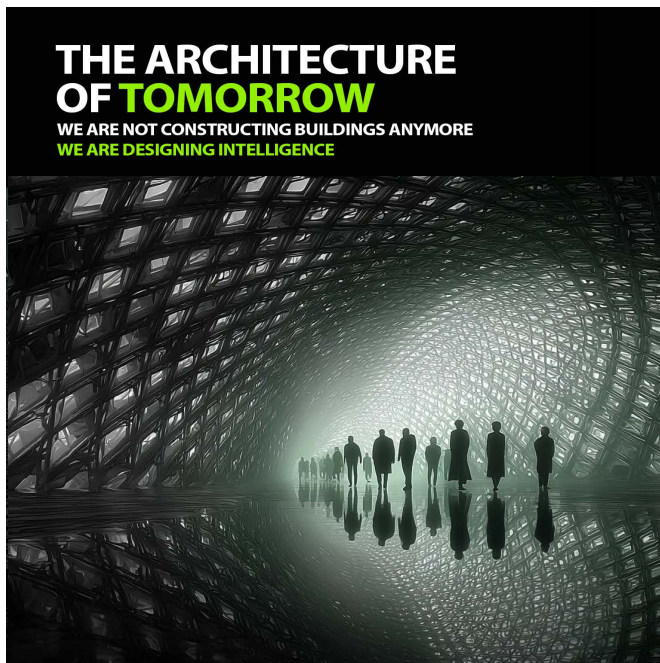




DYNAMIC NEURAL ARCHITECTURE

A theoretical framework for cognitive synchronization between humans and built environments.

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Dynamic Neural Architecture (DNA) rethinks the built environment as an adaptive participant in human experience rather than a passive container. The framework addresses the mismatch between dynamic human cognition and largely static architectural conditions by proposing environments capable of sensing relevant human and environmental states, interpreting patterns through artificial intelligence, and responding through controlled spatial and environmental adaptation.

DNA is organized as an interconnected system of three layers: a Sensing Layer that captures physiological, behavioural, and environmental information; a Processing Core that uses pattern recognition, machine learning, and predictive modelling to interpret changing needs; and a Response Network that can adjust variables such as lighting, acoustics, thermal conditions, and reconfigurable spatial elements. Together, these layers establish a continuous cognitive-synchronization loop in which the environment can sense, interpret, respond, measure, and re-adapt.

Presented at the International Conference of Artificial Intelligence in Zurich in January 2026, the research provides a theoretical foundation for neurally responsive architecture and explores its relevance to learning environments, workplaces, and healthcare settings. The next stage advances the framework toward empirical validation through EEG and physiological measurement, environmental sensing, AI-based interpretation, and IoT control. The long-term objective is to move architectural intelligence beyond automation and efficiency toward measurable, human-centred cognitive responsiveness.