

# Design & Innovation for Sustainable Cities

College of Environmental Design  
University of California - Berkeley  
Summer Session 2017  
ENV DES 8/98  
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Disc \*

2017



# fieldwork + site visits\*

Field Trip 1 | Bay Area Region | July 5th  
Exploratorium Fisher Bay Observatory – Bay Model – Mt. Tamalpais

Our first field trip will focus on the dynamic interplay between the built and natural environments of the Bay Area. You will learn about the historical transformations that have shaped the region into the place that you see today. We will begin at the top of Mt. Tamalpais, one of the highest peaks in the area, which offers a panoramic view of the entire San Francisco Bay and surrounding cities. We will be joined by LEAP founder Nathaniel Kaufmann and Wildlife Biologist Lidia D'Amico as they led an interpretive tour. Next, we will visit the Bay Model in Sausalito, constructed by the U.S. Army Corps of Engineers as a working hydraulic scale model of the San Francisco Bay. A Park Ranger will guide us through the exhibit and talk about the pivotal history of the model's construction and the Save the Bay movement. We will then travel via ferry to the Exploratorium's Fisher Bay Observatory in San Francisco where we will be joined by Senior Artist and Curator Susan Schwartzberg to explore the scientific exhibits and maps that allow us to understand the functioning of the Bay ecology and urban morphology of San Francisco.

Fieldwork 2 | Walkabout | July 12th  
Eastern San Francisco Waterfront - Heron's Head Park

Alison Sant will lead this exploration of San Francisco's Eastern Waterfront. This area, on the verge of massive transformation, represents more than any other in the city the complexity and contradiction that characterize contemporary urban process. Remnants of its industrial past and long-time residential communities here coexist with the first outcomes of a series of interventions that will reshape the urban form and the ecology of the area in radical ways. Throughout the walk we will have a chance to meet with many professionals that are leading cutting-edge work in this interesting site. We will hear from Carol Bach from the Port of San Francisco, Noreen Weeden from the Audubon Society, Catherine Boyer from the Romberg Tiburon Center for Environmental Studies, and Jeremy Lowe from the San Francisco Estuary Institute about experimental practices for climate change mitigation. We will talk with Philip Vitale from the Trust of Public Land about the future of green public space planned for the site. Finally, we will discuss with John Bela from Gehl Studio about the ambitious projects for new development that are currently underway.



# seminars\*

## Urban Innovation Seminar | Gabriel Kaprielian & Ghigo DiTommaso

The Urban Innovation Seminar provides a framework for discussing and contextualizing student work. Every week, students will engage in lively discussions ignited by brief presentations delivered by the Program Directors. To prepare for each session, students will be assigned readings and writings on the selected topics. The Urban Innovation Seminar will be presented in three modules: Urban Place, Urban Form, and Urban Futures.

Urban Place will focus on understanding the transformations of the built and natural environment of cities and how this can be used to inform future design decisions. Topics will include the use of mapping to geo-reference and layer past, present, and potential future urban and natural conditions to develop a narrative of place.

Urban Form will explore precedents of city block and housing typologies around the world and the factors and urban theory that shaped it. Examples will include built urban form from various time periods and the speculative urban form proposals and theory that influenced it.

Urban Futures looks at the continually evolving nature of cities, which are ever changing based on economic, social, environmental, and technological factors. Topics will include smart cities, big data, autonomous driving vehicles, ecoblocks, sustainability initiatives, resilience cities, and the role of science fiction and speculative design.

## Global Cities / Global Challenges Seminar | Ghigo DiTommaso

The Global Cities/Global Challenges Seminar addresses some of the most pressing challenges global cities are facing today. Through a series of lectures on the past, present and future of urban regions across five continents, we will discuss the many wicked problems cities are tackling. The seminar will also expose students to a series of success stories, showing how things can really change for the better through the agency of environmental design.

# digital workshops\*

GIS Workshops | 11th and 13th  
Katie McKnight – Digital Lead GIS

The GIS workshops will cover the basics of digital Geographic Information System mapping and will directly support the studio project work. The GIS Workshops will include geo-referencing historic maps, creating thematic maps, and visualizing data geospatially. There will focus on topics that will assist you in creating a past, present, future narrative of your assigned team site. You will use historic maps to understand the urban morphology and historic ecology, while layering current and projected future maps to see areas of intersection and transformation. Additionally, you will create scaled base maps to use as reference during your site Fieldwork. Lastly, you will explore higher level mapping functions such as 3D visualization with ArcScene, while paying particular attention to mapping as an art to achieve compelling and informative graphics.

Rhino Workshops | July 20th, July 25th  
GSI Instructors

The Rhino workshops will demonstrate digital 3D modeling and 2D drafting techniques, rendering with the V-Ray plug-in, graphic exporting, and digital fabrication file processing. Topics in the workshops will directly support the studio project work. The Rhino Workshops will focus on digital modeling and drafting to develop your urban design scenarios, in addition to exporting 2D graphics for Adobe software and presentations and creating perspective renderings with V-Ray.

Adobe Workshop | July 21st  
GSI Instructors

The Adobe workshop will include instruction with Photoshop, Illustrator, and InDesign. The workshop will link the workflow from Rhino 2D graphic exports, digital rendering, and generally focus creating high quality presentation materials from design work. Photoshop will include instruction on rendering techniques. Illustrator will be used primarily to create 2D vector graphics. InDesign will be used for Presentation Board layouts.

Digital Fabrication Workshop | July 25th  
GSI Instructors

The Digital Fabrication workshop will demonstrate techniques for additive and subtractive manufacturing. You will use Rhino software to create 2D and 3D files for fabrication of parts for your game board. This includes the use of 3D printing and lasercutting. In this process, you will learn to materialize your digital designs into physical artifacts.

# studio syllabus\*

“We need to view the fragility of the planet and its resources as an opportunity for speculative design innovations rather than as a form for technical legitimization for promoting conventional solutions. By extension, the problems confronting our cities and regions would then become opportunities to define a new approach.”

- Mohsen Mostafavi, Ecological Urbanism

## Studio Goals

Learn theory and skills to analyze a complex urban environment, assess need through research and mapping, develop an informed design proposal, and create effective representation utilizing computer software and digital fabrication methods.

## Studio Overview

Through mapping, research, and design you will envision the future of the San Francisco Bay Area’s urban waterfront as a model for resilient urban design and adaptation in the face of sea level rise. You will use the Bay Area as a living laboratory for research and speculative design interventions. The studio project will build off of the Resilient By Design Bay Area Challenge, an interdisciplinary competition which aims to develop implementable designs for coastal resilience in Bay Area communities. You will investigate and illustrate various scenarios to address issues of sea level rise, infrastructure, housing, social inequity, and livability, etc. To accomplish this task, you will work at multiple scales (Regional + City + Neighborhood + Human) to understand the interconnection and complexity of the urban fabric and local ecology. Working in teams, you will focus on a given site context in San Francisco Bay Area. Utilizing the framework of a gameboard your team will investigate the built and natural environment, various stakeholders, and adaptation scenarios that result in speculative designs for an innovative new urban form. The final design and research will be represented both physically with a digitally fabricated gameboard model and graphically with presentation boards and a final program book. Each of you will be a contributor to the content of this work and making DISC 2017 a success!

## Studio Project – Adapting to Rising Tides in the San Francisco Bay Area

The waterfront along the San Francisco Bay is facing a growing threat from sea-level rise. Over the years, the Bay Area has seen a large portion of the historic wetlands filled or leveed off for residential, commercial, and industrial land uses. With current sea-level rise projections, it appears that the water will once again reclaim the bay lands that have been filled. By the end of the century, a projected sea-level rise of 140cm may affect an estimated 270,000 people in the Bay Area and 331 sq. kilometers of urban development valued at \$62 billion. To further complicate matters, it is estimated that 2.1 million people and 660,000 homes are expected to arrive by 2040, adding to the 7 million current Bay Area residents. In addition to the built environment, sea-level rise will also affect the ecology of the San Francisco Bay, threatening to submerge the majority of existing tidal wetlands by mid-century.

The issues presented by sea level rise along the urban edge of the San Francisco Bay involve a complex series of challenges. This includes regional vs. local governance, built vs. natural environment, vulnerable shared infrastructure, diverse stakeholders, population growth, etc. With each chance scenario and potential design solution, there may be multiple outcomes with winners and losers, resembling a gameboard. How can the best design or policy be selected and tested? How will distinct communities learn about different options and strategies for coastal adaptation and be empowered to act? By creating and playing a sea level rise adaptation “game” of your own design, you will explore different scenarios to inform future urban planning decisions.

While climate change and sea level rise have are often seen as a problem, we will instead view them as an opportunity for design innovation to create more resilient and sustainable cities. Design of the built environment is inherently an optimistic pursuit, and as such we will explore the transformative potential of visualizing speculative futures. By reframing sea level rise as an opportunity, we will explore design solutions that move beyond mitigation strategies using the same old toolbox and rather use climate change as the motivation to focus on innovative design solutions that adapt to the needs of a 21st century city.

Through mapping, research, and design the focus of our studio work will be to envision the future of San Francisco Bay Area’s urbanized shoreline as a model for resilient and adaptable urban design. Each of the sites has been chosen for their distinct characteristics, challenges, and opportunities for growth and redesign. You will be tasked with exploring different scenarios of coastal adaptation and innovative urban design solutions. By researching the built and natural environment past, present, and future you will gain an understanding of the constraints and opportunities for informed design decisions. Using the framework of a game board, you will investigate the various stakeholders and explore different adaptation strategies and potential outcomes for coastal resilience.



## Studio Deliverables

You will be conducting research and design work on a weekly basis, individually and in teams. This work will build towards the final studio deliverables described below:

- Gameboard – The gameboard will represent the culmination of research, mapping, and design strategies for your team's assigned site. You will use the gameboard to investigate the potential outcomes of different scenarios and the relationship between adaptation strategies and the various stakeholders. The final result will be a layering of maps and site analysis with game pieces and instructions for play. The game board will utilize a variety of digital fabrication methods to construct the final product, including subtractive and additive manufacturing. The result should be a hybridized work of research, mapping, and design that is an interactive game and artistic artifact.
- Presentation Boards – The final presentation boards will display the research and design efforts of your team graphically. This will include the visualizations of different planning strategies and scenarios. You will be given specific guidelines for content that will include such graphics as a master plan, site and street sections, perspective renderings, etc. You will be expected to illustrate potential designs with visually compelling and clear graphics, combined together in a professional format.
- DISC 2017 Book – The DISC book will serve as a final archive of the studio work. The book will be compilation of the design process and final work, in addition to other DISC program content.

## Weekly Overview

### Week One: Bay Area / Region

- Bay Area Presentation
- Fieldwork #1 – Bay Area
- Research + Mapping

### Week Two: Site Mapping / City

- Home City Presentation + Mapping Review
- Fieldwork #2 – Walkabout
- Research + Mapping
- Site Analysis Past, Present, Future

### Week Three: Game board / Human

- Mid Review Presentation
- Field Trip #3 – Site Visits
- Game Development + Representation
- Stakeholders, Strategies, and Scenarios

### Week Four: Design Production

- Final Review Mockup Presentation
- Digital Fabrication Models of Gameboard
- Presentation Boards

#### Week Five: Presentation

- Final Review Presentation + Public Exhibition
- Presentation Refinement
- Finalize Work and Prepare for Display
- Work Documentation + Portfolio and Studio Book

#### Week One: Bay Area / Region Bay Area Research + Mapping

"... maps give us reality, a reality that exceeds our reach, our vision, the span of our days, a reality that we achieve in no other way."

- Dennis Woods, "The Power of Maps"

#### Learning Objectives

Gain a greater understanding of San Francisco city in the context of the Bay Area region through research, mapping, and first-person observation.

#### Week One Overview

You will begin with a first-person observation of the Bay Area during our Field Trip #1 that will include a visit to Fisher Bay Observatory in the Exploratorium, the Bay Model, and Mt. Tamalpais. Joining us will be expert professionals who will interpret and explain the urban and natural transformations of the Bay Area.

You will continue your analysis of the Bay Area through mapping and research. Working in teams, you will explore the past, present, and future built and natural environment at the scale of the region.

Utilizing Internet databases and library resources at UC Berkeley, you will compile information, written descriptions, and images that will combine with your mapping to create a narrative of the Bay Area. In teams, you will create a presentation with (20) slides that are visually compelling and informative.

Each team will be assigned a specific area of focus that will serve as a combined studio resource throughout the program. Teams will conduct research into their assigned focus area.

#### Specific areas of focus:

- Historical Ecology (wetlands, flora, fauna)
- Indigenous History + Culture
- Coastal Transformations (bay fill, sea-level rise, levees)
- Urban Morphology historical development and future planning)
- Infrastructure (water, waste, energy)
- Demographics (race, income, social equity, gentrification)
- Transportation (roads, rails, ferries, bicycle routes, bus)
- Land Use (built land, open space, parks, public space)
- Policy (law and land use)

## Week Two: Site Mapping / City Site Analysis + Mapping

"Mapping is a fantastic cultural project, creating and building the world as much as measuring and describing it."

- James Corner, "The Agency of Mapping: Speculation, Critique and Invention"

### Learning Objectives

Utilize mapping techniques in combination with research and fieldwork to gain a greater understanding of your assigned city site in the context of Bay Area. Develop a narrative of the urban transformations, historical ecology, current built and natural environment, demographics, and potential future sea level rise scenarios that can inform a coastal adaptation planning.

### Weekly Overview

During the second week, we will take a closer look at cities and neighborhoods. We will explore city form that has been built around the world, including your own hometowns. We will attempt to understand why cities are built the way they are based on a variety of factors including environmental, economic, and cultural. In particular, we will focus on your assigned cities and the neighborhoods where our studio project sites are located.

We will begin with extensive mapping to understand the urban morphology and underlying historic ecology of your sites. Through mapping, we can investigate the past, present, and future context of our sites and their relationship to the Bay Area region as a whole. Mapping will allow us to geo-reference historic maps that layer on top of the present built and natural environment to create a place narrative and show how the city has been shaped over time. We can see what lies underneath the city streets and explore the site ecology that existed before and what remains today. Layering current maps of the city, we can see the intersection of infrastructure, housing density, demographics, and transportation to gain a more informed perspective for urban design solutions.

In combination with site mapping, you will work in teams conducting research on strategies for coastal adaptation and armament typologies to combat flooding from sea level rise. This will include exploring case studies of other city plans. As part of the research, Fieldwork #2 will be a walkabout in the Southeastern waterfront of San Francisco where you will learn from professional experts on site-specific work along the Bay. By the end of the week, your team should have compiled work with mapping and research that creates a compelling place narrative and potential waterfront adaptation strategies.

## Week Three: Gameboard / Human Game Development

"Most of our housing and city planning has been handicapped because those who have undertaken the work have had no clear notion of the social function of the city."

- Lewis Mumford, "What Is a City?"

### Learning Objectives

Design a gameboard to play out various adaptation strategies for coastal resilience that responds to the Resilient By Design Bay Area Challenge and is informed by previous site mapping and case study research. Define the stakeholders, scenarios, and instructions of play to investigate potential outcomes. Create effective and compelling representation of your work for graphic presentation and prepare files for digital fabrication.

### Weekly Overview

Building off of the mapping, research, and fieldwork in week two, you will further investigate your site by designing a game board and instructions to test various adaptation strategies and events to determine scenarios and their outcomes, which affect stakeholders. The previous site mapping will serve as the literal base and basis for your game design as it begins to take on three-dimensional form through rough physical hand modeling and digital modeling with Rhino software.

Following the Resilient By Design Bay Area Challenge, you will explore different adaptation strategies in response to sea level rise and objectives for coastal resilience and community sustainability. This will incorporate addressing factors of housing, infrastructure, transportation, social inequity, climate change, and livability, etc. You will determine the stakeholders involved in your site, which may include homeowners, local government, distinct demographic groups, natural vs. built environment, etc.

Ultimately, you will develop a game board to explore different scenarios the site factors, events, and strategies. This will involve defining resilience and sustainability objectives that respond to sea level rise flooding, coastal armament, protecting tidal wetlands and Bay ecology, meeting housing demands of a growing population, and creating a more livable and equitable community. Many of these objectives may be at odds with each other. You will explore different outcomes by designing and then "playing" your game board. Ultimately, you will illustrate the different adaptation scenarios and determine the best design proposals. The urban designs should reflect the relationship of your site to the Bay Area region, when considering interconnected elements such as infrastructure, ecology, and the social function of the city at the human scale.

Digital workshops with Rhino 3D modeling software and Adobe Creative



Suite are aimed at building your skills in order to design and represent your ideas effectively. Specific design production guidelines will be given to assist in developing a clear, comprehensive, and professional final output. This will include presentation boards with outlined deliverables such as a master plan, site sections, perspective renderings, diagrams, etc. Additionally, you will begin to develop files for digital fabrication of your game board in week four.

#### Week Four: Design Production Digital Fabrication + Representation

“Construction is the art of making a meaningful whole out of many parts. Buildings are witnesses to the human ability to construct concrete things.”

- Peter Zumthor, “Thinking Architecture”

#### Learning Objectives

Produce effective and compelling two-dimensional graphic representation and three-dimensional models of your design proposals. Utilize advanced computer software and digital fabrication machines to create inspiring work that meets the studio deliverables.

#### Weekly Overview

Week four will focus on the production of your game board and urban design proposals. During this week, you will have full access to the Digital Fabrication Lab to create rapid prototypes and your final Game Board model. This will include using the 3D printers and lasercutters. Additionally, you will refine your design scenarios and the two-dimensional graphic representation for your presentation boards.

You will receive an orientation on how to use the equipment in the Digital Fabrication Lab, in addition to instruction on how to create cut and print files in preparation for digital fabrication. A Digital Fabrication workshop will demonstrate techniques of file preparation for additive and subtractive manufacturing.

#### Week Five: Presentation Refinement + Exhibition

“The timeless task of architecture is to create embodied existential metaphors that concretize and structure man’s being in the world. Images of architecture reflect and externalize ideas and images of life; architecture materializes our images of idea life. Buildings and towns enable us to structure, understand and remember who we are. Architecture enables us to place ourselves in the continuum of culture.”

- Juhani Pallasmaa, “An Architecture of the Seven Senses”

## Learning Objectives

Refine and produce final representative work of design scenarios, research, and game boards for public presentation. Documentation of work for archiving.

## Weekly Overview

During the final week of the program, the focus will be on finalizing work for public presentation and documentation. You will present your final work both at UC Berkeley and in San Francisco to the public and invited guests. This is your opportunity to demonstrate what you have learned and to also be part of the continuing discourse in planning the future of San Francisco Bay Area.

By week five, the bulk of the work should be done and you will be tasked with refining graphic content for the presentation. This will require working effectively as a team to finish work in a timely and professional manner. You will need to practice the oral presentation as a team, developing a narrative that describes the final proposals, design process, and research.

In addition to the exhibition and presentation of final work, we will also be documenting work for the DISC book and your portfolio.

# Disc \*

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