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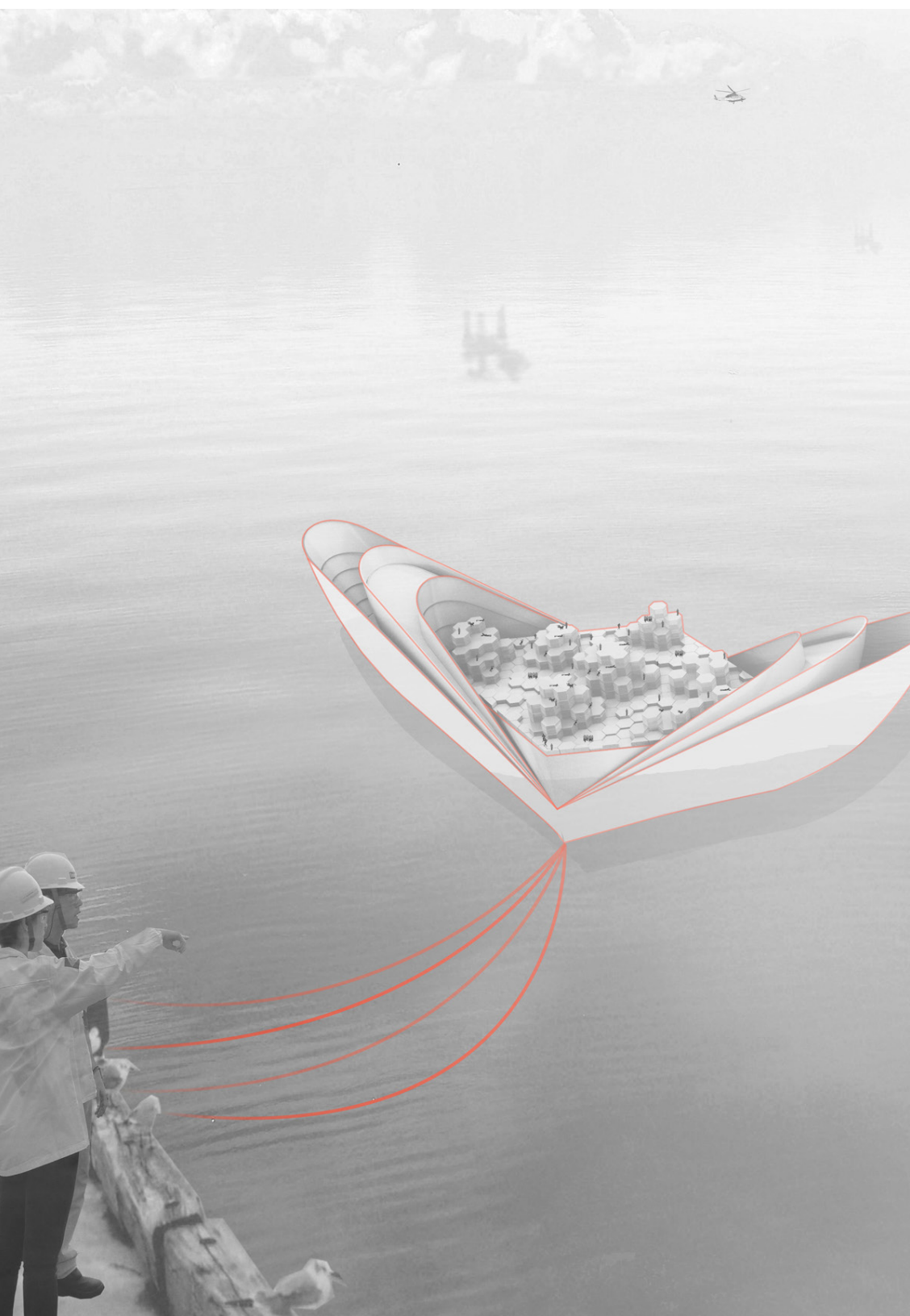
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Lecture Review and Interview by Thomas Murdoch
Interview with Neeraj Bhatia

Petropolises

A Quest for Soft Infrastructure as Water-Based
Urbanisms of the Floating Frontier City

Neeraj Bhatia gave the last of the fall lecture series hosted by the Department of Architecture at the College of Environmental Design, UC Berkeley in the fall of 2013. His talk emphasized infrastructure as the fundamental spatial product, and declared the need to move from “hard” to “soft” systems of infrastructure—understood as flexible, malleable, responsive, and non-linear—built to react or adapt to shifting conditions and allow for passive development through time. Additionally, he championed the term “active form” to mean spatial agents or actors that shape not just the architectural object, but also the way the object plays; advocating for forms that perform like verbs of the “object form” nouns in his syntactic metaphor. According to Bhatia, it has become apparent that “the natural environment is perhaps the only issue that affects all of humanity equally,” and a renewed “emphasis on the collective natural environment repositions the role of infrastructure as the foundational spatial format, as it allows for the interconnection between the human and environmental spheres.”¹ His emphasis on infrastructure and active form underscores a critique of architecture’s obsession with the object form, and its failure to operate at the scale

of an articulated collective. In her essay *From Site to Territory*, Lola Sheppard declares that “architecture can no longer define its parameters and responsiveness at the scale of its immediate site, but rather, must operate at the scale of the broader territory, a space expanded and thickened with environmental data, competing social and political claims, economic forces, systems of mobility, ecological systems, and urban metabolisms.”²

Bhatia discussed a number of his own projects that attempt to materialize this intellectual concern, proposing an array of architectural objects that are flexible and responsive to the surrounding environment, utilizing natural forces and pre-existing networks of infrastructure as the “active forms” that affect their performance. His focus on softness evokes and synthesizes various heterogeneous architectural concerns: structuralism’s ecological metaphors about self-regulating systems; critical theory’s speculation on architecture that is neither determined by, nor deterministic of, fixed programs; and the more recent expansive views on architectural practice espoused by projective theory. Yet, for all the optimism involved in the metaphorical pushing of the architectural envelope, there was also a palpable sense of resignation and subservience to the market forces that govern the production of architecture. The internal logics of capital welcome flexibility and softness in pursuit of improved building performance and return on investments. In the context of late capitalism, the architectural object becomes another consumable product. This article will focus on *The Petropolis of Tomorrow* and critically evaluate its pursuit for “soft infrastructure” and the (un)intended effects of “active form” on architecture as commodified object.

The Petropolis of Tomorrow is a design and research project examining new Petropolises—cities formed from resource extraction—associated with offshore oil drilling in Brazil.³ The project is not just a vision for floating urban typologies; it also speculates on new methodologies for

integrating infrastructure, landscape, urbanism, and architecture within the larger spheres of economics, politics, culture, and the environment. The proposal is a response to the desire of *Petrobras*, the Brazilian petrochemical company, to relocate workers offshore, in response to increased transportation costs of both oil and workers as rigs are established farther away from the coast. In the early 1970's, topographical or bathymetric studies conducted by former *Petrobras* president and then Brazilian president, Ernesto Geisel, revealed a large presence of oil fields at depths greater than 300 meters below sea level in several locations along the Brazilian coast. Geisel's governmental actions enabled *Petrobras* to initiate its own platform for technological development, investigation, extraction, and production program for oil operations in waters with depths greater than 2,000 meters.⁴ The United Nations' new Convention on the Law of the Sea (1982) extended and thickened the maritime boundaries of countries, creating exclusive economic zones (EEZs) that grant the coastal nation sole exploitation rights over all natural resources up to 200 nautical miles (370 kilometers) from the territorial sea baseline.

Despite the horizontal and vertical expansion of the logistical landscape dedicated to oil extraction, infrastructure of this kind has rarely been designed using long-term, comprehensive planning, and little effort has been made to engage the unique social, cultural, environmental, and economic challenges that face the implicated communities. Bhatia attempts to correct this by proposing "a holistic reassessment of the conditions of extraction by taking into account the livelihoods of workers, energy efficiency, and the legacy of oil infrastructure."⁵ By establishing a system of floating islands—which house workers, grow crops, harvest energy, and collect oil—strategically located along the natural drift current of the Brazilian coast, the project tackles the current logistical obstacles and rising costs resulting from

the growing distances of oil rigs from shore. Additionally, it indexes a natural condition of drift and overlays it with the existing industrial schedule, generating a symbiotic relationship between the ecosystem and its resource extraction through the creation of these new floating frontier cities.

It is no mere coincidence that speculation for this new urban typology and the pursuit of “active forms” and “soft infrastructure” should happen at sea. Keller Easterling, who coined the term “active form” in opposition to, “object form,” defines the former as “the way that some alteration performs within a group, multiplies across a field, reconditions a population or generates a network. They may be not only physical objects (...) but also topologies or organizational properties within a spatial field.”⁶ She identifies oceans as conflictive territories imbued with myth in her book *Enduring Innocence* (2005), dedicating a whole chapter to the sea, a “place of lawless exception and a cauldron of democracy,”⁷ in which she writes:

While most landscapes are kinetic, in so many historical and philosophic reveries about the political constitution of shifting territories, it is the sea that is the favorite model of active territories, the sea as the alter ego of the land. The sea is the stuff of epic tales, the mother and the femme fatale, the stage for the heroic historians of world systems or the solvent capable of dissolving landed logics.⁸

These maritime metaphors are favorites of both Neoliberals and Marxists alike. For the former, the frictionless sea as a global carrier of physical goods and virtual packets of information that accomplish a one-world economy; for the latter, the sea as a site of bio-political groundswell, possessing the potential to disrupt market forces. Hardt and Negri argue in *Empire* that it is not only these classic forces of resistance that

adopt the fluid and slippery qualities of the sea, but capital itself, capital in league with the state. Capital, they write, “tends toward a smooth space defined by uncoded flows, flexibility, continual modulation and tangential equalization.” In this “smooth space” of empire, “there is no place of power—it is both everywhere and nowhere.”⁹ According to Easterling, market and capital can switch places with resistance, and even bear some of its traits or costume elements as a masquerade.¹⁰ While both resistance and capital seek smooth and fluid spaces, architecture has historically opposed these qualities more than any other discipline, due to the inherent materiality and physical permanence implicit in its products—buildings. The recent housing crisis in the United States has shown that even those cultural repositories of financial stability, traditionally considered to be secure investment assets, could not escape the speculative and volatile forces of the market. When architectural practice and the construction industry are so inextricably linked to the economy, it is no surprise that we have come to expect of architecture these same qualities of smoothness and flexibility, and appropriately dress up our buildings in the various marketable garments required for the occasion.

The diverse actors involved in *The Petropolis of Tomorrow*—a list that includes a number of collaborating educational institutions, and the sponsoring giants *AECOM* and *Keppel Offshore & Marine*—all play their roles on this fluid stage by wearing the elaborate costumes demanded of each other. “Energy consciousness” is perhaps the most egregious of these masks, and in this case, is especially ironic. After all, one of the proposed designs for extractive urbanisms (*Drift & Drive*) plans to passively accumulate tidal and solar energy to charge the drift boats that would go about collecting oil and harvesting crops.¹¹ This sort of greenwashing—previously reserved for television advertisements featuring offshore windmills with voice-overs celebrating the company’s

recent investment in renewable resources, is now required of the architectural object as well. Much like the “fair trade” stamp on the pricy produce we buy at our organic store; buildings are now expected to come with a LEED plaque, or at least some conspicuously placed solar panels.¹²

Yet the openness of *Petrobras* to the sustainable and holistic evangelism of the architect is contingent on Bhatia’s delivery of a proposal that manages to lower transportation costs, ultimately providing a more profitable model of resource extraction. Easterling cautions against equating flexibility and responsiveness with openness:

[F]lexibility and responsiveness do not necessary [sic] describe a disposition of openness. Rather, the responsive organization is often one that is able to simultaneously extend and exclude. Optimizing the cheapest low-tech construction to deliver high-tech results with maximum profits relies on the continual perfection of the formula and the vigilant elimination of failure.¹³

The architect’s self-portrayal is one of an innocent healer who proposes a restorative plan. Bhatia wears this costume with ease, claiming that architecture should not shy away from objectionable patrons in the pursuit to expand its horizons and scopes of influence.

Although he correctly identifies offshore oil drilling as a missed opportunity of infrastructure design and integration, and fertile grounds for the speculation of future urbanisms of the *Waterworld* variety, he admittedly operates under certain assumptions that justify this controversial association. If there is one central belief that Bhatia uses to legitimize the *Petropolis* project, it is his certainty that society’s dependence on oil and the profitable nature of the industry prevents us from giving up the addiction until we have consumed every last drop on

the planet. If one chooses to accept this view, then resisting or fighting against the oil industry becomes an exercise in futility; conversely, leveraging its power to invest in lasting infrastructure that could survive the industry's expiration date and ease the transition to alternative energy sources becomes not just laudable, but pressingly urgent.

The *Petropolis* project accomplishes a number of its stated objectives, not the least of which is improving the livelihood of workers by providing housing and other amenities for their families in the residential islands, all the while reducing transportation time and costs associated with daily commuting to and from the oil rigs. The *Drift & Drive* proposal also elegantly incorporates the active form of ocean currents into the design and performance of the archipelago system, successfully creating an efficient and self-sustainable urban floating typology. However, doubts remain as to what sort of infrastructure legacy this project would leave behind. At the end of the day, the only "hard" elements of infrastructure involved are the existing pipelines that carry the crude oil to mainland, which serve as anchoring points to the three hub islands. The rest of the "soft infrastructure" would, in all likelihood, be carried off to the next global destination to be exploited once the Brazilian maritime oil reserves are depleted. I find this to be an extremely problematic scenario, considering the colonial past of the global south as purveyor of primary goods and natural resources; and the continued exploitation inflicted by transnational corporations who seek to benefit from extractive endeavors, but consistently fail to deliver on the promised investments and development made to local governments and communities.

In this regard, Bhatia's embrace of "softness" appears somewhat overly optimistic. Like many others in the discipline, he remains reticent to fully acknowledge the warfare and aggression of architecture, the volatile and violent ecologies in which it is embedded. For Easterling, these "declarations of innocence are similar to declarations of war."¹⁴

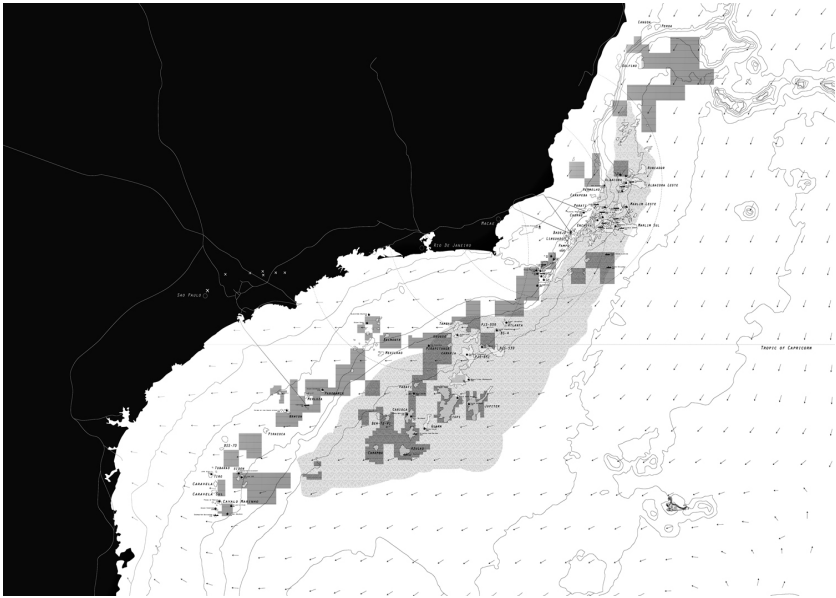


Figure 1 Floating island archipelago leveraging oceanic drift of the Brazilian coast. Drift & Drive 2012 (Joanna Luo, Weijia Song, Alex Yuen).

Architects perhaps secretly long for monism and attempt to reason towards a unifying theory or the true mechanics of nature, for the chance to gather the world onto a single sheet of paper and control it with geometry. Bruno Latour was correct in identifying architects as “obsessed with the construction of one immanence and the destruction of another.”¹⁵ While it might be true that “softness” actively rejects the notion of fixed and prescriptive geometries, it carries its own internal logics and biases, and preaches an evangelism every bit as authoritarian as the ones that came before it.

Although fluid models loosen ideas, they also provide a convenient means to confound issues or further deterritorialize disputes. In “The Smooth and the Striated,” Deleuze and Guattari demonstrate that “smooth spaces are not in themselves liberatory” and caution against

believing “that a smooth space will suffice to save us.”¹⁶ Smooth gathers and decodes information with a variety of motives, and the decoding does not imply innocent frictionless passage but, rather, shifting aggressions and adversaries. Easterling shares a similar view, when she states that:

Soft is a clever masquerade of this hard sea, one that uses landscape in all its incarnations as a convenient prop. It is similar to the portrayal of the sea as a regulating system or smooth, free, frictionless medium. Naturalizing the market, soft borrows an ethos about penetrable organizations that grow and learn by accepting contradictions. [...] Yet the desire for information is really a desire for optimization, and the illusion of an inclusive disposition masks an exclusive disposition. Recursivity produces an organization with its own steady state, and even its own catastrophes. The goal of soft is to devour extrinsic information, remain intact, and avoid contradiction.¹⁷

Although “soft” has become the unifying battle cry of this new architectural crusade, there are in fact many different, and sometimes conflicting, definitions and interpretations of the term. Central to Bhatia’s interest in softness is the investigation of the “formal relevance” of the architectural object, determined by the ability of form to sustain functionality through time. A particular version of this type of soft object seems to embody notions of adaptability and physical permanence that stand in opposition to an unfortunate product of architectural commodification: the disposable building, value engineered for planned obsolescence. But ultimately, formal relevance is still understood as object-centered functionality. An architectural object can sustain functionality by resisting changing site conditions and adapting to new programmatic demands, or alternatively by

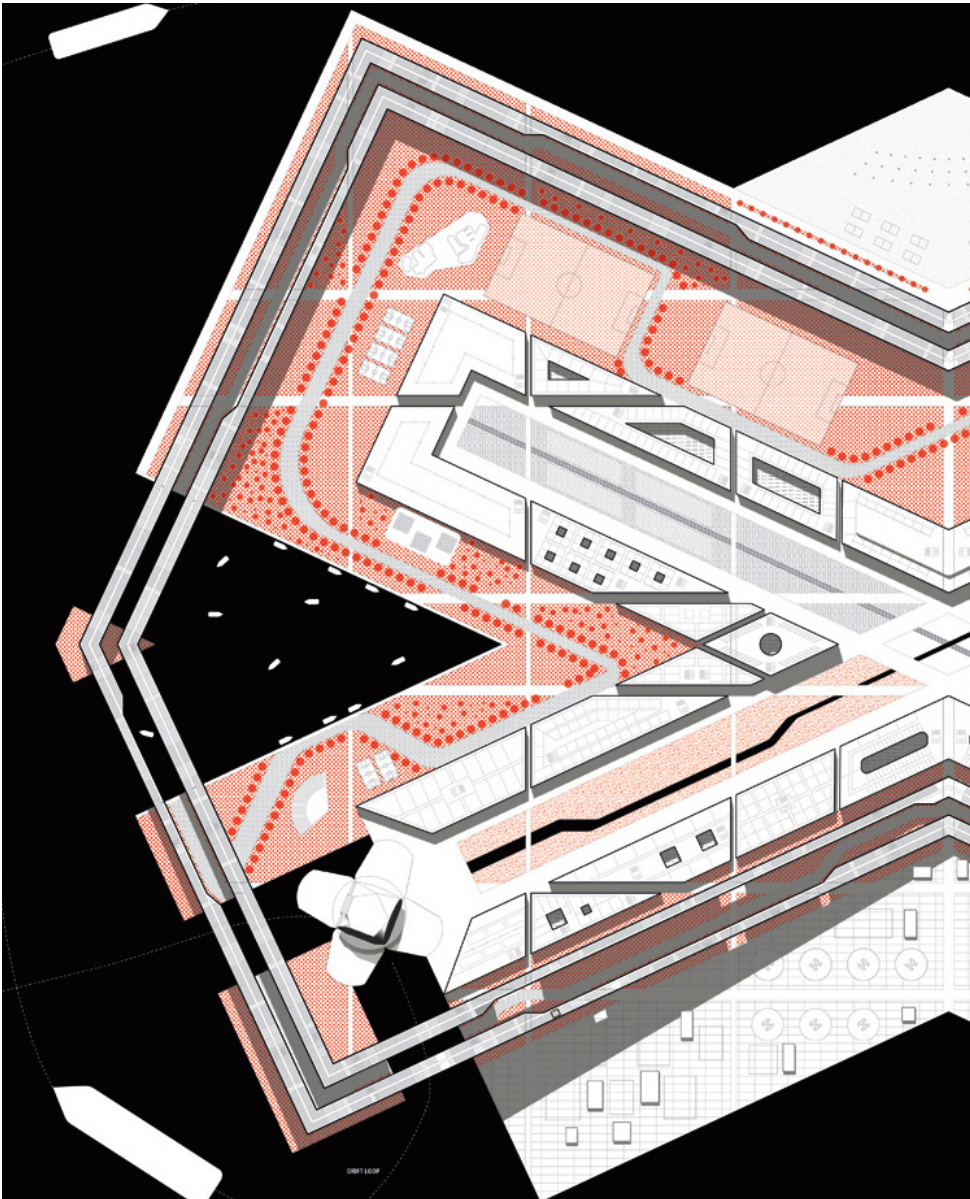
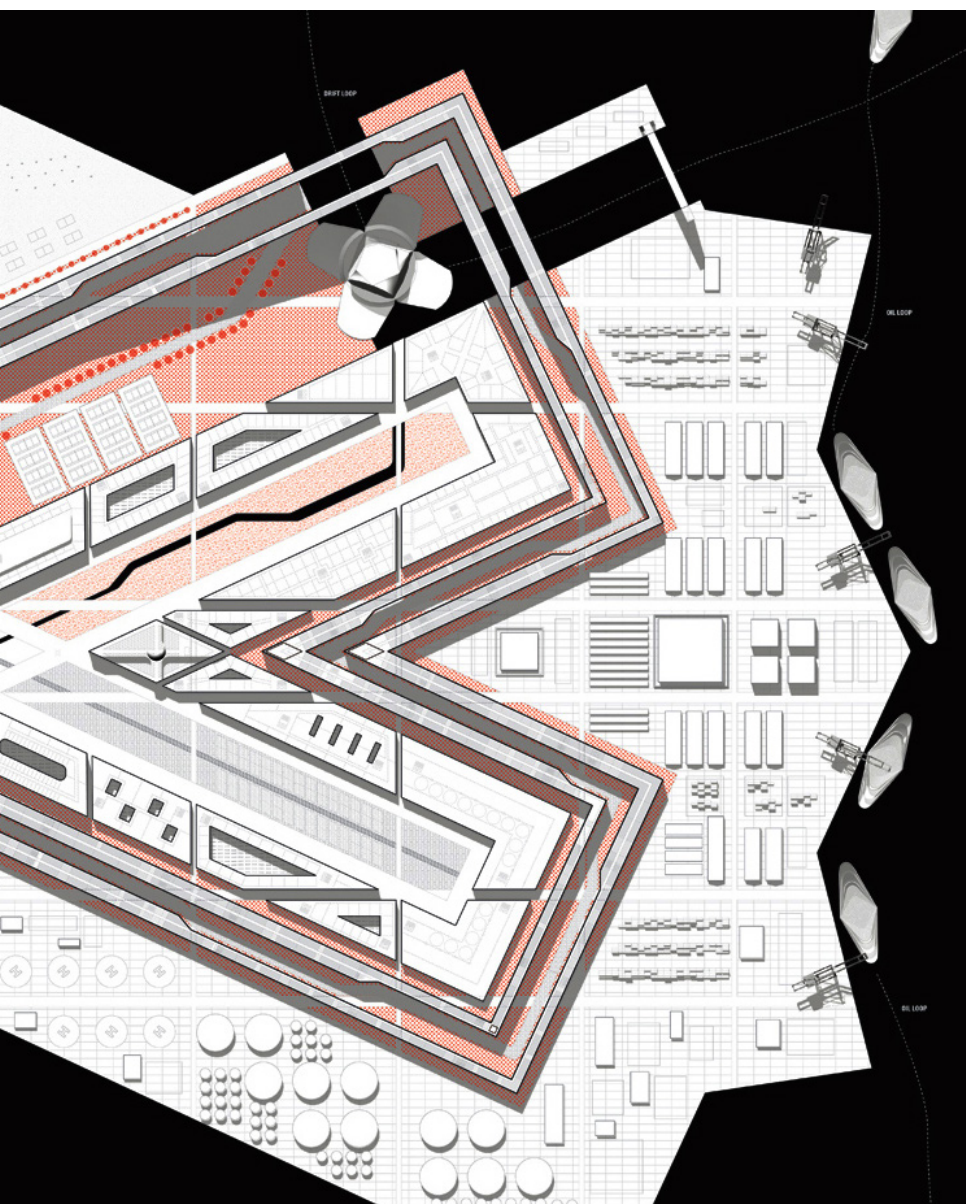


Figure 2 Hub island, permanent residence for workers, administrators, and their families. Drift & Drive 2012 (Joanna Luo, Weijia Song, Alex Yuen).



changing its site altogether while remaining formally relevant. The flipside to the nostalgic preservation of the repurposed historical icon is the architectural souvenir, propagating its profitable progeny wherever the market wind blows.

This is not to say that there is no merit in the speculation of nomadic water-based urban typologies. Perhaps in a karmic twist of fate, these *Petropolises* will outlive the extractive program that engendered them, and become the future floating refugee camps for the victims of global warming, as rising sea levels threaten to displace hundreds of millions of people living in low-lying coastal areas. In a final comedic act, the oil industry throws a lifeline out to the flood it helped create. Still, as architects we should remain aware of the true motivations behind the market's embrace of "softness," and identify opportunities to leverage our own concerns that often exceed its profit-seeking logic. *The Petropolis of Tomorrow* risks a regrettable fate as merely a better and more lucrative extractive urban typology, becoming a veritable souvenir of its birthplace, as it carries a "slice of Copacabana" on each of the residential islands that drift the sea.¹⁸

Interview

Thomas Murdoch: You seem to argue for an expansive view of architecture. What is architecture to you? And what should the role of architects be in society?

Neeraj Bhatia: I don't think I can say what the role of architects in society should be. Every designer needs to situate their own role based on their passion. I take a certain trajectory that fits me and my interests, at a scale that I'm comfortable working in, on problems and issues I'm interested in tackling. So I don't believe there's a one-size-

fits-all role, if every architect should be expansive, if there's a scale that architects should work at, or a type of project that architects should do. The diversity of the architectural discipline is what makes it a rich profession. There are an abundant number of tools an architect has at their disposal—both in terms of design, but also methodologies and ideologies that impact design—that could be applied to a variety of scales and issues that occur outside of the traditional boundaries of the discipline. While a lot of interest is focused on urbanism today, architects don't have a strong voice currently in those conversations and I believe there are several things that architecture as a discipline can offer to those discussions.

TM: How do you define soft? How does softness relate to architecture?

NB: Soft is a difficult word to define in the context of design. Part of the reason why one of my partners, Lola Sheppard, and I launched *Bracket 2* on soft systems was precisely to help us define what the term is, and what it means today. You could say that architecture as a profession really started through means of control and order—to provide shelter from the dynamic and turbulent weather conditions of the environment. I think there is a need to control embedded in the discipline and that need still exists. You could say that architects shouldn't control or order, but I believe this is one of the main roles of the profession. Architects are often hired to make difficult decisions, to try and project future uses and possibilities of space, and to organize program. Those things will always be part of the discipline.

I think that we are also noticing that the contemporary conditions of the city are transforming in dynamic ways at a much faster speed. A lot of the non-spatial forms of communication today have essentially

rewired the city in ways that make the idea of controlling and ordering increasingly difficult, particularly because we live in a moment of economic volatility, political instability, ecological crises, and so forth. While the medium of architecture is typically described by ordered permanence, we are now also required to think of what decisions made today will have a lasting effect in 20, 30, 40, 50 years—in other words, how can design have a longer term relevance? I think this is why terms such as *flexibility*, appear more often in architectural discourse—as an acknowledgement that future narratives and uses of buildings we design cannot always be anticipated. The notion of soft in that regard really emerges from trying to understand where to exert control, and where to allow for choice or dynamic conditions to invade the design process. That is an intriguing balance. I wouldn't say a project is ever exclusively ever hard or soft.

What we noticed working on this issue of *Bracket* was that there were certain characteristics in particular projects that allowed them to operate in similar ways to ecosystems—with complex feedback mechanisms at a variety of scales, an ability to adapt or transform and thereby acquire a form of resilience, built-in distributive systems rather than centralized ones, etc. What I took away from that is also part of my own personal interest in my practice, The Open Workshop. There are two systems in particular that are highly dynamic that architecture can be involved in re-negotiating. One is the transforming environment that humans live in—including its ecologies, geology, weather patterns and climate. And the other one is an increasingly pluralistic political environment. One in where the public is a series of different constituencies with divergent viewpoints. In our neoliberal society we respect and value the difference in viewpoints, which brings richness to our society. But, it also creates a challenge in terms of providing a singular coherence. So we start realizing

that there are potential limitations in the hard project, because the dynamic conditions of the environment and the divergent beliefs and viewpoints in society make it very difficult to create lasting solutions. Here, the soft project can offer cues on how the architect can set up a field of relations for anticipated and unanticipated outcomes from both the environment and its inhabitants.

TM: If we want to specifically address the Petropolis project, which of the soft characteristics were you most interested in exploring?

NB: Well, the *Petropolis* project was not set up as an exploration of ‘soft’ per se. I’ve been working with my partners in InfraNet Lab on a project in the Canadian north that was perhaps more ideologically positioned as a way to test soft systems. Or to think of the role of design in a climate that is extremely polar from summer to winter, and an area that is made up of a diverse series of cultures and identities.

While not organized as a study on ‘soft’ systems, there were still characteristics of soft that emerged in the *Petropolis* projects, and I think various phases of the project were conducive to different actions. In the first phase, examining the floating frontier, which is also the subject of the book, there are certain things that you can do on water that are very difficult to do on land. For instance, you can move boats as large as city blocks and reconfigure them with relative ease; you can move structures up and down in section quite easily, and so forth. Those became opportunities, not to create movement for the sake of movement, but to really reconsider the ocean, an area often depicted by designers as a *tabula rasa*, as a dynamic and living environment that the projects could be inserted within, respond to, but also have a positive effect on.

For instance, *Drift & Drive*, which is the focus of the *Harvesting Urbanism* chapter, is essentially a project that is trying to redevelop

logistics and understand how the dynamics of oceanic drifts can provide a way of moving goods and materials that do not require expedience. In that case, we were opportunistically leveraging the dynamic environment for energy and food production. In another example, in the *Logistical Urbanism* chapter, a project entitled *Frequency* builds upon Team X's "Scales of Association", which was a theory in the '60s that there are associations that occur between various scales of the city—from one's doorstep to the street, neighborhood, district, and city. At each of these scales there is a different type of interaction and interface that occurs among the public. *Frequency* builds upon Team X's concept by acknowledging that in the frontier of Brazil you have thousands of workers distributed over a vast landscape, and as such there are very few public amenities on the individual platforms. When you start consolidating these workers, not only do you get larger core populations to afford a larger diversity of amenities, if you actually consider *mobile* programs that interact with these platforms—arriving at different schedules depending on the scale of the program and its frequency of use—suddenly you have the programmatic diversity of a larger metropolis over time. You could say it's another take on the notion of the "sharing economy." So we have a scheme that develops through time, organized by a schedule, which gives it more ability to account for contingencies, whether anticipated or unanticipated, such as storms, festivals, emergencies, etc. Here, the master plan is replaced by designing *time* first.

Neeraj Bhatia is an architect and urban designer from Toronto. His work resides at the intersection of politics, infrastructure, and urbanism. Bhatia is a co-director of InfraNet Lab (<http://www.infranetlab.org/>), a non-profit research collective probing the spatial byproducts of contemporary resource logistics, and the founder of The Open Workshop (<http://www.theopenworkshop.ca/>), an architecture office

examining the project of plurality. Further, he is the research director of The Petropolis of Tomorrow (<http://www.petropia.org/>), a platform that explores the relationship between urbanism and resource extraction. Bhatia has previously taught at Rice University, Cornell University, University of Toronto, University of Waterloo, and is currently an assistant professor at CCA, where he co-coordinates the Urban Works Agency (<http://urbanworks.cca.edu/>). He is co-editor of *The Petropolis of Tomorrow* (with Mary Casper, Actar, 2013), *Bracket [Goes Soft]* (with Lola Sheppard, Actar, 2013), and *Arium: Weather + Architecture* (with Jürgen Mayer H., Hatje Cantz Publishing, 2009), and is co-author of *Pamphlet Architecture 30: Coupling—Strategies for Infrastructural Opportunism* (with InfraNet Lab, Princeton Architectural Press, 2010). Neeraj received his master's degree in architecture and urban design from MIT, where he was studying on a Fulbright Fellowship. Prior to that, he attended the University of Waterloo, where he obtained a Bachelor of Environmental Studies and a Bachelor of Architecture. He is an NCARB licensed architect.

Thomas Murdoch received his BA in Architecture from Yale University, and is currently pursuing his M.Arch. professional degree at UC Berkeley's College of Environmental Design. He has previously worked as a junior architect for Mitchell/Giurgola Architects in New York, where he was involved in the design of higher-education projects in the United States and Europe. At Berkeley, he has assisted in the construction of personalized thermal comfort prototypes for the Center for Environmental Design Research; and is now doing editorial work as a graduate student researcher for Prof. Lisa Trever's book on wall paintings, architecture and ritual practice of pre-Hispanic ruins at Pañamarca, Peru. He is interested in the socio-economic repercussions of architecture, conceived as a political tool of cultural normalization.

[Endnotes]

1 Neeraj Bhatia, "Resilient Infrastructures," in *Goes Soft: Bracket 2* (Barcelona: Actar, 2012), 219.

2 Lola Sheppard, "From Site to Territory," in *Goes Soft: Bracket 2*, 179.

3 *The Petropolis of Tomorrow*, accessed January 16, 2014, <http://www.petropia.org/info/>

4 Caio Barboza, "Self-sufficiency in Oil, New Management Model," in *The Petropolis of Tomorrow*, October 23, 2012, accessed January 16, 2014, <http://www.petropia.org/category/blog/page/2/>

5 Joanna Luo, Weijia Song and Alex Yuen, "Floating Frontiers: Drift & Drive," in *The Petropolis of Tomorrow*, February 27, 2013, accessed January 16, 2014, <http://>

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6 Keller Easterling, "The Action is Form," in *Sentient City* (Cambridge, MA: The MIT Press, 2011).

7 Keller Easterling, *Enduring Innocence: Global Architecture and Its Political Masquerades* (Cambridge, MA: The MIT Press, 2005), 65.

8 Easterling, *Enduring Innocence*, 64.

9 Michael Hardt and Antonio Negri, *Empire* (Cambridge, MA: Harvard University Press, 2000), 60-61.

10 Easterling, *Enduring Innocence*, 67.

11 Joanna Luo, Weijia Song and Alex Yuen, "Floating Frontiers: Drift & Drive," in *The Petropolis of Tomorrow*, February 27, 2013, accessed January 16, 2014, <http://www.petropia.org/category/blog/>.

12 "Elaborate costumes and stylistic affectations are often treated as the window dressing for a product that supposedly achieves neutrality by operating as a revenue envelope. Fiction and myth are, in this case, especially slippery, disposable, and comedic for the very reason that absolute meaning may finally be measured only in revenues or the techniques of "market science." Charged with no responsibility for historical or political reconciliation, the product's ersatz myths may be even more extreme. However familiar these spaces may be, the mixology between cocktails and cultural attributes may create territory that is at once strange and intimate, exposed and in disguise, real and fictional."

Easterling, *Enduring Innocence*, 3.

13 Easterling, *Enduring Innocence*, 45.

14 Easterling, *Enduring Innocence*, 35.

15 Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993), 37.

16 Gilles Deleuze and Félix Guattari, "The Smooth and the Striated," in *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987), 500.

17 Easterling, *Enduring Innocence*, 69.

18 Joanna Luo, Weijia Song and Alex Yuen, "Floating Frontiers: Drift & Drive," in *The Petropolis of Tomorrow*, February 27, 2013, accessed January 16, 2014, <http://www.petropia.org/category/blog/>.

[Chapter figure by Joanna Luo, Weijia Song, Alex Yuen, Mobile Oil Boat takes on oil, water, and drilling fluid to ballast itself. Drift & Drive 2012.]