

Building a Lab: Constructing Realities

Derya Uzal^[0000-0002-1516-592X]

Istanbul Technical University, Istanbul, Turkey

ABSTRACT: Laboratories, as enclosed architectural-material spaces, are defined by clear physical boundaries. However, the knowledge produced within them is universal, transferable, and subject to transformation. This paradox is reinforced by models and apparatuses, which not only facilitate the expansion of knowledge but also enable the translation of the given world into data, or conversely, the materialization of data into physical reality. Laboratories possess an inherent capacity for knowledge production, allowing them to mediate between diverse agents, operating across multiple scales, through the use of models. The spatiality of the laboratory extends beyond its physical confines, defining and applying models within varied epistemic boundaries—in vitro, in vivo, in papyro, in silico, among others. Within this framework, the laboratory constructs a "code-space," a self-referential domain in which knowledge is continuously generated and reconfigured through material processes. Moreover, the integration of apparatuses not only facilitates the implementation of models but also shapes the way the world is observed and interpreted within the laboratory setting. These intertwined mechanisms transcend mere experimentation, establishing a dynamic interplay that can only be realized within the laboratory environment. However, when applied to architecture, the notion of the "laboratory" does not conform to this exact paradigm.

Architectural researchers are increasingly formulating new methodological frameworks by engaging with material relationships embedded within previously overlooked disciplinary silos. These emergent spaces within architectural practice seek to situate themselves within broader debates concerning future scenarios and the ongoing discourse between theory and practice. At this juncture, despite foundational critiques of scientific research and knowledge production, this study interrogates why architecture, as a discipline, has adopted the "laboratory" model under its own name. Through a comparative reading, the research examines the emergence of architectural laboratories as a practice in relation to the critical junctures that have shaped the evolution of scientific laboratories. Beginning with the historical precedent of Frederick Kiesler's *Biotechnology and Correlation Laboratory*, established in 1946, this analysis traces the underlying motivations for the resurgence of the laboratory phenomenon in the 21st century.

KEYWORDS: architectural laboratories, practice, experimental architecture, agents in lab

INTRODUCTION

A laboratory is a generator attempting to decipher the code of life and sharing it as an extension of the scientific language, both in the academic and architectural fields. These generators experiment and investigate through models the potential irreversibility of the damage caused to the planet economically, politically, and socially by human-centered created relationships in recent years. The scientific stage diagnosing the crisis also questions the possibilities of alternative relationships by reconnecting with the agents who cause irreversible damage to the planet, engaging in complex relationships, and being ignored. Scientific research conducted in the laboratory reveals both the problem and potential solutions.

To address the global crisis, interdisciplinary research groups are devising innovative strategies by integrating previously neglected material and immaterial relationships that have long been confined within isolated disciplinary borders. Knowledge is no longer perceived as an enigmatic byproduct of a closed research process; instead, there is a growing consensus that the convergence of social and positive sciences is essential for a comprehensive understanding of contemporary challenges (Rheinberger 2001). In the 21st century, architectural practice finds itself at the intersection of debates concerning emergent future scenarios and the enduring dialogue between theory and practice. Concurrently, evolving perspectives in critical theory, combined with the adoption of avant-garde methodologies that harness next-generation tools, are guiding architectural practice into transformative new spaces—such as laboratories and workshops—which, in turn, provoke a profound re-evaluation of the traditional subject-object hierarchy.

Collaborations aim to respond to a global crisis have begun developing new action plans by considering material relationships embedded in isolated research of disciplines that were previously ignored. Architecture's practice is in search of its place in debates that involve future scenarios and the ongoing discourse between theory and practice. On one hand, emerging critical-theoretical frameworks and the pursuit of innovative modes of fabrication enabled by next-generation tools are drawing architectural practice into novel domains—such as laboratories and workshops. On the other hand, the imperative for a reimagined spatial framework, within which architecture can fully realize its practice, is driven by the need to proliferate experimental models that rigorously test speculative ideas. This approach not only enriches the field with diverse methodologies but also reconfigures the traditional subject-object hierarchy, effectively rendering all agents as nomadic participants in a constantly evolving discourse (Latour and Woolgar 2013).

Post-theory in architecture,—whether expressed through post-humanist perspectives or new materialist approaches—assumes the critical task of reinvigorating the connective and organizing frameworks of the discipline. Concurrently, it seeks to transform architectural practice by harnessing current technologies, thereby circumventing the inertia of traditional theory, and by integrating dynamic agents that effect change: agents that generate distinctions, engage in experimental practices, forge unique connections with materiality, produce modelable and testable prototypes, incorporate non-human participants, and articulate alternative trajectories of action through emergent languages (coding). Michael Speaks underscores that post-theoretical architectural practices find expression in creative spaces such as workshops, where speculative production is realized via the “knowledge table method” through rigorous testing and prototyping (Speaks 2005). He contends that the act of making arises from the design of knowledge—or “design intelligence”—achieved by decoupling design from conventional theoretical constraints, with “thinking by doing” emerging as a natural consequence (Speaks 2005).

Despite the contradictions, architecture’s activity area giving the name “lab” to a practice that prioritizes making with technology, moving away from theory, harbors inconsistencies. This is because the criticisms of scientific knowledge production systems, which create new relationships between humans and matter at the climatic crisis center, share a common ground with new materialist and post-human theorists, who are based on problems such as the complete separation of human and subject from matter and research. On the other hand, the models encompassed by all active players in the laboratory defend that the reality presented in the laboratory is the product of both an experimental and self-affirming mechanism (Rheinberger 2001). While the experimental nature in the laboratory serves as a practice that produces differences, scientific knowledge ensures that the knowledge produced is valuable by reaching the same result under all conditions.

At this point, despite fundamental criticisms of scientific research and knowledge production, the research questions why the discipline of architecture has adopted a “making” practice under this name. To understand this, a comparative reading will be made between the emergence of architectural laboratories as a practice and the breaking points of scientific laboratories, starting from the historical context of the first reasons for the emergence of the “Biotechnology and Correlation Laboratory” (1946) founded by Frederick Kiesler. This comparison will question the motivations for the re-emergence of the laboratory phenomenon in the 21st century. And the inquiry will be conducted in two stages. Firstly, the purposes, problems posed, solutions, and research scales of the laboratories opened in academies in the 21st century will be examined.

1.0 PRACTICE

1.1 Problematizing the architectural practice and search for a new practice

After 2000’s, architecture define its position between practice and theory. The mere referencing of the built environment by theory, coupled with the practice carving out its own space through technological interfaces and tools without relying on theory, leads to the need for architecture to establish a new connection in the stages of thinking, teaching, and implementing. Contemplating matter beyond its passive structure allows for the rearrangement of agents, but it also imposes the necessity of critically examining established connections. Announcing the death of theory, as Jonathan Culler pointed out, is more about determining how the discursive aligns with the practical (Culler 1997). Or, as Helene Frichot questions when the end of theory is announced, it is about being able to answer what architecture’s role is (Frichot 2009).

Emerging critical theory that challenges traditional architectural paradigms fuels an ideological intensification, inspiring individual perspectives and forging a discourse centered on practice while embracing new technologies. This architectural discourse promotes a post-theoretical narrative in which theory—synonymous with an excess of knowledge—fails to incite practice, thereby necessitating a reevaluation of theory from an alternative vantage point. Jane Rendell portrays both the artist and art as manifestations of an “idea machine,” where the idea itself constitutes the act of production, and thought is in perpetual transition into design (Rendell 2003). In this framework, the motivations and practices of the artist converge into a unified whole. However, such fluidity between theory and practice finds little equivalent in the realm of architecture. According to Rendell, architecture should, much like contemporary art, position itself at the intersection of thought and practice (Rendell 2003). Practitioners who engage with material relationships—whether as artists or architects—must develop methodologies that communicate directly with their material. In assuming this active stance, the practice of establishing relationships paves the way for innovative connections. Moreover, Rendell underscores the significance of action as articulated in Buchanan’s abstract machine, contending that this conceptual framework facilitates an assemblage generated through the dynamic exchange of relationships, thereby opening avenues to new interactions (Rendell 2003).

In a new relationship, one can become a transformative agent by revealing who they are and how they are. Rather than the closure of a theory text by someone who knows everything, Rendell suggests writing and doing to articulate the unique relationships of the agent (Rendell 2003). This way, both writing and practice can work together. Writing as theory may not be enough individually to question or perform active production. Helene Frichot, while discussing the death of theory, criticizes the role of the theorist (Frichot 2009). The theorist has a perspective that looks down on everything and everyone. Such an attitude keeps the theorist away from the magnificence of architecture. It does not allow them to see established relationships and form similar ones. To recreate relationships, one must be active. Or simply doing cannot find solutions for today’s crises. Rendell argues that here, the binding architect needs a standpoint (Rendell 2005). She draws attention to the need for a positioning that can respond to situated knowledge in Haraway, Jane Flax’s standpoint theory, or Elsbeth Propyn’s locality. Here, she provides the answer to what architecture actually does: architecture is a binding agent that “thinks between” matter and subject and “thinks as if

in between.” The architect must determine how to position themselves with their object based on their (own) experience.

1.2 Re-connecting to earth

In the 21st century, architects, artists, or scientists have recognized the necessity of transitioning to an action plan that establishes active connections and is not limited by the narrow application of theory. However, the challenge arises here regarding how different forms of connection can be articulated, aside from the unique practice suggested by Rendell through writing. Feminist discourse, by juxtaposing disciplines in different situations and proposing dynamic connection methods, challenges accepted relationalities, and we, as agents, are still attempting to (re)identify with objects and matter. Referencing various philosophies, such as Bruno Latour’s Actor-Network Theory (ANT) (Latour 1996) and Graham Harman’s object-oriented ontology, which see existing connections and explore possibilities for adding or increasing these connections, we move away from forms of connection like correlation that read objects solely through humans. Thinkers like Latour and Michel Serres (Serres 2013) discuss a more active objectification situation through already established connections. The reciprocal dynamic between relationships and objects is boundless, affirming that emergent social bonds continuously engender novel artifacts in recurring cycles. For Bernard Stiegler, this phenomenon epitomizes externalization (Stiegler 1998). Humans engage with their surroundings through apparatuses, transmuting the inorganic and inanimate into organized matter.

While creating unity in social disciplines is possible through these theories, we face challenges in responding to the more complex relationships between agents in fields like art and architecture. However, architects/architecture, as binders establishing connections, have some components that need to be re-related. Firstly, how matter is physically addressed, organized, and how these forms of connection are incorporated into the field of architecture. The climate crisis requires a new action in disrupted material cycles caused by human-disturbed matter. Discussing the above-mentioned forms of connection in architecture becomes inevitable when examining existing relationships, especially those related to waste in the built environment, which remains in nature for years or cannot be recycled. In order to apprehend such intricately interwoven phenomena, we must adopt novel tactical approaches; Karen Barad’s agential cut creates an active position, or, proposing a way of making against an attitude that homogenizes connection with matter, neglecting previously established complex forms of connection, especially in art and architecture (Barad 2007).

To develop a practice in which the creative agent may simultaneously embody both critical insight and generative capacity... Like the chain reaction produced in Peter Fischli and David Weiss’s “The Way Things Go” work. The connector -or artist/architect- needs to transform into a series of actions, careful but chaotic, that they do not fully control or orchestrate, much like the chain reaction in the mentioned artwork. Or, imagining a making method where the process and material object are not dominated by the master, as seen in the exhibition “Suddenly This Overview,” where sculptures symbolizing everyday objects from unbaked ceramics wait to be re-modeled, creating a geography that generates possibilities. The possibilities here are as powerful as the open-ended nature of a map. Thinking of architecture as a mechanism that considers the physical and chemical processes of matter, engages objects in a non-autonomous interaction without human intervention, is to envision a practice that does not dominate but orchestrates.

Architecture establishes active connections. Questions such as the positioning of the architect, complex relationships with matter, and the future of architecture bring forth significant inquiries, sparking new explorations in practice. Following the Kiesler Laboratory, we observe the continued motivation for laboratories to serve as spaces in cybernetic studies and those referencing organic elements, such as the Buckminster Fuller workshop. However, especially in the 2000s, numerous research-oriented laboratories are being established in universities. These laboratories are driven by their own desire for existence or the goals of the institution to which they are affiliated. In line with these goals, they conduct design research. These laboratories differ somewhat from field or material-centered testing laboratories where durability tests are performed. They represent new spaces where the design process invites other disciplines and new technologies.

1.3. Responses of architectural practice to scientific expansions on vitality

The association of architecture as a practice with the term “laboratory” began in the early 20th century with Frederick Kiesler. The Biotechnology and Correlation Laboratory, established by Kiesler at Columbia University in 1946, served as a unit where the externalizable reality of architecture was examined and researched. In Kiesler’s laboratory, the body (perceiving and designing) was dissected both cognitively and physically in an attempt to expose its parts. For Kiesler, architecture is a way of connecting to the world; it brings agents in relationships to a neutral level as small as the cellular scale and attempts to both separate and reunite them in this created space on a physical-biological-psychological level (Phillips 2017). Kiesler’s exploration, in its consideration of the relationships established through the body’s interaction with the external environment, offers an early architectural response to a post-human perspective. However, within the correlation framework, it diverges from contemporary post-human debates by comparing humans to other objects or technologies. The effort to redraw the boundary between the living and non-living, the utilization of epistemological outputs produced in the laboratory as traces in cybernetic studies by architects, finds its place in the architectural practice of today and in post-human and new materialism thinking (Phillips 2017).

Towards the end of the 19th century, the laboratory’s construction of scientific knowledge can be traced back to architectural thinking. References to elements of structures such as buildings and walls, the use of tools that allow the exploration and experimentation of a different scale of thought, such as models, have been employed. The implicit cross-referencing of structuralism by the laboratory, its methods, the closed nature of the experiment, and the way it creates and declares the “other” all influence every field, including architecture. After the 1960s,

discoveries in genetic studies, such as the nature-human relationship, the hierarchy of the other in a vitality classification reduced to codes, and the ability of the living to reproduce spontaneously, have influenced many disciplines as well. Particularly, creative fields have incorporated these scientific facts into their sociological, political, or technological practices, and references to them can be directly observed in representations and productions. Architects also frequently refer to the excitement they feel about the autonomous knowledge-generating capacity of the biology laboratory, describing practices that move towards spontaneity in the entropy/negentropy duality. Firstly Kiesler Laboratory, then the projects of Cedric Price Fun Palace in collaboration with Joan Littlewood (Littlewood 1964), Buckminster Fuller's biology-inspired structures, and Francois Roche's avatar-spaces...Again, 20th century, experiments in biology and physics laboratories mystified the laboratory itself in terms of the distinction between the living and non-living, matter, and time.

1.4. The transient boundaries based on the 20th century of laboratory practice and architectural practice

The laboratory, in the experiments of relativity from the early 20th century onwards, found itself in the position of having to explain the relationship between the object and the subject after the controversial position of the observer in the experiment. The positioning of the experimenter and the observer is in the shadow of the emergence of knowledge. The process that began with the relativity experiments has somewhat been illuminated towards the 21st century with the paradigm shift of Kuhn, the criticisms of science philosophers such as Serres and Whitehead. In this century, the capacity for knowledge processing in experiments and laboratories has increased, and criticisms have turned towards the method used in the experimenter's positioning and the tools and models used in the observer's experiment.

The scientific practice put forth in the laboratory, according to Bernard Stiegler, deciphers how things work cosmologically while constructing a complex relationship between the experimenter and the material (Stiegler 1998). Although such a intricate process makes the laboratory a controversial place, it allows for a unique practice-space in terms of the density of the relationship between things and humans. The connection between things and humans is unique in terms of the intensity of the relationship. The use of epistemological objects in the social (soft) sciences can be made, and we can speak when we muddy the water, or when we open "semi-objects" such as those mentioned by Barad.

1.5. In terms of experimentality

The definition of experimentality for about 30 years includes incorporating individualized research, i.e., the positioning of the experimenter, into the process of knowledge production. While the experiment itself being a closed process is often criticized, this debate dates back to the relativity experiments in the early 20th century. Today, Latour, Haraway, and Rheinberger argue that every method, every experiment, and every result are as transparent as scientific practice presents to the public. Because such a process of knowledge production is heterogeneous, and only when we muddy the water, or cut "semi-objects" like Barad, social (soft) sciences can look and speak here.

1.6. In terms of producing new agents

Personalized relationships established between matter and the experimenter in natural sciences create some "pioneer objects" that are not real but emerge through new relationships established to realize the idea of research. They perform speculation, create a scenario for the future, and allow the testing of models through the relationships they establish. In the process of scientific observation-experiment, agents who apply the schemas, put them into practice... Following the microscope technology, Gulliver, the variable nature of Maxwell's thermodynamics revealing genie, Schrodinger's cat in relativity, and the mice in the Onco-Mouse project. These are famous characters in experiments. However, in an experiment with an increased knowledge capacity, these agents enable the emergence of epistemological knowledge. And these pioneer objects produce possibilities instead of acting bodies in today's debate. Pioneer objects are forms that allow tracking of repeatable knowledge. These pioneer objects in the process efficiently present a genealogy for practice. Stiegler's "hyper-objects" Schwab's proto-objects, and Rheinberger's epistemic-things are intermediate productions of this experimental process. Experiment and experimentality exist for the interaction of the research object. Each experiment represents representations that create different realities.

Being a "lab" which social (soft) sciences have embraced in contrast to the laboratory, is an effort to critically address scientific practice and is naturally a creative practice. However, the sole reason for the embrace of the "lab fetish" by creative fields is not experimentality, as experimentality is already embedded in the nature of creative practices. Lab, which encompasses multiple individualities for a domain swinging between art and science like architecture, is quite attractive. Research, at this point, highlights the importance of these intermediate products in architectural practice. Instead of providing the same answer under every condition, it reveals a series of possibilities with a laboratory that produces and tests in the same environment. Or it envisions a laboratory that keeps these internal relationships active.

2.0 FROM THE FIELD

2.1. Friedrich Kiesler's 'biotechnology and correlation laboratory'

Kiesler, who poses similar questions in the field of architecture, draws a comparison between chemical molecules and physical atoms, stating that they are creatively the smallest units of the universe with similar production capacities. A significant result emerges from this, where he formulates a research-based practice. He views the

human body as a relatively short-lived, hidden source of architectural potential that shapes matter. Within the framework of biotechnology and correlation, the laboratory seeks to externalize and identify the covert elements that spark human creativity, moving them beyond the confines of the body. Ultimately, the aim is to externalize the processes that unlock architectural creativity.

Kiesler, on the other hand, takes this small part and attempts to construct the larger from molecules, the smallest and common denominator. His research is not selective; on the contrary, he establishes an inclusive and universal language. Similarities in the smallest components of humans, plants, animals, and matter cannot be separated due to the importance of maintaining a balance of various forces. This is because, in the balance of forces, form is said to evolve with evolutionary and environmental factors, and no mortal human can be the sole decisive factor for all powers; the human is an embodied reflection of fragmentary forces. The greatest concern has been to find the heredity of evolutionary knowledge inherited from biology for both the human body and the built environment. As he did in the laboratory environment applications of the scientific disciplines he collaborated with, he first dissects and then recombines humans and (built) environments. Correlation presents realities emerging in various force balances in an evolutionary process by turning into form (Phillips 2015). Looking at Kiesler, it should be noted that his relationships with biology, evolution, and non-human (animal) entities in the Correlation Lab research follow a different orientation than his contemporaries (Phillips 2015). Kiesler never attempts to be the subject that reins in scientific knowledge. Instead of arriving at fundamental beliefs, he designs a discursive space where variables are recorded. In a series of writings in *Architectural Record* (Kiesler 1937), just before being invited to Columbia University, he describes his expertise in various subjects such as performing arts, archeology, and the living spaces of animals. Kiesler's writings published in *Architectural Record* are found between pages of building examples and pages of building technology-materials, while in scientific journals, they appear in subheadings or sections used for special issues. Kiesler, by externalizing bodily features, attempts to propose a practice outside the body. The creative agent is a body with relationships and externalized senses. His designs involve the construction of partnerships, not an idealized individual.

CONCLUSION

The evolution of architectural practice—as delineated through emerging critical theories, laboratory methodologies, and a renewed engagement with materiality—demonstrates a transformative shift in the field. This synthesis of theory and practice, from Kiesler's pioneering Biotechnology and Correlation Laboratory to contemporary explorations in post-human and new materialist paradigms, underscores architecture's capacity to interrogate established hierarchies and reconfigure its relationship with both matter and society. By embracing dynamic experimentation and fostering innovative interconnectivity, modern architecture reclaims its role as a mediator between the built environment and the intricate web of natural and cultural forces. Consequently, laboratories have secured their position within the architectural landscape as a direct manifestation of today intellectual and scientific imperatives, serving to forge a design narrative that is unequivocally contemporary.

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