

Josiah Lau

Applied AI for the decisions that shape buildings and construction.

Architecture and delivery experience inform the domain models, spatial constraints, review gates, and visual communication. Runnable code, fixed evaluation fixtures, generated evidence, and explicit limitations carry the engineering claims.

[Visual portfolio](#)[GitHub evidence](#)[LinkedIn](#)josiahsutd@gmail.com / Singapore

SELECTED EVIDENCE

Three projects, three kinds of engineering evidence

01 / FLAGSHIP / RAG

AEC Code Compliance RAG

Page-aware public-document ingestion, local retrieval baselines, structured citations, abstention, service contracts, and bounded telemetry.

Hit@1 0.952

Document MRR 0.976; exact-target Hit@1 0.810; 95% interval [0.773, 0.992], n=21.

Manually labeled fixed snapshot. Document assistance only; no compliance certification or professional sign-off.

[Open visual case study](#)

02 / EMBODIED AI

Construction Embodied Agent Simulator

Shared demonstrations compare state, semantic-raster, egocentric, and rendered-RGB policies with filtering and planar MuJoCo replay.

Success 0.760

96 unseen grids; 51/150 raw physics contacts; 0 filtered contacts.

Pixels are rendered from simulator state. No physical camera, ROS, robot hardware, or safety validation.

[Open visual case study](#)

03 / COMPUTATIONAL DESIGN

Constraint-Aware Massing Explorer

Seeded rectangular geometry, hard feasibility checks, transparent proxy objectives, Pareto ranking, and baseline comparison.

Feasible 0.977

Baseline 0.052; mean best GFA error 0.19% vs 34.47%; 864 candidates per method.

Synthetic sites and rectangular envelopes. No code inference, calibrated environmental simulation, or approvable design.

[Open visual case study](#)

CAPABILITIES

Source-grounded AI / Embodied-agent evaluation / Computational geometry / AEC workflow contracts / Testing + reproducibility

REPRODUCE THE EVIDENCE

`python scripts/reviewer_check.py`

Checks public claims, commands, links, visual contracts, artifact-backed metrics, and focused tests without regenerating tracked evidence.

CLAIM BOUNDARY

Projects are local prototypes unless explicitly stated otherwise. Synthetic data, public-source snapshots, mock providers, and simulation-only robotics are labeled at project level. No customer adoption, deployed reliability, professional compliance outcome, QS sign-off, approvable design, or robot-hardware deployment is claimed.

Five implemented systems, one bounded handoff

01	Knowledge	AEC Code Compliance RAG Validated sources -> page-aware chunks -> ranked evidence -> cited answer or abstention	IMPLEMENTED
02	Intent	Communication + Specification Assistant Role-tagged messages -> requirements -> conflicts -> scoped approvals -> draft clauses	IMPLEMENTED
03	Options	Constraint-Aware Massing Explorer Typed site parameters -> seeded geometry -> hard checks -> proxy ranking	IMPLEMENTED
04	Quantity	QS Takeoff + Tender Workbench Vector geometry -> quantities -> rate provenance -> uncertainty -> exceptions	IMPLEMENTED
05	Action	Construction Embodied Agent Simulator Task + state -> learned action -> rule filter -> rollout -> planar command replay	IMPLEMENTED

Executed integration: 5 approved requirements -> 16/16 sourced fields -> 96 candidates / 92 feasible -> 7/7 priced schematic takeoff lines. Budget, accessibility, developed design, and tender analysis remain outside automation.

PROFESSIONAL DELIVERY

Design discipline carried into AI engineering

2024 - PRESENT	Director / 3JAI Studio AI workflow systems, review criteria, and client delivery
2022 - 2024	Project Manager / People's Association Tender, cost, progress, defects, audit, and handover
2020 - 2021	Architect / HDB GIS, estate planning, environmental studies, and agency coordination
2020	Graduate Architect / aKTa-RCHITECTS Authority submissions and construction packages
2018 - 2019	M.Arch Intern / Tierra Design Grasshopper CAD automation and drawing QA

CONTINUE THE REVIEW

Visual portfolio

Source + evidence

LinkedIn

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Profile and employment chronology are portfolio-owner supplied. Project metrics are generated from checked-in local artifacts. Neither source is third-party validation.