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Laboratories of the Field: Inquiry by Design

Amy WHITESIDES[1,2,*], Albert Zhengneng CHEN[1]

1 Stoss Landscape Urbanism, Boston, MA 02127, USA
2 Harvard University Graduate School of Design, Cambridge, MA 02138, USA

***CORRESPONDING AUTHOR**
Address: 54 Old Colony Ave Third Floor, Boston, MA 02127, USA
Email: aw@stoss.net

ABSTRACT

In the field of Landscape Architecture, design as research has been frequently addressed in the academic discourse. This article provides a snapshot of how design practice at Stoss Landscape Urbanism contributes to the discourse through applied practice and implementation as a research enquiry into the dynamics of and human response to the everchanging environment. This "design as research" in daily practice emerges as three episodes: 1) demonstration of ideas through experimentations and garden installations; 2) environmental and social dynamics as both research interests and tools with which to tackle challenges in urban environments and change over time; and 3) digital fabrication with biological materials as a tactile media to explore curiosity and creativity in design. The use of these tactics and tools offers a fresh perspective on the conventional definition of research and the methods and means through which designers continue to develop and test innovative solutions to social and environmental challenges. Looking retrospectively at the progression of applied research and its influence on projects across scales, Stoss provides insights into design process and reinforces the importance of continued exploration and testing within design practice.

KEYWORDS

Design Experimentation; Landscape Architecture; Processes; Dynamics; Animation Tools; Urban Forest; Garden

HIGHLIGHTS

- Design research reinforces exploration and iteration by direct/indirect connections
- Testing ideas via installations provides valuable insights for implementation
- Environmental and social dynamics simulation as tools to address challenges
- Animations support projects to present social and ecological dynamics

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1 Introduction

Ecological, social, and political systems on urban sites are deeply intertwined. Designing with landscape inherently engages all of these at once, yet must address them each within their own language, requirements, and limitations. At Stoss Landscape Urbanism, experiments on the site as garden or model as well as dynamics are explored through various media, providing insights and ideas that continue to evolve and grow in complexity and at different scales. Research in the office takes form through these experiments. It is not a singular act, not separate from day to day design practice. It is embedded in implemented works that allow Stoss, as a creative collective of designers, to develop and deliver projects, expand experience and create connection, awareness, and new ways to define urban spaces. The tactics and tools of experimentation involved in such research are discussed through three "episodes" reflective of Stoss's design process through time.

2 Demonstrations—Experimentation Through Installation

Small-scale, temporary installations have been a testing ground for ideas since the earliest days of the firm. These works are "thinking at scale," literally building an emergent idea for "demonstration." Demonstrations help troubleshoot technical challenges, test material compilations, or set up social or ecological interactions that fuel future projects through which these ideas can be expanded and improved upon.

These installations having themselves evolved over time were initiated through "Safe Zone," an installation for the International Garden Festival at Grand-Métis, Quebec, Canada. The "garden" is a topography of code and regulation—essentially a manufactured three-dimensional garden (with hillocks and valleys) built with synthetic surfaces—designed to undulate and activate the ground plane. Utilizing an array of readily available commercial products

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typically meant to signal potential dangers, such as poured-in-place rubber surfacing, warning strips, and traction mats. The non-traditional use of the materials created moments of surprise, such as increased depth of the rubbery surface suddenly changing underfoot, causing instability, and forcing physical reaction and adaptation. Adults and children found ways to engage each other and the topography, enjoying moments as changes in surface caught them off guard or as a friend bounced up and down to see over the next mound. As a highly manufactured play space within a forest, the bright color of the "garden" contrasted with lush greens and browns of dense plantings to turn "safety" on its head through material and corporeal experimentation between body and ground (Fig. 1).

Development of unexpected topographies that juxtapose landscape, function, and context continued through installation of Stock-Pile, a temporary garden site scheduled to be turned over for construction space in Harvard University's Radcliffe Yard, Massachusetts, the United States (Fig. 2). A stock pile is a heap of material, serving as a reserve supply commonly for construction. In this case, the essential elements of landscape construction (stone, aggregate, sand, and soil) are arranged in simple piles on a north-south grid. Each pile, constructed at the angle of repose for that specific material, was poised to subside over time in keeping with its unique inherent physical and structural characteristics. Two of the piles, planted with ferns, read "garden" amid the raw materials. As days went by, wind, water, animals, and even people disrupted the piles, accelerating their subsidence and creating new forms, while leaving traces of their presence through footprints, rivulets, and scattered stones. Conceived and completed in a matter of days, this project allowed for rapid experimentation with process, flux, and design language of rough industrial materiality against lush vegetation.

Emergent from these installations is Bass River Park, a filled salt marsh in West Dennis, Massachusetts (Fig. 3) that had been compacted and deadened over time. Stoss sought to reinvigorate the site as an undulating earthen carpet of hillocks that encourage social and ecological dynamics. Slopes and valleys allow humans and plants to inhabit the space as their own individual bodies respond to environmental conditions. Kids run up the slope, water-loving plants rest at the base where moisture collects. Quieter than Safe Zone and lusher than Stock-Pile, this project nonetheless emerges as a descendent of the creative exploration of the two precedent gardens. Subject to flooding with increasingly frequent storms, the landscape is intended to absorb and allow for change, embracing the ephemerality and process explored in Stock-Pile. The formal languages of both are adapted to enhance ecological conditions and give the park its signature—hillocks and valleys.

3 Dynamics—Urban Environments and Change Over Time

Ten years on from these early garden experiments and forests, and their role in urban life and the functioning of healthy ecosystems are capturing the firm's imagination and driving exploration. At Triangle Park in Cambridge, Massachusetts, installation of a time-conscious demonstration urban forest on a 1-acre urban site is providing a unique opportunity for full-scale

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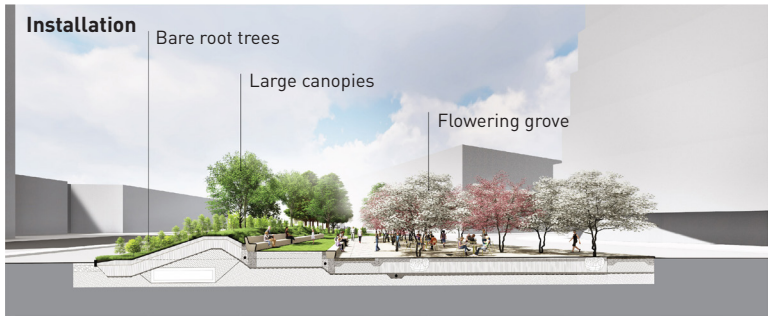
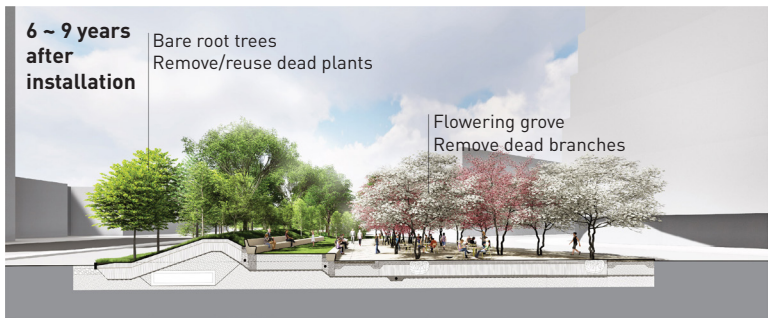
1. Rubbery hillocks create spaces for play and exploration within the "Safe Zone" garden.
2. Construction materials displayed individual angles of repose after installation.
3. Hillocks and depressions provide spaces for physical exploration and ecological variation.





4. Stills from the animation of growth over time illustrate design intent and the ongoing evolution of the demonstration forest of Triangle Park.

research and design in the urban environment.

Emerging from the principles outlined in the Cambridge Urban Forest Master Plan[1], the aim of Triangle Park was to demonstrate the capacity for small, underutilized space to meaningfully increase the coverage and diversity of urban canopy while continuing to provide occupiable open space for the neighborhood. Plant communities from New England upland and lowland habitats were selected and planted in multi-layered structures. To achieve the expected density, 65% of the proposed trees are fast-growing bare-root saplings. Stormwater capture and distribution to low areas drives growth of the inland forest communities. Additionally, the placement and composition of species were fine-tuned to their caliper sizes and growth rates to ensure healthy succession, giving the park a dynamic condition, especially through the early years.

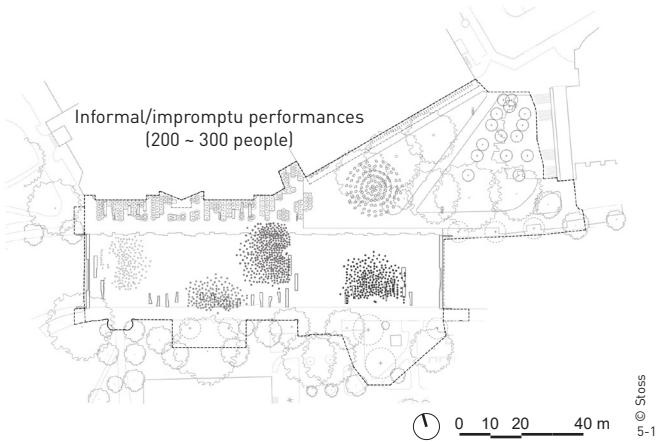
The dynamics presented at Triangle Park were designed and communicated through animation, which serves as a tool of understanding relationships between water, growth, season, and management (Fig. 4).

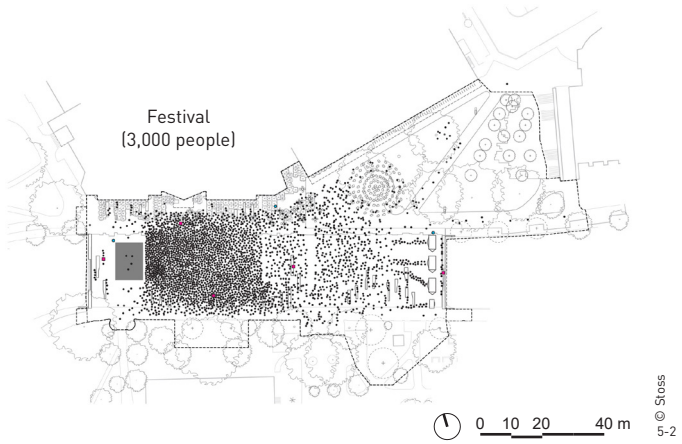
Social and environmental dynamics intersect on urban sites like those in Triangle Park. These dynamics are actively changing, often on a daily basis, and both shift with time, making flexibility and adaptability a crucial consideration for design and construction. For Harvard Plaza, Massachusetts, a busy site with students, university visitors, and passers-by on their daily commute, the design intends to accommodate both daily movements and larger formal and informal gatherings. Animation tools allow for imagining how people (as groups or individuals) might respond to and create changes on a site. Studies of possible activities on the daily, monthly, and yearly basis support research on future possibilities and demands on the site, and lead to the design (Fig. 5). Programming continues to evolve over time based on the needs of the university in accordance with the flexibility provided for and anticipated by the design.

At Gerstaker Grove in Ann Arbor, Michigan, the United States, intangible dynamics are visually amplified through lighting. Embedded within steep basins that collect stormwater, over 100 acrylic rods with vibrant LEDs light up as water enters the system and triggers a simple weather device. This dynamic lighting makes visible the capture of peak stormwater runoff and water quality improvements, which are provided by the landscape of basins, while bringing wonder and joy to passers-by who rush to get out of the rain.

The dynamic environment of water is a driving force in the design of Moakley Park in Boston, Massachusetts, the United States, where coastal and stormwater flooding must be managed and reduced. Topography, planting, and hard infrastructure are utilized to manage water across the site: some areas are kept dry through infrastructure while the others are intended to be flooded, adapting over time to respond to flood events, adjusting changes in salinity and ground water (Fig. 6).

Beginning often as drawings to express design intent, animation is frequently used as a means of communication as well as research, allowing for understanding of how systems interrelate and change over time. Created in the office, animations support design that allows for social and ecological dynamics to continue to play out in the field over time. Plant growth and succession at Triangle Park, dynamic lighting and rain levels at Gerstaker Grove, and regular shifts in programming and potential for social interactions at Harvard all constantly make and remake these sites. The animations express ideas that generate an ongoing experimentation within the field.





5. Stills from programming potential animations illustrate design flexibility to accommodate changing social dynamics in Triangle Park.
6. Stills depicting stages of flooding over time are used as design and communication tools to envision an adaptive coastal park for the site of Moakley Park.

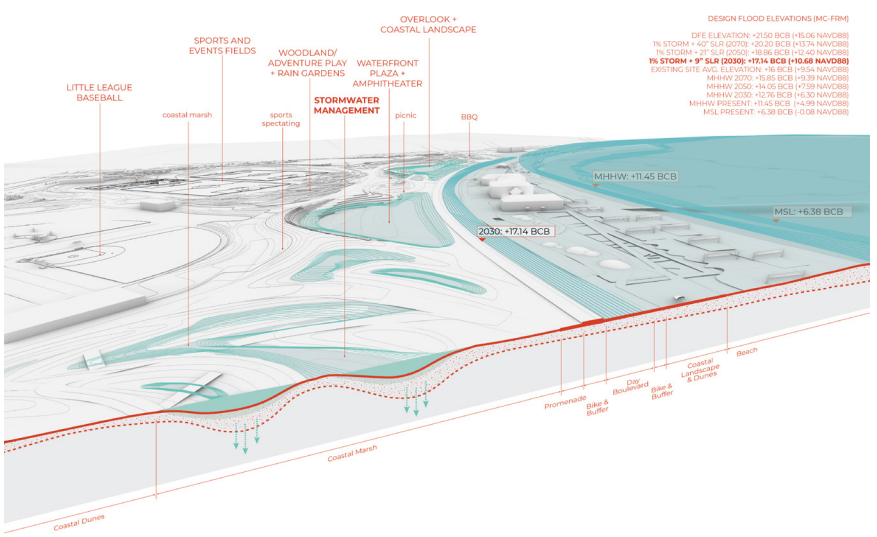
4 Curiosities—Digital Fabrication and Biological Systems

Exploration of digital fabrication with biological materials began as an idea of juxtaposing long held fascination with process, flux, and the unpredictable shape within a rigorously designed framework. What forms and functions could organic systems build and develop through technological means? And how might these respond and react to different environmental conditions?

Mycelium, a biomaterial that forms the roots of mushrooms, grows in soil or on substrates such as wood in long, thread-like shoots called hyphae; these take on form, if encouraged, as they grow (Fig. 7). This material has been studied and is gaining interest and applicability within the design and building industries over the past decade[2]~[5]. In 2018, Stoss began a series of its own experiments driven by curiosity about how this organic material might be able to create and hold up forms that other materials are challenged by and how the forms might change over time, reflecting the conditions of their environment. 3D-printed forms created the space in which mycelium could grow, creating blocks of various types of surfaces with from fine ridges to pebble-like textures to long dragon-spine-like spikes. Placed in a range of environments, from overwintering on the roof of Stoss' Boston office to the relatively clean, dry space of the work rooms, some blocks deteriorated, slumped, and crumbled over time while the others remained crisp and legible.

While initial experimentation with the material was without specific application, an interest in mycelium has found new potential. Stoss' proposal for a new garden site at Grand Metis Festival combines forest practices and lessons learned from Triangle Park with mycelium as mulch and form-making.

Within the Jardin de Métis, Quebec, Canada, the re-emerging cycle of the spruce budworm has compromised existing spruce stands[6][7]. Stoss' proposal for a garden within the forest challenges



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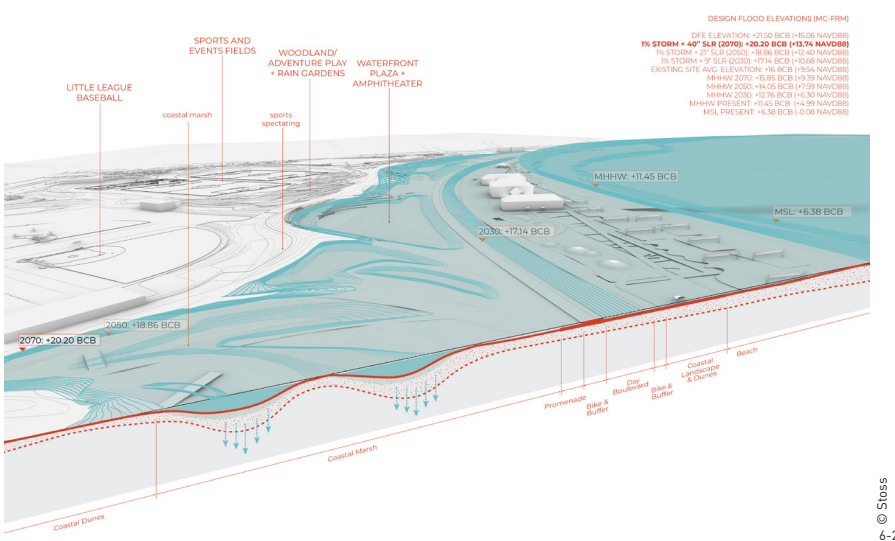

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7. Mycelium grown into 3D-printed forms resulting in unique textures.
8. Mycelium in the form of mulch biologically forms temporary seats providing respite within a forest garden.

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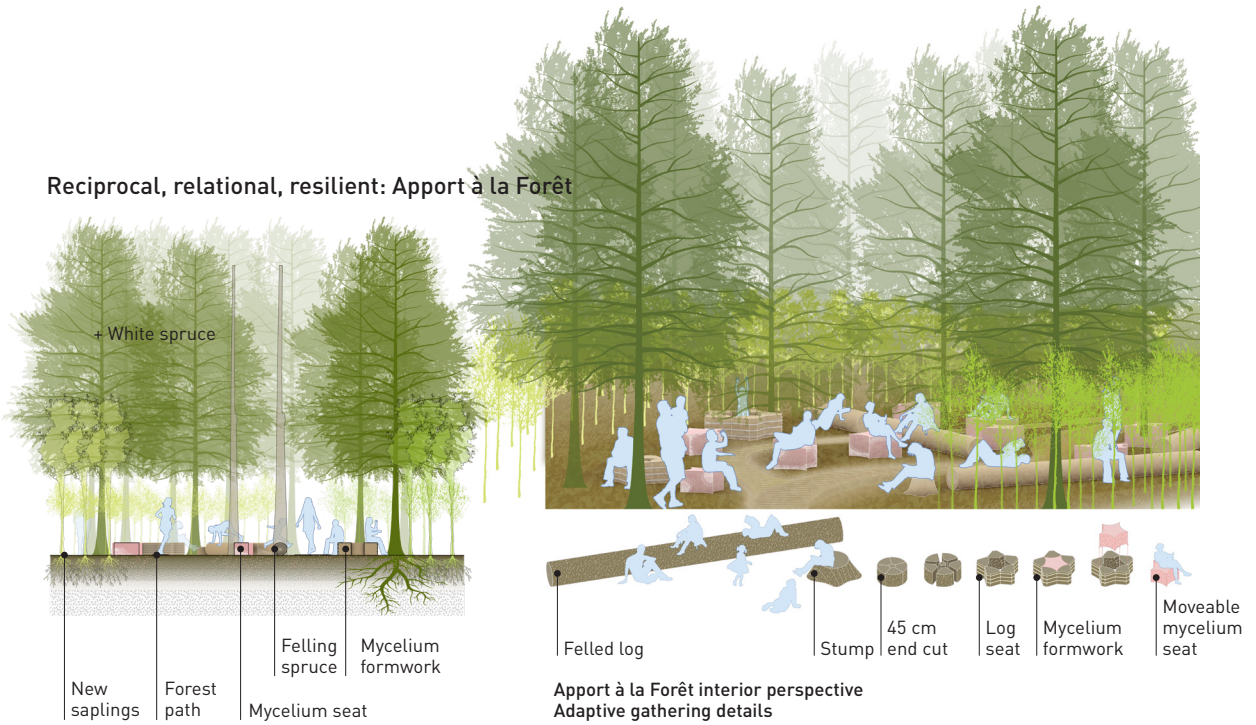

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the single-species approach to extractive forestry regimes and instead fosters a resilient and reciprocal strategy towards a communal forest. Apport à la Forêt project (Fig. 8) embraces the adaptive capacity of the forest, and the normal adaptive cycling initiated by the spruce budworm.

Utilizing a series of adaptive forestry techniques (diversifying, thinning, chip-chop, and mulching with mycelium), the proposal selects damaged spruces to be felled and uses them as nurse logs for seedlings, so as to return, renew, and regenerate the forest through decomposition, nutrient release, and habitat creation. Mycelium mulching forms the groundwork for sapling spruce to re-emerge and for new adaptive species to take root. Rough cuts delineate paths throughout the forest floor. Log cuts define gathering spaces. End cuts provide formwork for growing mycelium forest seats, previously designed as an in-office "curiosity," which offer visitors a contemplative space to sit in community and bathe in the forest.

5 Conclusions

Design as research at Stoss is at once targeted at and infused with a sense of playful open-ended creativity. Connections between research and final design are indirect. Ideas explored through installation, animation, and investigation of curiosities find expression in small gardens, graphics, and objects that inhabit the office. And, eventually, they find their ways into projects, usually evolving from a simple beginning but finally developing into recognizable offshoots and variants of their origin. Finding time and space to explore, test, and understand then to let ideas re-emerge in their own time and place is a critical part of this process. Projects may be places where ideas begin and are not ultimately expressed. Research and experimentation in the field then gives these otherwise abandoned ideas space to expand into new projects and new ideas.

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“现场实验室”：设计驱动的研究

艾米·怀特塞德斯[1,2,*]，陈峥能[1]

1 美国Stoss景观都市主义工作室，波士顿 02127
2 美国哈佛大学设计研究生院，剑桥 02138

***通讯作者邮箱：** aw@stoss.net

摘要

在景观设计领域，设计研究经常在生态、社会和政治体系中依照各体系中相应的语言、要求和限制条件构建本学科的学术话语体系。本文通过对Stoss景观都市主义工作室进行的多项设计项目进行简要说明，阐释了Stoss如何在不断变化的环境中，利用材料和场地作为设计实践的实验室，以此解决景观设计项目中的实际问题。通过建造小尺度装置和花园，Stoss在场地上测试设计想法，以此为后续项目提供适用的经验。与此同时，根据场地条件和变量的特点，Stoss模拟了生态动态和社会中使用者活动情景，为解决不同尺度的设计项目提供公众交流和调查方法。本文将Stoss的日常景观实践中的设计研究的项目特点总结为三个小节：1）通过小尺度装置和花园试验设计项目思路；2）将会随时间推移而变化的环境和社会动态融入到设计研究方向中，甚至将其作为工具，解决城市环境中的问题；3）利用数字化制造的技术将生物材料打造为可触碰的介质，探索新颖、创新的设计。

本文以几个Stoss早期设计或落地的项目为案例，突出项目的设计过程。例如在“装置”一节中，加拿大魁北克盛大梅蒂斯国际花园节的“安全区”、美国马萨诸塞州的哈佛大学拉德克利夫院子的“原料堆”和西丹尼斯的巴斯河公园项目，这三个实践在解决了技术难题的同时，收集材料并测试其效果，还通过项目建立起社会或生态互动。这些项目可为未来进行的项目提供动力，甚至这些简单的设计想法可以发展为更大尺度的设计项目。在“动态”一节中，美国剑桥市的三角公园和哈佛广场、安阿伯市的杰斯塔克树林和波士顿的莫克利公园均利用了动画和编程，进行设计与交流。这些技术可不断模拟该场地随时间演变的状态。“好奇心”一节重点介绍了菌丝体，一种可以形成蘑菇根部的生物材料在设计中的应用。上述思路和工具的使用为设计研究传统的目的和方法提供了一个新的视角，并进一步讨论了设计师应如何在这种新的研究形式中发挥主导作用，以及相关研究结果如何解决未来可能出现的问题。

关键词

设计实验；景观设计；过程；动态；动画；城市森林；花园

文章亮点

- 设计研究通过直接或间接联系支撑探索实践和设计迭代
- 通过建造临时构筑物验证设计构想，为后续项目落地实施提供经验
- 将环境和社会动态模拟作为应对挑战的工具
- 设计项目利用动画技术呈现与之相关的生态和社会动态

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