

university of oregon – school of architecture and allied arts – department of architecture
Arch4/585 Advanced Architectural Design I - PORTLAND
Professor Nancy Yen-wen Cheng <nywc@uoregon.edu>



image by Selah Au, Bart Chui, Hins Cheung and Peter Wong

BioSynergies Studio : independent thesis projects

How can architecture work with nature in the city? This thesis studio focuses on the relationship of built and natural environments, using the lenses of Biomimicry and EcoDistricts to create **deep green** buildings that work at every scale. We begin with the premise that everything is part of a larger system and ask, "How can something small create an impact that is BIG?" Design will be approached with the understanding that information from one scale informs another. Systems thinking can help designers create robust projects through projecting possible scenarios.

Every location possesses unique geological formations, indigenous materials, adapted species and spatial conditions that give cues to a thoughtful design. Using Biomimicry methods to think critically about natural processes, structures and mechanisms can inspire design solutions from the scale of city and neighborhood down to the building, room and architectural details.

MACRO: ECODISTRICTS

"How can designers make sustainable living feel smart, comfortable and attractive?" Students will be challenged to devise a building that contributes to the EcoDistrict vision of Civic Ecology. Tim Smith of SERA explains that "Civic Ecology is the integrated web of energy, nutrient, resource, financial, information, and cultural flows and interactions that are envisioned, created and managed by citizens acting for the common good within a geographically-defined community and its city-region. It is a human ecology of place, intimately integrating both natural and social/culture systems." Students will envision EcoDistrict life, showing how architects can not only support district energy, water collection and habitat corridors, but also cultivate great communities.

The class will introduce students to Portland's five pilot EcoDistricts, Urban Renewal Areas chosen by the Portland Sustainability Institute <<http://pdxinstitute.org/>> as focus areas for sustainable development. An intentionally diverse set, they range from the dense South of Market Portland State University district to the suburban Foster Green area. Students can study each district's urban plans to create a building that enhances its urban context. They can learn from the experts who are engaged in structuring how the social, economic and ecological triple bottom line can be cultivated through policy and economic development strategies.

Portland professionals will explain aspects such as civic ecology, resource flows, transit infrastructure, and cultural history and wildlife. Students have the opportunity to learn how EcoDistrict sustainability will be measured from those who are creating mechanisms for resource assessment. They can learn about how community consensus building and government alliances are catalyzing private-public development partnerships.

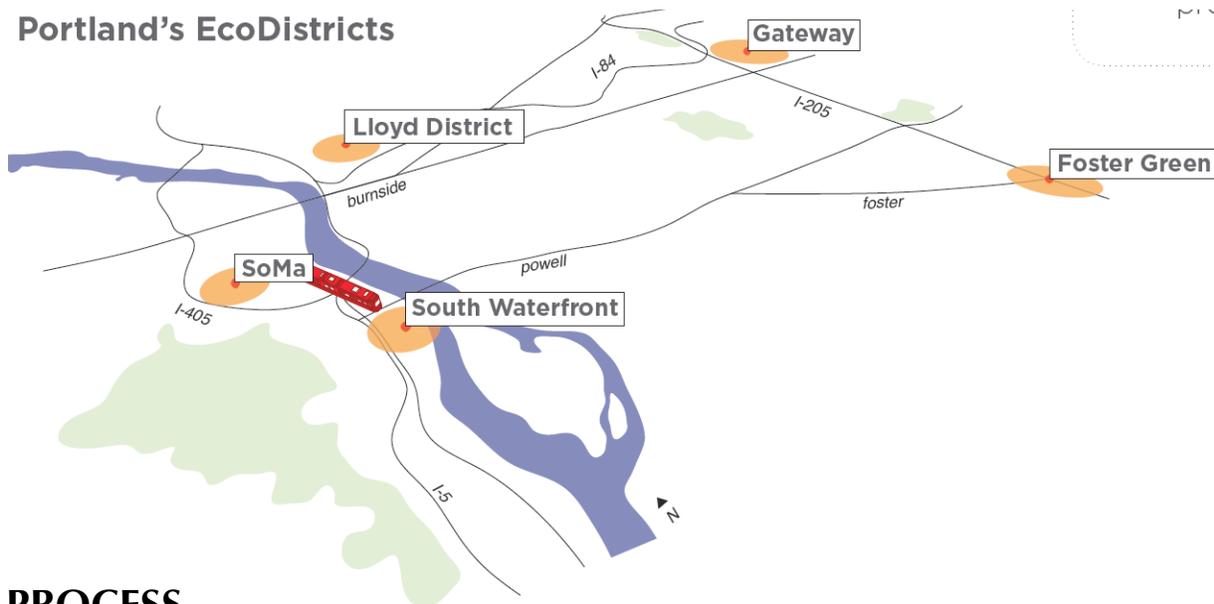
While resources for the Portland EcoDistricts are especially accessible (<http://pdxinstitute.org/>), **students may choose a site within any planned EcoDistrict**, such as

Southeast False Creek in Vancouver, B.C., Western Harbor in Malmo Sweden, or Dockside Green in Victoria, B.C. Students need to visit their site by January 2013 and have at least three contacts to provide documentation and feedback.

PROFESSIONAL MENTORING

During the Fall term, students will have many opportunities to meet architects, planners and landscape architects who want to be mentors. Social media will help students develop a professional network and an online presence. To foster a match, students will create a blog to show understanding, reflect about progress and document competency. During Winter Break, they will use the blog and thesis booklet to present themselves online to their choice of potential mentors and cultivate interested peers and more casual coaches. During Winter and Spring terms, students will consult a mentor at least twice each term, and mentors will be invited to reviews. Students are asked to summarize their project in a brief video or narrated slideshow.

Portland's EcoDistricts



PROCESS

COLLABORATION

Like Ecodistricts, the studio is based on the idea that together we can do more than we can do separately. Through short collaborative research and design exercises, we will develop a collaborative learning culture that is a microcosm for the Ecodistrict community we wish to encourage. We will look at how to foster innovation and create a group that matures through its interactions, that is resilient to unexpected challenges through marshaling social capital.

FREEDOM WITHIN A FRAMEWORK

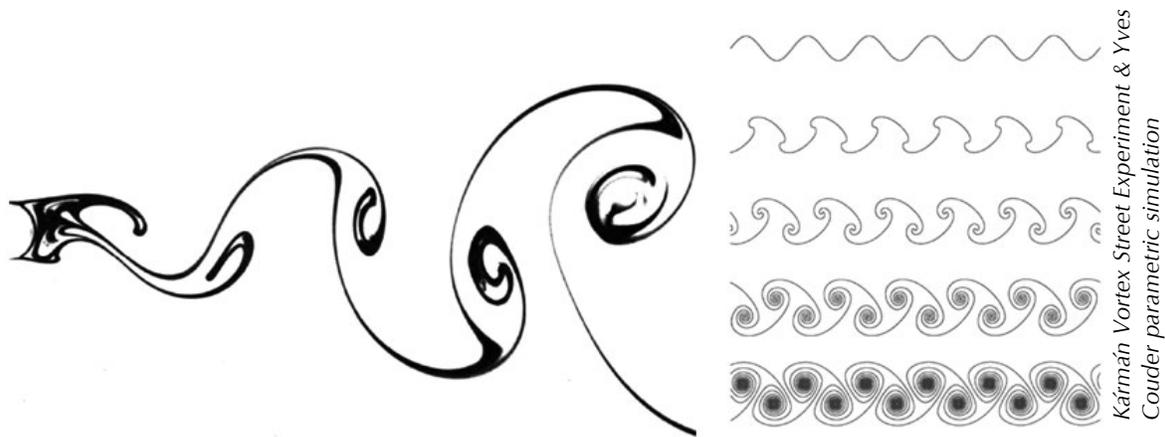
Students develop independent projects within a common framework of weekly topics to encourage dialogue and peer teaching. Within this framework, students have the opportunity to emphasize a personal area of focus. A structure of weekly themes, scheduled charrettes and assignments are provided to give unity to the many individual explorations in order to maximize dialogue. The studio format will vary from individual desk crits, small group discussion, and internal pin-ups to formal large-group reviews.

Each student is to identify the most compelling part of the project for further development. To encourage this, each student will conduct research and share in a topical focus area that relates to the studio topic of sculpting bioSynergies during Winter term.

PROGRAMMING & OTHER SUPPORT COURSES

Successful architectural design projects require a deep understanding of the user values, activities and requirements. Students may choose to develop an independent thesis program or work with the class to develop a common building program brief. **All those who want to develop an independent program must enroll in the Architectural Programming class** (3 credits) during Fall term. This class helps students investigate the psychological, cultural and functional expectations of diverse users.

FALL	WINTER	SPRING
Thesis Prep (3 cr)	Revit Fundamentals (2 cr)	Advanced Technology (tba)
Architectural Programming (3 cr)	Digital Workshops (1cr ea)	Professional Presentations (3 cr)
Digital Workshops (1cr ea)		
EcoDistrict Summit Oct 23-26		
http://www.ecodistrictsummit.com/		



DESIGN EXPERIMENTATION for DISCOVERY

The studio is driven by the design as a process of discovery, that phases of development can be staged to encourage careful observation. Inventive and agile designers generate and evaluate many options at each step of the process. Students will be coached to be efficient and effective at creating 3D sketches and study models in order to consider extremes and find the boundaries of possibilities.

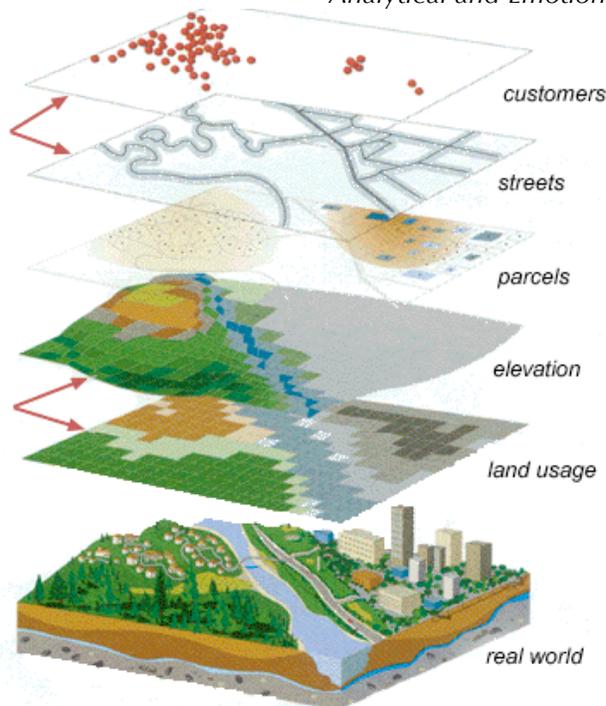
Students will experiment with digital + analog media to stimulate creative thinking at both the Macro (top-down) and the Micro scales (bottom-up). The class will explore hands-on making and digital form-finding using Biomimetic approach. Working from the sense of place, the class will work with material characteristics to generate conceptual models that are both emotionally compelling and rigorously performative. While the studio cannot cover basic software operation, it will provide opportunities for students to fully develop skills from digital media classes and workshops.

As the initial concepts become solid, students will be encouraged to develop the ideas in Building Information Models, testing options with daylighting and thermal analyses. Students will have the opportunity to use the Energy Studies in Buildings Lab's heliodon and artificial sky OR digital lighting simulation.

BIOGRAPHICAL PROFILE

At the University of Oregon, **Nancy Yen-wen Cheng** directs the Architecture Department's Portland Program. Fascination with how individuals think and interact drives her research and teaching. She studies the design process, focusing on digital technology for innovation and tactile processes for creative engagement. At University of Hong Kong '93-'96, she connected global partners in Virtual Design Studios. Teaching at Oregon since '96, she uses social media to cultivate learning communities, linking students designing green buildings and communities with local and remote experts. Cheng has headed the Association for Computer Aided Design in Architecture, the national AIA Technology in Architectural Practice group, the 2004 AIA-ACADIA Fabrication conference, and edited issues of the International Journal of Architectural Computing. <<http://aaablogs.uoregon.edu/nywc>>

Analytical and Emotional responses to Place



NOAA National Coastal Data Development Center



Burle-Marx's Copacabana beach, photo by Laszlo Ilyes

FALL TERM

The Fall prep course coaches students in finding a focus for inquiry and defining an architectural design problem to address that focus. Each student needs to find a question or series of related questions that can sustain his or her interest, that might be addressed through a series of projects over many years. The goal is to identify one's life passion within the spectrum of environmental design possibilities and find productive ways of working that feed the creative spirit. Each student should cultivate productive work habits that include rigorous investigation and speculative invention.

To set the stage for the design investigation, the Fall term will be spent defining the design problem in terms of the question to be investigated, framing the conceptual approach by studying relevant ideas and precedent projects. The thesis statement should take a position about the question and explain the design method, that is, how the site and program will be approached to test that position.

The Fall term assignments lead the student through a step-by-step creation of the thesis booklet components, with iterative refinement of the major thesis statement. Conceptual readings will frame our investigation and create a common vocabulary. Class periods will be used for lectures, reading discussions, creative assignment feedback and research presentations.



image by Chengbei Zhang

WINTER TERM

Students develop a clear architectural concept for a building that addresses the thesis inquiry and fits its natural and urban context. The class will explore design ideas from the **micro** scale (bottom-up) and the **macro** scale (top-down). At the **micro**-scale, we will use a Biomimicry lens to look at how nature can inspire designs for specific climatic and ecological conditions. Using the materials and visual textures of each location as inspiration, we will conjecture how a fresh look at connections and components can generate innovative building systems. At the **macro**-scale, we investigate how the site forces, ecology, culture, and history make each location unique. We will consider how EcoDistrict principles inform the site organization, building massing, movement connections and program distribution.

Each student must translate site constraints and program requirements into architectural terms, defining the character of the proposed place using qualities of light | dark; dense | open; compressed | open; soft | hard; skeletal | massive; translucent | opaque; layered | cellular; etc. The goal is to be able to describe an urban architectural design project that is thoughtfully organized, beautiful and relevant. At the end of the Winter Term, the urban design and architectural conceptual design exploration should be completed at the level of an excellent 4/584 studio project.

MICRO / MACRO

- 1 MACRO SITE ANALYSIS
- 2 SITE RESPONSE
- 3 BIOMIMETIC CONCEPT MODEL

BUILDING CONCEPT

- 4 ORGANIZATION
- 5 EXPERIENCE
- 6 FACADE

BUILDING DEVELOPMENT

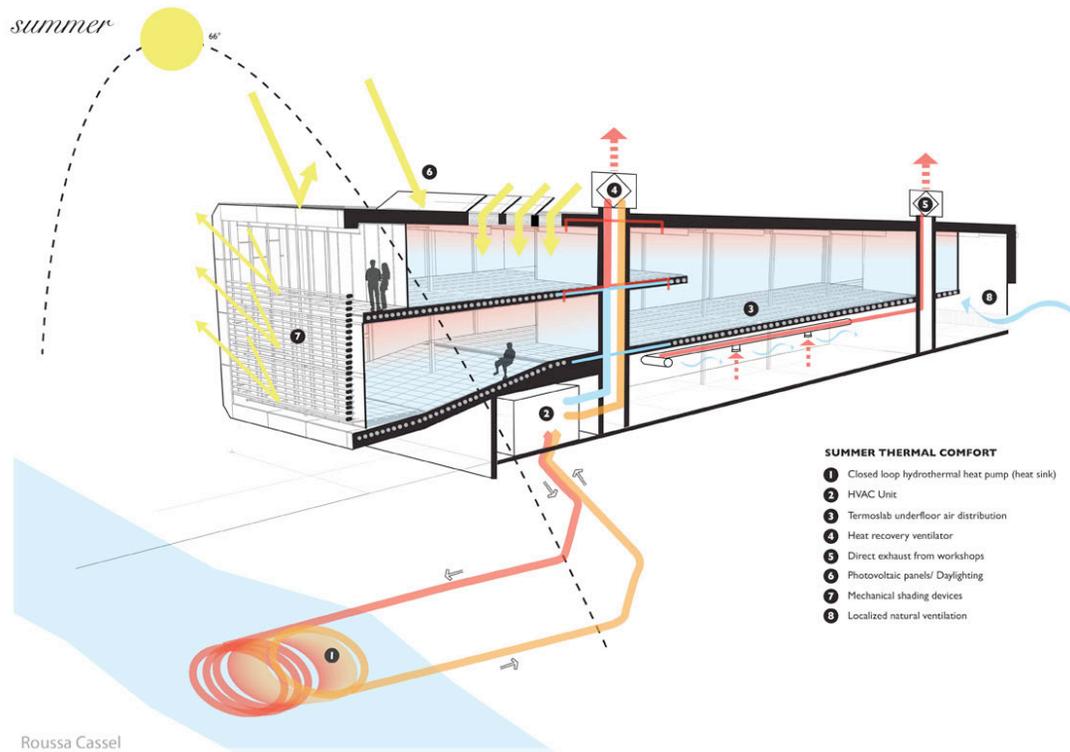
- 7 TECTONICS
- 8 SPATIAL CHARACTER
- 9 INTEGRATION
- 10 PRESENTATION
- 11 REFLECTION



Joy Rackley's Corvallis Cohousing Spring 2005



Corvallis Cohousing by Joy Rackley



Roussa Cassel

SPRING TERM

The Spring term focuses on methodically developing the conceptual design created in Winter term. It is a chance to build on previous efforts by confirming core concepts and convictions, assessing what solidly supports these concepts and identifying areas for further development. While strengthening the project's conceptual focus is the overall goal, this term, the art of building will be the main design source. It is an opportunity to explore how building technology and ecological design principles can flourish in your architecture project.

DESIGN WITH NATURE

- 1 ENVIRONMENTAL SYSTEMS & LIVING BUILDING CHALLENGE
- 2 LANDSCAPE & STORMWATER DESIGN (landscape model)

STRUCTURE / TECTONICS

- 3 STRUCTURE
- 4 TECTONIC EXPRESSION (structural bay model)
- 5 BUILDING ENVELOPE (wall section)

ARCHITECTURAL EXPRESSION

- 6 INTERIOR DEVELOPMENT (Daylighting model)
- 7 SPATIAL EXPERIENCE
- 8 TEMPORAL EXPERIENCE
- 9 - 10 PRESENTATION
- 11 SUMMARY : VIDEO & BOOKLET



Shaping Light shade by Nancy Cheng
model by Abe Rodriguez