SYLLABUS

THRIVING THROUGH MAKING   http://tinyurl.com/thrivingstudio

Prof. Nancy Yen-wen Cheng

Winter 2016, MWF 1:00-4:50pm, 8 credits
Prerequisites: 4/584 design studios and 4/507 Thesis Prep

Amphibian Carpet by Selah Au, Hins Cheung, Bart Chui, & Lewis Chui

The challenge of this design studio is to develop a clear architectural concept that addresses the theme of Thriving Through Making. Students will design an institution that supports learning and economic productivity, where apprentices are empowered by learning practical skills. New types of partnerships, workflows and learning paths are possible with the sharing economy and open educational resources. The studio will examine how to craft working and learning environments such as DIY Makerspaces, co-working business incubators and community resource libraries for promising sites adjacent to new MAX Orange Line light-rail stations in Portland, Oregon.

This ARCH 4-585 Advanced Architectural Design studio is the second in a three-term sequence, following the Fall term preparation of the project focus, site and program. In this Winter term studio, students will create the conceptual site and building design which will be developed with integrated building technologies in the Spring term. Each student must translate site conditions 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 class provides the opportunity for students to follow their particular interests in developing a capstone project that demonstrates their intellectual and professional abilities.

From the premise that buildings must function within larger natural and constructed systems, the class will explore design ideas from the **urban** scale (top-down) to the **component** scale (bottom-up). At the **urban** scale, we investigate how the site forces, ecology, culture, and history make each location unique. Students will study how Portland planning and ecodistrict principles can inform the site organization, building massing, movement connections and program distribution. At the **component** scale, we will use a biomimicry lens to look how natural structures, organisms and mechanisms can inspire designs that fit specific climatic and ecological conditions. Using the materials and visual textures of each location as inspiration, students will conjecture how a fresh look at connections and components can generate innovative building systems, examining parametric possibilities. These components will be used to compose at the **building** scale, considering biophilic approaches to healthy environments and analysis for high-performance building design.

LEARNING OBJECTIVES
- Develop a iterative design process using creative experimentation and rational evaluation
- Incorporate research and building analysis into the design process
- Design with nature, considering Ecodistrict, Biophilic and Biomimetic principles
- Develop communication skills for engaging others in architectural design ideas

SUSTAINABLE DESIGN

Students will think critically about the relationship of the built and the natural environment, considering on-site resources (i.e. sun, wind, water, vegetation), building requirements and existing resource flows. Natural systems or metaphors can spur design innovations:
– Strategies for capturing rainwater,
– Shielding or welcoming solar exposure
– Efficient structural solutions

Every site context possesses unique spatial conditions that give cues to a thoughtful design. EcoDistrict strategies ask how the building can contribute to or benefit from neighboring sites. Moving between scales of the city, district, building, room and details allows discoveries at one scale to inform the others.

Section through a christmas rose leaf showing round chloroplasts from Michael Hensel's (Synthetic) Life Architectures: Ramifications and Potentials of a Literal Biological Paradigm for Architectural Design, Architectural Design journal, v.76 no.2, p. 20

This studio heavily emphasizes constant design explorations through **sectional studies**. A design process utilizing site sections will reveal the spatial relationship between the inhabitants, built forms and nature. For example, in a seaside site, the movement of the waves and the shifting tide has implications for horizontal and vertical movement. Mapping the 10-, 25- and 50-year flood lines in plan and section can provide marks on the landscape that can be a starting point for a design that ties to natural phenomena.

While the project should be anchored in reality, actual constraints can act a point of departure for the imagination. The site needs to be documented through sections, plans, a physical model and a digital model that will necessarily abstract the on-the-ground conditions. Design ideas will be created by making intelligent assumptions based on available information and then establishing clear design parameters.

DESIGN DEVELOPMENT PROCESS

The class will consider how design processes can stimulate creativity, and how to refine and communicate design ideas. Students will be encouraged to try new approaches that integrate rational and imaginative thinking in a productive process, with individuals setting a personal agenda for honing specific design skills. Students will be encouraged to generate design alternatives to understand implications and develop the best option. Designers need to efficiently create 3D sketches and study models in order to consider extremes and find the boundaries of possibilities. The studio will encourage initial development through physical means: lots of trace paper sketches and quick models to foster fast ideation. As the ideas progress, digital studies will be important for refining and communicating the work.

A structure of weekly themes, scheduled charrettes and assignments will give unity to the individual explorations and maximize dialogue. Class time will be used for presentations, individual desk crits, small group discussion, internal pin-ups and formal reviews. Each student needs to take responsibility for pushing boundaries in design exploration and production.

REQUIREMENTS AND EVALUATION

Students are expected to come to all classes prepared and on-time. Fulfilling assignments in a complete and timely manner is critical to academic advancement, and critical for professional practice. Pinups and reviews serve as benchmarks to evaluate competency and readiness for the next phase.

ANALYTIC BLOG WRITING: Along with presentations, the course blog provides an opportunity to demonstrate competency at architectural design to an external audience. Writing thoughtful, concise notes about your progress, challenges, questions and next steps will help your instructors and peers respond to your needs. This is your opportunity to develop a professional network to provide feedback on your work. You can make specific entries private with our common password. Every student will have a minimum of <u>three posts</u> on their blog for Winter that summarizes the work completed and considers how to move forward.

FINAL DOCUMENTATION: At the end of the term, a project presentation summary as an Adobe PDF file must be accessible from the course website.

At the end of the Winter Term, the project's urban design and architectural conceptual design exploration should be completed at the level of an excellent 4/584 studio project. A quality Winter Term project delivery sets a strong foundation developing the tectonics and building systems in the Spring term. By the June final review, all UO terminal studio projects must successfully address these National Architectural Accreditation Board's student performance criteria (http://www.naab.org):

B.1 Pre-Design: *Ability* to prepare a comprehensive program for an architectural project that includes an assessment of client and user needs; an inventory of spaces and their requirements; an analysis of site conditions (including existing buildings); a review of the relevant building codes and standards, including relevant sustainability requirements, and an assessment of their implications for the project; and a definition of site selection and design assessment criteria.

B.2 Site Design: *Ability* to respond to site characteristics, including urban context and developmental patterning, historical fabric, soil, topography, ecology, climate, and building orientation, in the development of a project design.

C.3 Integrative Design: *Ability* to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental

GRADUATE STUDENTS

Graduate students are expected to research and develop their work more thoroughly than undergraduates by spending more time and by using prior educational and professional experience. This will be reflected in stricter standards for grading graduate students and an additional assignment:

STUDENT ENGAGEMENT INVENTORY

Activity	Undergrad	Grad
Course attendance	113	113
Assigned Readings	18	18
Design homework	80	80
Writing assignments	10	15
Field work / experience	7	14
Research	12	48
Total hours:	**240**	**288**

MATERIALS RESEARCH PRESENTATION
Graduate students are required to give a verbal and visual presentation about a structural system or finish material relevant to their project. The material should relate to the site through a conceptual metaphor, visual properties or local origin. The report should describe design considerations, showing cutting-edge aesthetic possibilities and summarize technical constraints. The latter should explain performance characteristics, such as structural properties, and give an overview of assembly methods. It could provide background such as how the manufacture of the material shapes standard units or describe how new fabrication and assembly technology is changing contemporary practice. The report will be **posted online** with citations.

Catalan vaulting, Mapungubwe Interpretive Centre, South Africa by Michael Ramage, John Ochsendorf & others.
http://www.atdforum.org/IMG/pdf_RamageATDF2010.pdf

BIBLIOGRAPHY

Searchable annotated weblinks at http://www.diigo.com/user/nywcheng

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Zumthor, Peter, Thinking Architecture, Birkhauser, 2006 NA1353.Z86 A35 2010

- **ART & ENVIRONMENTAL PERCEPTION**

Eliasson, Olafur and SF MoMA et. al. Take your time : Olafur Eliasson. San Francisco ;New York: San Francisco Museum of Modern Art ;;Thames & Hudson, 2007.

- **GREEN BUILDINGS**

Autodesk Building Performance Analysis Certificate using the Sustainability Workshop. http://sustainabilityworkshop.autodesk.com/bpac

International Living Futures Institute, The Living Building Challenge. https://ilbi.org/lbc/standard

- **BIOMIMICRY & BIOPHILIA**

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Gruber, Petra. Biomimetics in Architecture. SpringWien NA 2543 .B56 G78 2011

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Wiley, 2009. http://bks6.books.google.com/books?id=IGIWtYc5NO0C

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- **CODE COMPLIANCE**

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http://ecodes.biz/ecodes_support/free_resources/Oregon/14_Structural/14_ORStructural_main.html

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Wiley. 2012 e-book available via UO Library.
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- **DIGITAL + PHYSICAL DESIGN METHODS**

Architectural Design journal, London: (illustrated full-text PDF's online via UO Library)

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Iwamoto, Lisa. Digital Fabrications: Architectural and Material Techniques, Princeton Architectural
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Laseau, Paul. Graphic Thinking for Architects and Designers. Wiley, 2001. NA2705 .L38
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- **LANDSCAPE & URBAN DESIGN**

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Brinckerhoff Jackson The Interpretation of Ordinary Landscapes: Geographical Essays. New
York : Oxford University Press, 1979 GF90 .I57

Oppenheimer, Michael and Barry Bergdorf and Judith Rodin: Rising Currents: Projects for New York's
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SPECIAL NEEDS

Students with special needs who anticipate requiring accommodations should meet with their instructors <u>in the first week</u> and provide a letter from Disabilities Services http://ds.uoregon.edu.

COMMUNITY STANDARDS

The University community is dedicated to the advancement of knowledge and the development of integrity. In order to thrive and excel, this community must preserve the freedom of thought and expression of all its members. A culture of respect that honors the rights, safety, dignity, and worth of every individual is essential to preserve such freedom. Students are expected to conduct themselves in a manner that respects the rights and well-being of others. All students are required to familiarize themselves with the UO Student Conduct Code (http://conduct.uoregon.edu), a compilation of important regulations, policies, and procedures pertaining to student life. It informs students of rights and responsibilities at the university, and provide guidance for enforcing relevant policies essential to the UO missions.

ACADEMIC HONESTY

Students must follow academic honesty, copyright and fair use requirements. Students should be familiar with University policies related to academic integrity and penalties for violations. All work submitted should be your own original work and borrowed quote, paraphrased idea and image sources should be cited. http://copyright.psu.edu/copyright-principles/

DIVERSITY

It is the policy of the University of Oregon to support and value diversity. To do so requires that we:
- respect the dignity and essential worth of all individuals.
- promote a culture of respect throughout the University community.
- respect the privacy, property, and freedom of others.
- reject bigotry, discrimination, violence, or intimidation of any kind.
- practice personal and academic integrity and expect it from others.
- promote the diversity of opinions, ideas and backgrounds which is the lifeblood of the university.

UO employees, including faculty, staff, and GTFs, are mandatory reporters of child abuse and prohibited discrimination including sexual harassment and assault. This statement is to advise you that that your disclosure of information about child abuse or prohibited discrimination to a UO employee may trigger the UO employee's duty to report that information. More info:
http://around.uoregon.edu/mandatoryreporting
https://hr.uoregon.edu/policies-leaves/general-information/mandatory-reporting-child-abuse-and-neglect/presidents-message

CONFLICT RESOLUTION

Several options are available to resolve conflicts for students who believe they have been subjected to or have witnessed bias, unfairness, or other improper treatment. Recommended remedies include discussing the conflict with the specific individual, contacting Graduate Studies Director Alison Kwok (akwok@uoregon.edu), or Dept. Head Judith Sheine (jesheine@uoregon.edu). Outside the Department:
      UO Bias Response Team: 346-1139 or http://bias.uoregon.edu/whatbrt.htm
      Conflict Resolution Services 346 -0617 or
http://uodos.uoregon.edu/Programs/ConflictResolutionServices.aspx
      Affirmative action and Equal Opportunity: 346-3123 or http://aaeo.uoregon.edu/

SCHEDULE

SITE DESIGN	**1** 1/4-8	PLACEMAKING WITH NATURE: Applying design criteria and conceptual metaphors, develop open space and building massing options in relationship to urban and natural systems with a Site Design Toolkit. Study the local urban structure to find vulnerabilities and opportunities. ***Reading:*** *Roger Trancik's Finding Lost Space Ch.4, Green LOOP PDX competition.* F 1/8: Grasshopper bootcamp
	2 1/11-15	BIOMIMICRY: Examine how one organism thrives in the local eco-system and micro-climate to reveal strategies for site and architectural design. ***Reading:*** *Petra Gruber's Biomimetics in Architecture.* Recommended: Lim, Hensel, Benyus W 1/13: **PINUP Biomimicry, Site Models & Diagrams** F 1/15: GH: Ladybug Climate Analysis *to understand what passive strategies are most appropriate.*
	3 1/18-22	SITE / LANDSCAPE DESIGN ANALYSIS & REVISION Test and document how solid / void options work with sun, wind, water and greenery. ***Reading:*** *Girling & Kellett.* Recommended: McHarg, Spirn ***1/20 Material outline due*** 1/22: *Register for LOOP PDX*
SPATIAL SYSTEM	**4** 1/25-29	**-- REVIEW SITE DESIGN -- Monday Jan 25** MATERIALS: 1) Collage a musical metaphor studying how properties such as color, shininess, transparency, and flexibility could reflect your design. 2) Work with a partner to create spatial modules and clusters. ***Reading:*** *Brownell & Fox' HyperNatural* , Recommended: Borden **W 1/27 Material draft due** 1/29: Grasshopper: Translating material forms into parametric systems
	5 2/1-5	TECTONICS: Graphically analyze a precedent studying how material properties, components and connections can generate a building system, then generate your own using parametric variations. ***Reading:*** *Rice An Engineer Imagines.* Recommended: Menges, Borden, Oxman **2/1 & 2/3: Material Presentations**
	6 2/8-12	2/8: **PINUP of Material Tectonic System** ORGANIZATION: Develop the spatial system, looking at how natural connections generate a spatial order that expresses the architectural concept. ***Reading:*** *Allen Form & Forces.* Recommended: Active Statics, Laseau, Maki, Zumthor
BUILDING DESIGN	**7** 2/15-19	FACADE: Explore how the building presents its urban identity to the public and mediates the indoor-outdoor relationship. Iteratively create variations or develop a parametric definition. Develop images to scale with shadows. ***Reading:*** *Deplazes: Constructing Architecture* **---- REVIEW Portland?-- Friday Feb. 19**
	8 2/22-26	INTERIOR DAYLIGHTING STUDY: Tune how natural light can emphasize the aesthetic possibilities of a major space. Render perspective images with light and color to show daily and seasonal changes through user eyes. ***Reading:*** *Millet's Light Revealing Architecture***,** *Recommended: Guzowski*
	9 2/29-3/4	INTEGRATION & COMMUNICATION: Urban, building and materials together. Show the site evolving over time in terms of the architectural character and ecosystem development through sequential views or animation. 3/4: Dress rehearsal for refining visual and verbal communication.
	10	**---- FINAL REVIEW ---- TBA ~ Wed March 9**
	11	Final PDF project summary must be posted by Friday March 11. Exit Interviews.