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Institute of Spatial Perception
Subjectivity, neuroscience and spatial praxis

"For space 'is' whole and broken, global and fractured, at one and the same time. Just as it is at once conceived, perceived and directly lived."

Lefebvre

Introduction
In 1968, at the behest of the Los Angeles County Museum of Art, the artist Robert Irwin, accompanied by a young colleague named James Turrell, began a collaboration with Dr. Ed Wortz, the head of the life sciences department at the Garrett Aerospace Corporation which was at that time developing the environmental control systems for NASA's manned space flights. During an interaction that ultimately lasted several years and involved a range of experiments and dialogues, the collaborators utilized an anechoic chamber at UCLA that dampened not only sound and light but the rotational motion of the earth itself to investigate the effects of habituated perception – spending 6 to 8 hours at a time in a space utterly devoid of sensory input. According to biographer Laurence Weschler, the interaction between the two men resulted in a profound transformation in the thinking of both – with Irwin later constructing a series of architectural environments with unique spatial effects for a NASA conference on habitability, including a room designed to magnify acoustical reverberation and another with no visible edges.

While the experience generated for Irwin a deep appreciation of science and art as interpenetrating fields of inquiry, he maintained the role of art as nevertheless unique from that of science; he contends,"…if we should look at the world and feel that all things are not subsumable to, or resolvable by, logical thinking, then we have to begin to develop an antithesis, and that really is what contemporary art is in our culture, an antithesis."

The studio will examine the intersection between architectural, artistic and neurobiological paradigms of human perception and the relationship between spatial cognition and built form through the design of a cross-disciplinary research institute in New York City. Starting with the recognition that the concept of space in architecture has shifted from a subject of active inquiry to one of benign neglect- we will attempt to liberate new potentials within timeworn debates over the status of space as both a cognitive and cultural construct. Focusing our investigations on the encounter between emergent neurological research and evolving artistic practices - the studio will seek a more nuanced and polyvalent understanding of spatial perception at the convergence point of science, technology and art. Architecture's inevitable dialogue with optic, haptic, auditory and tactile conditions and its capacity to manipulate and construct perceptual effects will act as the source of new propositions that engage the entanglement of embodied perception, temporal extension and material form.

I.
Beginning in the late 19th century and reaching its apex in the alliance between early modernist aesthetic theories and emerging conceptions of space -time in science –and promulgated through publications like Gideon's *Space, Time and Architecture* of 1940 – space emerged as the primary protagonist in architectural debates of the first half of the twentieth century. Normalized within doctrinaire modernism, the predominant conception of space became that of a geometric and quantifiable extent – isomorphic and homogenous; subject to rational management and control. However, the apparent pervasiveness of the Euclidean/Cartesian model of space elides a diversity of counter positions that formed in response to a variety of influences- ranging from Marxist critiques to Phenomenology- that espoused a more complex and culturally situated understanding of the spatial. These divergent tendencies can be schematically illustrated by the juxtaposition between Le Corbusier's plan for the Ville Radieuse – with its rigid grid and infinitely extendable diagonal avenues -and the Situationist notion of urban space as a 'psychogeography' (exemplified by DeBord's Naked City project of 1957) - an assembly of 'distinct psychological climates' and 'unities of atmosphere.' For the Situationists, the relevance of urban space was primarily experiential and subjective rather than objective and formal. Moreover it invoked not only an individual subject navigating their surroundings based on 'spontaneous inclinations of orientation' but also the social body that constituted the city itself. Diachronic and narrative in nature, where the master plan is synchronic and totalizing, space, in Situationist terms, is no longer an abstract quantity but rather a 'lived' or practiced place - the point of view no longer the bird's eye of the planner but instead that of an embodied and mobile observer.

Today, when virtual stimuli and technological interfaces impinge more and more on unmediated experience, questions of how we perceive our spatial environment and architecture's role in locating the subject among proliferating and competing inputs have become increasingly vital. Siting our research in the fluid territory between spatial form and human cognition, we will engage both emerging research in the neurosciences and artistic practices grounded in sensory phenomena to critically examine architecture's capacity to structure and intensify embodied experience. The studio - while focused on the articulation of a precise building proposal -will address broader notions regarding the politics of perception in contemporary culture and the agency of architecture in an oversaturated sensory environment.

II.

Recent advances in neuroscience have generated an unprecedented abundance of insights into brain function – extending to research in spatial perception and cognition. New imaging technologies like functional mri's, which operate by measuring changes in blood flow to read the activation of brain cells, allow for a more precise understanding of the relationship between sensory input and neurological activity. These instrumentalities have increased our capacity to record and visualize complex processes, revealing the multi-layered, non-linear nature of human perception. For example In a recent study of how the brain engages in the navigation and memorization of space, initially uncovered through research that compared London cabbies and laboratory rats, neuroscientist Hugo Spiers encountered the interplay between three distinct types of cell structures in the hippocampus distinguishable by their unique patterns of activity. The three forms he termed 'place cells,' which respond to the unique conditions of individual spaces,' head direction' cells, which respond to the shifting coordinates of the head and eyes to provide an internal compass, and 'grid cells,' which relate to an imposed matrix of triangular coordinates that provide a dependable metric of space traversed. Depending on movement and external stimuli, these three modalities operate simultaneously but with shifting intensity – as the brain internally switches among them according to changes in position and visual signals.

While these evolving scientific insights raise compelling questions for architecture as a spatial practice, they also beg the question of whether the quantification of sensory processes in purely biochemical terms falls prey to a reductive materialism that belies the unique, irreducible, and culturally situated nature of human perception. The philosopher Thomas Nagel has asserted, by contrast, that an explanation of consciousness in neurophysiological terms "however complete, will leave out the subjective essence of the experience – how it is from the point of view of its subject — without which it would not be a conscious experience at all." As a countermeasure to this materialist tendency, the studio will also examine developments in the arts –specifically that range of artistic practices that engage perceptual phenomena as both subject matter and medium. Tracing a through line in modernist practice that runs from Duchamp to artists like Bridget Riley, James Turell, Robert Irwin, and Olafur Eliasson to name a few, this loosely related work operates at the boundaries between the subjective and the objective, often engaging notions of spatial cognition in ways that implicate architectural practices. The studio will examine how these alternative modes might complicate or subvert objective scientific models to allow for a more nuanced and multivalent understanding of perception. The Danish-Icelandic artist Olafur Eliasson, for example, has spoken of the importance of difference in the context of his installations – their capacity to elicit and intensify individual variations in sensory perception while simultaneously generating a collective social experience.

Mirroring this approach, the studio will involve the design of an institution that integrates both scientific and art practices concerned with spatial perception. While the precise content of the program will be formulated by the individual student, the intent will be to combine spaces for 'hard' scientific research and facilities for art production and display within a single institutional and architectural framework. Exploiting the ethos of experimentation common to both, the agenda will be to foster cross pollination between contrasting modes of investigating sensory phenomena and to induce hybrid practices that draw from both disciplines. To this end, the design of spaces for interaction, collaboration and the aleatory aspects of testing and research will be considered, as well as how the architecture of the facility relates to it's larger institutional and urban context - implicating a series of layered relations between test subjects, researchers, artists and the broader public. Architecture will provide both the medium and content for these exchanges.

While contemporary laboratories typically combine a maximum of environmental control with flexibility of use, the program of the institute presupposes a more exacting calibration between spatial form and experimental processes. Spaces like anechoic chambers, ganz fields or Ames rooms operate through the intentional dampening, amplification or distortion of sensory phenomena. Typically discrete spaces intended to generate specific effects, they implicate the possibility of a precise relationship between architectural configuration and embodied perception. In the well-known example of the Ames room, for example, the calculated distortion of an apparently normative architectural space reveals the gaps in mental processes relating to scale and depth perception. In it's manipulation of perspective and our expectations of orthogonality, the Ames room links to a long tradition of architectural techniques for shaping visual and spatial sensation. Forced perspective, anamorphic distortion, trompe l'oeil and

the elaborate manipulations of Baroque ecclesiastical architecture deploy related techniques for various ends- whether to induce religious awe or worldly pleasure. However whereas these conditions rely upon their invisibility for their effectiveness, their concealment from the observer, we will seek to foreground the operations of architecture in shaping human experience - "allowing people to perceive their perceptions." In this sense the entirety of the building will be understood as an experimental space – generating new programmatic and perceptual possibilities that mobilize architecture's unique capacity to orchestrate spatial experience.

III.

Finally, we will examine ideas regarding the culturally constructed nature of perception, growing out of research on how epigenetic factors (like the acquisition of language) present in a particular context impact the circuitry of the brain- imposing limitations on neural plasticity and generating and fixing intermodal connections in developing subjects. According to theories such as neural constructivism and neural Darwinism, modalities of perception mirror the distribution of sensory inputs within a given cultural context, as external stimuli and semiotic systems imprint their neural coordinates on the mutable software of the brain. If, according to Lefebvre, every culture generates it's own unique space, these theories suggest that our environment also organizes the means through which space is itself perceived.

These ideas echo Walter Benjamin's responses to shifts in subjectivity during the early twentieth century at the advent of mechanical reproduction, he writes, 'during long periods of history, the mode of human sense perception changes with humanity's entire mode of existence. The manner in which human sense perception is organized, the medium by which it is accomplished, is determined not only by nature but by historical circumstances as well." Considering questions of the homogenization of global culture, the rise of virtual environments and the influence of technology, we will examine what our current historical circumstances might imply for the formation of the contemporary subject. The studio will question how architecture itself – as a powerful medium for organizing and intensifying both individual and collective subjectivities might generate new potentials within dominant perceptual modalities.