ARC Centre for Next-Gen
Architectural Manufacturing

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Arch_Manu's first Hackathon of 2026 Showcases Computational and AI-Driven Innovation in Architectural Workflows

The first Arch_Manu Hackathon of the year, held 14–22 April 2026, brought together 18 participants across three interdisciplinary teams to explore the integration of computational workflows and artificial intelligence into architectural design and delivery. The event convened contributors from both industry and academia, spanning Sydney, Melbourne, Adelaide, New York City, and Barcelona.

Participants represented leading institutions and practices, including University of NSW, Swinburne University of Technology, and Adelaide University, working together with architecture firms Architectus, Cox Architecture, Grimshaw, and Tzannes. Over the course of eight days, teams developed prototype tools addressing key inefficiencies in current architectural workflows, particularly at the intersection of design, compliance, and computation.

The projects developed are summarised below:

1. **One Solar Script to Rule Them All**

   This project addressed a persistent challenge in architectural practice: solar compliance checks that typically occur too late, often triggering costly redesigns after massing decisions are fixed. The team developed a web-based tool that unlocks compliance-relevant feedback at the feasibility stage. Central to the tool is a 3D visualisation of "no-go zones" on a site—areas where required solar access cannot be achieved regardless of design effort. By foregrounding hard constraints early and providing actionable, directional feedback (e.g. specific dimensional adjustments rather than pass/fail outcomes), the tool reframes compliance as an active component of design exploration rather than a late-stage audit. The broader ambition is not another isolated script, but a platform-agnostic framework embedding compliance logic directly into early decision-making processes.

   Project team: Andrew Butler (Cox Architecture), Harris Paneras (Cox Architecture), Gavin Nicholls (Architectus), Kurtis Watts (Architectus), Qiaoqiao Yong (Adelaide University), Houssame Eddine Hsain (UNSW)

2. **Sketch to Script**

   This project explored how non-technical designers can leverage large language models to move from conceptual ideas to functional computational prototypes without writing code. The system maintains a structured "internal brief", allowing the model to stay anchored to the task and reducing the drift often seen in multi-turn prompting. This representation incrementally captures the design task but remains hidden from the user. Instead, users interact with it in two complementary ways: a guided Q&A process that helps draw out latent design intent from non-technical descriptions, and a parallel high-level planning view that summarises the proposed computational approach and can be directly edited. Both modes continuously update the same underlying brief, accommodating different cognitive styles or levels of technical familiarity, with the system indicating when the specification is sufficiently complete to proceed. This shifts the focus from free-form prompting to structured elicitation, offering a more reliable path from non-technical intent to a coherent specification that can support code generation or handover to a specialist. The prototype was implemented for parametric code generation and shown to produce working scripts.

   Project team: Dr Geoff Kimm (Swinburne University of Technology), Athol Ruston (Grimshaw), Dr Lisa LuBowden (UNSW), Zhengnan Liu (UNSW), Kaiyu Zhou (UNSW)

3. **Urban Analysis from Context Photography**

   For this hackathon project, a prototype for an AI-assisted urban analysis workflow using context photography was developed. The project responds to the limitations of traditional urban analysis, which can be subjective, inconsistent, time-consuming, and dependent on site access, by proposing a workflow where AI can analyse still photographs to identify urban patterns, materiality, approximate building heights, active frontages, accessibility issues, land use, and building character. The team developed a proof-of-concept web application using a multi-agent structure. A vision agent analyses uploaded street images. An insight and pattern agent assess accessibility, safety, visual patterns, colour and brightness. A place/context agent supplements the imagery with external data such as maps, real estate and census information. A synthesis agent aggregates the findings into summaries, scores, reports and design recommendations. The project emphasises a "human in the loop" model, where AI augments rather than replaces professional judgement, allowing humans to check errors, add meaning, and refine the analysis. Key findings were that multi-agent workflows can effectively combine multiple data sources, but still face limitations including hallucinations, unreliable measurements, inconsistent scoring, bias, data availability, and the challenges in integrating data-driven tools into conventional workflows such as OpenFacades. The suggested next steps include extending the prototype to video and broader public/private datasets, improving theoretical grounding through urban analysis research, and exploring longer-term collaboration to develop the tool beyond a hackathon prototype.

   Project team: Marc Micuta (Tzannes), Joshua Stellini (Grimshaw), Elaine Bouchard-Detre (Grimshaw), Dr Christopher Bamborough (UNSW), Nihal Morsi (UNSW), A/Prof Mehrnoush Latifi (Swinburne University of Technology), , Marziah Zad (Swinburne University of Technology)

The Arch_Manu Hackathon underscores the growing importance of AI not as a discrete add-on, but as embedded infrastructure within architectural workflows. By focusing on early-stage decision-making, structured design intent, and integration with practice, the event highlights a broader transition toward more intelligent, responsive, and collaborative modes of design production.

For more information about Arch_Manu's research and upcoming events, visit archmanu.com or contact archmanu@unsw.edu.au.

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.