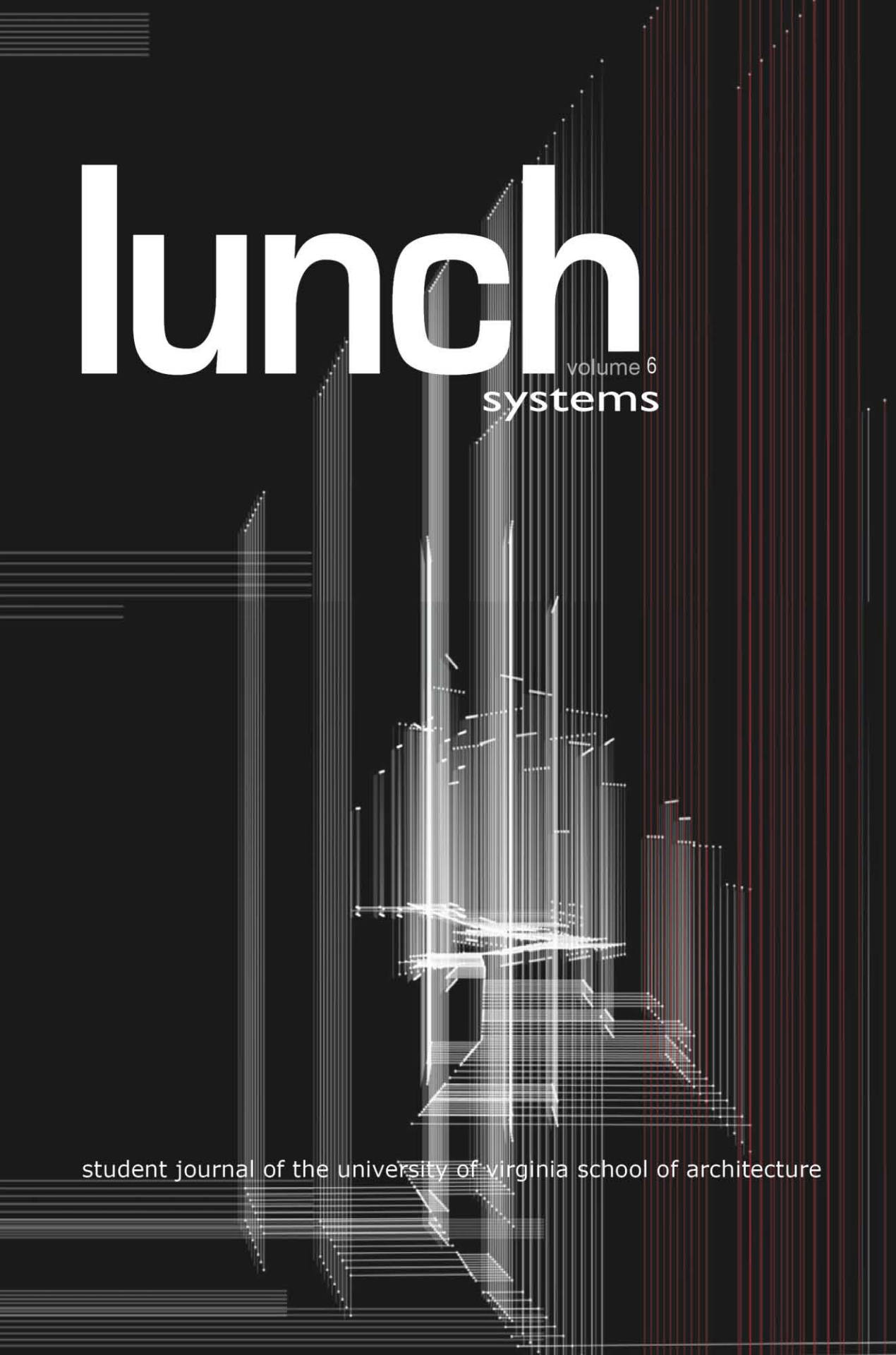
lunch

volume 6

systems



student journal of the university of virginia school of architecture

lunch 6: systems
University of Virginia School of Architecture
Campbell Hall
PO Box 400122
Charlottesville VA 22904-4122

Find us on the web: www.arch.virginia.edu/lunch

Editors: Beth Bailey, Jack Cochran, Joey Hays, Charles Sparkman

Cover image by Suzanne Mathew

Printed in the United States by Carter Printing, Richmond, VA

For future volumes, lunch is accepting submissions from alumni, students, and former and current faculty of the University of Virginia School of Architecture.

The editors would like to thank the students, faculty, and alumni who submitted their work for publication, and the seventeen copy editors who helped construct the narrative and layout of the journal. We are grateful to Dean Kim Tanzer, Kimberly Wong, the University of Virginia School of Architecture, and the School of Architecture Foundation for their support and dedication that make lunch possible each year.

Lunch 6 was supported by the University of Virginia Council for the Arts. Special thanks to the UVa School of Architecture Class of 1983 for their generous support of this year's journal.

To support lunch, please contact:
School of Architecture Foundation
PO Box 400122
Charlottesville, VA 22904-4122
434.924.7149
http://www.arch.virginia.edu/alumni/giving

Library of Congress Card Catalog Number is available.
ISBN-13: 978-0-9843671-1-5
ISSN: 1931-7786

PEREC Science Center (Michael Levy Bajar)

SYSTEMS THINKING IN THE STUDIO:
DESIGNING THE POTOMAC ENVIRONMENTAL RESEARCH AND EDUCATION CENTER

PHOEBE CRISMAN
ASSOCIATE PROFESSOR OF ARCHITECTURE

The best designers have always understood their work as part of a complex series of relationships within the context of a rich and heterogeneous world. One might argue, in fact, that the primary skill of the designer is the ability to create a set of interrelated elements that make a unified whole within an ever-changing and highly fluid context. Each system, be it a building, a garden or an urban strategy, also must be understood as part of many other systems in which it exists as an essential part. Social, ecological, economic, ideological, aesthetic and cultural systems of value are all inextricably linked through a network of relationships. As John Muir noted, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."[1]

This brief essay examines the theoretical and pedagogical intentions of the Fall 2010 PEREC on the Potomac Studio at the University of Virginia School of Architecture. Analytical reductionism was rejected in favor of an integrated design methodology that works across scales—from region to watershed, to district, to architecture to detail. Thinking systemically necessitated shifts in perception as well as representation. A focus on contextual knowledge and a holistic understanding of complex interactions formed the theoretical underpinning of the studio. The studio is part of my

Figure 1: Site Map (Kurt Marsh)

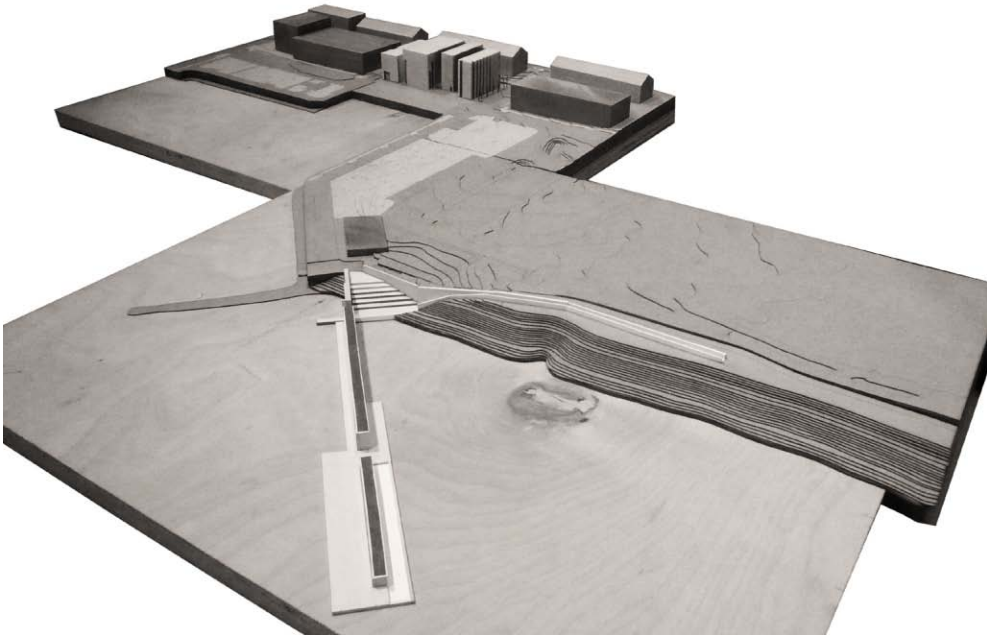


Figure 2: Fixed and Floating Conditions (Joel Trantham)

intertwined investigations into unusual or unlikely sites, sustainable strategies for the co-existence of cultural and environmental ecologies at the water's edge, and designing didactic buildings and landscapes. Recently I pursued this research agenda in three projects along the Elizabeth River and in the design and fabrication of the Learning Barge with UVa students.[2] In those earlier projects, and in this one as well, working with real world community partners was essential aspect of a systems approach. Too often academic learning is disengaged and even disdainful of future inhabitants, the client or the public and their needs and lived experiences.

The studio collaborated with Professors Chris Jones and Prof. Dann Sklarew, environmental scientists and directors of George Mason University's Potomac Environmental Research and Education Center, to create green designs for an innovative public educational venue and research outpost at the confluence of the Potomac and Occoquan Rivers. PEREC'S mission is "to utilize the tools of scientific research, restoration, education, and policy analysis to help society understand and sustain natural processes in ecosystems, watersheds, and landscapes."[3] Students considered how their designs could physically support PEREC's three research foci: restoration of the Potomac River and Chesapeake Bay, sustainability of natural ecosystems in suburban areas, and the impact of global climate change on the management of aquatic ecosystems. Located twenty miles south of Washington, DC along the I-95/Amtrak corridor, the complex and contradictory site is situated in the new town development of Belmont Bay between the sprawling Woodbridge suburbs and the Occoquan Bay National Wildlife Refuge (fig. 1). The program contains the

Figure 3: Highlighting the Center's Educational Role (Top: Tina Cheng, Bottom: Sophia Lee)

three distinct components, a Geospatial Research and Training Facility, PEREC, and a Public Science Center, which require research and teaching labs, indoor and outdoor classrooms, public exhibit, K-12 discovery lab, library, computer and virtual reality labs, offices, retail and boat and equipment storage. Students designed two separate architectural elements to house these activities – a fixed structure on an urban block along Harbor Street contains the majority of the lab and geospatial research, while the public educational element floats in Belmont Bay (fig. 2).

Several intertwined questions were explored during the design process: How can the specific history, culture, climate and ecosystem of this place influence the Center's design? How can the Center make a positive impact as a green demonstration project

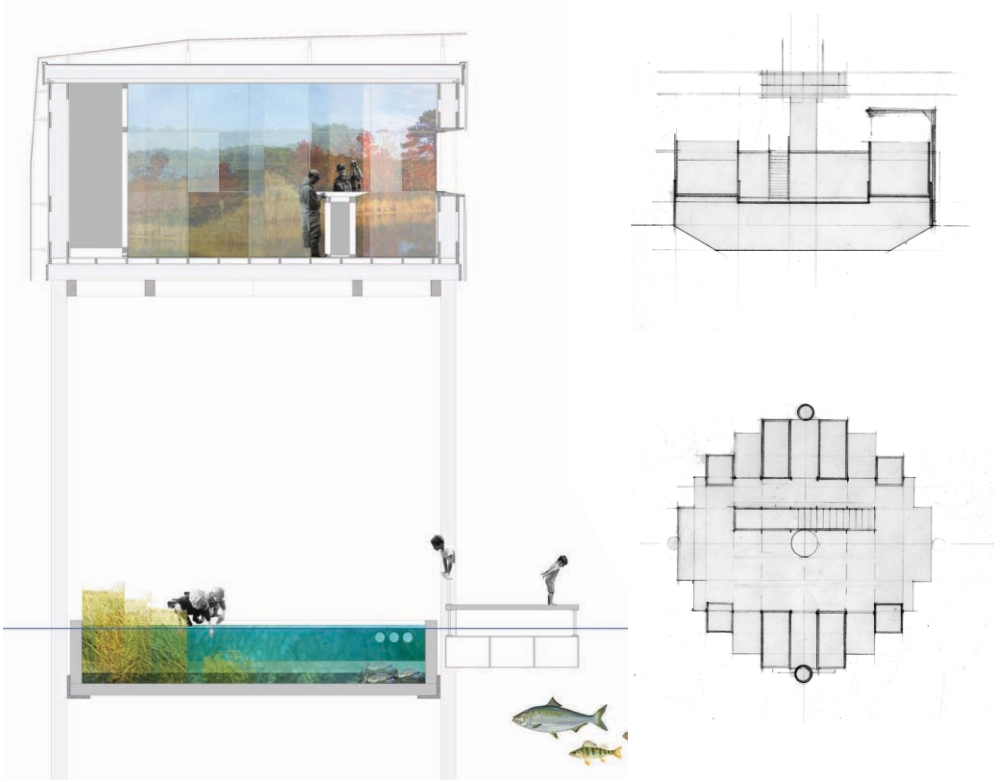


Figure 4: Breaking Down Unneccesary Barriers and Combining Unlikely Uses(Left: Daphne Lasky, Right: Ben Hartigan)

across a wide range of scales? How can the architecture contribute to a model of learning that emphasizes the importance of the physical environment and human engagement through the bodily senses? How will the Center be formally, spatially or materially different than the typical university lab building? How can the new Center serve as a model for how to build wisely and dwell with minimal mechanical intervention and negative environmental impact? It was crucial that both buildings were designed to maximize human health and happiness, while meeting LEED Platinum standards and minimizing resource consumption during construction and inhabitation. The Center is intended to create a new type of educational experience for the community and each project was designed to educate about sustainability through form, space, materials and systems. In addition, the studio proposed several opportunities for community use of the Center. In all cases, student proposals were designed to powerfully contribute to the district of Belmont Bay and the region in which it is located, to establish a translatable model for sustainable development, and to create a significant public presence announcing the Center's important social and educational role (fig. 3).

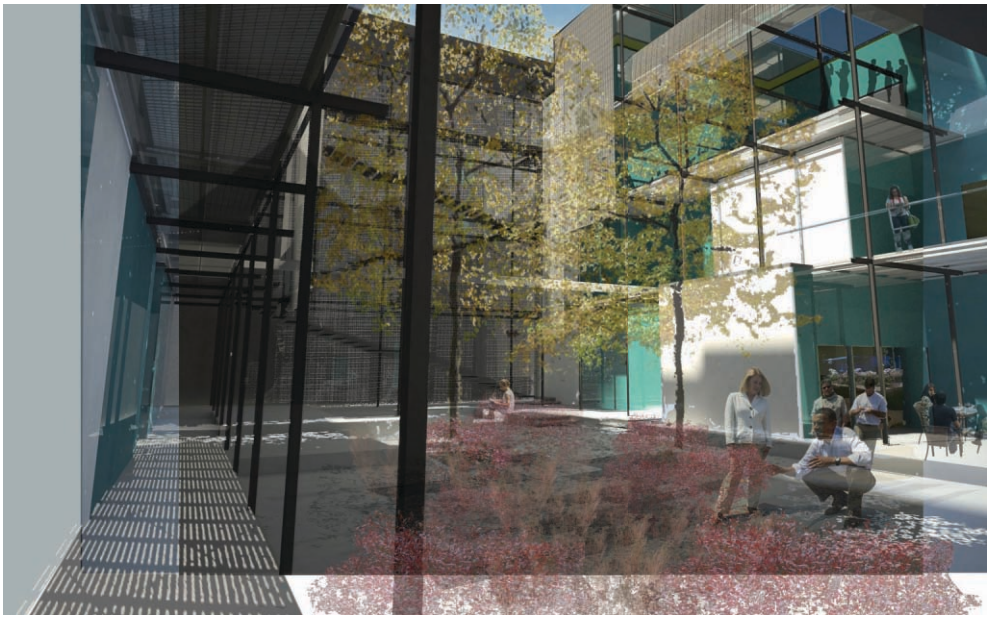


Figure 5: Inside and Outside Spaces (Kurt Marsh)

The studio examined abstract ethical and theoretical concepts, while exploring and resolving a specific design problem through creative and physical means – ideas and things. Students developed a mode of inquiry through an iterative process of critical thinking and critical making. For instance, they created strategies for reclaiming leftover places and materials while motivated by an ethical intention that remains open to time, use, ecology, reception and interpretation. They studied the threshold between public and private life by combining unlikely uses and exploring the environmental, social and aesthetic benefits of breaking down unnecessary barriers between these realms (fig. 4). They designed rich rooms and spaces both inside and outside (fig. 5). They employed strategies to improve dwelling for inhabitants while reducing building energy use and achieved material and tectonic resolution with integrated structural, envelope and environmental systems and building services (fig. 6). They investigated the importance of the bodily senses to architecture through texture, light, material, sound, temperature, color and other qualitative phenomena. They understood temporal change by hour, day, season, year and tide and explored threshold and the liminal zone between land and water (fig. 7). Ultimately, they studied the interconnectedness of architecture, human culture and the built and ecological environment while interacting and collaborating with project partners.

This collaborative studio investigation demonstrates the critical importance of thinking in systems to work across scales from complex urban environments to detailed architectural making. The congested conditions of Northern Virginia along the Potomac are an exemplary location in which to research and test design strategies for ecological

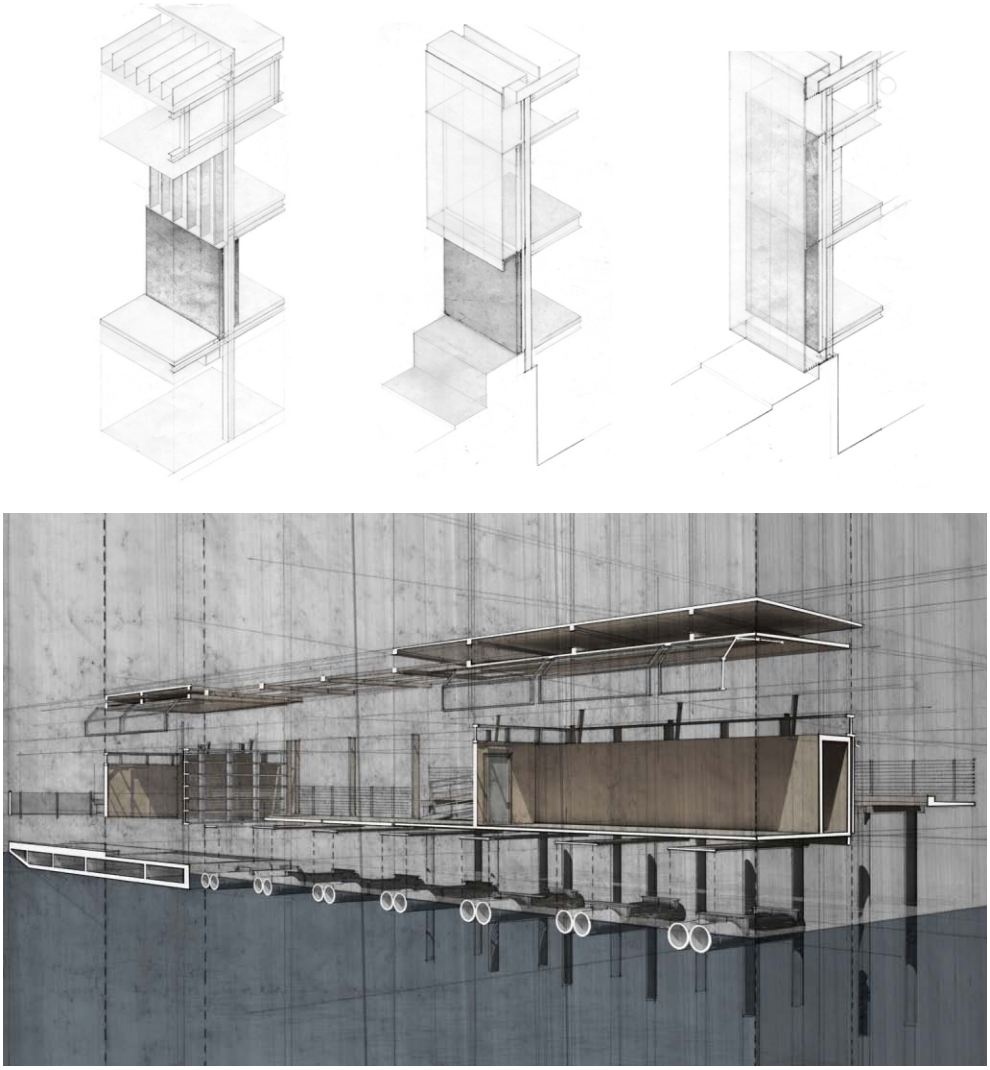


FIgure 6: Integrated Structural and Environmental Systems (Top: Ben Hartigan, Bottom: Tina Cheng)

regeneration and sustainable architecture. Such a holistic approach draws upon the University of Virginia School of Architecture's greatest strengths: the capacity to understand complex connections across a range of environmental, social, ethical and aesthetic systems, and to creatively embody this understanding through complex spatial, formal and materially rich designs for architecture, landscapes and cities.

1 John Muir, My First Summer in the Sierra (Boston: Houghton Mifflin, 1911)

2 See Phoebe Crisman, "Working on the Elizabeth River," Journal of Architectural Education, v.61, issue 1 (2007): 84-91. Also Phoebe Crisman, "Environmental and Social Action in the Studio: Three Live Projects along the Elizabeth River" in Agency: Working with Uncertain Architectures, F. Kossak, D. Petrescu, eds. (London: Routledge, 2010)

3 See the PEREC website for more information: http://perec.gmu.edu

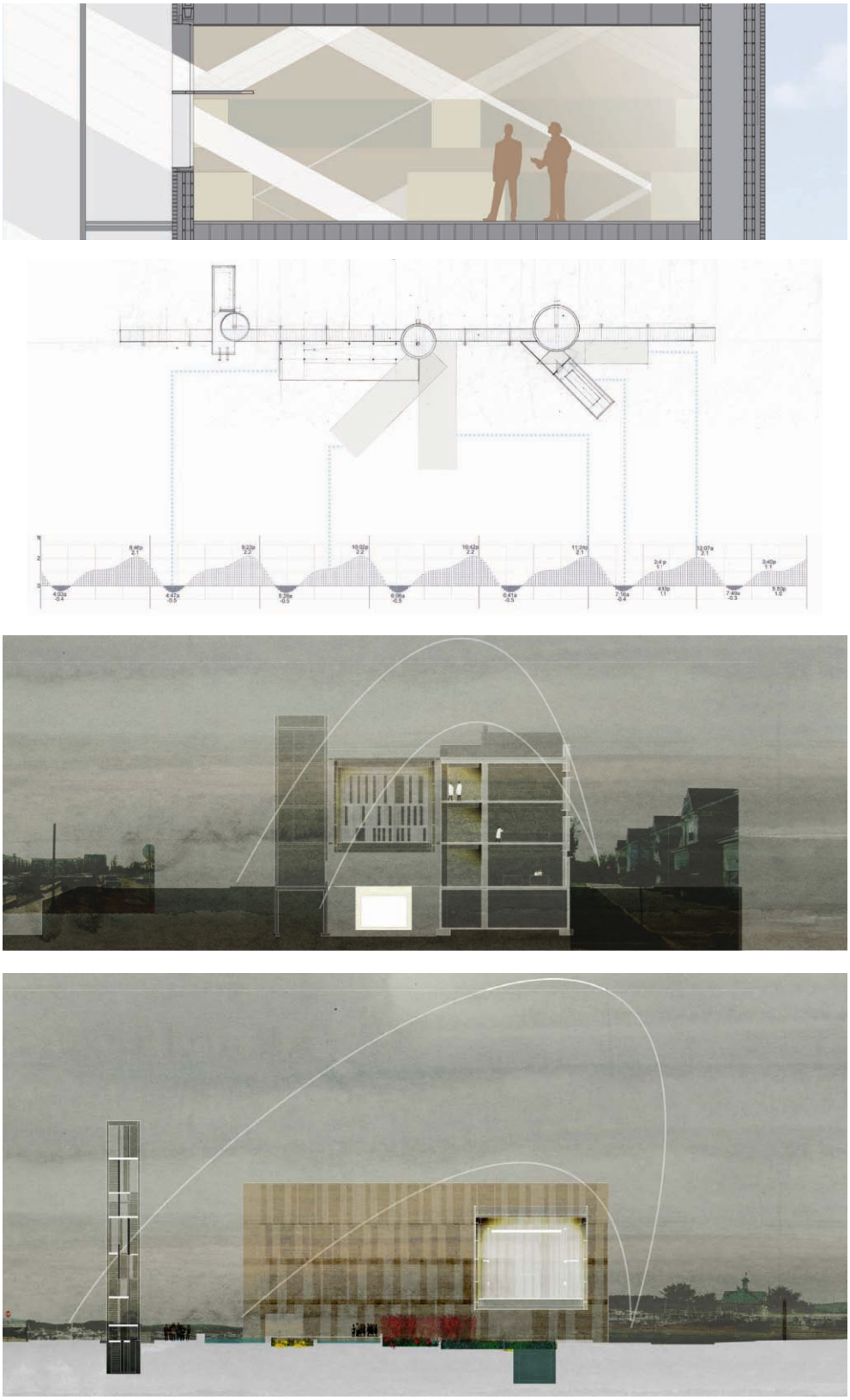


Figure 7: Understanding Temporal Change (Top Images: Emily Miyares (Light and Tide), Bottom Images: Lauren Hackney (Solar Path))