmarsh's systems mapping. This thread produced recognised outcomes internationally: Harvey Rupp's work with the *Invasive Wetlands* studio was awarded first prize in the *UIA International Student Competition 'Catalysts of Resilience'* evidencing that the loose collaboration model is not only generating material knowledge but producing outcomes legible with international academic and professional recognition structures as well (see Figure 5).

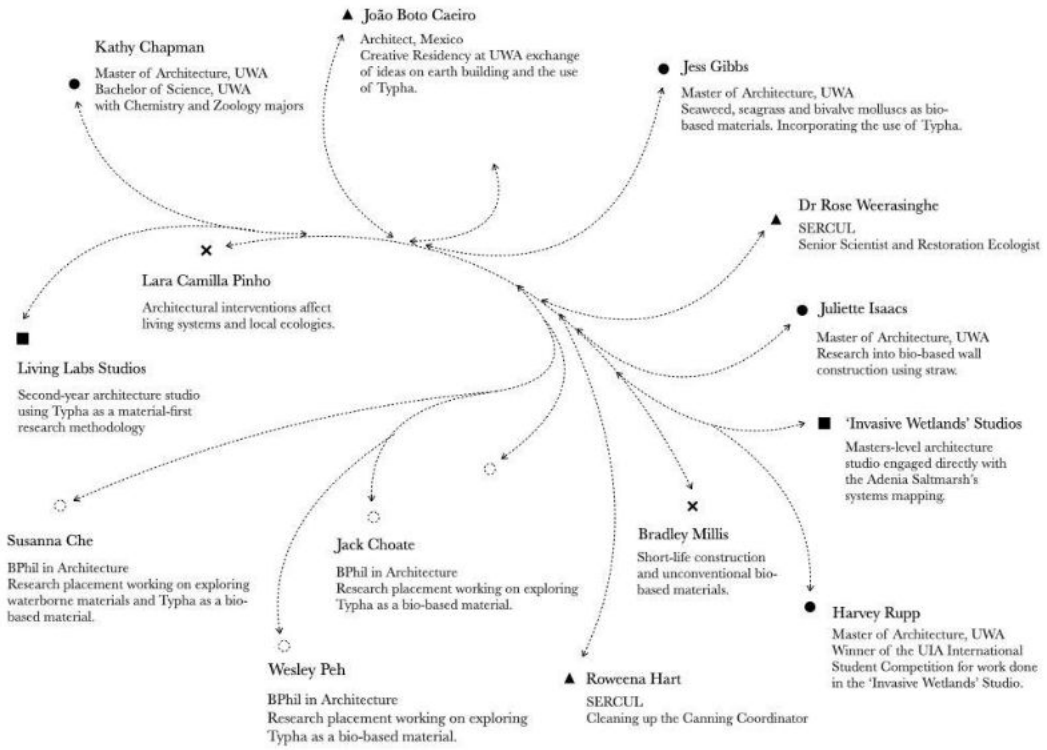

Figure 5: 'Loose collaborations' formed around Typha domingensis

The same looseness extends beyond individual contributors into institutional and cross-cultural partnerships: locally with the South East Regional Centre for Urban Landcare (SERCUL), whose on-ground rehabilitation work in the Canning catchment complements the research's material focus through alignment of interest rather than formal agreement; and internationally through an architect-in-residence exchange with João Boto Caeiro from Oaxaca, Mexico, testing whether disobedience and collaboration observed through *Typha domingensis* from the Adenia Saltmarsh holds as a transferable model or remains irreducibly local.

Knowledge sharing across disciplinary lines

Across this roster, the studios, and the SERCUL and Oaxaca partnerships, a consistent pattern emerges: knowledge moved not through formal transfer mechanisms but through shared direct engagement with the same material or site. An ecologist's grasp of the wetland systems, a cross-cultural transfer of knowledge, students' willingness to consider new ideas, an architect's material sensibility became mutually legible through proximity to Typha and Adenia, rather than through a coordinating framework or common disciplinary language.

This is a different model of interdisciplinarity from the grant or co-authorship-driven kind typically institutionalised in universities. If materials function as leverage points precisely because they are tangible and accessible, then knowledge sharing organised around a material – rather than a discipline spanning framework – may be what allows disobedience to remain productive. The material holds the disobedience together in the same way it holds the collaboration together: not by resolving disciplinary difference, but by giving that difference a point of contact.

The University as an incubator of disobedience

Universities unrealised potential as a site for alternative trajectories
Universities hold a structural advantage rarely exploited to its full potential: sustained institutional continuity combined with population – students – whose training requires them to question and experiment without the commercial or regulatory consequences that constrain practice. This makes universities uniquely suited to hosting experimental disobedience, yet the potential is typically underused, with research and teaching often run as parallel, disconnected tracks.

The present research demonstrates what happened when this separation is collapsed. Teaching itself became a mechanism for generating new material, ecological, and design knowledge – evidenced by the *Living Labs* and *Invasive Wetlands* studios, Harvey Rupp's award-winning contribution, Bachelor of Philosophy students immersed in the research, students undertaking independent research – including Juliette Isaacs whose work ran as a parallel self-directed thread and Jess Gibbs' earlier independent research, which preceded and directly informed the Typha work itself.

This bi-directional relationship – research shaping teaching, and student projects, in turn, seeding future research – is precisely the unrealised potential this section names. Universities are rarely structured to allow knowledge to flow this freely between research and pedagogy; where they are, as here, they function not as training grounds preparing students for an unchanged profession, but as incubators of the alternative trajectories that the professional currently lacks.

Academics and students as co-conspirators
Conventional academic structures position the student as the recipient and the academic as the giver of knowledge. Knowledge flows one way, from expert to trainee. The present research operates differently. As Typha in Western Australia is unstandardised and not widely documented, neither staff nor student holds great expertise; properties are

discovered collectively, through testing, rather than delivered by seniority. This flattens hierarchy not as principle but as a practical consequence.

This 'co-conspirator' role is bound by a shared complicity in a common act of testing against established norms. Harvey Rupp's award-winning studio work, Jess Gibbs' earlier research shaping the research on *Typha domingensis* and the students immersed in the ongoing experimentation, which in turn may influence their own research trajectories, are not instances of students being trained by the research; they are instances of students producing it.

This reframes supervision itself: rather than providing guidance to students in a mentorship role, the academic becomes a fellow experimenter, treating a student's unexpected result with the same seriousness as their own – the 'unrealised potential' proving relational as much as structural.

Discussion: experimental disobedience as method

Deliberately transgressing regulation and power structures in architecture
The disobedience enacted across this research is not incidental to Typha – it is structural to it. Harvesting Typha from a site legally recognised as a Threatened Ecological Community means that the research begins by working within, and against, a regulatory boundary rather than a neutral backdrop. Testing material absent from any building code means that every subsequent design decision operates without the protective cover of established compliance pathways. Structuring collaboration around shared material inquiry rather than institutional hierarchy quietly displaces the authority typically vested in supervisor, code, and profession alike.

None of these transgressions are reckless. Each is a considered confrontation with a specific system of power – environmental regulation, building standards or academic hierarchy. These systems currently foreclose the kind of material and pedagogical experimentation this research argues is necessary. Disobedience, in this context, is not a single act but a method: a repeatable practice of identifying where a regulation or hierarchy holds a norm in place and deliberately working against it in order to test whether the norm still serves its purpose.

Disobedience as a route to deeper understanding of place and systems
What this disobedience does is not simply permission to use an unconventional material – it is knowledge that would have been inaccessible through compliant means. Working outside code-approved testing methods revealed Typha's relational, part-dependent properties. Harvesting from a protected, actively managed site forced direct engagement with Adenia's hydrology, nutrient loading, and invasive dynamics in a way that specifying a conventionally sourced material would not have. Disobedience, in other words, functioned as a route into a systems knowledge that regulatory compliance would not have permitted.
Planetary boundaries are breached through interconnected, cumulative pressures rather than isolated failures. Addressing them therefore requires research methods willing to trace those interconnections directly. This includes the regulatory and disciplinary connections

that ordinarily prevent research from getting close enough to see them. Experimental disobedience, understood this way, is not a stylistic provocation. It is what allows a research programme to reach the deeper, more entangled understandings of place and systems that a compliant, siloed practice structurally cannot.

Conclusion

Disobedience and loose collaborations as a replicable model
As discussed above, this interconnected view of the planetary crisis shapes how *Typha domingensis* was approached: not as an isolated material innovation, but as an entry point into the regulatory, ecological, and disciplinary systems it sits within.

Across this research, disobedience and collaboration proved inseparable rather than complementary. Working with an unstandardised material sourced from a legally protected saltmarsh necessitated transgressing established codes and regulatory boundaries. That same transgression, in turn, compelled drawing together contributors from different disciplines and research backgrounds to produce systems knowledge that could not have been produced alone. Typha's relational material properties, and Adenia's entangled ecological dynamics, were brought together and made visible only because compliant, siloed research practice was deliberately set aside.

Whether this constitutes a replicable model depends on what is distinguished as transferable or not. Specific findings, such as Typha's part-dependent properties, may be valid for Typha from other locations. However, Typha does not grow aggressively in all wetlands. In many cases, it is a fundamental part of the local ecosystem and should not be removed.

In this scenario, Typha's link to Adenia's hydrology and high nutrient load are specific to this case and may only be transferable to similar scenarios. They belong to this material and this place, consistent with the paper's argument that bio-based material properties must be discovered on their own terms, species by species and site by site. What is replicable is the method: a research structure that treats materials as leverage points, collapses the separation between research and teaching, and allows collaboration to form loosely around a shared materials problem rather than a predetermined institutional framework.

This positions the university, specifically, as the site where this replication is most immediately possible. Any institution willing to relinquish the presumption of settled expertise – treating students and staff as co-conspirators rather than trainer and trainee – holds the same structural potential this research exploited. The invitation this paper extends is to replicate the disobedience and the loose collaborations: to identify unconventional materials, to identify overlooked sites and test what becomes visible when architectural research is willing to transgress norms.

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