We acknowledge and pay respect to the traditional owners of the land on which the University of Sydney is built; the Gadigal people of the Eora Nation. We pay respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.
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For more than 100 years, the Sydney School of Architecture, Design and Planning has fostered a diverse and collaborative environment for teaching, research and engagement. Our academics use ideas from the humanities, science, creative practice, and the social sciences to address modern built environment and design issues, from the design of wearable technologies to urban planning outcomes. We are proud that our people and students reflect the community we work and study in.

* QS World Ranking 2021
“Many of the world’s greatest challenges revolve around cities and digital technology. Through collaboration, creativity and rigour, the school’s research inspires transformation on built and designed environments, objects and experiences.”

Professor Robyn Dowling
Dean, School of Architecture, Design & Planning
University of Sydney
TOWARDS RESTORATIVE SOUND ENVIRONMENTS IN YOUTH JUSTICE FACILITIES ON COUNTRY

Michael Mossman – Senior Lecturer in Architecture
Densil Cabrera – Associate Professor and Director, Audio and Acoustics Program
Clare Cooper – Lecturer in Interaction Design
Shuai Lu – Lecturer in Audio and Acoustics

NSW has detention facilities for young people which ideally should divert them from future entrenchment in the criminal justice system, putting their lives on a positive course. These facilities present many difficult challenges, and this project investigates how their sound environment can be designed to positively contribute to living conditions, rehabilitation and well-being. While Indigenous overrepresentation in the detainee population demands culturally informed interventions to reconnect detainees with cultural ways, this project considers the role of sound to contribute to rehabilitation and healing. The project initiates a broader engagement with Youth Justice NSW and Indigenous realities of Country as healing.
COVID-19 has prompted all of us to reconsider the importance of health, and the Indoor Environmental Quality (IEQ) Lab is no exception. The World Health Organisation has conceded that microscopic aerosols containing SARS-CoV-2 represent the main pathway of infection. Acknowledging airborne transmission raises an urgent need to more comprehensively understand how air moves, and anthropogenic aerosols disperse within buildings. The IEQ Lab is conducting research on ventilation performance and airflow patterns of spaces, including open-plan offices and quarantine hotels. The project studies spatial dispersion patterns of tracer gas injected into the exhaled breath of an index patient who is represented by a full-scale, ‘breathing’ thermal manikin. A research outcome will be an ‘airborne infection iso-risk’ floorplate map for a variety of index patient locating scenarios. This could potentially be used by facility managers to spatially arrange office workstations and hotel quarantine rooms, or at least identify which workstations have the least risk of infection from airborne aerosols under each of the scenarios.
The COVID-19 pandemic has exposed underlying vulnerabilities in Australia’s housing system. Overcrowding, share accommodation, and precarious tenures are rising in the major cities and some regional areas where permanent rental supply has been drained by short-term tourism platforms. With inadequate housing increasing the risk of disease transmission and other health impacts under the pandemic, it is critical to better understand these informal and largely unregulated sectors of the housing system. The research outcome of this AHURI Scoping Project examines these issues, focusing on the impact of the COVID-19 pandemic on the linked housing forms of marginal, informal and short-term rental accommodation. The project aims were: to establish any health and housing risks of marginal and informal housing revealed or exacerbated during COVID-19; investigate any potential changes to the demand and supply of informal housing due to the pandemic; determine the change to demand and supply of informal short-term tourism rentals during COVID-19 and, finally, the related positive or negative effect on housing supply of these changes.
LIVING WITH AUTONOMOUS MOBILITY

Martin Tomitsch – Professor, Director of Innovation (EEE)
Luke Hespanhol – Lecturer in Design and Computation
Stewart Worrall – Research Fellow, Australian Centre for Field Robotics
Eduardo Nebot – Emeritus Professor, Patrick Chair in Automation and Logistics, Australian Centre for Field Robotics
Jennifer Kent – ARC DECRA Researcher
Alexander Wiethoff – Senior Lecturer, LMU Munich
Adrian Ellison – Associate Director (Data Science Consulting), DSpark PTY LTD

Australia is seen as a leader in the development and adoption of driverless cars. Australia’s Smart Cities Plan highlights that their transformational impact will “fundamentally change how we live and work”. Driverless cars and other autonomous vehicles have the potential to contribute to the strategic goals of Australian cities, addressing sustainability and liveability through shared ownership models and reduced congestion. This project contributes to the foundation for autonomous vehicles by focusing on a mostly overlooked aspect: how to make autonomous vehicles sympathetic to the social life of the urban spaces they inhabit. It tackles this challenge by developing new understanding about how autonomous vehicles interact with people around them, and how this is linked to perceived trust and safety. This, in turn, has the potential to reduce the risk of accidents from pedestrians misinterpreting the intention of the vehicle and to improve their public perception. Economic benefits include reduced costs of development and trials, as well as indirect cost benefits associated with road accidents and trauma by making autonomous vehicles safer for pedestrians.

This research was funded by the Australian Government through the Australian Research Council.
BIG DATA BUGS: INVESTIGATING THE DESIGN OF AUGMENTED REALITY APPLICATIONS FOR MUSEUM EXHIBITIONS

Anastasia Globa – Lecturer in Computational Design and Advanced Manufacturing
Callum Parker – Lecturer in Interaction Design
Jude Philp – Senior Curator of the Macleay Collections, Chau Chak Wing Museum

This project uses the co-design approach taken for designing a web-based and smartphone-augmented reality application for a Chau Chak Museum exhibit on geo-located data for entomology specimens. Instead of visitors having an alienating experience viewing artefacts from behind glass partitions, the augmented reality app brings specimens to life, providing audiences an engaging sensory experience to spatially visualise insect specimens in-situ and view more detailed information through their own devices. The intricate and interconnected nature of data visualised in the proposed AR environment created both challenges and opportunities. To this end, an existing museum collection containing over 300,000 thousand insect and non-insect specimens was recorded as a data set which contained both existing and obsolete geographic and taxonomic data.
UI INTERFACE | DESIGN APPROACHES

MINIMALIST DESIGN ITERATION

MUSEUM STYLE DESIGN ITERATION

Explore • Explore in the adult form

Lepidoptera • M. boldo • Papilionidae

Explore the museum's collection and discover the diversity of butterflies and moths. The interface allows you to filter by species, family, and location, providing a comprehensive view of the collection. The interactive 3D models enable you to visualize the insects from various angles, enhancing the learning experience. The museum also offers educational resources and interactive exhibits, making it a valuable resource for enthusiasts and students alike.
TRANSFORMING THE PALLIATIVE CARE PATIENT JOURNEY USING EMERGING TECHNOLOGIES

Naseem Ahmadpour - Senior Lecturer in Design, Director of the Design Major
Phillip Gough - Lecturer in Biological Design, Director of Bio Design Major
Philip Poronnik - Professor of Biomedical Sciences, School of Medical Sciences
Martin Brown - Project Manager Innovative Technologies
Judy Kay - Professor of Computer Science
Bob Kummerfeld - School of Computer Science
Melanie Lovell - HammondCare, Palliative Medicine Physician and Senior Specialist, Director of Clinical Trials at Greenwich Hospital
Phil Austin - Research Fellow and Osteopath
Tim Luckett - Palliative Medicine, IMPACCT Centre, UTS
Professor Meera Agar - Palliative Medicine, IMPACCT Centre, UTS
Jane Philips - Head of School of Nursing, Faculty of Health, QUT

The COVID-19 crisis provided stark evidence that the ability to maintain health in sustainable yet autonomous ways is crucial for those who are unwell. The crisis highlighted how the needs of people with chronic conditions or those in palliative care were ‘invisible’. These factors reinforce the 2018 National Palliative Care Strategy that stressed the need to harness personalised, technology-enhanced interactive experiences to improve palliative care outcomes. Through the immersive virtual reality platform, this project brings a lens of human-centred design to medical treatment, seeking to provide agency to patients to better manage physical symptoms and access a wider range of programs such as mindfulness, wellbeing and connectedness. These outcomes will also inform similar solutions for the treatment of chronic diseases such as cancer and neurological disorders.
This research examines the bespoke buildings of 21st-century Translational Medicine and explores the way in which architecture is directly engaged with changing cultures of research and care. In 1996, the famed medical journal *The Lancet* published a paper that spoke of a new interdisciplinary disease-focussed form of scientific practice it would call ‘Translational Medicine’. Translational Medicine combines the ‘pure’ science traditionally housed in laboratories and the clinical practices traditionally housed in hospitals or clinics in an endeavour to speed up the problem-solving mechanisms of medical research. This new model of medical research and practice quickly proliferated across almost all sub-disciplines of medicine. The architectural ramifications have also been considerable. Whilst large scale buildings dedicated to medicine—laboratories, clinics and hospitals—remain ubiquitous in most cities of the developed world, a new typology dedicated to Translational Medicine has emerged. This new typology combines functions traditionally deposited in separate laboratory and clinical facilities and frames itself in relation to highly specialised medical problems, that in turn, require highly specialised architectural solutions. The buildings of Translational Medicine do not simply host, accommodate or contain, but rather transform and fabricate new possibilities for medical practice. And it is precisely this medical dimension of architecture that I explore. The argument, simply stated, is that architecture is implicated in practises of medicine.
This research develops a sustainable model for transforming apartment buildings through re- and co-design rather than demolishing them.

Apartment buildings have become the standard solution for urban living and have been rolled out en masse across Australian cities over the past 50 years. The majority of these buildings no longer meet current social, environmental and economic standards. They are wasteful of energy, fail to meet resident expectations, depreciate in value and are seen as modernist eyesores that frustrate the aspirations of neighbourhoods. With apartments accounting for 36.3% of households globally and as much as 46.1% in the EU, this scenario represents a significant issue for cities and their residents.

To date, the default answer to this issue has been demolition and new build. But research shows that in many scenarios this is economically unfeasible because costs often outweigh benefits; environmentally unsustainable due to the embodied energy of new construction and demolition waste; and socially irresponsible because of displacement and disruption to resident communities.

If the case for redesign of apartment buildings is so clear-cut, why is it not already a mainstream development option? The main reason is that many apartment buildings are multi-owned and decisions on building need to be made by consensus amongst multiple decision makers. This makes a participatory approach a necessity rather than an option but with no formal process in place, progress is slow, expensive and can frustrate entire projects. This research explores the redesign of private multi-owned apartment buildings and the role that participatory approaches play in the design and construction process.

This research is funded by Australian Research Council Linkage Project: CoDesign Guide for Transforming Ageing Apartment Buildings (LP200100053) 2021-24.
DIGITAL TECHNOLOGIES
AND THE PRIVATE RENTAL
SECTOR IN AUSTRALIA

Dallas Rogers – Senior Lecturer in Urbanism
Sophia Maalsen – ARC DECRA Researcher

Digital technologies have the potential to exacerbate housing inequalities, but they also have the potential to create a better housing system and Australian society. This project investigates the growth of the private rental market and the creation of new digital technologies that are aimed at renters, landlords and property managers. Sometimes called Generation Rent and PropTech, respectively, the intersection of these major changes will have significant impacts on Australian society. The tech industry views the increasing group of renters as a new business opportunity, while these real estate tech companies may not own, or be in the same country as, the physical real estate assets on their platforms, profoundly altering the relationships between properties, landlords, tenancy managers and renters. Some, like Airbnb, have already begun to change the short- and long-term private rentals markets in some cities and neighbourhoods. Working in partnership with the Tenant Union, this project evaluates the potential for innovation among the new digital technology companies targeting the private rental sector. We will develop a set of housing policy recommendations for different State legislative contexts, and most importantly, we will use this data to co-produce a Tenant Advocacy Technology.

This research was funded by the Australian Government through the Australian Research Council.
HIDDEN HOUSING CRISIS?
URBAN PLANNING AND
INFORMAL HOUSING SUPPLY

Nicole Gurran – Professor, Chair of Urbanism, Director of the Henry Halloran Trust
Affordability pressures increasingly force low-income renters into substandard or ‘informal’ housing arrangements ranging from share accommodation through to backyard ‘granny flats’ and unauthorised dwelling units. This project aims to uncover how this ‘hidden’ housing is produced within formal systems of urban regulation and risks or benefits for residents. By exposing the significant but often ignored role of informality within housing systems, the project expects to advance the fields of housing and urban studies; lead international scholarly collaboration; and build research capacity. Project outcomes are intended to enhance local planning practice and improve housing standards and choice, particularly for low-income renters.
From the end of the 1780s, the colonial government of New South Wales began to turn parcels of the Crown land claim made in 1770 into plots, large and small, of private property. This project, supported by the Henry Halloran Trust and the Australian Research Data Commons, is testing the means by which a large-scale study of the pattern and pace of that process, called alienation, took place over time. Contributing to the Time-Layered Cultural Map of Australia, this pilot study explores the history of land alienation over a series of parishes in New South Wales. When and where was land first considered to be in private hands? What did that privatisation entail? How was it mediated? And what did it allow? The project begins from the observation that the history of Australian architecture is a history, too, of the relationship of what we build and where we build. Using the tools of the digital humanities, it offers a spatialised account of an important aspect of Australian history, at the intersection of governance, law, architecture, and culture.
THE PRECARIOUS CITY: THE SUBURBAN SETTLEMENT IN AN AGE OF UNCERTAINTY

Laurence Troy – Lecturer in Urbanism
Bill Randolph – Professor, City Futures Research Centre, UNSW

This project will investigate the disintegration of two interrelated pillars of Australia’s post-war ‘suburban settlement’ – home ownership and income security – and the consequences of this for patterns of urban change. Drawing on the concept of social citizenship, the project will explore the implications of this process through the life trajectories of 25- to 40-year-olds. The research will generate new knowledge by extending our understanding of how structural changes in employment opportunities are disrupting established patterns of housing demand for this group. The knowledge generated will inform policymakers and wider debates on the longer-term implications of the breakdown of home ownership on the Australian model of citizenship.

Australian Research Council (ARC) Discovery Project 2021
MICROTIMBER: ADVANCED BUILDING ELEMENTS MADE FROM WASTE

New research is showing positive results when harnessing 3D printing technology to combine timber and plastic waste and create high-performance building elements.

Waste is a pressing global problem that depletes our primary resources and impacts on our environment. The construction industry is a prime offender, consuming 30-50% of primary materials and producing around 40% of landfill through construction and demolition. In Australia, 85% percent of logged timber and 88% of plastics are wasted and end up in landfill. This project shows that timber and plastic waste are a valuable resource and can be transformed into smart sustainable building elements, using advanced manufacturing technologies in the form of 3D printing.

3D printing can do things that current construction technologies cannot: The 3D printing process allows architects to design at the nanoscale, fluidly varying the material composition and printing parameters to make building elements of variable strength, density, shape, texture and colour as demonstrated in the microtimber prototypes. Future research will develop this concept towards building houses that are affordable and sustainable and can be recycled.

This research was funded by the Forrest and Wood Products Australia Grant "Microtimber: Development of 3D printed gradient timber panel composed of waste and -by-products" (PNA359-1516) in partnership with ARUP.
CIRCULARITY BY DESIGN: A ROADMAP TO SYSTEMIC INNOVATION FOR THE AUSTRALIAN CONSTRUCTION INDUSTRY

Arianna Brambilla – Lecturer in Architecture
Eugenia Gasparri – Lecturer in Architectural Technologies
Paolo Stracchi – Lecturer in Architectural Technologies

The current global construction sector is based on take-make-waste economic models, whereby resources are invested in construction and disposed of at the end of a building’s life. In the pursuit of a more sustainable future these approaches are no longer affordable, and timely measures are necessary to address environmental and social challenges. Building construction practices need to rethink the way they work by shifting from linear to circular approaches of design and construction, where resources are reused, repaired, remanufactured and/or recycled to limit waste. This project responds to the urgent call for action in the field – “Circularity by Design” – which aims to identify opportunities and barriers for the adoption of circular economy strategies in the Australian construction industry, leading to systemic-radical innovation. The research analyses international best-practice approaches to circularity and scrutinises current design and construction practices giving voice to major stakeholders and key players partaking in the process. The project represents a steppingstone to promote a constructive dialogue between academia, industry and policy makers in order to define a collaborative roadmap that informs and supports sectoral change in Australia, toward the reconciliation between building activities and natural resources.
HexBox Canopy, an intensive workshop collaboration between the School of Architecture, Design and Planning and TU Kaiserslautern.

Image credit: Katherine Lu
INNOVATING SINCE 1918

#1 IN AUSTRALIA AND #21 IN THE WORLD
2021 QS World University Rankings by Subject

ABOVE WORLD STANDARD
Excellence in Research Australia (ERA)

HIGHEST RANKING
ERA Research impact

HIGHEST RANKING
ERA Research engagement

$6.4 MILLION+
in built environment research funding
2018-2021

3 FUTURE FELLOWS*
3 DECRA FELLOWS*
*since 2011

7 POSTDOCS
65 PHD CANDIDATES

#1 IN AUSTRALIA AND
#4 IN THE WORLD
Graduate Employability (Sydney Uni)

STUDENT DEMOGRAPHIC
55% Female, 45% Male

STAFF DEMOGRAPHIC
54% Female, 46% Male
Launched in 2020, our Strategic Plan 2020-2023 reflects our commitment to social justice, student-centred programs, multi-disciplinarity, staff professional development, and engagement with industry and the community. Balancing ambition and feasibility, the implementation of the strategic plan is underway. Through the ‘doing’ of these initiatives, the plan’s aspirations will become woven through the School’s everyday teaching, research, culture and operations.

**MISSION**

We lead and inspire thought on built and designed environments, objects and experiences. Our staff and students work in partnership with the professions and each other to shape inclusive and sustainable futures. Together we apply creativity, rigour and a collaborative mindset to advance knowledge.

**OBJECTIVES**

**EDUCATION**

Our graduates are innovators and creative leaders. They are equipped to deliver public good through wide-ranging careers in design and the built environment.

At the frontiers of disciplinary knowledge, our education advances the professions of design, planning and architecture in Australia, Australasia and globally. It is informed by international and Indigenous perspectives and responsive to the needs of a diverse body of students.

**RESEARCH**

Our world-recognised disciplinary and multidisciplinary research advances knowledge and addresses timely intellectual and societal challenges to enable inclusive and sustainable futures.

Our researchers connect across the disciplines and with external research partners to generate new research questions, knowledges and approaches and solutions to real world problems.

**CULTURE**

We embed trust, integrity and partnership in School culture to enable inclusive and sustainable futures.

We elevate culturally and gender diverse and Indigenous voices and perspectives.
STRATEGIES

EDUCATION

Enhance our capability to deliver high-quality teaching by mentoring, developing and supporting our academic staff.

Deliver a coherent offering of student learning experiences that are engaged with professional practice, committed to social justice and informed by Indigenous, local and global perspectives.

Enhance the collaborative capability of graduates who are specialists with deep disciplinary knowledge and trained to work across the disciplines.

Deliver targeted initiatives to grow Indigenous student numbers, aligned with the One Sydney, Many People strategy.

RESEARCH

Foster a collegial high-performance research culture by connecting researchers across disciplines and career stages and providing structured mentoring opportunities.

Strengthen our reputation for path-breaking disciplinary scholarship with a sustained commitment to generating high quality academic and non-traditional research outputs.

Fully embed higher degree research as an integral element of our research ecosystem.

Improve our capacity for problem-focused research, engagement and impact through skills development and targeted investment.

CULTURE

Build Indigenous knowledges and cultural competency into activities across the School and advocate for increased participation of Indigenous students and staff in School life.

Encourage staff to reach their potential by providing mentoring, leadership and career progression opportunities and wellbeing support for academic and professional staff at all stages.

Create a collaborative and outward-looking culture in which academics lead creative and critical enquiry and transform practice.

Involve our local, national and international alumni and partners in shaping the future of our School, to ensure our education and research address the emerging needs of our time.

OPERATIONAL ENABLERS

Enable professional staff to deliver operational excellence by providing high quality support for their career development and wellbeing

Streamline our operations support through better software systems and aligned reporting to improve our processes, maximise our efficiency and deliver sustained excellence

Cultivate a high functioning team to model transparency, accountability, collegiality and trust

Embed a culture of external engagement across the School and develop effective and imaginative approaches to working with partners

Designing the Future
WHERE WILL THE FUTURE TAKE US?

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