ARC Centre for Next-Gen
Architectural Manufacturing

Room 4041, Level 4, Anita B. Lawrence Centre (West Wing)
University of New South Wales, Kensington 2052
archmanu@unsw.edu.au
www.archmanu.com

Arch_Manu ITTC Press Release

February 21, 2025

Arch_Manu February Hackathon 2025: Advancing lifelong learning in Architecture and Engineering

The ARC Centre for Next-Gen Architectural Manufacturing (Arch_Manu ITTC) successfully completed its first hackathon of 2025 (February 12–19), bringing together 37 participants from across the globe, including experts from academia and government, industry leaders from the Architecture, Engineering, and Construction (AEC) sector, and emerging researchers. As part of Arch_Manu ITTC's mission to leverage industry-transforming research and development, the hackathon provided a forum to foster interdisciplinary collaboration, create proof-of-concept digital tools, and explore new perspectives on the critical challenges facing the AEC workforce.

Hackathon theme: Focused on the theme of lifelong learning and professional development in the architecture and engineering industries, the Arch_Manu February Hackathon 2025 aimed to generate innovative solutions for upskilling, reskilling, and continuous learning within the sector. Participants were invited to come together for an intensive 2-day sprint to develop novel approaches to:

- digital transformation challenges in AEC organisations,
- peer-to-peer learning and mentorship,
- the tracking, validation, and promotion of professional growth, and
- enhancing inclusivity and accessibility in lifelong learning.

The February Hackathon 2025 is the third such event to be hosted by Arch_Manu ITTC, with participation rates increasing each time. Arch_Manu ITTC is thrilled to have had such diverse representation within the project teams; the most recent event featured contributions from participants located in Sydney, Melbourne, London, Paris, Frankfurt, Munich, New York, Colombo, and Bogotá.

Hackathon highlights:

- Diverse participation: Participants included PhD candidates and senior academics from UNSW, Swinburne University of Technology, and the University of Adelaide, alongside representatives from leading Australian architecture firms Architectus, Cox Architecture, and Tzannes, as well as esteemed international firms Bollinger+Grohmann and Grimshaw. Bringing the government perspective, NSW Architects Registration Board was also actively involved in the event, leading one of the project groups.
- Expert guidance: A team of eight consultants from academia and industry provided on-call mentorship and expert advice, ensuring teams were supported throughout the hackathon.
- Collaborative innovation: The hackathon encouraged the interdisciplinary teams to work in a flexible manner over the course of the week, accommodating the diverse time zones of participants.
- Hybrid global connectivity: The presentation of the projects to the broader Arch_Manu team occurred at the offices of Cox Architecture in Sydney and Architectus in Melbourne, connected via video call to all remote participants.

Projects Developed: An initial 10 project proposals were shortlisted to six by the Hackathon Steering Committee, with participants ultimately voting in the final five projects to be developed during the event.

Project teams and outcomes are summarised below (all names listed alphabetically):

1 Designing meaningful continuing professional development (CPD): Co-creating tools for Architects' Learning Groups (ALGs)

This project was proposed by the NSW Architects Registration Board Registrar and CEO Dr Kirsten Orr and Arch_Manu's Leader of Engaged Problematisation A/Prof Catherine Collins. The project explores innovative ways of supporting and delivering Continuing Professional Development activities, which are critical for maintaining the relevance of architects' skill sets. The NSW Architects Registration Board facilitates a peer-to-peer CPD model called 'Architects' Learning Groups' (ALGs), which are intended to facilitate opportunities for knowledge sharing grounded in real practice challenges. ALGs need supporting infrastructure to reach their full potential and would benefit from tools to assist organising learning sessions, sharing knowledge, and ensuring activities qualify as formal CPD.

The project proposes strategies for more effective delivery of CPD activities through an ALG Toolkit comprising a CPD Learn-To-Learn Module and a CPDAssist technology tool. The CPD Learn-To-Learn Module aids ALG set up and supports peer-to-peer learning. The CPDAssist tool leverages data and AI, using a large language model (LLM) to map CPD activities efficiently and accurately to competency requirements.

Project team: Dr Christopher Bamborough (UNSW), Andrew Butler (Cox Architecture), A/Prof Catherine Collins (UNSW), Steve Fox (Architectus), Dr Nicole Gardner (UNSW), Chirag Gujarati (UNSW), Melissa Hollis (NSW ARB), Lisa Lu (UNSW), Sandra Meng (UNSW), Dr Kirsten Orr (NSW Architects Registration Board)

Expert advice: Jenna Rowe (Jenna Rowe Architect), Prof George Shinkle (UNSW)

2 The career maze: Supporting non-linear career paths in architectural practice

Proposed by Arch_Manu Partner Investigator Andy Watts (Head of Digital Technology, Group, Grimshaw), this project is an investigation of the expanding spectrum of architecture and engineering roles within industry to provide some clarity around career progression pathways across specialisations and the professional development required to support them. The project team, involving representatives from UNSW, Swinburne University, and Architectus, developed a Task-Driven Strategy for defining roles in the Digital Technology Team within architecture and engineering firms. Instead of relying on rigid job titles, roles are aligned with emerging tasks and digital capabilities, such as AI integration and data-driven decision-making. The outcome is a scalable framework that enhances digital transformation, clarifies career paths, and ensures adaptability in an evolving industry.

Project team: Jumana Hamdani (UNSW), Dr Mehrnoush Latifi Khorasgani (Swinburne University of Technology), Jorge Luis Rivero Torres (Swinburne University of Technology), Kurtis Watts (Architectus)

Expert advice: Andy Watts (Grimshaw)

3 How do you break a monopoly? Exploring competition and market dynamics in the AEC Sector

Proposed by Arch_Manu Partner Investigator Andy Watts (Head of Digital Technology, Group, Grimshaw), this project explores the change management approaches required to dismantle the 'monopolies' of ubiquitous software packages or ingrained ways of working in practice without disrupting workflows, facing resistance, or losing efficiency. While change often comes with uncertainty, organisations that embrace structured change management models and learn from other industries can make transitions smoother, more effective, and sustainable.

In this project, a team of Arch_Manu PhD Candidates from Swinburne University of Technology and University of Adelaide collaborated with a team from Architectus and Grimshaw to explore how AEC leaders can prepare for and drive change successfully, using proven frameworks to ensure new tools and processes become business as usual with minimal friction. Using Kotter's 8-Step Change Model, this project proposes a clear set of steps and actions tailored for AEC managers to increase their odds of success when driving transformation. This framework provides a roadmap for overcoming resistance, mobilising teams, and embedding change into everyday practice.

Project team: Nadia Anam (Swinburne University of Technology), Shahrzad Fereidouni (Grimshaw), Romain Guillot (Grimshaw), Setareh Motlagh (Architectus), Thao Thanh Pham (Swinburne University of Technology), Hirusheekesan Selvanesan (University of Adelaide)

Expert Advice: Prof George Shinkle (UNSW), Andy Watts (Grimshaw)

4 What's my LOD? Understanding and defining Levels of Development in digital models

This project was proposed by Arch_Manu PhD Candidate Farrukh Memon, who worked with a team from Architectus, Cox Architecture, Grimshaw, and Tzannes to address the challenge of inconsistencies in definitions and applications of the Level of Development (LOD) in Australian architectural Building Information Modelling (BIM) practice. These inconsistencies result in stakeholder disputes, inefficient workflows, contractual ambiguities, and costly rework due to the absence of a standardised approach to LOD definitions across firms and the development of BIM Execution Plans (BEPs) for projects. The multidisciplinary team (comprising BIM experts, architects, and researchers) conducted a stakeholder survey and workshop to assess industry-wide issues, revealing the necessity for automated validation, standardised compliance tracking, and enhanced interoperability. The team proposed a multi-platform Revit plugin that provides real-time LOD validation, integrates with BEPs and LOD matrices, and suggests artificial intelligence and machine learning for future enhancements, such as predictive LOD recommendations and automated BEP generation in accordance with relevant ISO standards and industry guidelines.

Project team: Kingsley Castillo (Architectus), Tiago Antonio Dias da Silva Santos (Grimshaw), Indu Ilangovan (Grimshaw), Farrukh Memon (Swinburne University of Technology), Marc Micuta (Tzannes), Sharon Zhang (Cox Architecture)

Expert advice: Andrew Butler (Cox Architecture), Steve Fox (Architectus), Dr Mehrnoush Latifi Khorasgani (Swinburne University of Technology)

5 Comparability of Buildings: Developing methods for benchmarking and evaluating buildings

Proposed by Ljuba Tascheva and Alexander Hofbeck from Bollinger+Grohmann, this project explores methods of meaningfully comparing buildings to understand relative performance.
Two Arch_Manu PhD candidates worked with a team from Grimshaw to develop a solution leveraging graph-based representation and key performance indicators (KPIs), testing the approach on a comparison of structural systems. Span lengths of primary elements (columns, beams, and slabs) were analysed by implementing a graph-based data structure where nodes represent structural elements and edges capture span relationships. Validated through a case study of two historical buildings (data provided by Bollinger+Grohmann), the framework evaluates structural efficiency through structural continuity and tributary area analysis KPIs. The project includes a synthetic structural system generator and a visual comparative analysis interface, demonstrating scalability and practical applications for early-stage design decisions.

The framework effectively bridges the gap between oversimplified and overly complex building data representations, providing a standardised method for building comparison that could be developed into a minimum viable product within 3-6 months. Future development of the approach could incorporate additional domain-specific KPIs and workflow integration through professional development training.

Project team: Jorge Castillo (Swinburne University of Technology), Erik Escalante (Grimshaw), Houssame Eddine Hsain (UNSW), Jeffrey Moser (Grimshaw), Hesham Shawqy (Grimshaw), Eve Tobey (Grimshaw)

Expert advice: Andrew Butler (Cox Architecture), Alex Hofbeck (Bollinger+Grohmann), Sofija Grinevska (Bollinger+Grohmann), Ljuba Tascheva (Bollinger+Grohmann)

Looking ahead: Arch_Manu's hackathons provide a unique opportunity for interdisciplinary teams to tackle pressing challenges within the AEC sector, fostering the development of cutting-edge tools and strategies for use within practice, while also informing future Arch_Manu research initiatives. There are plans to further develop and implement the hackathon project outcomes within Arch_Manu partnering organisations for industry testing and further refinement.

Arch_Manu is excited to announce the next Hackathon mid-year. Updates will be shared on Arch_Manu's website (http://archmanu.com/) and LinkedIn (https://www.linkedin.com/company/archmanu/).

About Arch_Manu: Arch_Manu is an interdisciplinary, industry-focused research and training initiative funded by the Australian Research Council's Industrial Transformation Training Centre scheme. It brings together academic and industry leaders to drive digital transformation in the architecture and engineering industries, fostering cutting-edge innovation and professional development.

Media Contact: Prof M. Hank Haeusler (Arch_Manu Director), m.haeusler@unsw.edu.au or archmanu@unsw.edu.au