Why Do People Feel More Comfortable in One Space than Another?



Louis Kahn,
Salk Institute for
Biological Studies,
La Jolla,
San Diego, California,
1964

In 1957, Jonas Salk, developer of the first safe and effective polio vaccine, began his quest to fulfil his dream of creating a collaborative environment where researchers could explore the basic principles of life and contemplate the wider implications of their discoveries for the future of humanity. Salk partnered with architect Louis Kahn to design such a research centre. Their close collaboration resulted in what is not only one of the great structures of the 20th century, but also one of the most important centres for biological research on the planet. Salk and Kahn's foresight in the design of the laboratories has also allowed the Institute to remain a functioning facility for advanced research.

INTRODUCTION

IAN RITCHIE



Architecture is a uniquely multifaceted discipline integrating perception, imagination and artistic expression with the physical world of space, light and form – construction and its materiality – to create the buildings in which humans live and, ideally, thrive. Until very recently little has been known about how our brains, bodies and buildings interact. Although architects for centuries have depended on intuition and experience to create environments that influence the people who use a space, we know we have much to learn about human responses to environmental stimuli.

Neuroscience is beginning to provide us with an understanding of how the brain controls our bodily activities, affecting how we think, move, perceive, learn and remember. There is now concrete evidence that one of the properties of the human brain is 'neural plasticity' – that our brains change as we learn – and that the brain changes partly in response to our environment.

Architecture is imagined and, when built, shapes us. This was recognised by the Academy of Neuroscience for Architecture (ANFA), which was established under the auspices of the 2003 American Institute of Architects (AIA) Convention held in San Diego, home of the Salk Institute for Biological Studies. The newly coined discipline united the fields of anatomy, physiology, pharmacology, psychology, medicine and behaviour with biology, immunology, genetics, molecular biology, chemistry, physics, electronics and artificial intelligence.

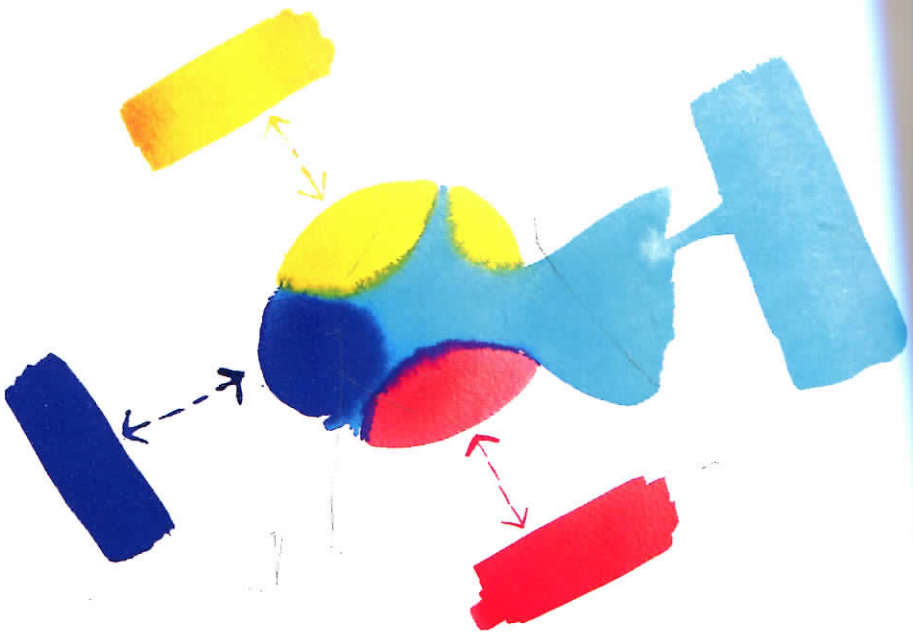
ANFA's stated mission is to 'promote and advance knowledge linking neuroscience research to a growing understanding of human responses to the built environment'.[1] In his address to the AIA convention in 2003, Salk Institute President Fred 'Rusty' Gage made the following observations, which are the core premise for this issue of AD: '(1) The brain controls our behaviour; (2) Genes control the blueprints for the brain's design and structure; (3) Environment can modulate gene function and, ultimately, the brain's structure; (4) Changes in the environment change the brain; (5) Consequently, changes in the environment change our behaviour; and (6) Therefore, architectural design can change our brain and our behaviour.'

Architecture Meets Philosophy Meets Art Meets Neuroscience

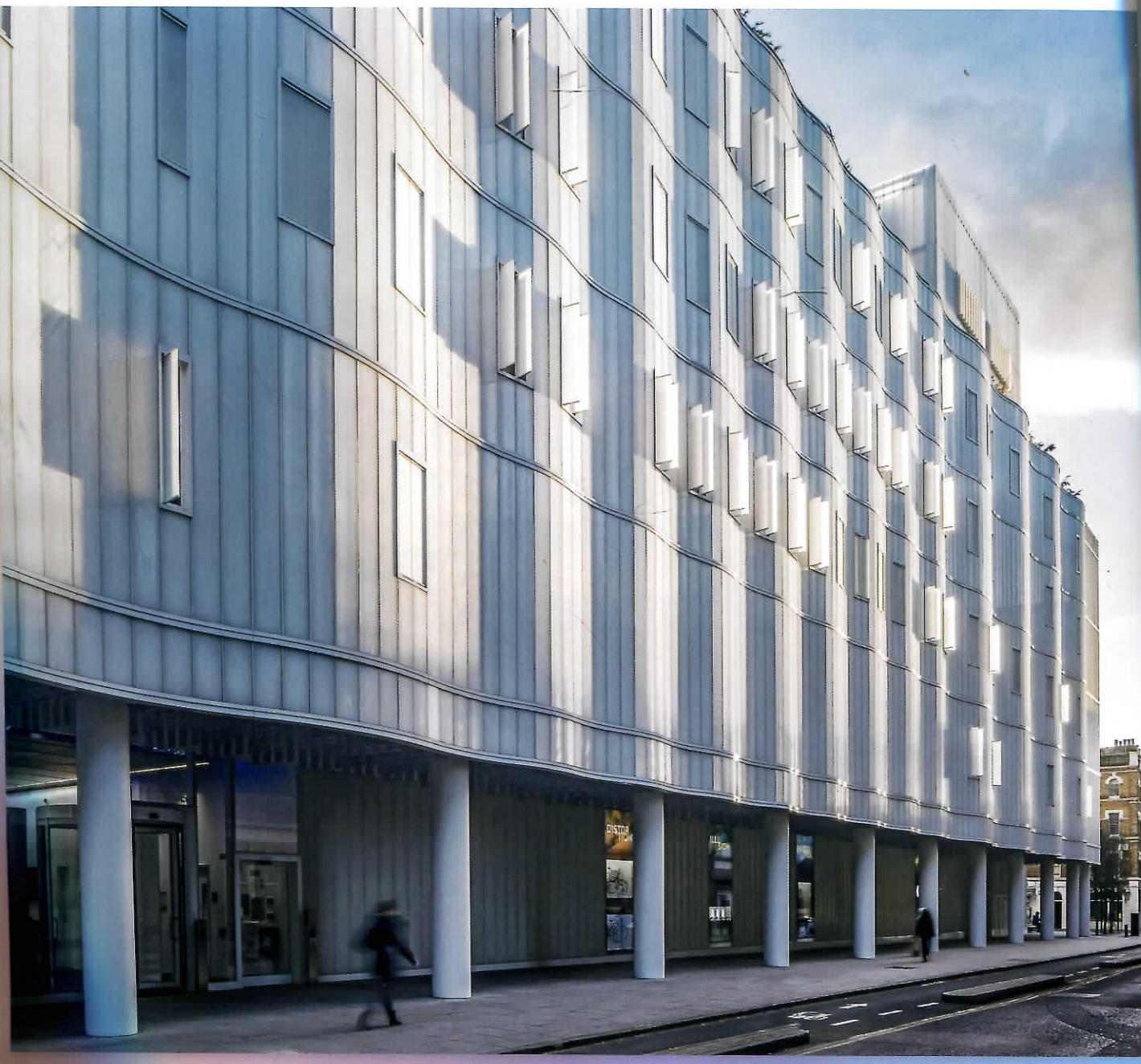
Ian Ritchie Architects' longstanding engagement with neuroscience blossomed during the design process of the Sainsbury Wellcome Centre for Neural Circuits and Behaviour at University College London (UCL), when, during discussions at the Salk Institute about the practice's recent commission, Rusty Gage offered wise insights into a research approach. As a result, the centre, completed in 2016, was one of the world's first buildings 'designed with the mind in mind', and its design process unique because it proceeded 'from the inside out'. Before designing the building, the architects spent a year visiting neuroscientists worldwide to understand the state of their art and what they could envisage their laboratories requiring years from now. Architects and neuroscientists – in particular John O'Keefe (who

Ian Ritchie Architects,
Sainsbury Wellcome Centre for Neural Circuits and Behaviour,
University College London (UCL),
London,
2016

right: Spatial flow concept drawing. The scientists stressed their desire for flexible, interconnected spaces that can be adapted over time to create a dynamic place in which to study science. When spaces flow into each other, people cannot help but meet during the day, blurring the boundaries between different areas of scientific research. Turquoise is lab space, yellow is write-up, red is satellite clinical space, and purple is interaction space.



below: Two wavelengths and amplitudes create the undulating facade and introduce a gentle vertical rhythm to the streetscape. The wall is composed of a unique assembly of prefabricated modules of low-iron toughened structural cast glass. These insulated and light-transmitting modules carry integrated windows with their own cast-glass louvres, which can be opened and closed as desired to provide privacy and to reflect the evening light. The white colour of the translucent glass reflects light into the street without creating glare.





Scale-free networks are characterised by the presence of large hubs or nodes that are highly connected to other nodes in the network. The interior spaces of the Sainsbury Wellcome Centre are composed of a multitude of different spaces that flow into and link with each other, creating an interlinked composition of spatially and organisationally different scales. Here, double-height laboratories and write-up areas are illuminated by the translucent cast-glass facade.

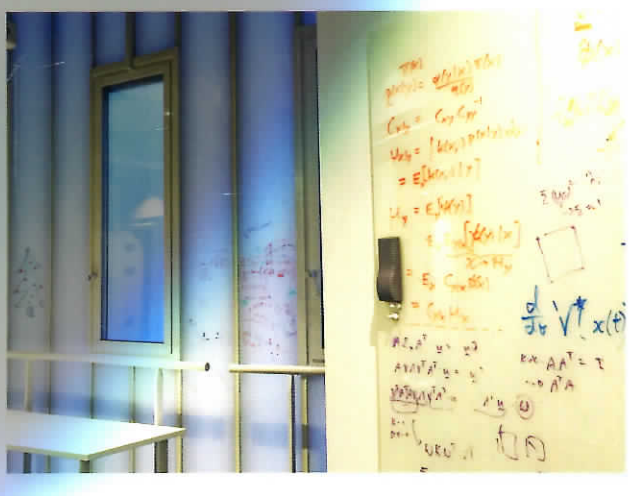


The centre's theoretical computational unit's spaces link to the experimentalists' working areas, and include this zenithally lit double-height space. There is a connecting gallery alongside at the upper level with windows that open to allow discussions taking place below to be shared, simultaneously acknowledging our human preference for long vistas and catering to our innate curiosity.

was interim director of the centre, discovered place cells in the hippocampus, and shared the Nobel Prize in Physiology or Medicine in 2014 with May-Britt Moser and Edvard Moser) and Peter Dayan (Director of the Gatsby Computational Neuroscience Unit at UCL from 1998 to 2018 and now Director at the Max Planck Institute for Biological Cybernetics in Tübingen, Germany) – embraced the idea of collaborating closely throughout the building's entire three-year design period to ensure that their spatial and research needs were planned with function and atmosphere well into the future.

Most scientific innovations or discoveries occur when creative people from diverse fields of study work together and exchange ideas and perspectives. The Sainsbury Wellcome Centre was designed specifically to assist this process by subtly enabling scientists to meet easily, every day, encouraging conversations and collaborations while still allowing individuals to be private and in control of their own environments. This was done by incorporating the results of neuroscientific research to inform the spatial structure of the interior architecture: about how people interact with the space around them, the importance of adaptability, the nature of light and its wavelengths in the working environment, and how the spaces in which we live and work affect our mood and behaviour. The nature and organisation of the resulting interior spaces with long, short and vertical views and varying volumes was described by one of the scientists as akin to the scale-free nature of the brain itself.

This issue of Δ aims to encourage a broader understanding of how these research and design disciplines can guide the design process for the better, to clarify what we know at present about what neuroarchitecture can bring to the quality of design thinking and application, and what design can bring to neuroscientific research. It draws together some of the latest research in these fields, offering an accessible overview of the discipline of neuroarchitecture.



The neuroscientists who were going to be working in the building explained that chance conversations often sparked ideas, and that this can happen anywhere, and how important it was that the building should support such serendipity. As a result, the scientists are free to write on any glass surface within the building, including the inside of the cast glass cladding.