School of Architecture and Built Environment

HDR Project List

Geelong Waterfront Campus

The School of Architecture and Built Environment research aims to create new knowledge for an agile, adaptive and responsive built environment. Drawing on the potential of human-centred design, construction and technology, our researchers recognise the need to develop new ways of approaching problems in our highly interconnected and complex world.

Our researchers explore the role of architects and built environment professionals in shaping the future at a time when digital technology and innovations are disrupting the ways we think, live, work and do business. We also look at ways of adapting the sector's methods of approaching problems, to make an impactful contribution to a socially, economically and environmentally viable future.

Need a supervisor? Explore the project list to connect with academics across our mix of disciplines and research themes of architecture, planning, urban design, landscape architecture and construction management.

Project list

Emerging Technologies for Improving Work Health, Safety and Wellbeing in Construction

Abstract: This project aims broadly at developing innovative solutions for improving work health, safety and wellbeing in the construction industry. Research may be undertaken in a specific area such as work health, work safety or workplace wellbeing in construction. Digital methods/tools such as decision support systems, artificial intelligences, data analytics, digital twins or Internet of Things may be developed for addressing challenges pertinent to safety risk identification, assessment and control.

References:

Tender, M., Couto, J.P., Gibb, A., Fuller, P., Yeomans, S. (2022). Emerging Technologies for Health, Safety and Well-being in Construction Industry. In: Bolpagni, M., Gavina, R., Ribeiro, D. (eds) Industry 4.0 for the Built Environment. Structural Integrity, vol 20.

Key words: Construction , Work health, Safety and wellbeing, Digital solutions, and Risk management

Principal Supervisor:	Prof Imriyas Kamardeen
Associate Supervisor:	Dr Abid Hasan
School	School of Architecture and Built Environment
Course	S805 Master of Construction Management (Research)
	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Construction 4.0

Abstract: This research program investigates industry 4.0 solutions for improving the performance of the construction industry broadly. Students may work on topics related to productivity, building quality, cost effectiveness, procurement strategies or sustainability in construction and built facilities/asset management.

References:

Casini, M. 2021. Construction 4.0: Advanced technology, tools and materials for the digital transformation of the construction industry. 1st Ed. Elsevier, Amsterdam.

Key words: Construction management, Asset and facilities management, Industry 4.0 and Performance improvement

Principal Supervisor:	Prof Imriyas Kamardeen
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School	School of Architecture and Built Environment
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	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Advancing, society, culture and the economy
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
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Environment, Social and Governance (ESG) adoption and reporting framework for the construction industry

Abstract: The Sustainable Development Goals include economic, environmental, and social dimensions; however, most industries, including construction, prioritise the economic dimension over the others. Environment, Social, and Governance (ESG) has emerged as a vehicle for organisations to address environmental and social obligations using governance policies and practices prioritising non-financial considerations. Existing ESG frameworks emerged from the financial and manufacturing sectors and focused on assisting investors in making ethical investment decisions. The construction industry is among the leading contributors to carbon emissions and has some of the highest workplace injury rates. Nevertheless, the construction industry lags behind others in adopting and reporting ESG. Considering the contextual differences between the construction industry and the financial and manufacturing sector, the existing ESG frameworks may exclude social, environmental and governance dimensions unique to construction. This research, therefore, aims to develop an ESG adoption and reporting framework rooted in the context of the construction of organisations. This research will employ natural language processing-based mixed-methods to source and analyse relevant data from multiple sources, including focus groups, sustainability reports, and social media. A contextualised ESG reporting framework for the construction industry would promote its adoption and contribute to minimising the industry's negative environmental and social impact.

References:

Siew, R.Y.J., (2017). 'Critical evaluation of environmental, social and governance disclosures of Malaysian property and construction companies'. Construction Economics and Building, 17(2), pp.81-91.

Siew, R.Y.J., Balatbat, M.C.A. and Carmichael, D.G., 2013. 'The Relationship between Sustainability Practices and Financial Performance of Construction Companies'. Smart and Sustainable Built Environment, 2(1), pp. 6–27

Lagasio, V. and Cucari, N., 2019. 'Corporate governance and environmental social governance disclosure: A meta-analytical review'. Corporate Social Responsibility and Environmental Management, 26(4), pp.701-711.

Shurrab, J., Hussain, M., & Khan, M. (2019). 'Green and sustainable practices in the construction industry: a confirmatory factor analysis approach'. Engineering, Construction and Architectural Management, 26(6), 1063-1086.

Allison, R. W., Hon, C. K., & Xia, B. (2019). 'Construction accidents in Australia: Evaluating the true costs'. Safety science, 120, 886-896.

Key words: Environment, Social, and Governance; Construction industry, Sustainability and Natural language processing

Principal Supervisor:	Dr Abdul-Manan Sadick
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Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship

Growing Up In Cities in the Twenty-First Century

Abstract: The Growing Up in Cities (https://www.deakin.edu.au/architecture-built-environment/research/growing-up-in-cities) replicates two benchmark adolescent studies done in 1972 by MIT Professor Kevin Lynch and in 1998 by University of Colorado Professor Louise Chawla. The research themes and findings of GUIC III will continue along the trajectory of the original two studies by focusing on contemporary issues that affect young people such as urbanisation, globalisation, digital practice and global warming. The intent of GUIC III is to empower young people and provide them with a voice that advocates for their health and wellbeing in contemporary urban contexts across the globe. The research seeks to: understand how young people (aged between 10 and 15 years) use and derive meaning from their local environment; develop insight into how the urban environment affects their lives, through observation and based on young people's own words; and apply this knowledge in support of meaningful change in the design and management of urban places.

References:

Chawla, L. (ed.) (2002). Growing up in an urbanising world. UNESCO Publishing & Earthscan Publishing. Lynch, K. (ed.) (1977). Growing up in cities: Studies of the spatial environment of adolescence in Cracow, Melbourne, Mexico City, Salta, Toluca, and Warszawa. MIT Press.

Derr, V., Chawla, L., & Mintzer, M. (eds.)(2018). Placemaking with Children and Youth: Participatory Practices For Planning Sustainable Communities. New Village Press.

Kreutz, A., Derr, V., & Chawla, L. (2018). Fluid or fixed? Design processes that facilitate or constrain nature play and learning in a schoolyard and park, Landscape Journal, 37 (1), 39-54.

A Kreutz, A Timperio, & J Veitch. (2021). Participatory school ground design: play behaviour and student and teacher views of a school ground post-construction." Journal of Landscape Research, 46(6), 860-877.

Key words: Young people, Urban design, Participatory research and Longitudinal study

Principal Supervisor:	Dr Angela Kreutz
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School	School of Architecture and Built Environment
Strategic Research and Innovation Centre	HOME
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Improving health and wellbeing
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Enhancing Building Performance through Sustainable Design Integrated with Phase Change Materials (PCMs)

Abstract: Buildings & construction is one of the largest energy consumers worldwide, using about 35% of energy and is responsible for around 38% of CO_2 emissions. Sustainable building design integrated with phase change materials (PCMs) emerges as an innovative solution to reduce energy consumption and carbon emissions. PCMs can store and release thermal energy during phase transitions, enhancing energy efficiency and occupant comfort. Integrating PCMs into building components can increase thermal energy storage, resulting in lower energy use and CO_2 emissions. However, the challenge lies in selecting and integrating PCMs without compromising structural integrity, durability, and performance. This proposal aims to simulate PCM integration into eco-friendly materials to optimise building design for different climates. Through comprehensive simulations, data will be collected to gain insights into the behavior of PCM-infused materials. The study will simulate constructed building components across various Australian climatic conditions to identify optimal PCMs for specific regions. The research findings have the potential to advance the development of energy-efficient, thermally comfortable buildings while promoting sustainable and contextually responsive design practices.

References:

R.A. Kishore, M.V.A. Bianchi, C. Booten, J. Vidal, R. Jackson, Optimizing PCM-integrated walls for potential energy savings in U.S. Buildings, Energy Build. 226 (2020), 110355. Link

G. Evola, L. Marletta, F. Sicurella, A methodology for investigating the effectiveness of PCM wallboards for summer thermal comfort in buildings, Build. Environ. 59 (2013) 517–527. Link

Z. Al-Absi, M. Hafizal, M. Ismail, H. Awang, A. Al-Shwaiter, Properties of PCM-based composites developed for the exterior finishes of building walls, Case Studies in Construction Materials, Volume 16, 2022, e00960, ISSN 2214-5095. Link

Key words: Sustainable Design, PCM Simulation, Eco-Friendly Building Materials, Energy-Efficient Buildings, Occupant Comfort, Building Performance Analysis

Principal Supervisor:	Dr Hong Xian Li
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School	School of Architecture and Built Environment
Strategic Research and Innovation Centre	HOME
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship

Investigating PV Anomaly and Degradation Using Machine Learning Methods

Abstract: In fulfilling the Australian Government's aspiration of achieving net-zero emissions by 2050, low-carbon resources and renewable energies are deemed effective solutions. The installation of solar Photovoltaic (PV) systems has witnessed an exponential increase in usage worldwide, and the total installed solar PV capacity has reached over 26.1 gigawatts in Australia. However, research reveals that the installed solar PV panels have up to 18.9% of power loss due to various faults and degradation. Most of the PV system fault alarms are only reported post incidents (i.e., system failures), so it is imperative to develop a cogent framework for pre-incident anomaly detection and forecasting, based on emerging digital technologies that incorporate advanced analytical tools such as Machine Learning. The aim of this research is to investigate, design, and test different machine learning methods to analyse the anomaly and degradation of solar PV systems and develop a pre-incident technological framework for early detection of low-performing panels by employing Machine Learning Methods.

References:

Australian PV Institute (2022), Australian PV market since April 2001. Link

Ahmed, R., Sreeram, V., Mishra, Y. and Arif, M. D., 2020. A review and evaluation of the state-of-the-art in PV solar power forecasting: Techniques and optimisation. Renewable and Sustainable Energy Reviews, 124, p.109792.

Firth, S.K., Lomas, K.J. and Rees, S.J., 2010. A simple model of PV system performance and its use in fault detection. Solar energy, 84(4), pp.624-635.

Kim, J., Rabelo, M., Padi, S.P., Yousuf, H., Cho, E.C. and Yi, J., 2021. A Review of the Degradation of Photovoltaic Modules for Life Expectancy. Energies 2021, 14, 4278.

Key words: Solar PV, Anomaly, Degradation and Machine Learning

Principal Supervisor:	Dr Hong Xian Li
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Campus	Geelong Waterfront
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Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
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Collaborative Governance for an Effective Construction and Demolition Waste Management

Abstract: Construction and demolition waste (C&DW) has a detrimental impact on sustainability in Australia. Exiting studies have investigated CDMW from a specific participant's perspective where collaborative governance remains the most prominent gap in CDWM. The governance is very complex due to the involvement of numerous stakeholders. Thus, bridging technologies to overcome complexity and enabling a collective stakeholder network is essential for collaborative governance. Accordingly, the roles of stakeholders, the required data and policies for an effective CDWM, and the process of decision-making in collaborative governance in CDWM need to be identified. Ultimately, a model will be developed to portray the application of suitable technology like blockchain technology to establish collaborative governance in CDWM.

References:

Gopalakrishnan, P. & Ramaguru, R., 2019. Blockchain based waste management. International Journal of Engineering and Advanced Technology, 8(5), pp. 2632-2635. Kabirifar, K., Mojtahedi, M. & Wang, C., 2021. A systematic review of construction and demolition waste management in Australia: Current practices and challenges. Recycling, 6(2), p. 34.

Lee, D., 2020. Restructuring municipal solid waste management and governance in Hong Kong: Options and prospects. , 38(9), . Waste Management & Research, 38(9), pp. 1047-1063.

Nawaz, A., Chen, J., Su, X. & 2023. Exploring the trends in construction and demolition waste (C&DW) research: A scientometric analysis approach. Sustainable Energy Technologies and Assessments, Volume 55, p. 102953. Zhao, X. et al., 2022. Construction and demolition waste management in Australia: A mini review. Waste Management & Research, 40(1), pp. 34-36.

Key words: Collaborative Governance, Construction and Demolition Waste Management and Blockchain

Principal Supervisor:	Dr Gayani Karunasena
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Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
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Circular Economy Practices for Liquid Waste Management in Construction Projects

Abstract: The discharge of liquid waste from construction sites can lead to significant adverse effects on environmental, economic, and social aspects. As emphasized by researchers' effective liquid waste management practices are crucial in the construction sector. Additionally, have pointed out the necessity for future research to establish efficient and practical approaches to liquid waste management in construction projects. Accordingly, transitioning toward a circular economy entail adopting sustainable strategies for resource and waste management, a pivotal element of the transformation. Moreover, this change should encompass all types of materials and waste. Consequently, multiple studies have highlighted the circular economy as a promising pathway for enhancing liquid waste management practices in construction projects. Therefore, integrating circular economy practices into liquid waste management within the construction industry, particularly focusing on policy implementation within the Australian government context is vital. The outcomes will serve as the basis for formulating recommendations to strengthen policy frameworks, promoting more sustainable liquid waste management practices in construction projects. Furthermore, the research's contributions extend to enriching academic literature by offering empirical insights into the adoption of circular economy practices for liquid waste management within the construction context, specifically in Australia.

References:

Karunasena, G., Gajanayake, A., & Udawatta, N. (2022). Wastewater management in the construction sector: a systemic analysis of current practice in Victoria, Australia. International Journal of Construction Management.

Karunasena, G., Udawatta, N., Crimston, A., Gamage, S. V., & Gajanayake, A. (2021). Are we handling trade wastewater discharge effectively during building construction in Australia? In: 44th Australasian Universities Building Education Association (AUBEA) Conference, 296.

Karunasena, Gayani, Gajanayake, A., Wijeratne, W. M. P. U., Milne, N., Udawatta, N., Perera, S., Crimston, A., & Aliviano, P. (2023). Liquid waste management in the construction sector: a systematic literature review. International Journal of Construction Management, 0(0), 1–11.

Perera, S., Hardie, M., & Ratnasabapathy, S. (2021). Liquid Waste Management in the Construction Projects (Issue September). https://doi.org/10.26183/bsp8-b005 Smol, M., Adam, C., & Preisner, M. (2020). Circular economy model framework in the European water and wastewater sector. Journal of Material Cycles and Waste Management, 22(3), 682–697.

Key words: Construction Projects, Circular Economy, Liquid Waste Management and Policy

Principal Supervisor:	Dr Gayani Karunasena
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School	School of Architecture and Built Environment
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship

Stakeholder management in large infrastructure projects: A social media perspective

Abstract: Large infrastructure projects play important roles in promoting economic growth. Stakeholders are crucial considerations in the delivery of large infrastructure projects, and their effective management is one of the project successful factors. Social media provides platforms for the interaction of different project stakeholders through various ways such as information creation and sharing, communication, connection, and engagement. Social media contains huge amounts of useful data to support the management of stakeholders in the delivery of large infrastructure projects. Nevertheless, these data are not fully used. On the basis of the Stakeholder Theory, the research project aims to explore optimal ways of using social media data in managing stakeholders of large infrastructure projects. This research project will help to understand stakeholders and promote their effective management in the delivery of large infrastructure projects by using social media data.

References:

Freeman, R. E. (2010) 'Strategic management: A stakeholder approach', Cambridge University Press.

Eskerod, P., & Jepsen, A. L. (2016) 'Project stakeholder management', Routledge.

Chung, K. S. K., Eskerod, P., Jepsen, A. L., & Zhang, J. (2023) 'Response strategies for community stakeholder engagement on social media: A case study of a large infrastructure project', International Journal of Project Management, 41(5), pp. 102495.

Lobo, S., & Abid, A. F. (2020) 'The role of social media in intrastakeholder strategies to influence decision making in a UK infrastructure megaproject: Crossrail 2', Project Management Journal, 51(1), pp. 96-119.

Williams, N. L., Ferdinand, N., & Pasian, B. (2015) 'Online stakeholder interactions in the early stage of a megaproject', Project Management Journal, 46(6), pp. 92-110.

Key words: Stakeholder management, Large infrastructure project and Social media

Principal Supervisor:	Dr Xin Hu
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Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Advancing, society, culture and the economy
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Client Capabilities for Net-Zero Transport Infrastructure Development

Abstract: Transportation is a significant contributor to greenhouse gas emissions, making it imperative to transition to net-zero infrastructure. While numerous studies focus on technology and engineering aspects, limited attention has been given to the capabilities and capacities of clients—the organizations or entities commissioning these projects. Clients play a pivotal role in setting project objectives, budgets, and sustainability goals. Understanding their capacities and limitations in driving net-zero initiatives is essential for successful, sustainable infrastructure development. The primary challenge lies in the lack of a comprehensive framework or guidelines to assess client capabilities specifically tailored to net-zero transport infrastructure development. Clients often lack the knowledge, resources, and strategies necessary to set, monitor, and achieve net-zero goals effectively. This research project seeks to identify and evaluate the critical competencies, resources, capabilities and strategies that clients need to facilitate the development of sustainable, net-zero transport infrastructure, thus contributing to a more sustainable future.

References:

Juliano Denicol, Andrew Davies, (2022) The Megaproject-based Firm: Building programme management capability to deliver megaprojects, International Journal of Project Management, Volume 40, Issue 5, Pages 505-516 Infrastructure Victoria (2023) Infrastructure can help pave the way to net zero.

Mckinsey & Company (2022) Link

Key words: Net-zero transport infrastructure, Client capabilities, Sustainable development, Climate change mitigation and Infrastructure management

Principal Supervisor:	Dr Dominic Doe Ahiaga-Dagbui
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Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Building Fitouts from Waste to Value: Automated Emission Assessment Toolsets

Abstract: A substantial volume of waste is generated annually as a result of recurring fitout churn cycles within commercial buildings, retail properties, and offices. However, property owners are currently facing unprecedented pressure to account for the emissions stemming from these practices. The availability of data for calculating emissions associated with fitout items and furniture components has been notably limited, presenting a considerable challenge. This project is focused on the development of an automated system designed to generate emission reports through the scanning of fitouts. Key concepts integral to the project encompass the utilization of scan-to-Building Information Modeling (BIM) technology, the estimation of emissions related to building components, and the creation of codes and programs that facilitate data exchange between these platforms.

References:

Arup (2022) Circular fit-out in retail stores Circular design principles. Link

Fini, A.A.F. and Forsythe, P. (2020) 'Barriers to reusing and recycling office fit-out: An exploratory analysis of demolition processes and product features', Construction Economics and Building, 20(4), pp. 42–62. Link

Forsythe, P. (2017) 'Quantifying the recurring nature of fitout to assist LCA studies in office buildings', International Journal of Building Pathology and Adaptation, 35(3), pp. 233–246. Link

Forsythe, P. and Ahmadian Fard Fini, A. (2018) 'Quantifying demolition fitout waste from Australian office buildings', Facilities, 36(11–12), pp. 600–617. Link

 Host K. (2018) STRIPOUT WASTE GUIDELINES. Link

Simonen, K., et al. (2017) Embodied Carbon Benchmark Study: LCA for Low Carbon Construction. Link

Key words: Decarbonisation, Fitouts, Building Information Modeling (BIM), Automation and Low-carbon construction

Principal Supervisor:	Dr M. Reza Hosseini
Associate Supervisor:	Prof Tuba Kocaturk and Dr Jun Wang
School	School of Architecture and Built Environment
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
	S800 Master of Architecture (Research)
	S805 Master of Construction Management (Research)
Campus	Geelong Waterfront
Impact Theme	Creating smarter technologies
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Circular Economy transition of the Built Environment

Abstract: The circular economy transition of the built environment is a sustainable approach to architecture, construction and urban development that emphasizes systems thinking, digital technologies, organizational management, and design-driven approaches. It's a holistic strategy aimed at minimizing waste, maximizing resource efficiency, and promoting the reuse and recycling of materials. This approach seeks to create regenerative urban systems that extend the lifespan of buildings and infrastructure, reduce environmental impact, and enhance the overall quality of urban living. We call for PhD projects to explore the circular economy transition of the built environment by integrating systems thinking, digital technologies, organizational management, and design-driven approaches. Through interdisciplinary collaboration, the PhD projects are expected to investigate cutting-edge methods for designing and constructing urban spaces that minimize waste and carbon emissions while enhancing liveability. By leveraging digital technologies and design-driven principles, the aim is to optimize resource flows and create adaptable urban systems, contributing to the development of sustainable cities that benefit both people and the planet.

References:

Shooshtarian, S.; Hosseini, M.R.; Kocaturk, T.; Arnel, T.; Garofano, N.T. Circular economy in the Australian AEC industry: Investigation of barriers and enablers. Build. Res. Inf. 2022, 51, 56–68.

Elghaish, F., Hosseini, M. R., Kocaturk, T., Arashpour, M., & Ledari, M. B. (2023). Digitalised circular construction supply chain: An integrated BIM-Blockchain solution. Automation in Construction, 148, 104746. Link

Kocaturk, T., & Hosseini, M. R. (2023). Towards a circular transition of the built environment: systemic and transdisciplinary models, methods and perspectives. Building Research and Information, 51(1), 1–4. Link

Munaro, M. R., Tavares, S. F., & Bragança, L. (2020). Towards circular and more sustainable buildings: A systematic literature review on the circular economy in the built environment. Journal of Cleaner Production, 260, 121134. Link

Key words: Circular Economy, Built Environment, Digital technologies and Design-driven

Principal Supervisor:	Prof Tuba Kocaturk
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Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
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Unlocking Circular Cities: Harnessing Digital Technologies as Enablers for Sustainable Urban Transformation

Abstract: The urgent need for sustainability in urban environments has brought the concept of the circular economy (CE) to the forefront of global discussions. Cities, as centres of habitation and economic activity, possess unique potential to drive the transition to a circular economy. This PhD project will investigate how digital technologies can act as enablers for achieving circularity at city-wide scales. The project will examine successful use cases of digital technology adoption in cities, analysing their impact on the circular economy, and identifying best practices. The exploration will extend to understanding the role of policy and governance structures (especially with reference to smart cities initiatives), and propose strategies for effective implementation. It will also entail an analysis of the impact of technology enabled circular initiatives on environmental sustainability, social equity and economic resilience. The study will seek to provide a comprehensive understanding of the potential and challenges of digital technologies as enablers for circular cities. The findings will contribute to advancing knowledge in this emerging field, offering insights for urban policymakers, planners, and technology developers, especially within the specific context of regional Victoria.

References:

European Commission. (2023). A Europe fit for the digital age: Empowering people with a new generation of technologies. Link

Honic, M., Kovacic, I., Rechberger, H., 2019a. Improving the recycling potential of buildings through material passports (MP): an Austrian case study. J. Clean. Prod.217, 787–797. Link

Konietzko, J., Bocken, N., Hultink, E.J., 2020. A tool to analyze, ideate and develop circular innovation ecosystems. Sustainability 12 (1). Link

Kristoffersen, E., Blomsma, F., Mikalef, P., Li, J., 2020. The smart circular economy: a digital-enabled circular strategies framework for manufacturing companies. J. Bus.Res. 120, 241–261. Link

Circularise. (2023b). End-to-end supply chain traceability. Link

Key words: Circular economy, Urban sustainability, Digital technologies, City-wide transformation and Circular city,

Principal Supervisor:	Prof Tuba Kocaturk
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School	School of Architecture and Built Environment
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Enabling a sustainable world
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
More information	Contact sebe-hdr-admissions@deakin.edu.au

Digital Prototyping for Sustainable Suburban Housing: Integrating Circular Economy Principles through Governance and Community Engagement

Abstract: This Ph.D. project presents a significant opportunity to investigate the effective utilization of digital prototyping technologies in enhancing decision-making processes in sustainable housing and suburban development. The project aims to integrate circular economy principles into future housing and suburb planning and design, with a strong emphasis on governance and community engagement. The project will provide decision makers with an invaluable tool to simulate, analyse, and optimize various design scenarios while concurrently considering sustainability and circular economy principles. This Ph.D. project offers a unique opportunity to collaborate closely with key industry partners, leveraging the expertise of Deakin University and embedding the research within an ongoing real-life project. This collaboration ensures that the research outcomes directly contribute to addressing practical challenges in sustainable housing and suburban development, enriching the project's impact and relevance.

References:

European Commission. (2023). A Europe fit for the digital age: Empowering people with a new generation of technologies. Link

Retrieved 6-March-2023 from Preut, Anna, Jan-Philip Kopka, and Uwe Clausen. 2021. "Digital Twins for the Circular Economy" Sustainability 13, no. 18: 10467. Link

Key words: Suburban development, sustainable housing, digital infrastructure, simulation, community engagement

Principal Supervisor:	Prof Tuba Kocaturk
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School	School of Architecture and Built Environment
Course	S917 Doctor of Philosophy (Architecture and Built Environment)
Campus	Geelong Waterfront
Impact Theme	Creating smarter technologies
Expression of Interest	Applicants are encouraged to contact the nominated principal supervisor to discuss project suitability and complete and Expression of Interest form
Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship
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Circular cities approach for new Intergenerational Living and Learning urban precincts

Abstract: Circular Cities is an approach to the multi-layer and interdisciplinary scientific examination of circularity in the built environment from a systemic and design thinking perspective, emphasising the interrelated dimensions of social-cultural, socio-spatial, socio-ecological and socio-technical shifts required for the desired transition beyond sustainability. One of the greatest challenges for societies is the separation of generations which affects the quality of life for seniors and engagement of youth. Senior living facilities and education campuses are often designed in a way which maintains isolation and deepens the divide.

References:

Girard LF, Nocca F. Moving towards the circular economy/city model: Which tools for operationalizing this model? Sustainability (Switzerland). 2019;11(22). OECD. (2019). The Circular Economy in Cities and Regions. Link

Williams, J. (2021). Circular Cities: A Revolution in Urban Sustainability. Routledge Studies in Sustainability. Routledge. Williams, J., 2019a. Circular cities. Urban Studies, 56(13), pp. 2746-2762.

Key words: Intergenerational living and learning, Urban design and Circular cities

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Consonance in urban form

Abstract: Consonance in urban form is contingent on the continuity of the fine grain natural and built features that are imbued in the commodity of the evolved historic urban fabric. A city's past can be viewed therefore, as a repository of urban form characteristics from which concise design responses can result in a congruent urban landscape. This research project proposes new methods to evaluate the interplay of architectural elements and landscape features that can be traced throughout the lifespan of the particular evolving urban areas under scrutiny and postulates a theory of how the mapping of historical urban form can correlate with deriving parameters for new buildings. In essence the proposition of this project is that urban morphology is a missing constituent in the process of urban design, as it holds the key to providing evidence of urban growth that can guide the design of new forms that are accordant within a particular setting.

References:

Sanders, P., Lozanovska, M., & Van Galen, L. (2021). Lines of Settlement: Lost Landscapes within Maps for Future Morphologies. Heritage, 4, 1400–1414. Link

Sanders, P. & Baker, D. (2016), Applying Urban Morphology Theory to Design Practice. Journal of Urban Design, 21(2), pp.213-233.

Sanders, P.S. & Woodward, S.A. (2015), Morphogenetic analysis of architectural elements within the townscape. Urban Morphology, 19(1), pp. 5–24.

Sanders, P.S. & Woodward, S.A. (2014), Veracity of the archive: a research approach to the collection and verification of urban morphological records using qualitative data analysis software. Journal of Map and Geography Libraries, 10(2), pp. 173–203.

Hall, T. & Sanders, P. (2011), Morphological design control for large-scale city development: a new proposal. Built Environment, 37(4), pp. 427–444.

Key words: Urban morphology, Architecture, Landscape features, Archives and Maps

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Architectural Design and Lived Experience in Aged and Palliative Care buildings

Abstract: The residential aged care sector is rapidly growing and evolving. New models of care and new building typologies, including small and medium households, have emerged with little contemporary socio-spatial or evidenced-based-design research on the implications for quality of life (QoL) of residents and care staff. Contemporary design thinking and practice needs to respond rapidly to these changing expectations. The practice of designing and building new facilities is moving far ahead of current research. Briefing errors are expensive or impossible to fix post occupancy. There is an urgent need to undertake design-based research to understand the impact of the built environment for all users. Key project questions include: 1. Socio-Spatial analysis of the Impact of the Design and Lived Experiences of Residential Aged Care on the Recruitment and Retention of Workforce gaps in Aged Care; A Comparative study 2. Socio-Spatial analysis of the design and lived experiences of Residential Aged Care models: A study of multiple traditional & small household typologies. 3. Evidence-based design: Identifying key design elements of the small household building typologies in Residential aged care models. 4. Socio-Spatial analysis of the Impact of the Design and Lived Experiences of Palliative Care environments; A comparative study

References:

Farley, H, McGann S., Bulsara C. (2023). Socio-Spatial analysis of the design and lived experiences of Residential Aged Care models: A study of traditional & small household typologies. (Mercy Health Foundation commissioned report).

McGann S. (2016) The Production of Hospice Space: Conceptualising the Space of Caring and Dying. Routledge UK. Link

McGann S. (2011) Spatial Practices and the home as hospice. Australasian Medical Journal (4) (9): 495-499 (9).Link

Key words: Aged Care, Design and Small household

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Architectural Design and Lived Experience of workforce groups: Gender-based perceptions

Abstract: Socio-Spatial analysis of the Impact of the Design and Lived Experiences of mine site accommodation in the Recruitment and Retention of Workforce gaps: Gender-based perceptions. Current recruitment campaigns and strategies within predominantly male-dominated industries, including mining and construction, are failing to recruit and retain female staff as mandated by government equality targets. Other industries, such as banking and IT, have acknowledged and acted upon the importance of competitive workplace design and worker lived experiences in attracting and retaining a high quality workforce. This research seeks to understand gender perspectives of workplace and the associated accommodation in attracting a more diverse workforce.

References:

Creagh R, McGann S, Tye M, Jancey J. (2017) "Green Star is not a Physical Activity Star." Facilities, Vol. 35 Issue 1 pp. 81 – 98. Link

Jancey J. McGann S. Creagh, R. Blackford K. Howat P. & Tye M. (2016) Workplace building design and office-based workers' activity: a study of a natural experiment. Australian and New Zealand Journal of Public Health. Feb;40(1):78-82. Link

McGann S, Creagh R, Tye M, Jancey J & Blackford K. (2014) Stationary in the office: Emerging themes for active buildings. Architecture Science Review. Link

J, Tye M, McGann S, Blackford K, & Lee A. (2014) Application of the Occupational Sitting and Physical Activity Questionnaire (OSPAQ) to office-based workers. BMC Public Health 2014 14:762. Link

McGann S. Creagh R., Tye, M. Jancey J. Pages-Olive, R. & James H. (2015) Stairway to health: An analysis for workplace stairs design and use. R In Living & Learning: Research for a Better Built Environment, ASA. Link

Key words: Workplace design, Lived experience and Gender

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Architectural Design and Lived Experience in Mixed Tenure Housing and Intergenerational communities

Abstract: Themes associated with this topic include Evidence-based analysis of Design and Lived Experience of Mixed Tenure housing: Socio-Spatial analysis of private, affordable and social housing groupings Understanding the impact of design and lived experiences in Build to Rent in Mixed Tenure developments Socio-Spatial analysis of the Impact of the Design and Lived Experiences of intergenerational housing communities

References:

Tersteeg, A. K., & Pinkster, F. M. (2016). "Us up here and them down there" how design, management, and neighbourhood facilities shape social distance in a mixed-tenure housing development. Urban Affairs Review, 52(5), 751-779.

Bailey, N. J., & Manzi, T. (2008). Developing and sustaining mixed tenure housing developments. York: Joseph Rowntree Foundation. Taylor, S., & Johnson, G. (2023). Examining tenancy duration and exit patterns in a single-site, mixed-tenure Permanent Supportive Housing setting. Housing and Society, 50(2), 182-205.

de Souza, T. M. (2022). From Derelict Estates to a Mixed-tenure Neighbourhood: Social Housing Tenants' Experiences of Neighbouring in Peckham, London. In Neighbours Around the World: An International Look at the People Next Door (pp. 93-110). Emerald Publishing Limited.

Carey, F. (2020). Creating community: Tenant and staff perceptions of formal and informal processes in mixed-tenure community housing. Parity, 33(7), 24-25.

Key words: Mixed-tenure, Design and Lived experience

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Transdisciplinary methods for architectural representation

Abstract: Architecture and architects have a very particular relationship with representational "mediating artefacts" (Pérez Gómez and Pelletier, 1997: 7), a relationship which is interwoven with the projection of ideas and propositions between past, present and future. Architectural theorists Alberto Pérez Gómez and Louise Pelletier (1997: 7) and Robin Evans (1989) explain that since the Renaissance architectural drawings have been essential tools in the design and communication of spatial propositions, prior to their physical construction. Evans notes that architects' primary medium is drawing, rather than building, and architecture is "dependant on pictures for purposes of construction and dissemination" (Evans, 1989: 21). Architect and theorist Stephen Holl (2007), in taking a phenomenological approach, highlights spatial and temporal qualities absent from traditional and digital drawing (including CGI animations), and architect and historian Jonathan Hill suggests that when such architectural qualities are not recorded in conventional methods of architectural representation "they are not designed by the architect" (Hill, 1998: 137). To expand architecture's range of representational techniques, Hill proposes appropriation of other disciplinary representational practices. This project seeks to expand methods for making architectural mediating artefacts, drawing upon other disciplines' techniques and processes. It will explore ideas of the analogical connection between representation and building.

References:

Evans, R. (1989). Architectural Projection. In E. Blau & E. Kaufman (Eds.), Architecture and its Image. Montreal: Centre Canadien d'Architecture. pp. 19-36

Hill, J. (Ed.) (1998). Occupying Architecture: Between the Architect and the User. London: Routledge.

Holl, S., Pallasmaa, J., & Pérez Gómez, A. (2007). Questions of Perception: Phenomenology of Architecture. San Francisco

CA: William Stout. Pérez Gómez, A., & Pelletier, L. (1997). Architectural Representation and the Perspective Hinge. Cambridge, Mass.; London: MIT Press.

Rattenbury, K. (Ed.) (2002). This is Not Architecture: Media Constructions. London: Routledge.

Key words: Transdisciplinary, Architectural representation, Architecture, Drawing and Analogy

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Evaluating Incentivized Target Cost Contracts in Construction Procurement

Abstract: Construction projects are notorious for cost overruns and delays. In recent years, incentivized target cost contracts have gained popularity as a means to align the interests of owners and contractors while controlling costs. However, their effectiveness remains an open question, as their success may depend on various factors such as project complexity, contractor-owner relationships, and contract design. The primary issue is the lack of comprehensive empirical research on the effectiveness of incentivized target cost contracts in construction procurement. While theoretical advantages are apparent, their real-world performance requires in-depth evaluation. This research project seeks to address this gap by conducting a rigorous assessment of the outcomes of projects executed under incentivized target cost contracts. We aim to determine whether these contracts consistently achieve their objectives of cost control, timely delivery, and quality, and if their success varies across different project types and contexts. The study will thus seek to 1. To assess the historical performance of incentivized target cost contracts in construction procurement. 2. To identify the factors influencing the success or failure of these contracts. 3. To analyze the impact of incentivized target cost contracts on cost control, project timelines, and quality outcomes.

References:

Love et al. (2011) Risk/Reward Compensation Model for Civil Engineering Infrastructure Alliance Projects, Journal of Construction Engineering and Management, 137 (2) (2011), pp. 127-136

Australian Contractors Association (2021) Inquiry into procurement practices for government-funded infrastructure, Australian Contractors Association Submission, Submission 11, Link

Key words: Incentivized target cost contracts, Construction procurement, Contract effectiveness, Cost control and Project outcomes

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BIM as a risk transformation tool for hybrid construction projects

Abstract: The construction industry faces persistent challenges related to project risks, which can lead to financial losses, safety hazards, and delays. The problem lies in the inadequacy of conventional construction methods and the need for comprehensive risk mitigation strategies. This research will explore how hybrid construction, complemented by BIM, can transform risk management in construction projects.

References:

Rashidi, A., Yong, W. Y., Maxwell, D., & Fang, Y. (2022). 'Construction planning through 4D BIM-based virtual reality for light steel framing building projects'. Smart and Sustainable Built Environment.

Darko, A., Chan, A. P., Yang, Y., & Tetteh, M. O. (2020). 'Building information modeling (BIM)-based modular integrated construction risk management–Critical survey and future needs'. Computers in Industry, 123, 103327.

Ahmad, Z., Thaheem, M. J., & Maqsoom, A. (2018). 'Building information modeling as a risk transformer: An evolutionary insight into the project uncertainty'. Automation in Construction, 92, 103-119.

Key words: BIM, Project risk management, Hybrid construction and Technology

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Fractal Architecture

Abstract: The research explores the convergence of fractal architecture, digital fabrication, and parametric design methodologies. The goal of the project is to evaluate the beneficial impacts of fractal-like architecture compositions in human-being. By adopting fractals as generative tools of complex forms, the researchers will propose architectural elements such as surfaces to be digitally fabricated. These elements will then be assessed in comparison to other natural and human-made forms to evaluate the reduction of stress in the human brain. Digital fabrication technologies, such as 3D printing and CNC milling, play a pivotal role in realizing these complex fractal geometries, enabling the construction of intricate architectural elements with precision.

References:

Taylor, R.P. (2006) Reduction of physiological stress using fractal art and architecture. Leonardo, 39:3, pp. 245-251.

Mandelbrot, B. (1983) The fractal geometry of nature. Freeman. Bovill, C. (1996) Fractal geometry in architecture and design. Birkhäuser. Sedrez, M. and Pereira, A.T.C. (2012) Fractal shape. Nexus Network Journal, v. 13, pp. 503. Link

Ostwald. M. (2009) Fractal Architecture: Knowledge formation within and between architecture and the sciences of complexity. VDM Verlag.

Key words: Fractal geometry, Architecture, Fractal architecture and Digital fabrication

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Indigenous Toponomy

Abstract: This project investigates the intersection of indigenous toponomy (place-naming) with Geographic Information Systems (GIS) technology and urban design principles, aiming to create a better understanding traditional knowledge and memory and contemporary urban development. The study seeks identify indigenous perspectives on place-making and the narratives behind the selection of names for places, streets and monuments. By collaborating closely with indigenous communities, the research aims to document and analyze traditional place names, spatial narratives, and their associated cultural significance. Integrating this indigenous toponomy within GIS platforms enables the mapping of cultural landscapes and facilitates the visualization of spatial relationships that may have been overlooked by conventional urban planning practices.

References:

Blair, D., and Tent, J. (2021) A revised typology of place-naming. Names: a journal of onomastics, 69:4 Link

Koch, H., and Hercus, L. (2014) Aboriginal placenames: naming and re-naming the Australian landscape. Asia-Pacific Institute for Toponymy, ANU e-press. Link

Oto-Peralias, D. (2018) What do street names tell us? The 'city-text' as socio-cultural data. Journal of Economic Geography, 18, pp. 187-211. Link

Tent, Jan. 2015. "Approaches to Research in Toponymy." Names 63(2): 65–74. Link

Mamontova, N, and Klyachko, E. (2022). 'Process toponymy': a GIS-based community-engaged approach to indigenous dynamic place naming systems and vernacular cartography. Cartographica, 57:3, pp. 213-225. Link

Key words: Indigenous knowledge, Architecture, Urbanism, Memory and GIS

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Architecture Gamification

Abstract: This research investigates gamification principles to support collaborative architectural design processes, exploring how elements from games can enhance user engagement, creativity, and problem-solving within the realm of built environments. This study aims to explore new game ideas for children and adults discussing architecture and the city. Through an interdisciplinary lens, the research delves into the integration of gamified experiences in architectural teaching and learning and collaborative design workshops. By incorporating game-like principles, participants are encouraged to explore design concepts more deeply and, in the process, identify design solutions, options or preferences. Previously, the researchers created a game to make cities greener, which we aim to create variations such as blue-green city, biophilic city and circular design city. The project idea is to create applications for gamification in urban planning, where citizens can participate in virtual or real-time playful gatherings. These interactive platforms could foster a sense of ownership and participation among residents, resulting in more responsive and inclusive urban development.

References:

Fonseca D., Villagrasa, S., Navarro, I., Redondo, E., Valls, F. and Sanchez, A. (2017). Urban gamification in architecture education. In: Rocha, A. et al. (eds) Recent Advances in Information Systems and Technologies. World CIST 2017. Advances in Intelligent Systems and Computing, 571. Link

Devisch O., Poplin, A. and Sofronie, S. (2016) The Gamification of Civic Participation: Two Experiments in Improving the Skills of Citizens to Reflect Collectively on Spatial Issues. Journal of Urban Technology, 23:2, 81-102. Link

Tu, C.-H., Sujo-Montes, L.E., and Yen, C.-J. (2015) Gamification for learning. R. Papa (ed.), Media Rich Instruction: Connecting Curriculum To All Learners. Link

Vanolo, A. (2018). Cities and the politics of gamification. Cities, 74, pp. 320-326. Link

Vesa, M. and Harviainen, J.T. (2019) Gamification: concepts, consequences and critiques. Journal of Management Inquiry, 28:2, pp. 128-130. Link

Key words: Architectural design, Participatory process, Gamification and Design process

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AI-Aided Architectural Design

Abstract: This research project focuses on the integration of Artificial Intelligence (AI) within architectural design processes, exploring its creative potential to generate forms. This study aims to bridge the gap between traditional architectural methodologies and cutting-edge AI technologies to enhance design conceptualization. Adapting on exploratory approaches and workshops the research investigates AI-driven process and integration into various design phases, from machine learning to text-to-image prompting generators. The project also addresses the ethical and practical implications of AI in architecture, contemplating issues related to human-AI collaboration, design ownership, and the preservation of architectural authenticity. By collaborating with architectural practitioners and AI experts, the research aims to develop guidelines for integrating AI tools seamlessly into design workflows while fostering a balance between technological advancement and human intuition.

References:

Pena, M.L.C., Carballal, A., Rodriguéz-Fernandéz, N., Santos, I., and Romero, J. (2021) Artificial intelligence applied to conceptual design: a review of its use in architecture. Automation and Construction, 124. Link

Chaillou, S. (2022) Artificial intelligence and architecture: from research to practice. Birkhäuser Verlag. Leach, N. (2022). Architecture in the age of artificial intelligence.

Bloomsbury Visual Arts. Leach, N. (2018). Design in the age of artificial intelligence. Landscape Architecture Frontiers, 6:2, pp. 8-19. Link

Key words: artificial intelligence, architectural design, human-computer collaboration, design process

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Positioning the construction industry to the United Nations' Sustainable Development Goals

Abstract: As we approach the midpoint of the United Nations's Sustainable Development Goals (SDGs), it is imperative to reflect on the gaps in development planning that may not have been apparent in 2015, as well as interrogate progress in relation to the construction industry towards achieving the global agenda for development. The construction industry is key to the delivery of the SDGs because construction provides the physical basis for the economic activities necessary for attaining short-term economic growth and long-term development, the construction process generates income and other sectors of the economy, and the completed items contribute to enhancing the quality of life. The specific objectives of this project are: (1) to provide practical case studies for the impact of development planning in the construction industry as it relates to all SDGS; (2) investigate and propose solutions to advance progress toward SDGs. Examples of some research questions are: What are the linkages between SDGs and the construction industry? How should the construction performances be assessed to promote the industry to play a better role to attain the SDGs? What are the challenges and barriers in relation to the construction industry to achieving the SDGS? This project will bring to focus key priorities for advancing the global development agenda, keep a forward-looking perspective and highlight the most insightful vision on the greatest potential to achieve the SDGs.

References:

Internationalization of the construction industry in the global value chain W Niu, Z Xu, B Liu, C Liu Technological and Economic Development of Economy 29 (4), 1336–1352-1336–1352

Key words: Sustainable Development Goals (SDGs), Construction industry, Case studies, Progress assessment and Performance priorities

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Analysing interindustry linkage using input-output tables

Abstract: Over the past two decades, Deakin University has been at the forefront of substantial research focused on analysing interindustry linkages. This research has utilized input-output tables both on a national and international scale, with a specific emphasis on examining the intersections of the economy, energy, and carbon dynamics. The methodology employed, known as input-output analysis, has allowed researchers at Deakin to delve into the intricate connections among various sectors within an economy. This line of research is particularly valuable as it sheds light on how changes or activities in one sector can reverberate across others worldwide, ultimately influencing economic, energy, and environmental outcomes. By utilising input-output tables, researchers at Deakin have been able to uncover the ripple effects of policy changes, economic shifts, energy consumption, and carbon dioxide emission patterns. For comprehensive insights into this research and its outcomes as well as possible research themes for prospective research students, one should explore the papers published by Professor Chunlu Liu together with his former and current research students. These papers would provide a detailed understanding of the research methodologies applied, the scope of the investigations undertaken, and the specific discoveries made in the realm of interindustry linkages within the context of economy, energy, and carbon considerations.

References:

Border-crossing frequencies of CO_2 embodied in international trade of construction products for final demand Q Gao, B Liu, J Sun, C Liu, Y Xu Engineering, Construction and Architectural Management 30 (6), 2360-2380

Key words: Input-output analysis, Interindustry linkage, Economy, Energy and Carbon

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Sustainable university campus construction and renewal

Abstract: University campuses have been an inseparable component of the society, economy and environment in their located cities or towns. Since the 1990s, university leaders have started to acknowledge the importance of higher education institutions in achieving national and global sustainability goals through education, research, policy formation and information exchange. So far, over five hundred universities worldwide, including Deakin University, have signed the Talloires Declaration, which served as a call for actions for higher education institutions and a large number of universities have created initiatives to improve campus sustainability in form of task forces, projects, or committees aimed at reforming university practice and policies on sustainability. The Australasian Campuses Towards Sustainability (ACTS Inc), which was established as an Incorporated Association in 2006, has included the majority of the tertiary sector within Australia (Deakin included) as well as Further Education institutions across Australasia, and acted as the umbrella organisation for sustainability within operations and learnings for its members. This proposed research project aims at underpinning the School's research focus on the Integral Design for Futures (IDF) of university campuses through quantitative and qualitative assessment of their individual and collective performances in a long term. The four-quadrant IDF principles will be applied to sustainable design, construction and management of university campuses by means of their economic, environmental, social and technological sections. Research topics that may be investigated under this research project include but are not limited to: quantitative economic assessment of individual sustainable university campus initiatives and the future proofing of their construction; quantitative environmental assessment of collective university campuses for carbon emission mitigation and greening potentials; qualitative social assessment of individual universities campuses for their responsibilities and partnerships with specific communities; and qualitative resilience assessment and governance approaches to university campuses for action and behaviour changes by a group.

References:

Students' sound environment perceptions in informal learning spaces: a case study on a university campus in Australia J Zhang, C Liu, M Luther, B Chil, J Zhao, C Liu (2023), pp. 1-22, Engineering, Construction and Architectural Management, Bingley

Key words: Sustainable development, University campus, Construction and Renewal

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Effective Construction and Demolition Waste Management in Australia: Application of Biomimicry Principles

Abstract: More than 25.2 million tonnes of construction and demolition waste (C&DW) were generated in Australia in 2020- 2021, and around 80% of this waste stream was recycled. However, the second most fraction (around 18%) of disposal of the waste is accounted for by C&DW which directly send to the landfill. Therefore, more concern should be given to the steady increase in the volume of C&DW generation. It directly and negatively impacts nature. Still, nature unveils its best efforts to regulate the balance of the ecosystem. Biomimicry is a discipline of applying nature's principles. One of guiding principles in biomimicry is "nature hates waste". Therefore, researchers have searched and found that biomimicry will perceptibly guide to rethink and renovate waste management. Among more biomimicry principles, using recyclable materials and optimizing the construction project which can and have been adopted in waste management. All the related researches have stated that biomimicry will reduce the waste. However, no study has executed an in-depth study for the adoption of biomimicry principles to manage waste. This study will investigate the applicable biomimicry principle, their approach towards C&DW management (CDWM) and finally develop a constructive action plan for effective CDWM throughout the construction project life cycle.

References:

Ahamed, M., Wang, H. & Hazell, P., 2022. From biology to biomimicry: Using nature to build better structures–A review. Construction and Building Materials, Volume 320, p. 126195.

AlAli, M., Mattar, Y., Alzaim, M. & Beheiry, S., 2023. Applications of Biomimicry in Architecture, Construction and Civil Engineering. Biomimetics, 8(2), p. 202.

Kabirifa, K., Mojtahedi, M., Wang, C. & Tam, V., 2021. Effective construction and demolition waste management assessment through waste management hierarchy; a case of Australian large construction companies. Journal of Cleaner Production. Volume 312.

Oguntona, O. & Aigbavboa, C., 2023. Nature inspiration, imitation, and emulation: Biomimicry thinking path to sustainability in the construction industry. Frontiers in Built Environment, Volume 9, p. 1085979.

Pickin, J. et al., 2022. National Waste Report 2022, Docklands: Blue Environment Pty Ltd.

Key words: Biomimicry Principles, Construction and Demolition Waste Management

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GRATION/ARCHITECTURE: critical histories and futures

Abstract: Through an architectural lens, this project examines the spatial and material frameworks of unprivileged migration at the intersections of corporeal, regional and global scales. Focusing on the architectural dimensions, functions and fabric of transnational migration corridors, an inclusive approach to documentation and analysis challenges narrower concepts of 'place', 'home' and the binary of 'origin' and 'arrival', that have constrained the scope of previous architectural research on migration. The project explores tactics for engaging architecture as method. Architecture/migration research intersects with theories related to several other disciplines including geography, sociology and anthropology. The approach in this project is to strengthen research on the socio-spatial field by drawing on (often underutilised) architectural fieldwork as well as history research methods. The 'architectural' data resulting from these methods can have strong cross-disciplinary potential, as well as provide a platform for exchange with industries and communities, including local and state government institutions, urban design, planning, landscape and the architecture professions. In addition, the aim is to generate experimental and creative methods alongside new critical theories on migration and architecture.

References:

Boccagni, P. & Erdal, M. (2021) "On the theoretical potential of 'remittance houses': toward a research agenda across emigration contexts", Journal of Ethnic and Migration Studies, 47 (5), 1066-1083.

Lozanovska, M. (2019) Migrant Housing: Architecture, Dwelling, Migration. London: Routledge. Beynon, D (2019) "Beyond Big Gold Mountain: Chinese-Australian settlement & industry as integral to colonial Australia," Fabrications, 29(2), 184-206.

Lopez, S. L. (2015) The Remittance Landscape: Spaces of Migration in Rural Mexico and Urban USA. Chicago: University of Chicago Press.

Lozanovska, M. (Ed.) (2016) Ethno- Architecture and the Politics of Migration. London: Routledge.

Key words: Migration, Architectural history, Socio-spatial and Renewal,

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The Questions of Contemporary Architectural Theory and History

Abstract: Project/s broadly focus/es on pressing questions of contemporary architecture (20th and 21st century) which include, but are not limited to, architectural representation and matters of visual, image and media, crisis in architecture, globalisation and local vs. global, Western and non-Western, diversity in architecture. Within this general framework, the project is further specified with the prospective candidates.

References:

C. Greig Crysler, Stephen Cairns and Hilde Heynen (eds.), The SAGE Handbook of Architectural Theory (London: SAGE Publications Ltd, 2012).

Key words: Contemporary, Image, Media, Crisis and Visual

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Social and Affordable Good Home-Design: Creating change through co-design

Abstract: Within Greater Geelong and regional areas, women fleeing violence have been identified among the key groups in urgent need of social housing. Focusing on the need for further social inclusion in the co-design for social housing, this project commits to hear first-hand from women victim survivors, along with specialist family violence and housing case managers. The project is informed by an understanding that there is a diversity of women, including women with disabilities, disabled by violence/abuse, and refugees. It seeks to respect, listen, and respond to the diverse lived experiences and cultures of these women and co-design a 'good home-design' blueprint that aligns with the National Plan to End Violence against Women and Children 2022-2032 actions on housing. This is to 'Ensure women and children escaping violence have safe and secure housing' (Commonwealth of Australia, 2022). In particular, this study aligns with the aim to hear these women's voices to inform longer term, sustainable housing, and to comprehensively understand the critical components of designing these homes from their perspectives and experiences.

References:

Fossey, E., Harvey, C., & McDermott, F. (2020). Housing and support narratives of people experiencing mental health issues: making my place, my home. Frontiers in Psychiatry, 10, 939.

Muir, K., Powell, A., Flanagan, K., Stone, W., Tually, S., Faulkner, D., Hartley, C., & Pawson, H. (2020) 'A pathway to where?' Inquiry into understanding and reimagining social housing pathways, AHURI Final Report No. 332, Australian Housing and Urban Research Institute Limited, Melbourne.

Key words: Social housing, Affordable housing, Lived-experience, Co-design and Intersectionality

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Sustainability assessment of retirement villages in Australia

Abstract: Population ageing is an established trend in Australia. Retirement villages are a viable living arrangement of older Australians. It is becoming popular to incorporate sustainability features into retirement villages for the purpose of creating a sustainable living environment where residents' social, economic, and environmental requirements are satisfied. Sustainability assessment is a crucial strategy of facilitating the shift towards sustainability. Although many sustainability assessment tools are available, these tools are not specifically designed for retirement villages, and they do not take the unique living requirements of olde adults into consideration. The project aims to develop a sustainability assessment tool for retirement villages in Australia based on the theories of the "Triple bottom line" of sustainability and Environmental Gerontology. The project facilitates strategic decision-making of delivering a sustainable living environment in retirement villages, which supports older adults' active and healthy ageing. It additionally deepens understanding about the interrelationship of ageing, living environment, and sustainability.

References:

Hu, X. (2021) 'Environmental sustainability and the residential environment of the elderly: A literature review', Building and Environment, 206, pp. 108337. Hu, X., Xia, B., Chong, H. Y., Skitmore, M., & Buys, L. (2020) 'Improving the sustainable retirement village framework: From theory to practice', Journal of Cleaner Production, 248, pp. 119290.

Hu, X., Xia, B., Chen, Q., Skitmore, M., Buys, L., & Wu, P. (2018) 'A practice mining system for the delivery of sustainable retirement villages', Journal of Cleaner Production, 203, pp. 943-956.

Hu, X., Xia, B., Skitmore, M., & Buys, L. (2018) 'Providing a sustainable living environment in not-for-profit retirement villages: A case study in Australia', Facilities, 36(5/6), pp. 272-290.

Hu, X., Xia, B., Skitmore, M., Buys, L., & Hu, Y. (2017) 'What is a sustainable retirement village? Perceptions of Australian developers', Journal of Cleaner Production, 164, pp. 179-186.

Key words: Sustainability assessment, Retirement village, Older people and Australia

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A Dynamic LCSA model to optimise decisions made on Energy-from-Waste facilities

Abstract: Energy from waste projects (EfW) provide a sustainable alternative to landfill solid waste management. The application and implementation of life cycle sustainability assessment (LCSA) in EfW is, however, faced with multiple challenges owing to three key concerns: complexity and uncertainty heterogeneous set of indicators and the disjointed nature of existing techniques. The aim of this research is to develop a dynamic LCSA model to optimise decisions made on EfW based on the complex array of considerations. The need for a dynamic LCSA for EfW cannot be overstated as studies have shown that there is potential for 50% of overall life cycle sustainability effects (i.e., economic, environmental, and societal impact) of buildings to be underestimated when interdependencies and non-linearities are ignored. Managing society's waste is, however, a dynamic process and the balances shift and change over time, hence, it is vital to optimise Australia's EfW policy landscape through dynamic (LCSA) modelling.

References:

Tokede O., Roetzel A., & Ruge G. (2021) A holistic life cycle sustainability evaluation of a building project. Sustainable Cities and Society. 73, pp.1 – 14.

Francis A.& Thomas A. (2022) A framework for dynamic life cycle sustainability assessment and policy analysis of built environment through a system dynamics approach. Sustainable Cities and Society. 76

Magnanelli E., Mosby J., & Becidan M, (2021) Scenarios for carbon capture integration in a waste-to-energy plant. Energy. 227, pp. 1 – 10.

Wienchol, P., Szlęk, A, & Ditaranto, M. (2020) Waste-to-energy technology integrated with carbon capture–Challenges and opportunities. Energy. 198:117352

Sala, S., Farioli., F & Zamagni., A. (2013) Life cycle sustainability assessment in the context of sustainability science progress. International Journal of Life Cycle Assessment. 18 (9), pp.1686-1697.

Key words: Life cycle assessment, Sustainability, Energy from waste, Optimisation and Mathematical modelling

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Architectural representation and filmmaking

Abstract: Time is a fundamental aspect of architectural space, but this is rarely represented through the conventional media of spatial recording and production. The visual language of the now ubiquitous architectural computer animation owes more to gaming than it does to filmic practice, and frequently engages very poorly with the temporal and tectonic. The current accessibility of filmmaking tools offers opportunities for architects to consider how to meaningfully "draw time", to embed this essential fourth dimension of architecture within the documents that both record and bring it into existence. The question for architects is of the most appropriate way to make such "moving drawings", and what filmic precedents might support this emerging practice. The majority of research on film and architecture deals with the (normally subservient) role of architecture as a dramatic element in narrative cinema, or with the emergence of cinematic architecture. When film works are seen as a precedent for such time-based architectural representation, it is often highly narrative driven entertainment films that are selected. This transdisciplinary research project seeks to look to wider forms of time-based practice to explore where the future of the architectural film might lie. The project encourages traditional and practice-based form of research enquiry.

References:

Bruno, G. (1997). Site-seeing: Architecture and the Moving Image. Wide Angle, 19(4), 8-24. Keiller, P. (2007). Film as Spatial Critique. In J. Rendell (Ed.), Critical Architecture. London: Routledge.

Schwarzer, M. (2004). Zoomscape: Architecture in Motion and Media([1st ed. ed.)

New York; [Great Britain]: Princeton Architectural Press. Suess, E. (2018). Light Events: Interior and Exterior Space in 'Wavelength'

P. Brown, P. Lara-Betancourt, G. Lee, P. Sparke, & M. Taylor (Eds.), Flow: Between Interior and Landscape. London: Bloomsbury. pp. 87-96 Suess, E. (2020). Light Matter: the Transdisciplinary Practice of the Architectural Moving Drawing. In I. Troiani & H. Campbell (Eds.), Architecture Filmmaking. Bristol: Intellect. pp. 155-170

Key words: Architectural representation, Architectural filmmaking, Moving image and Artists' film

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Benchmarking infrastructure asset management capability

Abstract: The proposed research aims to deliver actionable knowledge about developing a culture of best practice for assessing and ascertaining the state of managing assets of public, private and community sectors. Two of the key objectives of the proposed research are to: a) Explore the level of capability maturity of asset management within private, public and community sectors towards understanding and building asset management capability benchmark b) Inform future asset management policies and strategies across different sectors in the context of managing assets. The likely benefit of the research is that asset service organisations will be able to develop a clear image about the landscape of best-practiced strategic asset management process areas, assess capability for each process area and their practices; and understand target capability level.

References:

Ibrahim, I., Sa'ad, U. B., Daud, D., Yaro, H. U., & Bello, R. Asset Management Performance Benchmarking: A Maturity Model Review.

MacGillivray, B. H., Hamilton, P. D., Hrudey, S. E., Reekie, L., & Pollard, S. J. T. (2006). Benchmarking risk analysis practice in the international water sector. Water Practice and Technology, 1(2), wpt2006024.

Too, E. (2012). Infrastructure asset: developing maintenance management capability. Facilities, 30(5/6), 234-253.

Esmaili, D., & El-Diraby, T. E. (2017). Organizational competency in urban water infrastructure asset management. Canadian Journal of Civil Engineering, 44(12), 1056-1070.

Verbruggen, L. A. H., Van Duin, J. H. R., Tavasszy, L., Schoenmaker, R., & Cornelissen, S. C. (2022). Benchmarking port asset performance. International Journal of Transport Development and Integration, 6(3), 217-235.

Gupta, S., & Sharma, A. K. (2022). Evolution of infrastructure as an asset class: a systematic literature review and thematic analysis. Journal of Asset Management, 23(3), 173-200.

Key words: Maturity model, Asset management, ISO55000, Statistical analysis and Comparative analysis

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Developing a Strategic Asset Management Plan

Abstract: The objective of asset management plan is to optimise service delivery potential of assets, to minimise related risks and costs, and ensure positive enhancement of natural and social capital over the asset life cycle. In many firms asset management is often fragmentary and seldom considered on the strategic level. Due to financial, economic and human significance of asset management, a more holistic and integrated approach to asset management is increasingly being recognised as an urgent need to ensure effective and smooth management of company's engineering or technological assets and service delivery outcomes.

References:

Diop, I., Abdul-Nour, G., & Komljenovic, D. (2021). Overview of strategic approach to asset management and decision-making. Int. J. Eng. Res. Technol.(IJERT), 10, 64-89.

Younis, R., & Knight, M. A. (2014). Development and implementation of an asset management framework for wastewater collection networks. Tunnelling and Underground Space Technology, 39, 130-143.

Alegre, H., & do Céu Almeida, M. (Eds.). (2009). Strategic asset management of water supply and wastewater infrastructures. IWA Publishing.

Brown, K., Laue, M., Tafur, J., Mahmood, M. N., Scherrer, P., & Keast, R. (2014). An integrated approach to strategic asset management. Infranomics: sustainability, engineering design and governance, 57-74.

Kellick, P. (2010, December). Developing a strategic asset management framework. In Proceedings of the Institution of Civil Engineers-Municipal Engineer (Vol. 163, No. 4, pp. 221-224). Thomas Telford Ltd.

Key words: ISO 55000, Engineering assets, Sustainability, Knowledge management and Climate change.

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Development of a Pavement Deterioration Model to Predict Crash Rate and Riding Quality

Abstract: Different Pavement Performance Models (PPM) have been used to predict the future condition based on the present scenario under a definite range of future traffic volume, loading and maintenance strategy. (Nordfou, 2010). The road asset management system is dependent on the accuracy of the pavement performance model, but still it is not possible to have an accurate and a precious prediction model (Molenaar 2003). Most of them are not comprehensive enough and did not consider all influencing factors like pavement structure, construction, traffic, maintenance and the environment. (Saba, 2007). Most of the cases, those performance models predict the probable pattern of failure, but not the impact of crash rate due to this failure. Safety Performance Function (SPF) has been used widely for crash prediction, but this mathematical expression predicted average crash frequency of the base condition (HSM, 2009). After a few years from a new road construction, due to the pavement deterioration the base condition does not exist and limits the use of SPF. The combination of PPM and SPF can be a good solution to predict the pavement failure pattern and associated crash risk.

References:

Chan Y. C., Huang B., Yan X., Richards S., 2010. Investigating effects of asphalt pavement conditions on traffic accidents in Tennessee based on the pavement management system (PMS), Journal of Advance Transportation., 44: 150–161.

Molenaar, A.A.A., 2003. Pavement performance evaluation and rehabilitation design, keynote paper, Proceedings of MAIREPAV' 03, Guimaraes, Portugal. Nordfou., (2010).

Saba, G, R., 2007. Pavement Performance Prediction Models. Norwegian Public Roads Administration, Road Technology Division.

Zhang, J., Du, Y., Su, R., (2011), Investigating the Relationship Between Pavement Roughness and Heart Rate Variability by Road Driving Test. China

Key words: Pavement Performance Model, Deterioration Model, Condition Monitoring, Road Safety and Prediction Modelling

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Occupational Health and Safety (OHS) Concerns of Female Construction Workers

Abstract: The construction industry worldwide is faced with skill shortages. Attracting and retaining more female workers in the construction industry can help alleviate this issue. As organisations and governments are targeting to recruit more female workers in coming years, examining specific Occupational Health and Safety (OHS) risks for females is essential. Research shows that the occupations, mechanisms of incidents, and injury types contributing to most incidents among male and female construction workers could differ. However, due to their marginal representation in various trade roles, the overall analyses of OHS incident data often fail to capture the specific physical and psychosocial hazards that apply to female construction workers. Using mixed methods research, this research will examine female workers' OHS concerns in the Australian construction industry. The findings of this study will help regulators, construction organisations, practitioners, and training providers identify specific OHS concerns for developing more comprehensive OHS management plans, training, and awareness programs for female construction workers.

References:

Hanklang, S., Kaewboonchoo, O., Silpasuwan, P. and Mungarndee, S.S. (2014) 'Musculoskeletal disorders among Thai women in construction-related work', Asia Pacific Journal of Public Health, 26(2), pp.196-202

Hasan, A. and Kamardeen, I. (2022) 'Occupational health and safety barriers for gender diversity in the Australian construction industry', Journal of Construction Engineering and Management, 148(9), p.04022100.

Sorrentino, E., Vona, R., Monterosso, D. and Giammarioli, A.M. (2016) 'Gender issues on occupational safety and health', Annali dell'Istituto superiore di sanita, 52(2), pp. 190-197.

Key words: Occupational Health and Safety, Construction Safety, Gender Diversity, Female Workers and Construction.

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Experiences of Migrant Workers in the Australian Construction Industry

Abstract: The concern is growing in the Australian construction industry about short-term and long-term shortages of skilled construction workers (professionals and tradespersons). The skill shortages in construction have broader implications for society and the economy due to the construction industry's significant contributions to employment and Gross domestic product (GDP). The industry is expected to rely more on migrant workers in the coming years to meet its skill demands. Migrant workers will play a crucial role in replacing retiring workers and meeting the growth in demand for new labour and skilled workforce. Therefore, construction industry stakeholders must understand migrant construction workers' work experiences and recognise the need to attract and retain them. However, the experiences of migrant construction workers have not been studied in depth in the Australian context. Using mixed methods research, this study will provide insights into migrant workers' experiences to inform the organisational culture and employment practices in the Australian industry.

References:

Ling, F.Y.Y., Dulaimi, M.F. and Chua, M. (2013) 'Strategies for managing migrant construction workers from China, India, and the Philippines', Journal of Professional Issues in Engineering Education and Practice, 139(1), pp. 19-26.

Peiró, J. M., Nielsen, K., Latorre, F., Shepherd, R., & Vignoli, M. (2020) 'Safety training for migrant workers in the construction industry: A systematic review and future research agenda', Journal of Occupational Health Psychology, 25(4), pp. 275–295.

Key words: Migrant Construction Workers; Skill Shortage and Australian Construction Industry.

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Effectiveness of Mental Health Interventions in the Australian Construction Industry

Abstract: Construction workers experience more anxiety and stress, leading to higher mental health problems and suicides than the national average in many countries. In Australia, the number of deaths of construction workers from suicide is double the national average. It is almost six times the number of deaths from workplace accidents involving physical injuries. Previous studies show that mental health interventions and programs otherwise successful in other workplaces might not work on construction sites due to the workforce and cultural issues. There is a strong need for further research on the design and implementation of mental health intervention and promotion programs. Adopting mixed methods research, the study will provide insights into the existing mental health promotion and intervention programs in the Australian construction industry and their effectiveness in preventing mental health disorders. The findings will inform the development of primary and proactive interventions for more effective management of mental health problems in construction.

References:

Chapman, J., Roche, A.M., Duraisingam, V., Ledner, B., Finnane, J. and Pidd, K. (2020) 'Exploring the relationship between psychological distress and likelihood of help seeking in construction workers: the role of talking to workmates and knowing how to get help', Work, 67, pp. 47-54.

Duckworth, J., Hasan, A. and Kamardeen, I. (2022) 'Mental health challenges of manual and trade workers in the construction industry: a systematic review of causes, effects and interventions', Engineering, Construction and Architectural Management, Vol. ahead-of-print No. ahead-of-print.

Kamardeen, I. and Hasan, A. (2023) 'Analysis of work-related psychological injury severity among construction trades workers', Journal of Management in Engineering, 39(2), p.04023001.

Key words: Mental health, Suicides, Construction workers and Mental health program

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Condition Prediction Modelling of Sustainable Infrastructure

Abstract: As the world grapples with aging infrastructure and environmental concerns, the development of sustainable solutions becomes paramount. This study delves into the intersection of predictive modeling and sustainable infrastructure, aiming to enhance maintenance strategies and prolong the life of critical systems. The research addresses the challenge of infrastructure deterioration by proposing a predictive modeling framework that integrates advanced data analytics, structural engineering principles, and sustainability criteria. By harnessing historical performance data and utilizing machine learning techniques, the model forecasts the future condition of infrastructure components, enabling timely intervention and resource allocation. Moreover, the incorporation of sustainability metrics ensures that maintenance practices align with eco-friendly practices, contributing to long-term environmental health. The proposed approach's efficacy is demonstrated through a comprehensive case study involving a key infrastructure system, highlighting the model's ability to accurately forecast deterioration trends while optimizing sustainability indicators. The findings underscore the potential of predictive analytics to revolutionize infrastructure management paradigms. Ultimately, this research offers a crucial advancement in the realm of sustainable infrastructure by providing decision-makers with a proactive tool to ensure longevity and ecological soundness.

References:

Tran, D. H., Ng, A. W., McManus, K. J., & Burn, S. (2008). Prediction models for serviceability deterioration of stormwater pipes. Structure and Infrastructure Engineering, 4(4), 287-295.

Kobayashi, K., Kaito, K., & Lethanh, N. (2012). A statistical deterioration forecasting method using hidden Markov model for infrastructure management. Transportation Research Part B: Methodological, 46(4), 544-561.

Piryonesi, S. M., & El-Diraby, T. (2021). Climate change impact on infrastructure: A machine learning solution for predicting pavement condition index. Construction and building materials, 306, 124905.

Key words: Deterioration curve, maintenance management, life cycle, economic life and project delivery

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Social Sustainability of Infrastructure Projects

Abstract: In an era marked by increasing urbanization and global interconnectedness, the societal dimension of infrastructure development gains prominence. This research delves into the intricate interplay between infrastructure projects and their social impact, aiming to foster equitable and inclusive advancements. The study investigates the multifaceted aspects of social sustainability by examining how infrastructure projects influence local communities, social dynamics, and quality of life. By employing a comprehensive framework that considers diverse stakeholders' perspectives, cultural sensitivity, and social justice principles, this research assesses the extent to which infrastructure interventions promote positive social outcomes. Through case studies spanning a range of infrastructure typologies, the research illustrates the nuanced ways in which social sustainability can be both integrated and compromised within development initiatives. It underscores the significance of community engagement, participatory planning, and the mitigation of potential negative repercussions. The findings accentuate the potential for infrastructure projects not only to improve physical connectivity but also to foster social cohesion and enhance the overall well-being of populations. In conclusion, this research contributes a holistic perspective to infrastructure project planning and execution by underscoring the importance of prioritizing social sustainability. It offers insights to policymakers, practitioners, and stakeholders for steering projects that align with societal values, engender positive social change, and fortify the enduring fabric of communities.

References:

Vijayakumar, A., Mahmood, M. N., Gurmu, A., Kamardeen, I., & Alam, S. (2023). Critical indicators for assessing the life cycle social footprint of Australian freeways. Construction Innovation.

Vijayakumar, A., Mahmood, M. N., Gurmu, A., Kamardeen, I., & Alam, S. (2023). Social sustainability assessment of road infrastructure: a systematic literature review. Quality & Quantity, 1-31.

Vijayakumar, A., Mahmood, M. N., Gurmu, A., Kamardeen, I., & Alam, S. (2022, November). Social sustainability indicators for road infrastructure projects: A systematic literature review. In IOP Conference Series: Earth and Environmental Science (Vol. 1101, No. 2, p. 022039). IOP Publishing.

Sierra, L. A., Pellicer, E., & Yepes, V. (2017). Method for estimating the social sustainability of infrastructure projects. Environmental Impact Assessment Review, 65, 41-53.

Key words: Quality of life, Social resistance, Social excusion, and Displacement

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Smart Heuristics: Building an Adaptive Toolbox to Assess the Uncertainty of Rework in Construction

Abstract: Performing rework within the production system of construction is the most expensive waste that confronts organisations, with its causation yet to be fully understood in practice. Any effort to assess the risk and uncertainty of rework poses challenges due to limited information about its frequency and causes, often rendering the use of statistical models immeasurable. Research has shown that smart heuristics (i.e., simple task-specific decision strategies) enable epistemic success under conditions of uncertainty and cognitive complexity – they are accurate, fast, and rely on limited information. Thus, this research project aims to address the following question: How can smart heuristics effectively assess the uncertainty of rework in construction? Situations during the construction of large-scale transport infrastructure projects where there is profound uncertainty surrounding rework will be the unit of analysis for this project. Specific objectives of the research are to:1. Identifying the recurring circumstances and conditions that influence rework in construction. 2. Determine the extent and use of heuristics in the decision-making associated with assessing the risks and uncertainty of rework. 3. Design and develop an adaptive toolbox of smart heuristics that can be drawn upon to make effective decisions before and after rework events under varying conditions despite the presence of imperfect information. 4. Ascertain the conditions under which a smart heuristic is expected to generate results comparable to or better than those of more complex strategies.5. Develop an adaptive toolbox of smart heuristics to support a new decision-making framework for determining rework under varying project conditions.

References:

Gigerenzer, G., Todd, P.M., & the ABC Research Group. 1999. Simple Heuristics That Make Us Smart. Oxford University Press, New York

Gigerenzer, G., & Selten, R. 2001. Bounded Rationality: The Adaptive Toolbox. MIT Press, Cambridge, MA Gigerenzer, G., & Gaissmaier, W. 2011. "Heuristic decision-making". Annual Review of Psychology, 62, 451-482. Link

P.E.D., & Matthews, J. 2020. "Quality, requisite imagination and resilience: Managing risk and uncertainty in construction". Reliability Engineering and System Safety, 204, 107172. Link

P.E.D., & Matthews, J. 2022b. "When 'less is more': the rationale for an adaptive toolbox to manage the risk and uncertainty of rework". Developments in the Built Environment, 12, 100084. Link

Key words: Adaptive toolbox, Ecological rationality, Heuristics, Rework and Transport projects.

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Improving construction workers health and safety using Artificial Intelligence (AI), Sensing, and Computer Vision

Abstract: Construction is a priority industry for injury and fatality prevention. In 2020, the industry had the 3rd-highest fatality rate with an average of 3.1 fatalities per 100,000 workers each year. This rate was 15% higher than the 5-year average for the industry (Safe Work Australia, 2021). This project aims to improve workforce health and safety in Australian construction and infrastructure sectors by conducting multi-disciplinary research in Artificial Intelligence (AI), wearable sensor technology, and computer vision to provide critical health and safety information to workers and managers (Sadeghi et al., 2022). The use of physiological sensing/computer vision combined with state-of-the-art machine learning models will aid to provide a platform for more efficient assessment and management of health and safety hazards and risks in construction sites (Nasirzadeh et al., 2020; Mir et al., 2023). For this purpose, the project will address fundamental challenges related to managing workers' safety and health using traditional machine learning algorithms as well as issues with wearable sensor technology and computer vision based on past studies. More information related to one of similar past projects can be found here.

References:

Safe Work Australia (2021). Key work health and safety statistics Australia 2021. Link

Sadeghi, S., Soltanmohammadlou, N., and Nasirzadeh, F. (2022). 'Applications of Wireless Sensor Networks to Improve Occupational Safety and Health in underground mines', Journal of Safety Research, Vol. 83, pp: 8-25.

Nasirzadeh, F., Mir, M., Hussain, S., Tayarani M., Khosravi, A., and Nahavandi S., (2020) 'Physical Fatigue Detection Using Entropy Analysis of Heart Rate Signals', Sustainability, 12 (7), 2714.

Mir, M., Nasirzadeh, F., Bereznicki, H., Enticott, P., Lee, SH., and Mills, A (2023). 'Construction noise effects on human health: Evidence from physiological measures', Sustainable Cities and Society, Vol. 91, 104470.

Mir, M., Nasirzadeh, F., Bereznicki, H., Enticott, P., and Lee, SH. (2022). 'Investigating the effects of different levels and types of construction noise on emotions using EEG data', Building and Environment, Vol. 225, 109619.

Key words: Construction project, Health, Safety, Hazard and Artificial Intelligence (AI)

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Scholarship	Applicants will need to complete an Expression of Interest and if successful apply for a Deakin University Postgraduate Research Scholarship

Using Artificial Intelligence (AI) to improve the cost, time and quality performance of infrastructure and construction projects

Abstract: Around 48% of infrastructure projects fail to meet their baseline cost, time and quality objectives. Based on the previous studies, 90% of transportation infrastructure projects that are delivered experience significant schedule and cost overruns (Flyvbjerg et al., 2002). The costs of non-conformance and defects have been reported to be as high as 20% of construction costs. Artificial Intelligence (AI) techniques including Computer Vision, Agent-Based Modelling, and Building Information Modelling (BIM) have been trialled in the sector, opening up the possibility to improve the performance of construction and infrastructure projects (Nasirzadeh et al., 2018; Nasirzadeh et al., 2020; Mahami et. T al., 2023; Mirzaei et al., 2018). This project aims to use advanced AI techniques to reduce project cost and increase project productivity. In addition, the AI techniques will be used to detect quality defects automatically and meet quality objectives. In summary, the proposed project will address the limitations of past studies in the area of using AI to improve the performance of infrastructure and construction projects.

References:

Flyvbjerg, B., Holm, M. & Buhl, S. (2002). 'Underestimating costs in public works: error or lie, Journal of the American Planning Association', 68(3), pp. 279-295.

Mirzaei M., Nasirzadeh F, Parchami, M., and Zamani, M. (2018). '4D-BIM Dynamic time-space conflict detection and quantification system for building construction projects', ASCE's Journal of Construction Engineering and Management, 144 (7), pp 112-123.

Mahamivanan, H., Ghassemi, N., Tayarani D., Shoeibi, A., Hussain, S., Nasirzadeh, F. (2023). 'Material recognition for construction quality monitoring using deep learning methods', Construction Innovation, Published online.

Nasirzadeh, F., Kabir, HM Dipu, Akbari, M., Khosravi, A., Nahavandi, S., and Carmichael, D.G. (2020). 'ANN-based prediction intervals to forecast labour productivity, Engineering, Construction and Architectural Management', Vol. 27(9), pp. 2335-2351

Nasirzadeh, F., Khanzadi, M., and Mir, M. (2018). 'A hybrid simulation framework for modelling construction projects using agent based modelling and system dynamics', International Journal of construction management, Vol. 18(2), pp. 132 – 143.

Key words: Cost, Quality, Artificial Intelligence (AI), BIM and Construction Projects

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Using Artificial Intelligence (AI) to manage disasters and risk events

Abstract: This project aims to use innovative Artificial Intelligence (AI) techniques such as Computer Vision, Agent-Based Modelling, and Sensing to manage disasters or risk events. The use of computer vision will aid to control disasters as well as risks using captured videos and images. Sensing technologies will aid to predict and assess disasters and risks. Finally, Agent-based modelling will aid to model interactions between agents and key influencing factors in the case of a disaster or risk event. The project will advance our knowledge on disaster and risk management and will adopt the state-of-the-art AI technologies to support and improve community safety.

References:

Nasirzadeh, F., Carmichael, D.G., Kashi, M.G., Khanzadi, M., Akbarnezhad, A. (2019). 'A hybrid approach for quantitative assessment of construction projects risks: The case study of poor-quality concrete', Computers & Industrial Engineering, Vol. 131, pp: 306-319.

Tan, Y , Chen, P., Shou, W., and Sadick, A. (2022). 'Digital Twin-driven approach to improving energy efficiency of indoor lighting based on computer vision and dynamic BIM'. Energy & Buildings, Vol. 270, 112271.

Key words: Risk, Disaster, Infrastructure, Artificial Intelligence (AI) and Construction

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