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Mapping Landscape Architects' Expertise in Climate Adaptation With Design Research Projects Over the Past Two Decades

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ABSTRACT

This article maps out landscape architects' expertise in multidisciplinary, comprehensive climate adaptation discourse. Systemic frameworks and process-driven approaches in contemporary Landscape Architecture discipline can become a powerful tool for harnessing unprecedented solidarity for climate actions across fields. However, landscape expertise is still largely ignored or marginalized in real-life climate discourse dominated by policymakers, scientists, and engineers. This study addresses this gap in understanding landscape expertise through design research projects over the past two decades. The article theorizes a body of landscape architecture projects in the past two decades, and proposes three terms—spatialize, synthesize, and speculate—for describing the landscape expertise in multidisciplinary, comprehensive climate adaptation projects. "Spatialize" refers to landscape architects' capacity to construct knowledge through strategically displaying "data" through critical cartography. "Synthesize" is the ability to envision multispecies entanglement by combining cultural, ecological, historical, biological, and political lenses through material practices. "Speculate" means to understand landscape design as a long-term practice with repeated operations, and, thus, to design is to deploy a speculative framework that generates knowledge through practice.

KEYWORDS

Climate Change; Landscape Architecture; Interactional Expertise; Landscape Expertise; Cartography; Multispecies Entanglement; Speculation

HIGHLIGHTS

- Introduce "interactional expertise" and propose "spatialize," "synthesize," and "speculate" to describe landscape expertise in climate adaptation
- Connect ideas such as multispecies entanglement to recent climate adaptation projects
- Call for climate solidarity across fields and advocate landscape architects' essential role in it

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1 Introduction

Object-oriented philosopher Timothy Morton uses "hyperobject" to describe a phenomenon that expands massively beyond individual human's perceptibility both spatially and temporally[1], and climate change is such a hyperobject. Thus, climate adaptation requires responses beyond the capacity of any single individual or discipline, and this wicked problem can only be addressed with combined expertise and from a supra-disciplinary perspective. Many believe landscape architects have the training and expertise to respond to unprecedented environmental uncertainties such as climate change. However, most design explorations remain speculative,

and some real-world design projects, such as those in Rebuild by Design (RBD) competition① in 2014, are stalled and curtailed. Designing for climate adaptation becomes a good-willed myth that the landscape academia tells its faithful followers, yet, regrettably, landscape architects' expertise is ignored or marginalized in real-life climate discourse dominated by policymakers, scientists, and engineers.[2]

Climate adaptation is more than science and engineering. It is a multi-faceted problem—economic, social, cultural, ecological, and technological. What is needed is a systematic overhaul. Many landscape design speculations involve knowledge and expertise from other disciplines, such as changes in policies, organizing communities, and climate modeling and prediction. Yet, working in political arenas, negotiating and collaborating with experts of diverse backgrounds and incommensurable paradigms, is hard, and limited research has been done in such an area.[3]

This article addresses the gap in understanding landscape architects' expertise in climate adaptation with frameworks and concepts found in the field of Science, Technology and Society (STS), specifically, the study of expertise. A group of STS scholars proposed "interactional expertise" as an important concept to expand the traditional understanding of knowledge production bounded and regulated by disciplinary silos.[4][5] Interactional expertise is the capacity to communicate with experts from other disciplines without actually practicing the fundamental works of such disciplines.[4] In a way, landscape architects use interactional expertise all the time; however, the profession is unfamiliar with the concept and seldom use it to describe the sort of landscape expertise. This article describes landscape expertise as a type of interactional expertise, that is, the capacity to communicate fluently with other contributory experts. This article tries to articulate landscape expertise by analyzing professional and academic design research projects over the past two decades.

This article is structured in two sections: section I presents a symptom, and section II responds with three categories of landscape expertise. Section I analyzes a real-world planning project—the Virginia Coastal Resilience Master Plan—a state-level effort that involves diverse experts, including coastal engineers, scientists, policymakers, local communities, and indigenous tribes. The goal for presenting this project is twofold. First, this case teases out how landscape expertise is clearly overlooked in comprehensive planning projects. Second, Zhang Shurui, one of the authors of this article who held an administrative position in the project, "opens the black box" of this government-led, multidisciplinary planning process. Section I elucidates the decision-making framework and reveals several challenges that can become opportunities for landscape expertise.

As a response to the first section, section II presents a range of landscape design research projects. When analyzing the cases, this article takes on an art criticism approach, that is, to reflect the meaning of these projects to culture and society, as well as landscape profession, instead of their technical specifications. This article uses ideas and concepts from Philosophy and Feminist Anthropology to bridge landscape theory and practice, which is necessary in constructing contemporary landscape architecture theory.[6] This article proposes three types of landscape expertise that may increase the agency of landscape architects in multidisciplinary collaborations. They are *spatialize*, *synthesize*, and *speculate*. This article uses the three terms to describe landscape expertise as a type of interactional expertise, and argues that to an extent, landscape architects are "multilingualists" in a multidisciplinary research team. Most importantly, landscape architects can "translate" scientific and political jargon into visual languages, which can better reach communities that do not have the knowledge and resources to understand the complexity of climate change.

2 Section I: Master Plan as Assemblage of Expertise

A real-world, government-led, state-wide climate adaptation planning is a complex process involving experts of various backgrounds. These experts are choreographed within a predetermined framework to exercise agency in specific ways. Thus, a master plan is better understood as an assemblage② of expertise.[7][8] Each expert brings some experience and knowledge to the table, and the whole "master plan" embodies a collection of knowledge that cannot be reduced to individual experts or policymakers. To participate and become irreplaceable in this assemblage, landscape architects must clarify and articulate their expertise.

This section takes an anthropological and STS approach to present a government-led, state-wide planning project in Virginia, the United States. One caveat is that the only person with landscape

① Rebuild By Design (RBD) was a competition launched by the U.S. Department of Housing and Urban Development (HUD) after the Hurrican Sandy in 2009 to create blueprints for recovery and resiliency efforts. Please visit the official website of RBD for more information.

② Assemblage was first developed by Gilles Deleuze and Félix Guattari, re-interpreted by many scholars over the past thirty years and became an important term in contemporary intellectual life. Assemblages emerge from the interactions between the heterogeneous components, and the properties of the assemblages are emergent and irreducible (source: Refs. [7][8]).

training in this effort was Zhang, who served as an administrative staff in the Governor's Office and had no substantial agency or input to the master planning process. However, the position allowed her to observe closely, from the "backstage," how a government-led project usually evolving with different actors contributed to this process and how different experts communicated and collaborated.

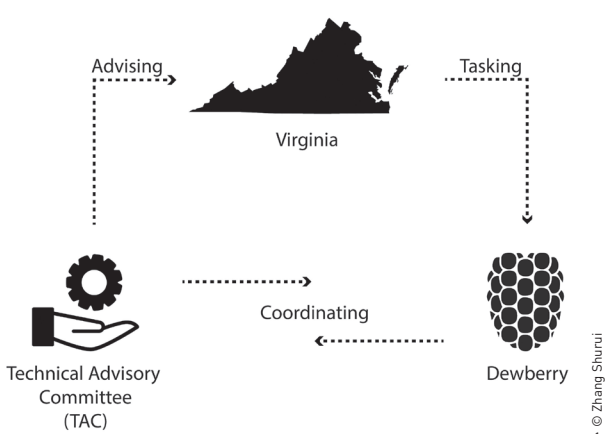
The effort of coastal protection and adaptation was initiated when former Governor Ralph Northam came into office in 2018. The state took several actions to increase resilience, including developing a Virginia Coastal Resilience Master Plan (the Master Plan hereafter).[9] Although the Master Plan does not possess any legislative power, it is an important document to guide future planning and provide communication and educational resources.

The production of the Master Plan was led by the Chief Resilience Officer and the Special Assistant to the Governor for Coastal Adaptation and Protection, both appointed directly by the Governor. Given the complexity and scale of the state-wide master plan, two additional important components—a contracted planning and engineering firm Dewberry and a Technical Advisory Committee (TAC)—were added to assist the effort.

The key players in this planning process are illustrated in Figure 1. Dewberry went through a rigorous request-for-proposal process and was selected as a contractor in March 2021 to prepare the Master Plan. The Dewberry team is consisted of planners, engineers, and scientists, but no landscape architect. TAC performs risk assessments, provides recommendations, develops evaluation criteria for the Master Plan projects, and makes recommendations to strengthen State and Non-State partnerships.[9]

In assembling the TAC, twenty-four representatives from state agencies, coastal planning district commissions (PDCs), regional commissions (R.C.s), and academic institutions were assigned by the executive order. The Chief Resilience Officer and the Special Assistant were allowed to invite additional experts to be TAC members based on the need of the Master Plan. By the first TAC meeting in December 2020, 57 people served on the TAC. By September 2021, there were almost 90 consistent TAC members, including designated representatives and advisors. The representatives from PDCs and R.C.s have profound knowledge of their localities and experience working with communities; the representatives of state agencies understand government policies and regulations related to their fields. Other experts include military liaisons, law professors, geology and oceanography scientists, tribal representatives, and economic experts. However, as of the publication of the Master Plan in early 2022, no landscape architect was appointed as a TAC member.

1. Organizational structure between expert groups in the Master Plan



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This further demonstrates that landscape expertise is either unclear or misunderstood outside the disciplinary silo. Even though many believe landscape architects have the training and expertise for combating climate change, without clarifying their expertise, landscape architects are still outside the high-level decision-making process that can have a substantial impact on the strategies of climate adaptation. Analyzing the decision-making system in the government-led initiative helps better articulate landscape expertise. Thus, Section II uses this case as a backdrop to project how landscape architects can act in a political arena.

3 Section II: Three Types of Landscape Expertise

3.1 Spatialize

The priority for spatial thinking caused a clear difference between landscape architects and other experts in workflows. Many experts on the Master Plan team regarded a map as a representation of fact instead of understanding the act of mapping as a research method. When facing a spreadsheet of data with spatial attributes, these experts analyzed such data with Excel functions. In contrast, a landscape architect would first attempt to spatialize these data on a map and study the spatial relationships between features. This is not to claim that one method is more advanced than the other, but to highlight that some habitual workflows in Landscape Architecture—such as understanding things visually in space—can provide an alternative way of thinking that other professions may not go to as the first resource.

Landscape architects' spatial thinking has a deep tradition in cartography, especially *critical cartography*—the process of constructing counter-narratives with maps.[10][11] The major difference between landscape architects and other experts, such

as geospatial analysts, in terms of mapping, is their different epistemological frameworks regarding truth and knowledge. Instead of understanding spatial "data" as objective facts, many landscape architects posit that maps are constructed artifacts manifesting power and knowledge. For them, there is no objective truth in a map but always constructed narratives about the phenomena that the mapmaker tries to articulate through visual tactics—the mapmaker chooses what and how to show on the canvas. Thus, landscape architects may construct knowledge and reinvent narratives for climate adaptation by displaying spatial information with specific intentions.

Over the years, many landscape architects and scholars have created numerous maps with predicted data to visualize the impact of climate-change-induced sea level rise concerning complex urban and ecological systems. Structures of Coastal Resilience (SCR) is a research initiative conducted by scholars, including landscape architects, from four universities③. The SCR teams obtained and combined up-to-date topographic and bathymetric data in the form of Digital Elevation Models (DEMs) (Fig. 2). Then, using the projective storm surge inundation data produced by the science team at Princeton University, the SCR teams mapped out the impact of climate change on coastal areas under different probabilistic scenarios and compared them with proposed topographies under the same conditions (Fig. 3). Most importantly, these projective mappings served as the foundation for comprehensive landscape strategies and design propositions (Fig. 4).

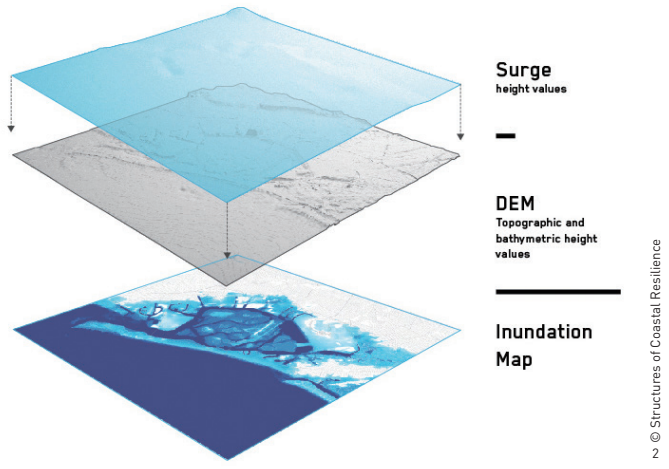
Climate change is a hyperobject that expands beyond human access in both space and time[1]. SCR is only one of many other endeavors in which landscape scholars and architects map to record, capture, predict, and articulate such hyperobjects. Landscape architects' spatial thinking turns this inaccessible idea into tangible and relatable visuals through projective mappings and concrete landscape strategies. They serve as boundary objects to help different experts understand unfamiliar concepts, strategies, scientific ideas, and generate discussions and debates.[12] In the United States, generating a broad-based discussion is extremely important, since climate change and sea level rise are extremely politicized topics—many denounce the sciences behind climate research[13] and refuse to believe in sea level rise. These provocative visualizations produced by landscape architects translate "climate change," a scientific fact, into a discourse that engages communities and stakeholders outside the scientific silo.

3.2 Synthesize

In a recent interview, landscape architect Kate Orff posited that we need not only physical infrastructures but also a "community infrastructure."[14] Indeed, besides physical and nature-based infrastructures, we need a culture that motivates individuals to

③ Please visit the official website of Structures of Coastal Resilience for more information.

2. Overlaying storm surge information on the digital elevation model (DEM) of Jamaica Bay, New York, to visualize potential impact of the projected sea level rise.
3. Interactive visualization of storm surge impact on the proposed topography in different storm surge scenarios in relation to climate change. Please visit the website for more information about the mapping and analysis processes.



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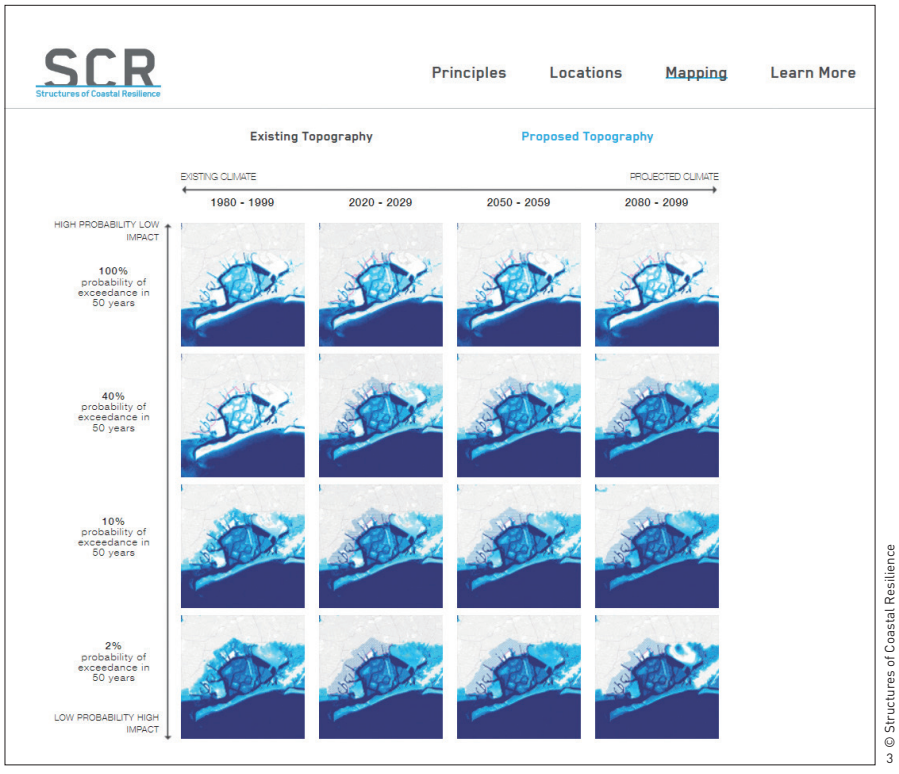

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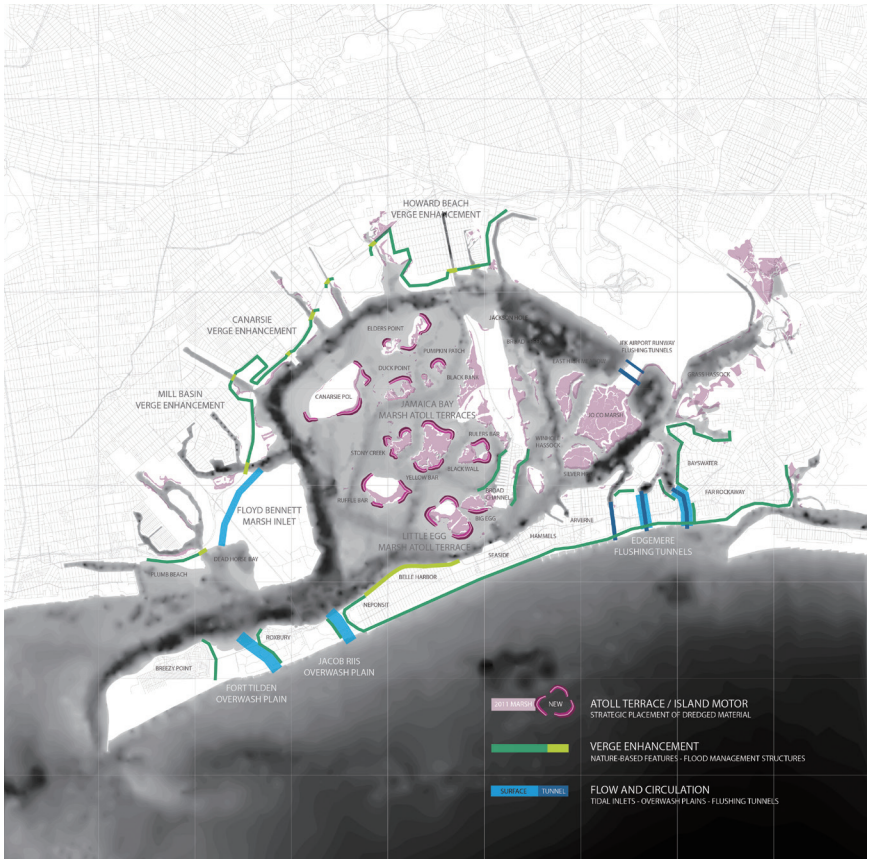

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4. Jamaica Bay Resilience Plan, one of the SCR projects, addressing vulnerability and coastal storm risk management by merging novel techniques of ecosystem restoration with layered nature-based features.

connect to and understand the changing climate, and a culture that is willing to decarbonize itself. Landscape architects have the capacity to synthesize multiple perspectives—of cultural, ecological, historical, technological, and political—with a more-than-human lens in order to create narratives that can engage a broad-based audience and inspire actions over time. This can be demonstrated with a series of projects revolving around oysters designed by SCAPE, a New York based firm.

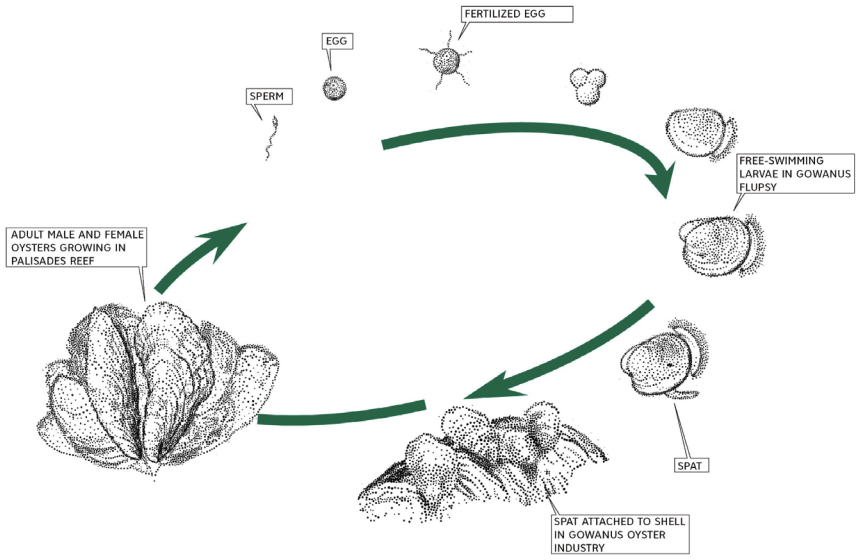
SCAPE's Oyster-tecture project was an art exhibition in 2009 in response to the call from the Museum of the Modern Art (MoMA) titled *Rising Currents* that explored New York's waterfront resilience in the face of sea level rise. This speculative project proposed utilizing oysters' ability to clean the water and designed structures to establish oyster habitats and form "living shorelines" to mitigate the impact of sea level rise (Fig. 5). Design strategies were articulated as process-based operations and emergent cultural practices that must be repeatedly carried out by agencies, organizations, and individuals involved. This framework understands landscapes in their broadest sense as cultural products; thus, any type of environment becomes a site for landscape operations.

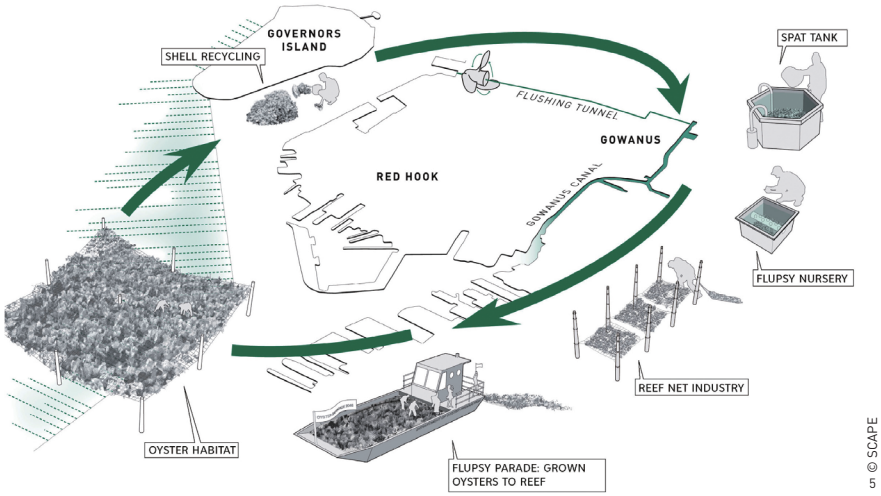
In SCAPE's proposal, the designers recognized that their site, Gowanus Canal, was a cultural product of the oyster production industry, as expressed by Orff that "New York was built on the backs of oyster [people], and our streets were literally built over oyster shells."[15] An important aspect of the proposal was to utilize and celebrate this tradition, turning oyster production into the identity of the place. The designers created a fake brochure labeled as Summer 2025, issued by an imagined agency called the Department of Oyster Production, Gowanus Association of Oyster Producers (Fig. 6). The brochure shows a map of the canal with multiple oyster production sites and educational programs for public access. The designers illustrated an imagined water taxi pass along with multiple water taxi routes, connecting the sites for visitors to experience the oyster industry. The brochure also points to a made-up website where visitors can register for programs and events.④ Through these strategies, SCAPE connects oysters' life cycle with the cultural landscapes of Gowanus Canal, breaking the mainstream, binary storytellings of the nature-culture divide. Oysters' lives are entangled with that of other species, including humans, creating a sort of multispecies entanglement and co-flourishing.

This art exhibition was held before Hurricane Sandy in 2012, which had a huge impact on coastal New York and raised public awareness about sea level rise and climate adaptation, and thus gave birth to the RBD competition. SCAPE's winning entry, Living Breakwaters, developed process-based strategies that used infrastructures to create public spaces not only for humans but also for nonhuman species. Designers proposed deployable coastal infrastructures such as breakwaters that, at the same time, can function as emergent habitats for species such as oysters and clams. Coastal landscape designs were articulated by deploying these infrastructures as habitats to support a network of nonhuman species through ecological emergence.⑤ SCAPE rendered section perspectives by highlighting different kinds of nonhuman lives that the designed landscape can support, conveying a sense that the landscape is a result of multispecies co-production (Fig. 7).

Over the years, from the original Oyster-tecture to Living Breakwaters and several other living shoreline projects, SCAPE has, in fact, established a discourse around oyster culture and coastal resilience. Along with the Living Breakwaters project, SCAPE helped develop the Oyster Gardening Manual[16], a small booklet about the

④ Please visit the website of SCAPE for more information about the Oyster-tecture project.
⑤ Please visit the website of SCAPE for more information about the Living Breakwaters project.





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LIFE CYCLE AS STRATEGY

history of oyster culture in New York Bay and how to farm oysters with tools and techniques. Another aspect of the Living Breakwaters project was a Science Technology Engineering and Mathematics (STEM) curriculum designed for 6th to 8th-grade public school science classes, highlighting the importance of the oyster history both culturally and ecologically, with the project as a pilot case in resilient coastal design.

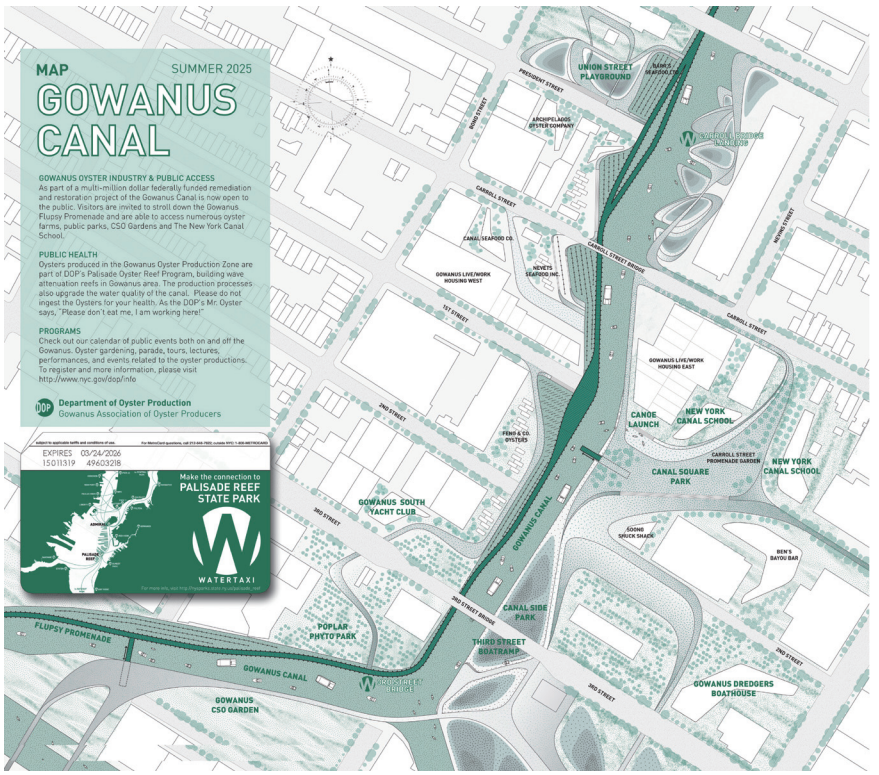
In 2019, the Living Breakwaters project participated in *Hudson Rising*, an exhibition by the New York Historical Society. The exhibition explored the ecological history of the Hudson River, and the project was featured as a viable method for climate adaptation through landscape strategies.

As we can see, cultivating a culture is equally important as SCAPE's design approaches. From Oyster-tecture to Living Breakwaters and various coastal projects, the designers have operated as instigators or catalysts in a sociocultural movement; they have played an important part in growing awareness of climate change and coastal adaptation. This relies on landscape architects' ability to synthesize cultural, ecological, historical, technological, and political lenses through material practices, using oysters as an anchor to engage a broad-based community and create a discourse.

From SCAPE's projects, we can also see a development from one anchor species to a network of multispecies entanglement. This development mirrors that in the field of Feminist Anthropology, in which scholars like Anna L. Tsing and Donna J. Haraway trace from one species to another, illustrating the co-production and sympoiesis⑥ of human and nonhuman actors.[17][18] SCAPE's projects break the binary of nature and culture, living and nonliving, as

⑥ Donna Haraway coined the term "sympoiesis" to replace the concept of "autopoiesis" (self-production) in cybernetics. It means "making-with." Haraway claims that nothing makes itself and nothing is really self-organizing or autopoietic (source: Ref. [18]).

5. Oyster-tecture utilizes oyster's life cycle as a design strategy to create living shorelines that can mitigate the impact of climate change.
6. The speculative map of Oyster-tecture shows that the project faced not only an ecological challenge but also a cultural challenge.



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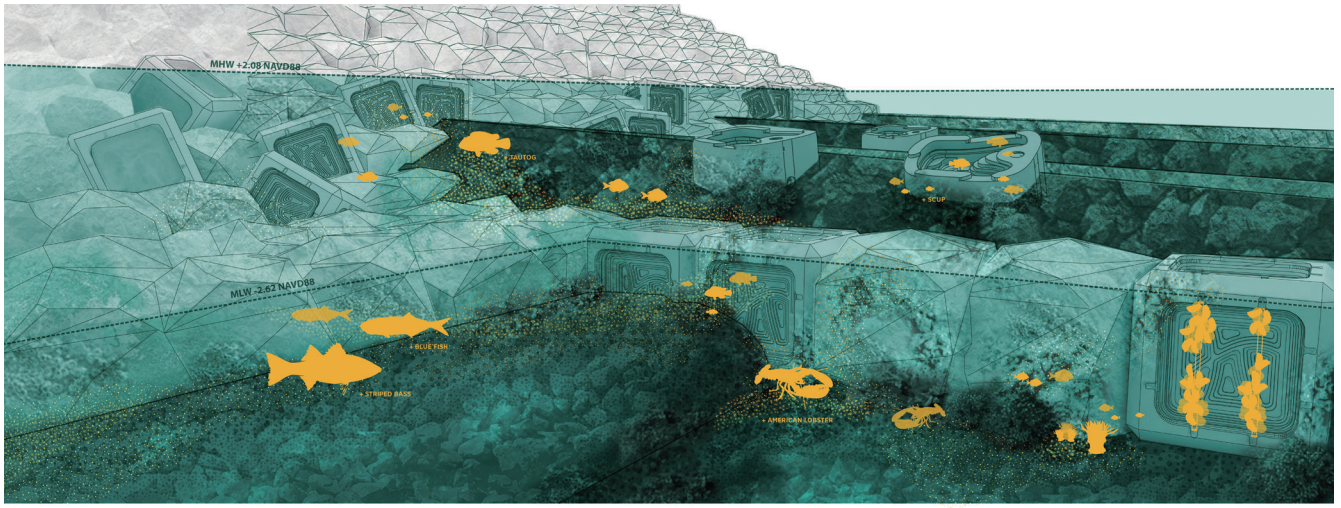


7. In Living Breakwaters project, breakwaters become habitats for various nonhuman lives which co-flourish with engineering interventions.

7 © SCAPE

well as human and nonhuman by telling landscape stories of multispecies co-flourishing.

3.3 Speculate

"Master planning" is inherently a type of utopian thinking. It is "speculative and provisional, not a sacred text, but a compilation of goads and lexicons, something to discuss and debate... alter and use."[19] However, bounded by short-term political structures and mainstream thinking driven by "problem-solution" frameworks, engineers, scientists, policymakers, and community members often forget that "utopia is unrealizable by definition, a stimulus not an outcome."[19] In other words, because we focus on "solving a problem," we lose the opportunities to develop an adaptive epistemology in responding to the climate crisis. How can we bypass the theory–practice dichotomy and embrace a kind of adaptive epistemology—learning by doing?

In recent years, several transformative works come from Brian Davis's discussion on landscape instrumentalism[20], Bradley E. Cantrell and Justine Holtzman's consideration on "modification" as a way of knowing[21], the notion of prototype that challenges the theory–practice dichotomy[22], and "cultivated wildness" as a technical framework to construct new knowledge about the environment through repeated operations[23]. In this body of work, landscape theorists and scholars have developed a kind of adaptive epistemology based on landscape strategies. By understanding landscape design as long-term practices and repeated operations, this body of work refuses to act based on what we have known, instead, alludes to a speculative epistemological framework that generates knowledge through acting. Landscape practices become a way to generate new knowledge about the environment through long-term engagement with the land.

A master landscape architecture thesis in 2020 entitled "Adaptation Handbook" can serve as an example to demonstrate landscape architects' expertise on speculation[24]. Adaptation Handbook considered communities at the eastern shore of Virginia, a peninsula between the Chesapeake Bay and the Atlantic Ocean comprising two counties, Accomack and Northampton (Fig. 8), which are both known for their agriculture and aquaculture production in Virginia. Because of the remote location and separation from other parts of the state, most people of the Eastern Shore live, work, recreate, and socialize on their land. For them, the landscapes are not only valuable for their economic and ecological value, but also places of history, emotion, and meaning. When people lose their land due to the changing climate and rising sea levels, they also lose their culture and identities.

With the unique site condition and history, how does the community here adapt to the changing environment while maintaining their connection with the land? What kind of new relationship can people form with the landscape? This thesis explored how the locals live with rising sea levels and severe weather through adaptation and relocation by visions of human's future position in a changing environment. "Imaginaries have a double function; they are both an achievable aim and a way to achieve this aim."[25]

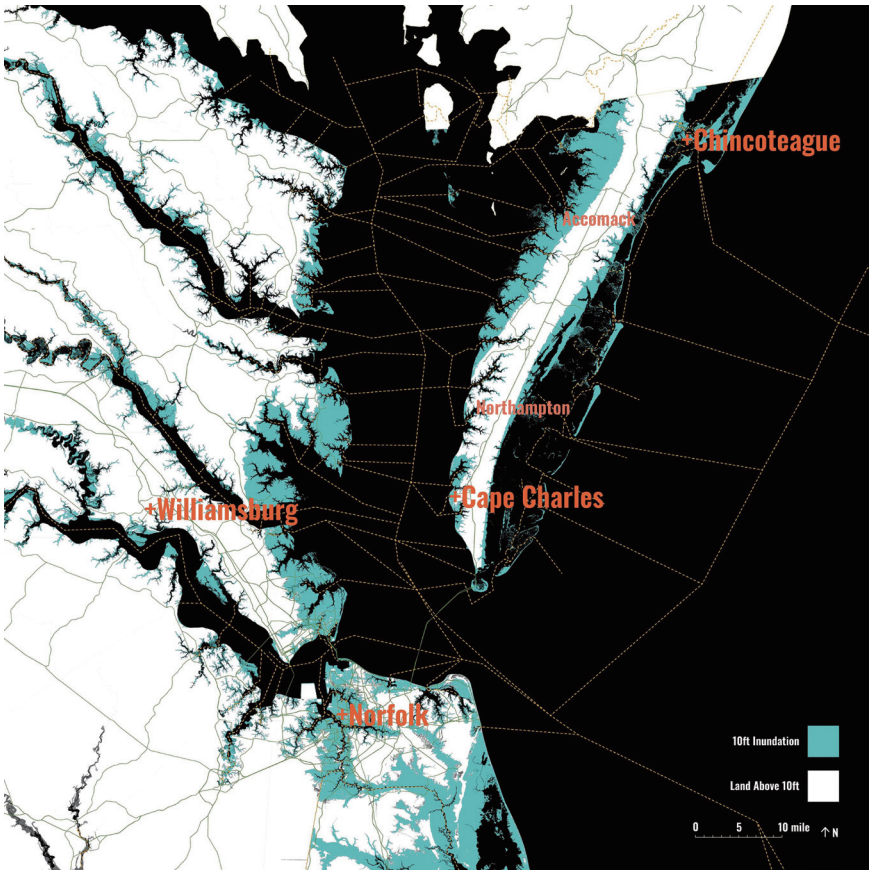
The purpose of this thesis was to provide possible outcomes of climate change on the Eastern Shore, with the hope that these visions can serve as a reference point to foster connections among disciplines, organizations, and communities. This method of starting

with a desirable future and working backward to identify required policies, technologies, actors, and spaces is called "backcasting."[26] It is a common approach used in many disciplines when engaging uncertainties. Other similar concepts include "sociotechnical imaginaries" in STS.[27] When facing an unfathomable challenge such as climate change, imaginaries can be the first step to engender real change.

There is no specific goal or plan for what exactly the future will look like, but with these shared long-term visions in mind, actors are able to identify specific short-term changes that need to happen in technology, policy, and cultural practices. Identifying these short-term changes can also help people find their places under these possible scenarios. Instead of accepting and waiting for the future to happen, more people can actively engage with the decision-making process and participate in changing the future (Fig. 9).

However, it is still important to acknowledge the utopian quality of the visions and understand their speculative and provisional qualities. Like Michael Sorkin suggested, a vision plan is better understood as "a compilation of goads and lexicons, something to discuss and debate... alter and use."[19] The purpose of the vision is not to provide an accurate prediction of the future but to offer a common ground that people can discuss and tinker with. Achieving a desired future scenario is a process that requires constant adjustment. An image of the future is merely the first step. To affect real changes, actors need to work together to issue funding, implement policies, and carry out experiments.

8. Sea Level Rise Map of the Eastern Shore, showing projected impact of the rising seas on the coastal Virginia,.



4 Conclusions and Discussion

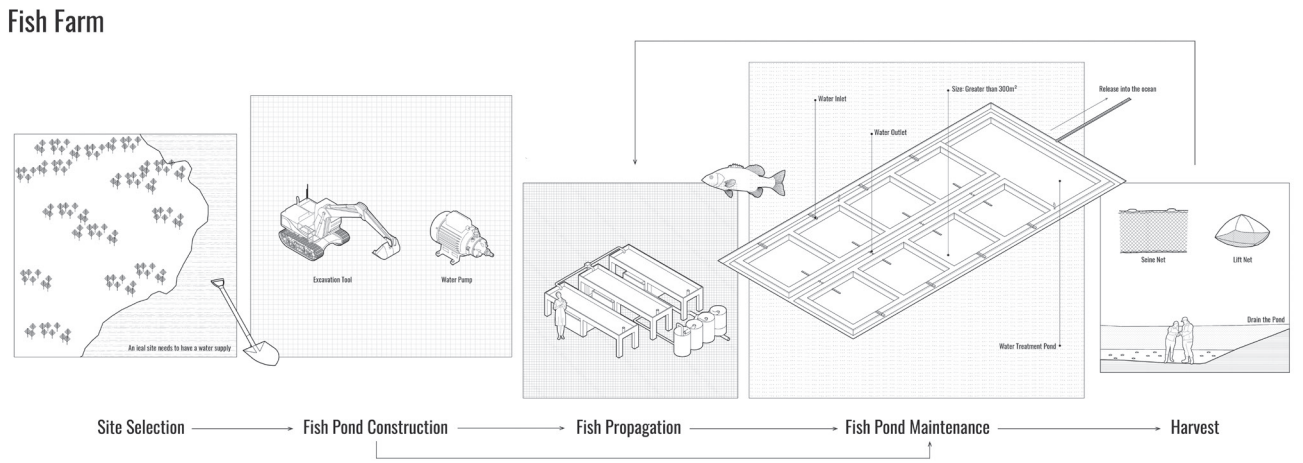
The climate crisis is a threat, but it can be framed as an opportunity, for it generates unprecedented solidarity across cultures, disciplines, and professions to potentially overhaul the vicious and perpetual systems that produced the climate crisis in the first place. Imagine if solidarity surrounding climate actions were leveraged to reimagine a future for humanity. This article thus calls for climate solidarity across fields and advocates landscape architects' essential role in it.

This article is by no means a critique of current real-world climate adaptation efforts led by governments and public agencies, and the authors share the same vision and urgency as many experts in science and engineering professions and disciplines. By analyzing a government-led coastal adaptation master planning project, this article reveals the indispensable role landscape expertise can play in climate actions.

Landscape architects today still face the challenge of marginalization and misunderstanding from experts outside the landscape disciplinary silo. Authors' past multidisciplinary collaboration experiences suggest that many experts would reduce landscape architecture to aesthetic and ecological interventions, overlooking landscape architects' systemic, process-based frameworks in addressing complex and multi-faceted issues. Thus, this article proposes a set of lexicons—*spatialize*, *synthesize*, and *speculate*—to explicate the kind of landscape expertise.

"Spatialize" refers to the kind of spatial thinking specific to the Landscape Architecture discipline. Instead of presenting spatial data as facts, many landscape architects use spatial information to construct narratives. Mapping is not an end, but a means towards new knowledge. Landscape architects can use this tactic to reinvent narratives about climate impact and reframe controversial propositions such as "relocation" and "retreat" as opportunities to make ways for novel ecosystems and productive landscapes.

"Synthesize" speaks to landscape architects' ability to coalesce cultural, ecological, historical, technological, and political frameworks through material practices. These projects often recruit experts with diverse backgrounds as multidisciplinary teams, such



9. Operation catalog, showing various strategies that the communities could adopt to respond to their shifting landscapes due to climate change and rising sea levels.

as the one presented in section I. Landscape architects are trained to be "multilinguists" and can synthesize various, and sometimes contradicting frameworks through material practices. Like SCAPE's oyster-tecture project, designed landscapes have multiple scales of undecidability and can be unpacked within different interpretation systems.[28]

Finally, rooted in the process-based landscape design paradigm, "speculate" speaks to the ability to understand design itself not as a finished product but as a long-term practice with repeated operations. This way of thinking can provide an alternative to the present-day, problem-solution-oriented climate efforts. Climate adaptation is not problem-solving. What is needed is a kind of adaptive epistemological framework and constantly inventing and reinventing new concepts, theories, and methods to adapt to the changing climate.

Providing these three lexicons aims to help landscape architects clarify their roles in climate actions. Of course, there may be other aspects of landscape expertise that these three terms cannot describe. Creating a discourse of landscape expertise merits further discussions and debates.

REFERENCES

[1] Morton, T. (2013). *Hyperobjects: Philosophy and Ecology After the End of the World*. University of Minnesota Press.

[2] Fleming, B. (2019). Design and the green new deal. *Places Journal*. doi:10.22269/190416

[3] Gorman, M. E., Zhang, Z., Fauss, K. D., & Bowes, B. D. (2019). Collaboration Among Apparently Incommensurable Expertises: A Case Study of Combining Expertises and Perspectives to Manage Climate Change in Coastal Virginia. In D. S. Caudill, S. N. Conley, M. E. Gorman, & M. Weinel (Eds.), *The Third Wave in Science and Technology Studies: Future Research Directions on Expertise and Experience* (pp. 255-272). Palgrave Macmillan. doi:10.1007/978-3-030-14335-0_14

[4] Gorman, M. E. (Ed.). (2010). *Trading Zones and Interactional Expertise: Creating New Kinds of Collaboration*. MIT Press.

[5] Collins, H., & Evans, R. (2002). The third wave of science studies: Studies of expertise and experience. *Social Studies of Science*, 32(2), 235-296. doi:10.1177/0306312702032002003

[6] Meyer, E. K. (1992). Situating Modern Landscape Architecture. In S. R. Swaffield (Ed.), *Theory in Landscape Architecture: A Reader* (pp. 21-31). University of Pennsylvania Press.

[7] Deleuze, G., & Guattari, F. (1987). (B. Massumi, Trans.). *A Thousand Plateaus: Capitalism and Schizophrenia*. University of Minnesota Press. (Original work published 1980)

[8] DeLanda, M. (2016). *Assemblage Theory*. Edinburgh University Press.

[9] Commonwealth of Virginia. (2021). *Virginia Coastal Resilience Master Plan*.

[10] Harley, J. B. (1988). Maps, Knowledge, and Power. In D. E. Cosgrove & S. Daniels (Eds.), *The Iconography of Landscape: Essays on the Symbolic Representation, Design, and Use of Past Environments*. Cambridge University Press.

[11] Crampton, J., & Krygier, J. (2005). An introduction to critical cartography. *ACME: An International Journal for Critical Geographies*, 4(1), 11-33.

[12] Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, 'Translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science*, 19(3), 387-420. doi:10.1177/030631289019003001

[13] Drennen, A. & Hardin, S. (2021). *Climate deniers in the 117th Congress*. The Center for American Progress.

[14] CNN. (2021, August 9). *Using nature to combat climate change*.

[15] TEDWomen 2010. (2021, December). *Reviving New York's rivers—With oysters!*

[16] Billion Oyster Project (2014, August 5). *Oyster gardening manual*. Issuu.

[17] Tsing, A. L. (2017). *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton University Press.

[18] Haraway, D. J. (2016). *Staying With the Trouble: Making Kin in the Chthulucene*. Duke University Press.

[19] Sorkin, M. (2019, May 2). *The last lecture*. YouTube.

[20] Davis, B. (2013). Landscapes and instruments. *Landscape Journal*, 32(2), 293-308. doi:10.3368/lj.32.2.293

[21] Cantrell, B., & Holtzman, J. (2016). *Responsive Landscapes: Strategies for Responsive Technologies in Landscape Architecture* (p. 254). Routledge. doi:10.4324/9781315757735

[22] Zhang, Z., & Liu, X. (2020). Control and uncertainty: Towards a paradigm of prototyping. *Landscape Architecture Frontiers*, 8(4), 10-25. doi:10.15302/J-LAF-1-020032

[23] Zhang, Z., & Cantrell, B. (2021). Cultivated wildness: Technodiversity and wildness in machines. *Landscape Architecture Frontiers*, 9(1), 52-65. doi:10.15302/J-LAF-1-020040

[24] Zhang, S. (2020). *Adaptation handbook*. [Master's thesis, University of Virginia].

[25] Hajer, M. A., & Pelzer, P. (2018). 2050—An energetic Odyssey: Understanding 'Techniques of Futuring' in the transition towards renewable energy. *Energy Research & Social Science*, (44), 222-231. doi:10.1016/j.erss.2018.01.013

[26] Robinson, J. B. (1990). Futures under glass: A recipe for people who hate to predict. *Futures*, 22(8), 820-842. doi:10.1016/0016-3287(90)90018-D

[27] Jasanoff, S., & Kim, S.-H. (2009). Containing the atom: Sociotechnical imaginaries and nuclear power in the United States and South Korea. *Minerva*, 47(2), 119-146. doi:10.1007/s11024-009-9124-4

[28] Berrizbeitia, A. (2001). Scales of Undecidability. In J. Czerniak (Ed.), *Downsview Park Toronto* (pp. 117-125). Prestel Publishing.

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基于过去二十年间的设计研究项目评述景观设计师在气候适应实践中的专长

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摘要

我们可以将气候危机看作一种威胁，也可以将之视为一种机遇，因为它促使不同文化、学科和行业前所未有地团结一致，这种团结有望彻底改变最初导致气候危机的根深蒂固的恶性循环。

本文评述了景观设计师在多学科综合性气候适应语境中的专业性，即“景观专长”（landscape expertise）。当代景观设计学科中以“系统”和“过程”为主导的思维模式，能成为跨学科气候行动、团结协作的强有力工具。然而，在现实中，气候相关的讨论通常由决策者、科学家和工程师主导，景观专长仍然被忽视甚或边缘化；如今的景观设计师仍然面临着其他学科专家的误解——在本文作者过去的多学科合作经历中，许多其他领域的专家仅简单地将景观设计等同于美学和生态层面的设计，而忽视了景观设计师在解决复杂、多元问题时重视“系统”和“过程”的思维方法，而本文恰旨在回应这一对景观专长理解上的欠缺。

文章首先通过剖析美国弗吉尼亚州的一项由政府领导的大规模海岸适应总体规划实践，梳理出当前世界气候适应实践工作所涉及的专业领域。文章继而对过去二十年间一系列景观设计项目进行了理论分析，并提出了三个术语——“空间化”（spatialize）、“融合”（synthesize）和“推想”（speculate）——以阐释多学科综合性气候适应项目中景观专长的内涵。“空间化”是指景观设计师通过战略性地展示“数据”，批判性地审读地图和构建知识的能力。“融合”是指景观设计师通过物理空间实践，统筹考量文化、生态、历史、生物和政治等视角，来构想“多物种共生”的愿景。“推想”旨在将景观设计视为一种必须频繁运营的长期实践，从而将景观设计视为“基于实践产生知识”的探索性框架，而非由理论知识主导实践的过程。

关键词

气候变化；
景观设计学；
互动型专长；
景观专长；
制图学；
多物种共生；
推想

文章亮点

- 引介“互动型专长”（interactional expertise）概念，并以“空间化”、“融合”和“推想”来阐释景观设计师在应对气候变化时的专业性
- 在“多物种共生”等概念与新近的气候适应性项目之间建立联系
- 呼吁各领域团结一致，共同面对气候变化，并倡议景观设计师在团结协作中发挥重要作用

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