Cal Poly San Luis Obispo Architecture Department
Thesis Prospectus | Professor Sandy Stannard

ARCHITECTURE + NATURE

It is my feeling that living things and non-living things are dichotomous….But I feel that if all living plants and creatures were to disappear, the sun would still shine and the rain still fall. We need Nature, But Nature does not need us.

- Louis Kahn

"Resident" vs. "Inhabitant:" "A resident is a temporary occupant, putting down few roots and investing little, knowing little, and perhaps caring little for the immediate locale beyond its ability to gratify…..The inhabitant, in contrast, 'dwells,' as Illich puts it, in an intimate, organic, and mutually nurturing relationship with a place. Good inhabitance is an art requiring detailed knowledge of a place, the capacity for observation, and a sense of care and rootedness."

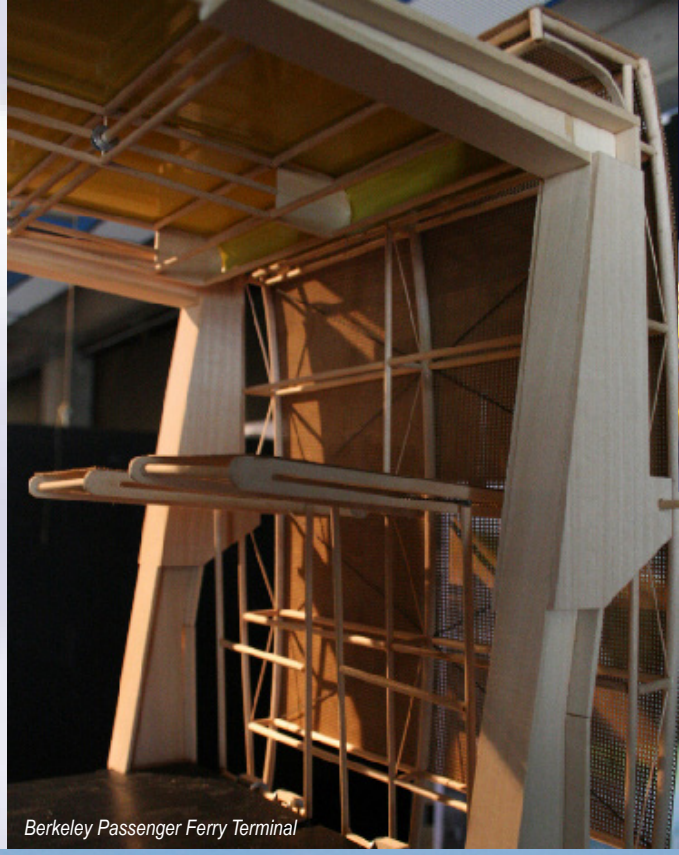
- David Orr, *Ecological Literacy*

Study nature, love nature, stay close to nature. It will never fail you.

- Frank Lloyd Wright

Nature doesn't have a design problem. People do....Instead of using nature as a mere tool for human purposes, we can strive to become tools of nature who serve its agenda too..... What would it mean to become, once again, native to this place, the Earth - the home of all our relations?

- William McDonough and Michael Braungart, *Cradle-to-Cradle*



Berkeley Passenger Ferry Terminal

Fresno Wellness Center

Cal Poly Student Center

Responsive, Responsible

Humans and all their associated artifacts are an immutable fact in nature. However, on our current consumptive trajectory, we are on a collision course with the environment. If we accept the definition of sustainability as "the triple bottom line" (i.e., the three E's of "economy, ecology, equity" OR the three P's of "people, planet, profit"), at its practical root, sustainable architecture is about how we come to terms with our place in nature. (We might also overlay onto our sustainability definition Vitruvius' maxims of "utilitas, firmitas, venustas" to remind ourselves of the timelessness and applicability of these lessons).

Faced with increasingly diminishing resources, creating appropriate architectural environments is beyond choice: it is essential. Ecological luminaries such as architect Ed Mazria have re-analyzed the statistics, revealing that architecture with all of its associated technologies and materials consume nearly 50% of the energy generated in the United States. Architects are thus strategically poised to positively intervene to effect change in our culture's insupportable, consumptive trajectory. With this resurgent need for ecologically responsive design, designers no longer have the luxury to ignore the affects of their architectural creations on the global environment and its inhabitants. ***Buildings are the mediator between man and nature; the designer is the artistic intermediary charged with creating a responsive, responsible architecture.***

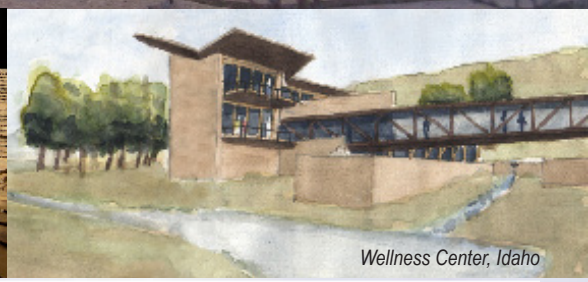
Treasure Island Cancer Treatment Center

Homeless Youth Refuge, Portland

In this context, ideas that will be considered in this thesis sequence will include:

Architecture + The Landscape

Place-making is essential in the creation of meaningful architecture, no matter what the scale. Scale of settlement patterns and appropriateness of setting are vital issues in any successful architectural endeavor. The specifics of any given place, its genius loci, must be understood and respected. In addition to phenomenology and place, ***creating symbiotic relationships with the land should be the goal of all of our built artifacts.***

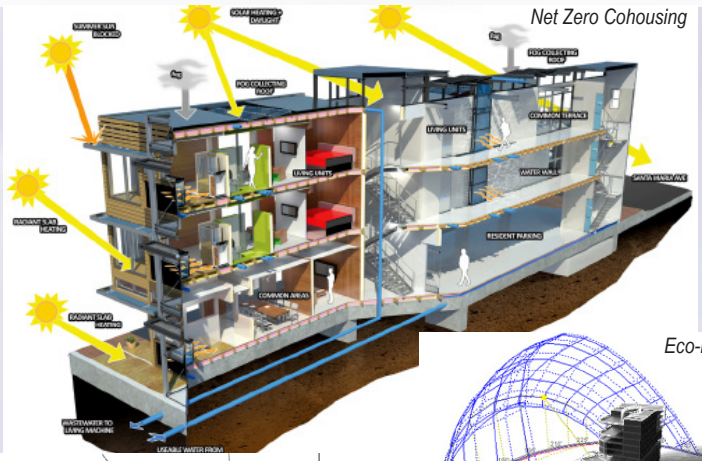


Wellness Center, Idaho

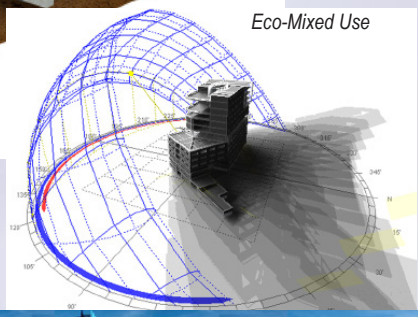
Hotel Avila Living Machine

Architecture + The Environment

Sensitive architectural solutions should respect and celebrate the environment. This includes an appreciation for the local (geographies, bioregions, seasons, micro-climates, etc.) as well as a response to the global (energy and water sources resources, etc.). Because buildings are energy consumptive, this is an arena in which architects have the opportunity to innovate, taking advantage of contemporary parametric tools in order to create stunning as well as responsive design solutions. Learning from the past, learning from other cultures, and taking advantage of technological innovations, ***architects can design inspiring, resourceful, delightful environments.***



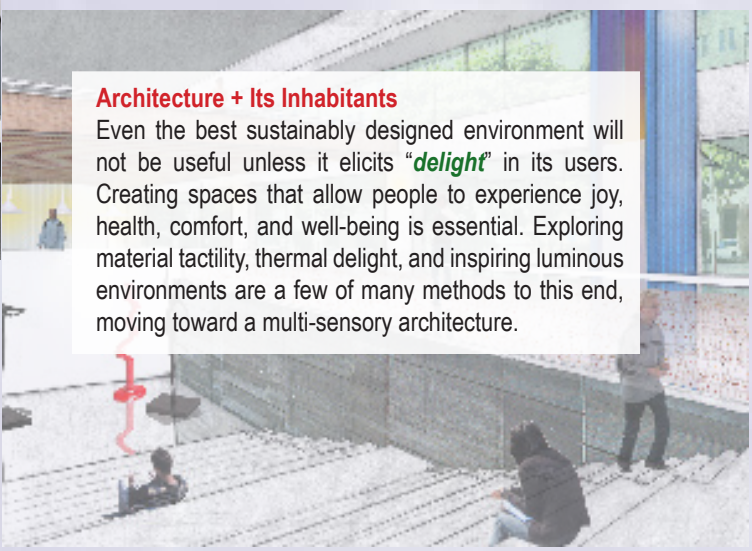
Net Zero Cohousing

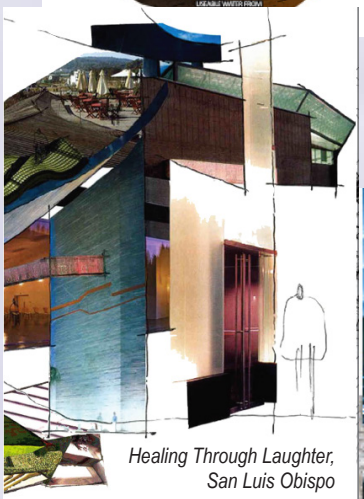


Eco-Mixed Use

Architecture + Its Inhabitants

Even the best sustainably designed environment will not be useful unless it elicits "***delight***" in its users. Creating spaces that allow people to experience joy, health, comfort, and well-being is essential. Exploring material tactility, thermal delight, and inspiring luminous environments are a few of many methods to this end, moving toward a multi-sensory architecture.





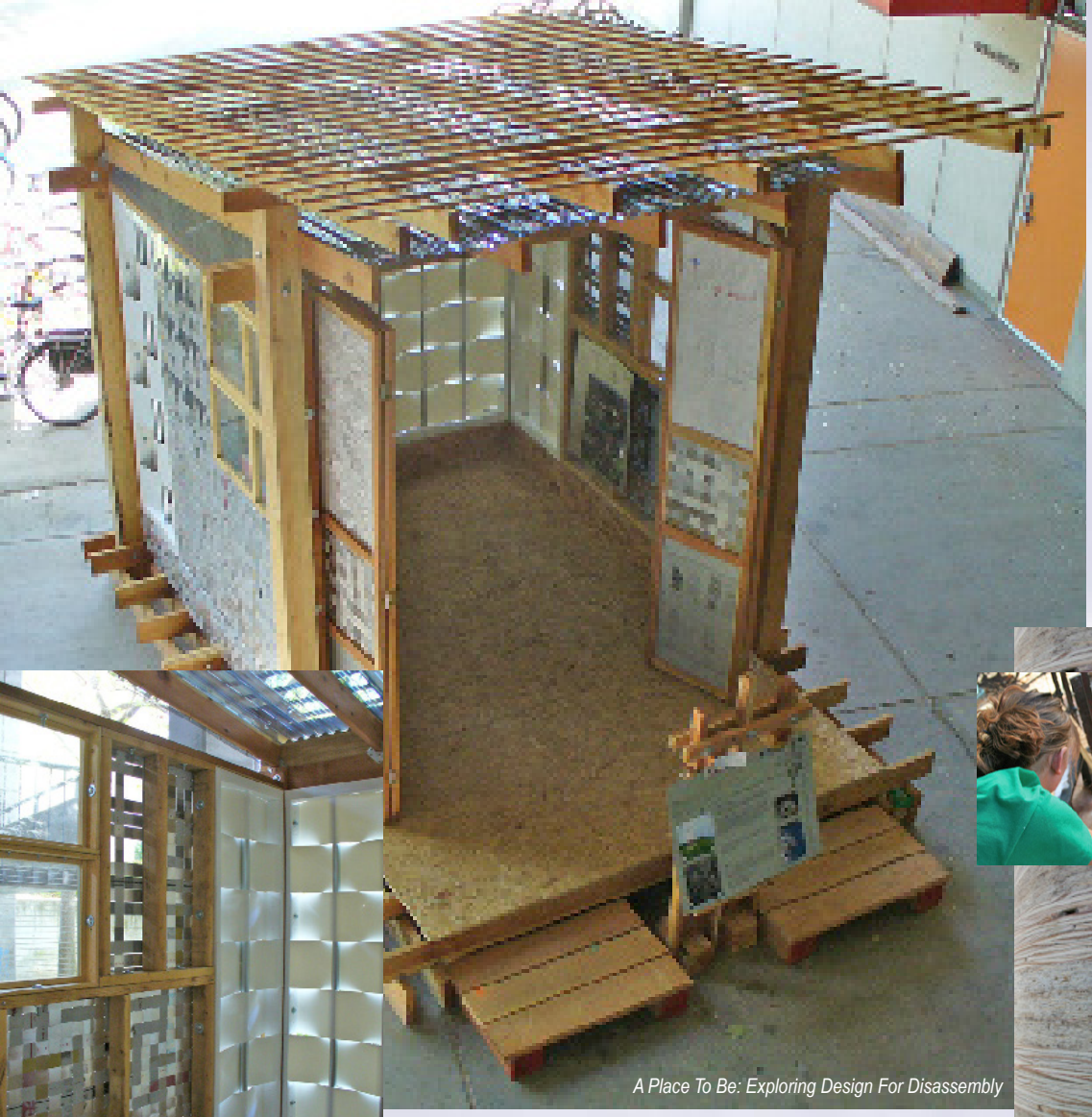
Healing Through Laughter, San Luis Obispo

Re-Connect: Nature to Man, Lake Tahoe

Landscape Spectrum

Architecture + Materiality

Materials are the basic building blocks of an architect's language. Exploring the ***poetic potential of structure and materiality*** is the goal here. Further, it is our responsibility to understand the pivotal cradle-to-grave-to-cradle issues related to material choices, with consideration for the energy consumption involved in extraction as well as recycling. Thus, a designer manipulating any given palette of materials must balance issues of material source with appropriate and inspiring form and structure.

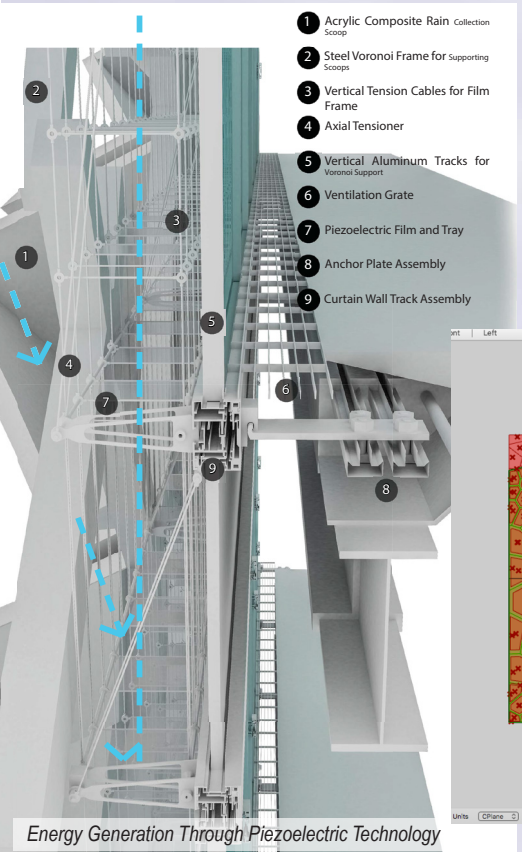


A Place To Be: Exploring Design For Disassembly

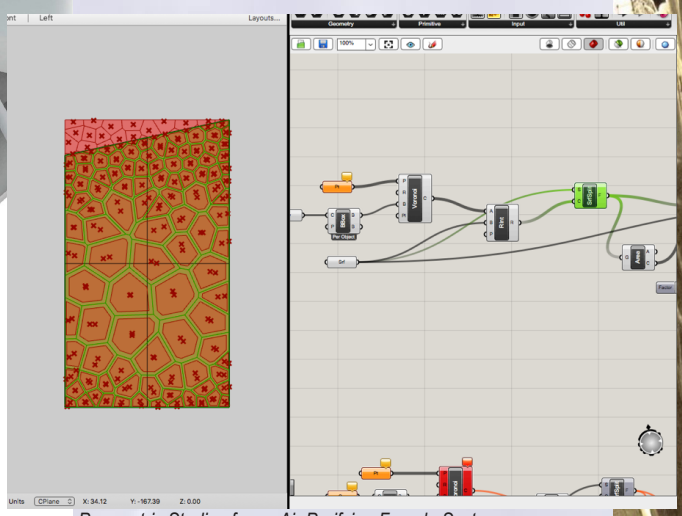
Power Generating Facade Exploration

Architecture + Technology

The ***appropriate use of technology*** should be the aim of any project. This includes not only the technology used in the design process but also in construction, operation, and maintenance. Use of appropriate simulation tools for design as well as performance will be part of studio activities.



Energy Generation Through Piezoelectric Technology

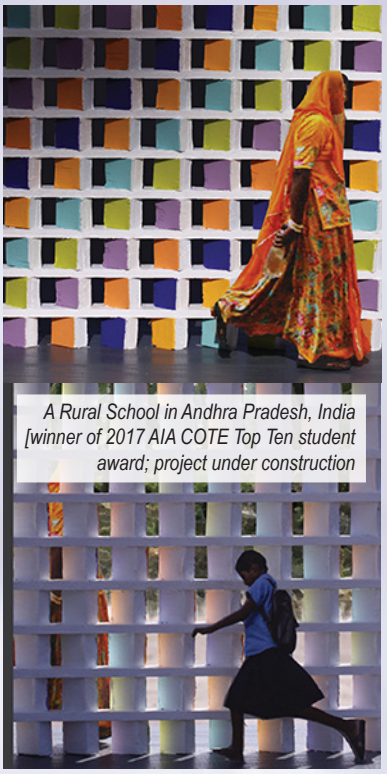


Parametric Studies for an Air Purifying Facade System

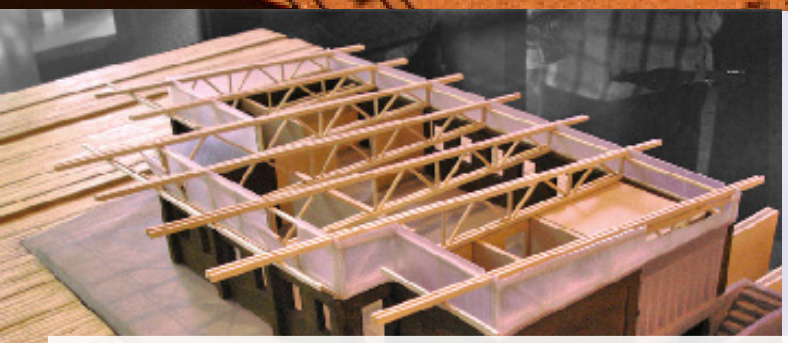
Santa Barbara Transit Center

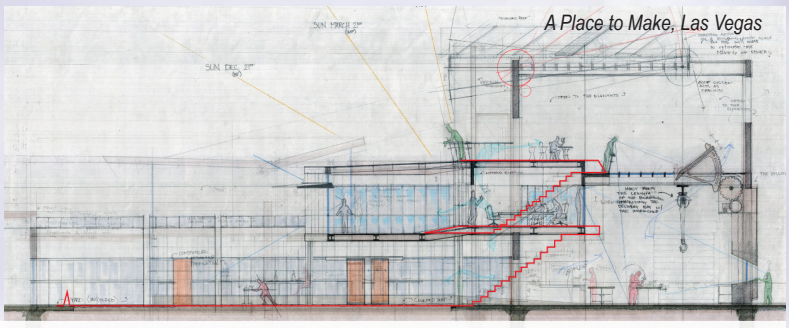
Architecture + the Social-Cultural-Economic-Political Context

All architecture is physically contextual (whether consciously conceived or not); it is also always political (whether consciously calculated or not). The primary goal should be to make architectural proposals that are ***strategic rather than reactive, appropriate to the space and time of the given situation.***



A Rural School in Andhra Pradesh, India [winner of 2017 AIA COTE Top Ten student award; project under construction





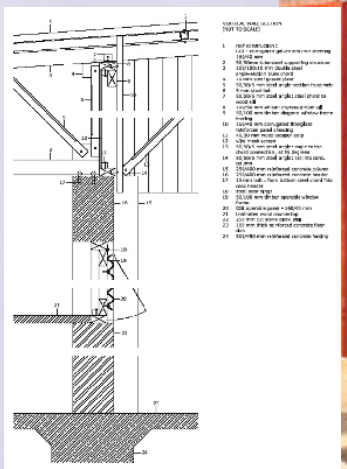
A Place to Make, Las Vegas

The Paradigm of Architecture | Integration

The ultimate aim of this topical sequence is to understand how our creative work reflects upon, questions, and relates to the broader field of architecture. Are we advancing the discipline or simply replicating the past? Are we improving our relationship with nature, or settling for the status quo? Are we creating stimulating, responsible environments or …….? To paraphrase Corbusier, we should aim to ***make the bad difficult and the good easy.***

Naturally, these topical issues are not discreet and they should overlap. The iterative design process will be a guiding principle. "Architecture + Nature" projects might develop in a multitude of scales and uses.

Project HOPE: Design/Build AIDS Clinic, Africa

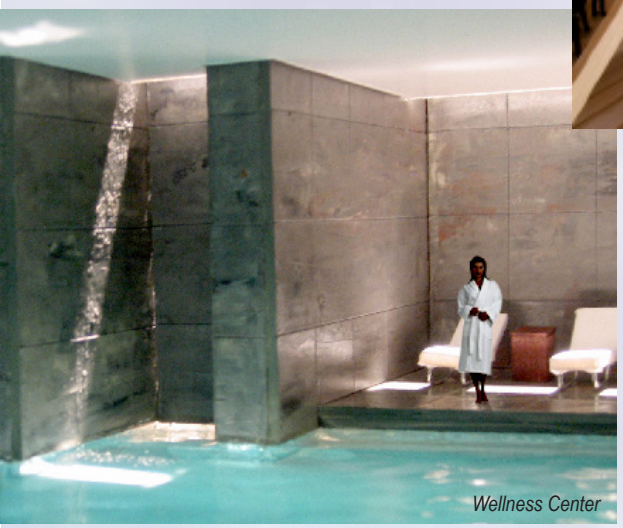


Planning in the Present for the Future

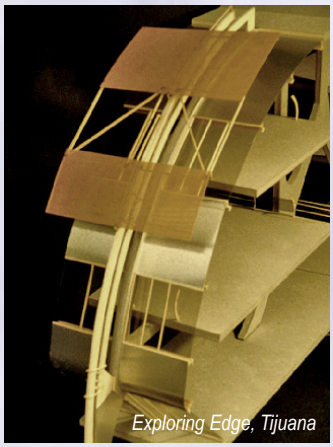
Buildings are among the more durable artifacts that a society produces with causal affects on the environment that far outlive their makers. As thoughtful, educated designers, we are the stewards not only of creating meaningful spaces for people but also for respecting the environmental setting of these places. Man's existence within the earth's fragile ecosystems (of which we are a part) calls for sensitive, responsive, appropriate design.

It is our responsibility to search for a fitting co-existence, a symbiotic relationship that neither impoverishes the planet nor our human experience on it.

Multi-Modal Transit Center, LA



Wellness Center



Exploring Edge, Tijuana

Freeway Lid Eco-Village

Schematic Schedule

Thesis Seminar: "Architecture + Nature"

What is the Thesis (and development of a dialectic). Critical position explored through a series of "peer" reviewed abstracts and presentations. Precedent research, program, and site explorations.

Design Studio Fall: Ideation

Explore schematic ideas through a series of topical charrettes. Site modeling and analysis. Conceptual design proposals and material/form/light explorations. Submission #1 thesis "book." Fieldtrip(s). Juried reviews.

Design Studio Winter: Development

Re-evaluation of conceptual ideas.
Demonstrable development of design proposal(s).
Submission #2 of thesis "book." Fieldtrip(s).
Juried reviews.

Design Studio Spring: Synthesis

Completion of thesis. Submission of #3 thesis "book." Juried reviews and final exhibition.

This is potentially one of the most challenging periods of architectural innovations in history. While many of the established architects today seem intimidated by the accelerating momentum of change – fearing their stylistic commitments may be under attack – there is no reason why the environmental revolution cannot be welcomed as the threshold of a great creative era. Here is an opportunity to invent the future on terms that are sociologically and ecologically responsible.

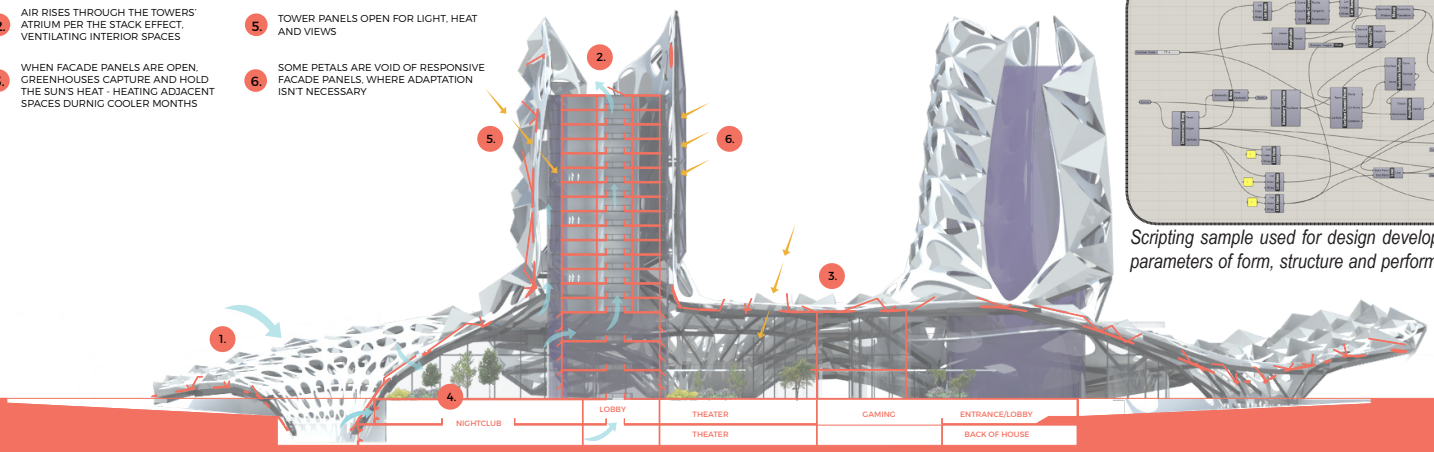
- James Wines, *"The Art of Architecture in the Age of Ecology"*

Treat the Earth well. It was not given to you by your parents.
It was loaned to you by your children.

- Kenyan Proverb

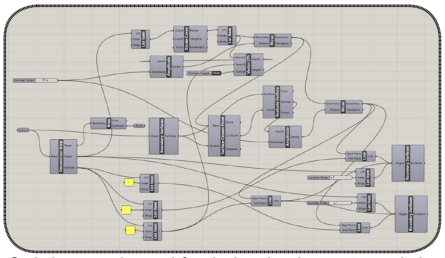
A Place To Be

1. THE VENTURI EFFECT INCREASES AIR VELOCITY AND DIRECTS AIR TO UNDERGROUND SPACES
2. AIR RISES THROUGH THE TOWERS' ATRIUM PER THE STACK EFFECT, VENTILATING INTERIOR SPACES
3. WHEN FACADE PANELS ARE OPEN, GREENHOUSES CAPTURE AND HOLD THE SUN'S HEAT - HEATING ADJACENT SPACES DURNIG COOLER MONTHS
4. GREENHOUSES INCREASE HUMIDITY THROUGH EVAPORTRANSPIRATION, RAISING COMFORT LEVELS
5. TOWER PANELS OPEN FOR LIGHT, HEAT AND VIEWS
6. SOME PETALS ARE VOID OF RESPONSIVE FACADE PANELS, WHERE ADAPTATION ISN'T NECESSARY



SOUTH SECTION

Biomimetic Resort, Las Vegas

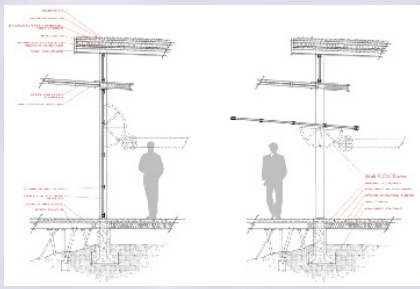


Scripting sample used for design development - exploring parameters of form, structure and performance [A. Church]

Partial Bibliography

Alexander, Christopher, *A Pattern Language* (New York: Oxford University Press, 1977).
Benyus, Janine, *Biomimicry: Innovation Inspired by Nature* (New York: Harper, 2002).
Carson, Rachel, *Silent Spring* (Boston: Houghton Mifflin Co., 1962).
Drew, Philip, *Touch This Earth Lightly: Glenn Murcutt in His Own Words* (Duffy & Snellgrove, 2000).
Earth Pledge, *Sustainable Architecture White Papers* (New York: Earth Pledge, 2000).
Fernandez-Galiano, Luis, *Fire and Memory: On Architecture and Energy* (Cambridge: MIT Press, 2000).
Guzowski, Mary, *Daylighting for Sustainable Design* (New York: McGraw Hill, 1999).
Hosey, Lance, *The Shape of Green: Aesthetics, Ecology, and Design* (Island Press, 2012)
Kwok, Allison, and Walter Gronzik, *The Green Studio Handbook, 3rd Edition* (Architectural Press, 2018).
McDonough, William and Michael Braungart, *Cradle To Cradle* (New York: North Point Press, 2002).
Leopold, Aldo, *A Sand County Almanac* (New York: Oxford University Press, 1989).
Mau, Bruce, *Massive Change* (London: Phaidon Press, 2004).
Mazria, Edward, "It's the Architecture, Stupid!" (*Solar Today,* May/June 2003, p. 48-51).
Mazria, Edward, *Passive Solar Energy Book* (Emmaus: Rodale Press, 1979)
McHarg, Ian, *Design With Nature* (Garden City: Doubleday/Natural History Press, 1969).
McKibben, Bill, *The End of Nature* (New York: Random House, 2006)
McPhee, John, *The Control of Nature* (New York: Noonday Press, 1989).
Miller, David, *Toward a New Regionalism* (Seattle: University of Washington Press, 2005).
Millet, Marietta, *Light Revealing Architecture* (New York: Wiley + Sons, 1996).
Moe, Kiel, *Convergence: An Architectural Agenda for Energy* (New York: Routledge, 2013).
Orr, David, *The Nature of Design: Ecology, Culture, and Human Intention* (New York: Oxford University Press, 2002).
Pallasmaa, Juhani, *The Eyes of the Skin: Architecture and the Senses* (London: Academy Group Ltd., 1996).
Pollan, Michael, *In Defense of Food* (Penguin Press, 2008)
Portoghesi, Paolo, and Erika Young, *Nature and Architecture* (Milano: Skira, 2000).
Reisner, Marc, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Penguin Books, 1993).
Steffen, Alex, Ed., *World Changing: A User's Guide for the 21st Century* (New York: Abrams, 2006).
Tanizaki, Junichiro, *In Praise of Shadows* (Stony Creek: Leete's Island Books, 1977).
Thompson, D'Arcy, *On Growth and Form* (London: Dover, 1992).
Van der Ryn, Sim and Stuart Cowan, *Ecological Design* (Island Press, 1995).
Wells, Malcolm, *Gentle Architecture* (New York: McGraw Hill, 1992).
Wines, James, *Green Architecture* (Koln: Taschen, 2000).
Yeang, Ken, *Ecodesign: A Manual for Ecological Design* (Academy Press, 2006).
Zelov, Chris, Ed., *Design Outlaws on the Ecological Frontier* (Easton: Knossus Publishing, 1997).

"Plant a Seed; Watch it Grow" Preschool, San Luis Obispo



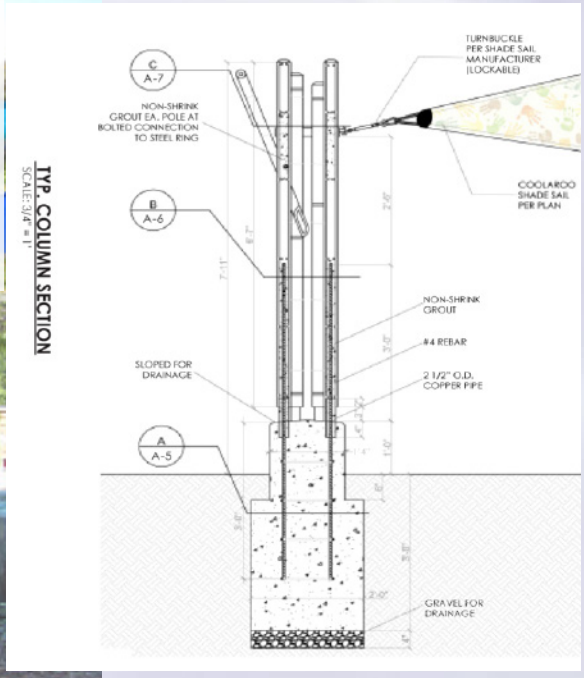
SAMPLE [design|build]

Paradigm of Architecture | Integration

A funded proposal for an "outdoor classroom" at a local elementary school, leading to multiple levels of design/ build involvement by thesis students.

Phase 1: Peterson, Montes, Radle
Phase 2: Iliff, Fematt, Robinson, Douglas, Oroudjeva, Leung
Phase 3: Boyce, Bultema, Hicks, Wentz-Fitzgerald, Woods
Phase 4: Bierce, Evans, Gibbs, Rowlee, Stabler, Wang, Wong
[project ongoing]

Recognized with a USGBC C4 "Green Innovation" Award



SAMPLE [design|build]

Paradigm of Architecture | Integration

Solar Decathlon 2015: a net-zero energy interdisciplinary design|build project involving many students from multiple disciplines.

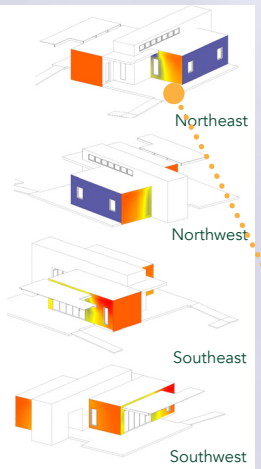
Thesis student: Michael Fletcher

Project managers: Lisa-Marie Mueller, Alyssa Parr

Recognized with a 2017 USGBC|CCGBC Central Coast Green Building Council Design Award

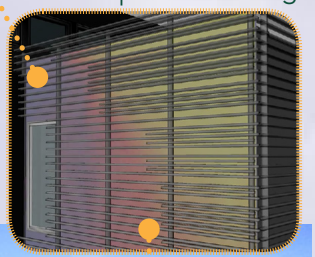
INHOUSE: DESIGNED TO RESPOND TO CLIMATIC DESIGN PRIORITIES

- **organize**: facing south with east/west elongation
- **insulate:** tight envelope with R 30.5 walls + roof; R 24 floor
- **shade:** south windows + envelope
- **ventilate:** operable windows for cross and stack ventilation
- **stabilize:** phase change material dampens temperature swings
- **collect:** solar power as well rain and greywater



Shading Strategy

Analysis of incident solar radiation informed the design of the exterior screen, intended to shade the envelope as well as subtly demonstrate our solar responsive design



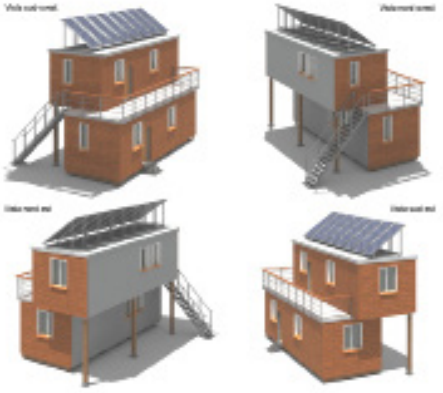
Phase change material used as a thermal stabilizer as well as artistic display

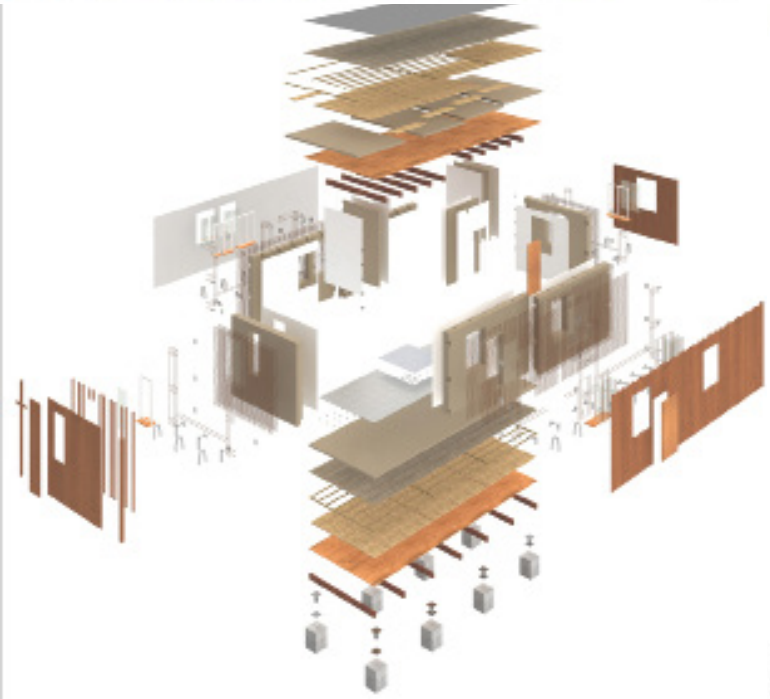
SAMPLE [small | medium scale]. . . . . .

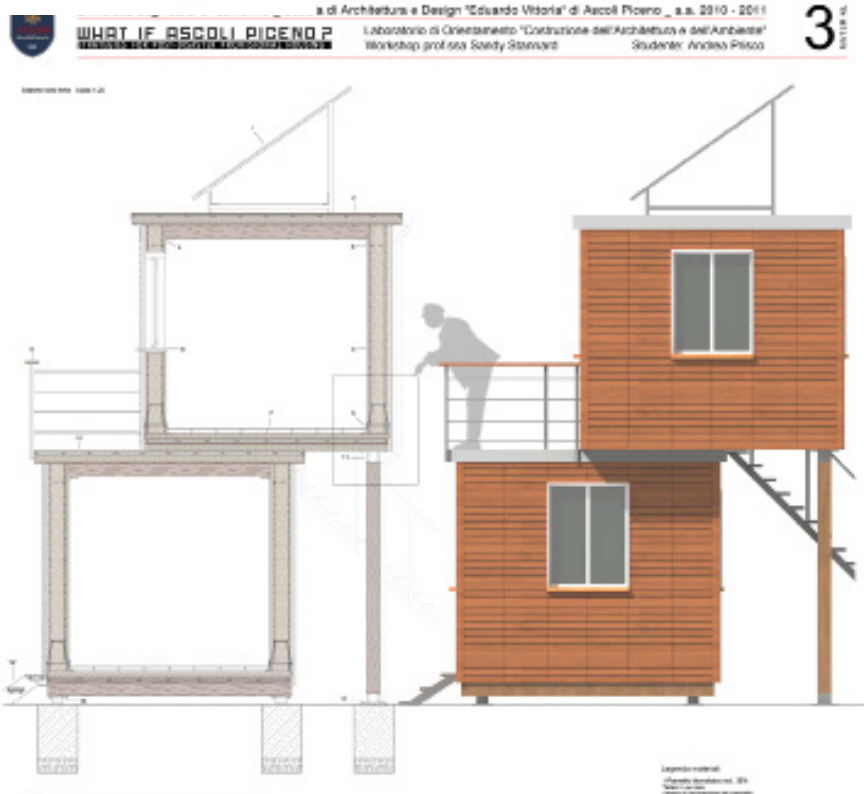
Paradigm of Architecture | Integration

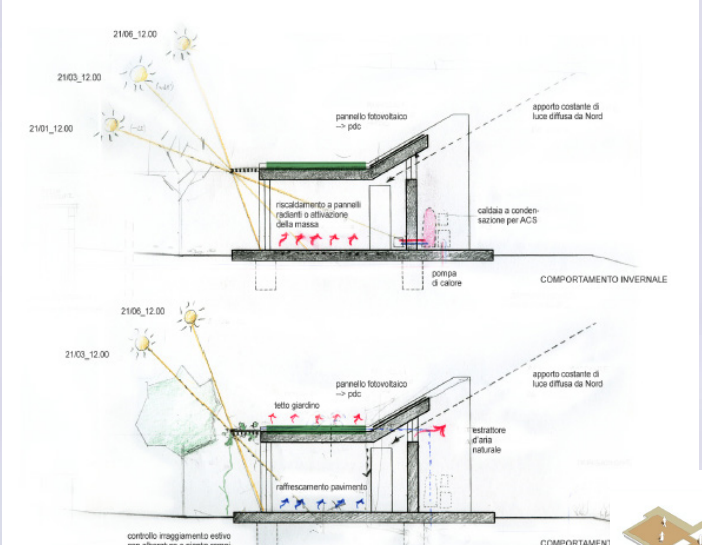
Small sampling of Italian student work, spring 2011. Project challenges: long-term/temporary relief housing for earthquake victims; off-grid, zero energy dwelling.

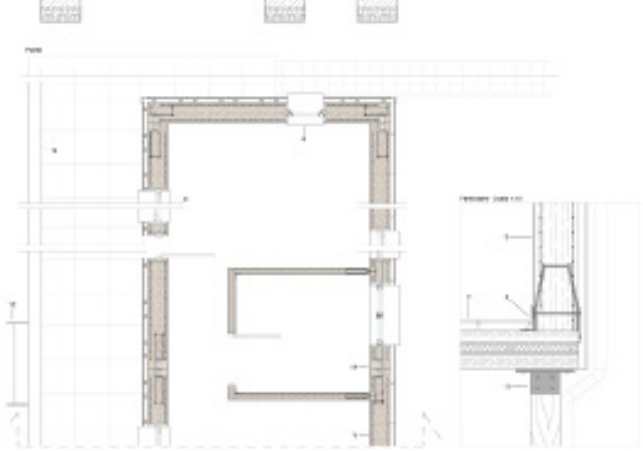
[A. Prisco, D. Cameli]

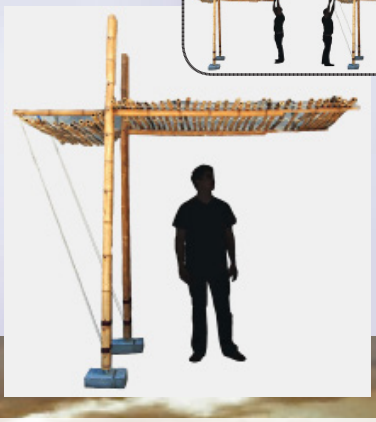




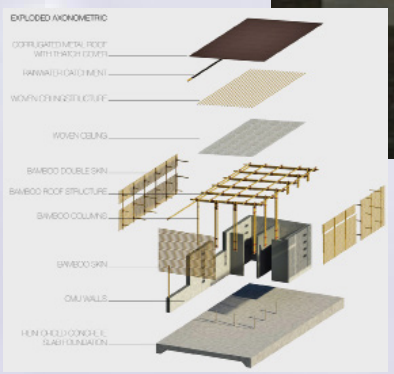


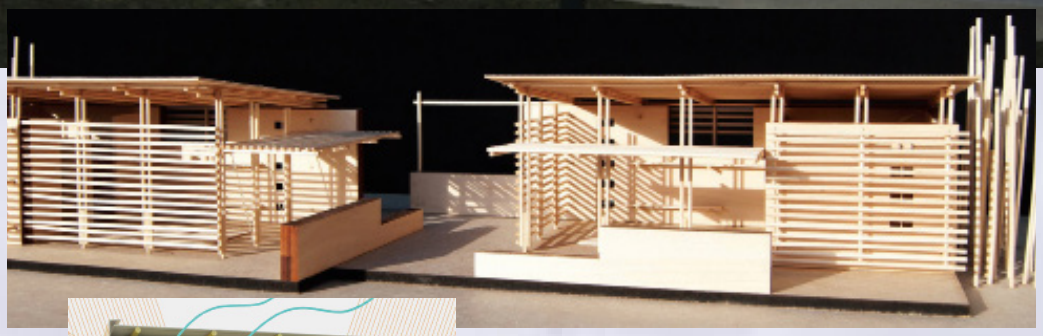


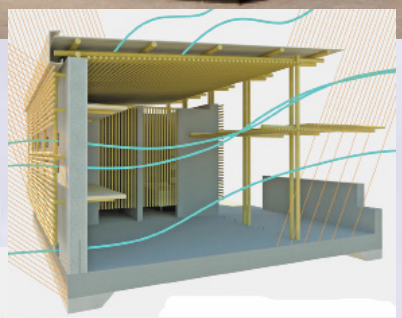


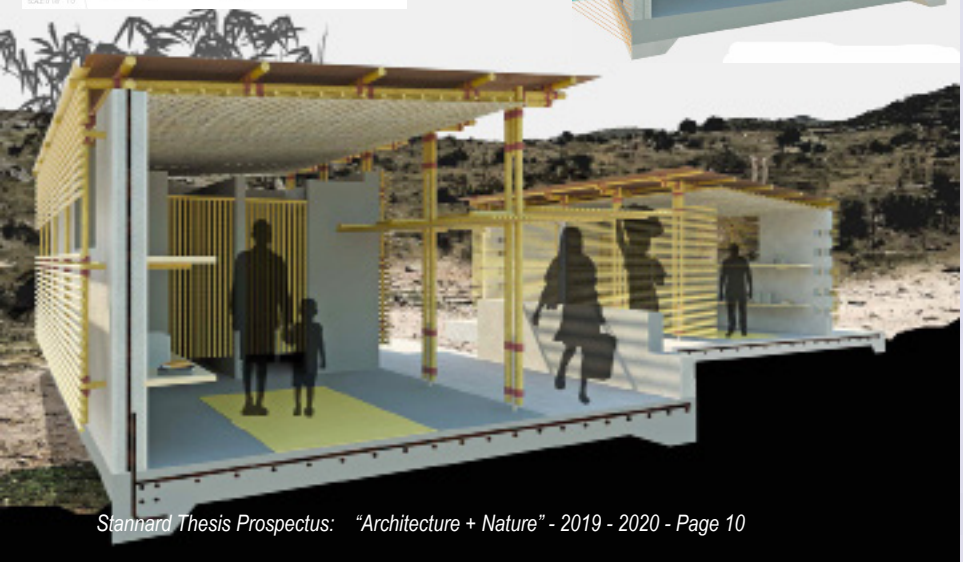


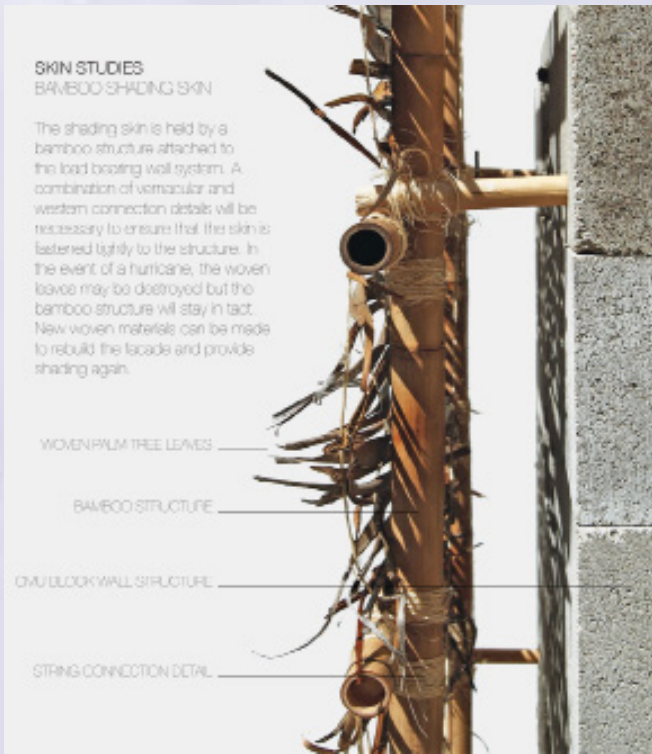
S A M P L E [humanitarian]. . . . . .
Paradigm of Architecture | Integration
Proposal for Haitian relief housing, using appropriate passive design principles and durable, sustainable, low tech materials. *[There are an average of 2 - 4 humanitarian projects in the studio each year, including Journeyman International projects].*
[E. Namisniak]

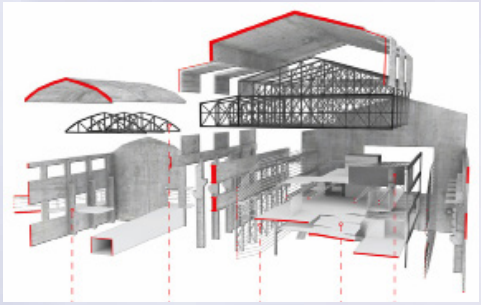










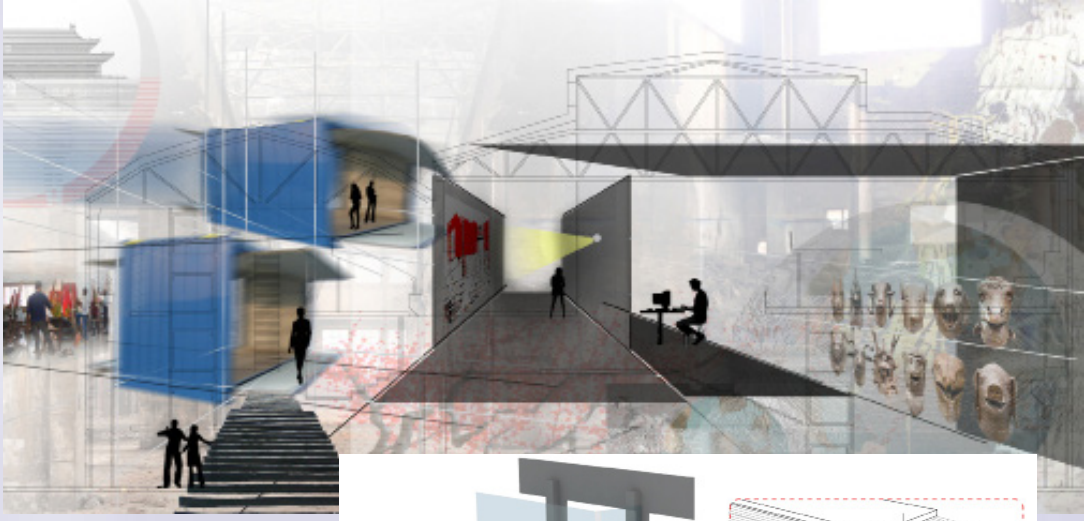


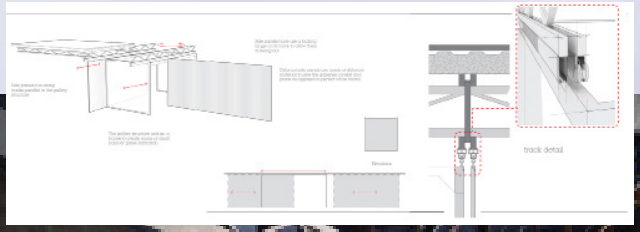
SAMPLE [large scale]. . . . . .

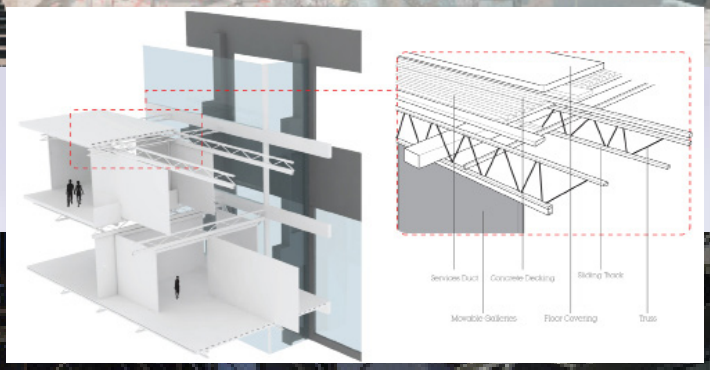
Paradigm of Architecture | Integration

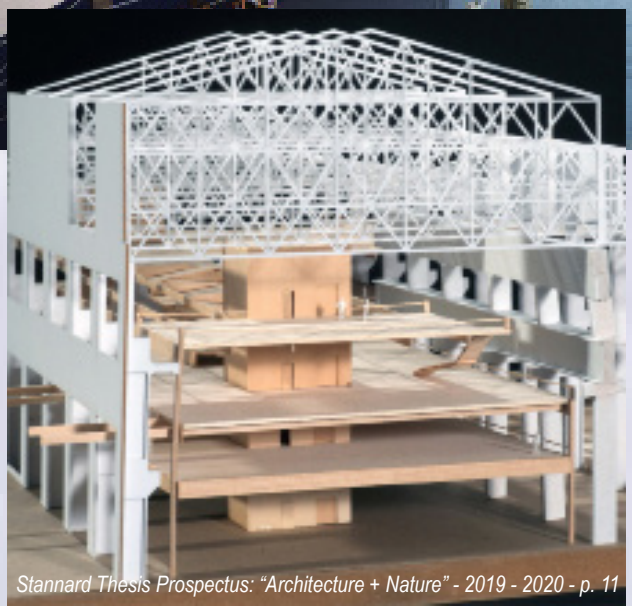
Adaptive re-use of an under-utilized factory into a center for contemporary art, exploring notions of continuous flexibility and freedom of expression; Beijing, China.

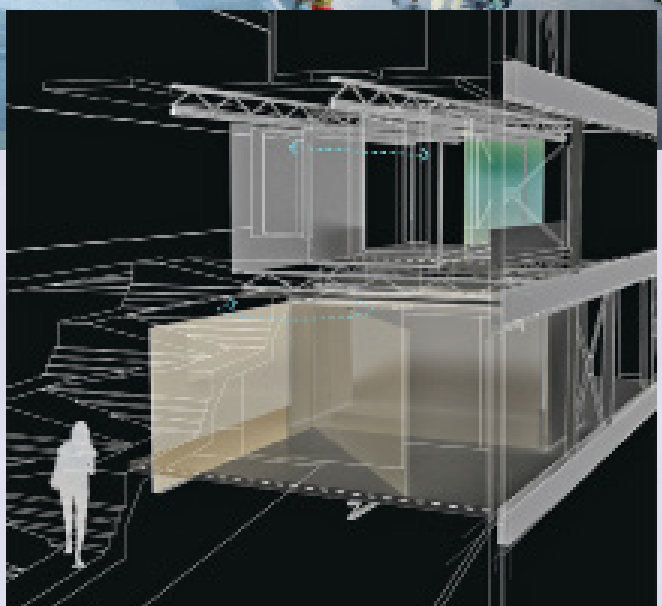
[M. Yee]











SAMPLE [materials exploration]. . . . .

Vellum. et cetera

"Vellum" is a seven week challenge in which students design and construct a full-scale three dimensional piece "in the spirit of" their thesis topic.
Also shown: studio design/build flexible bench/stand project.

Rain coat made from re-purposed plastic bags [K. Barton, award winner]

Leaf spring bench from reclaimed/repurposed material [T. Bierce, B. Preston; award winner]

[J. Luty, runner up award]

Storage system, design for flexibility, transportability, and zero waste [D. Aine/M. Rittenour; award winner]

Molded plywood chair, from concept to prototype. Now in production. [B. Preston, award winner]

S. Reddy, Honorable Mention

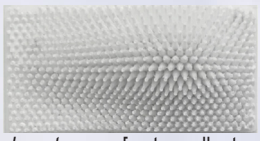
Collaborative studio design/build bench + stand for final show [Sandy's 19, 2013]

S A M P L E [performative materials explorations]. . . . .

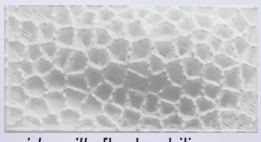
When Performance Informs Design

Inspired by natural systems or by emerging materials engineering, the students used multi-modal methods to explore their design ideas, leaning on parametric design tools in search of superior performance as well as delightful aesthetics (with this tool use representing an emerging chapter in the design professions). *[The work was selected for presentation as part of the AIA/ACSA "Intersections" Symposium (June 2018)]*

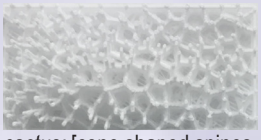
Water Collecting Facade Study



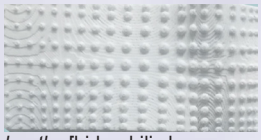
desert moss: [water collects on the leaf tip "awns"]



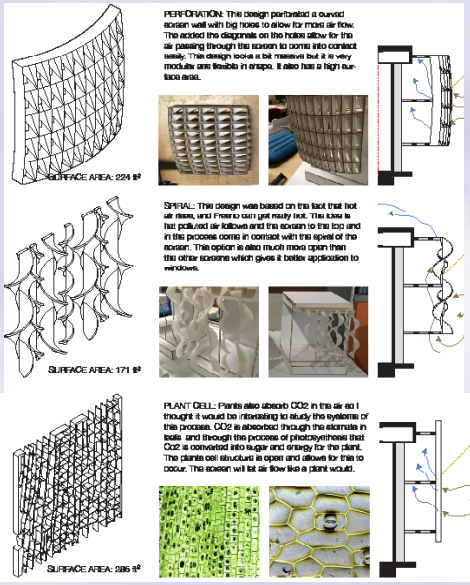
spider silk: [hydrophilic nanofibrils collect water]

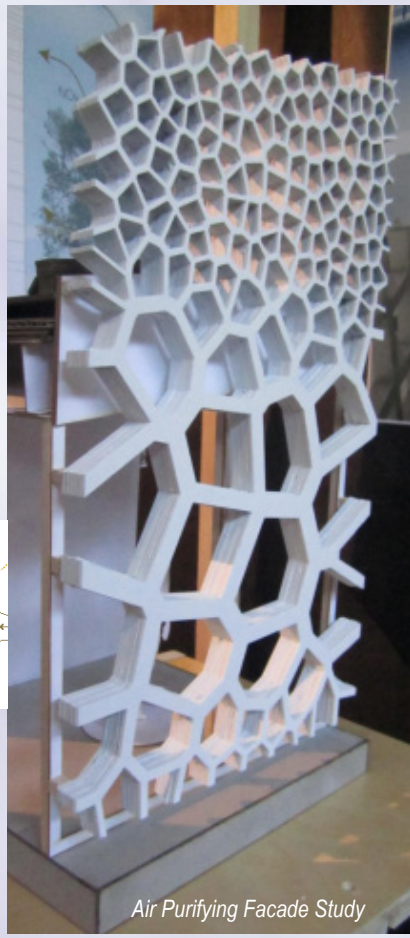


cactus: [cone shaped spines collect water]

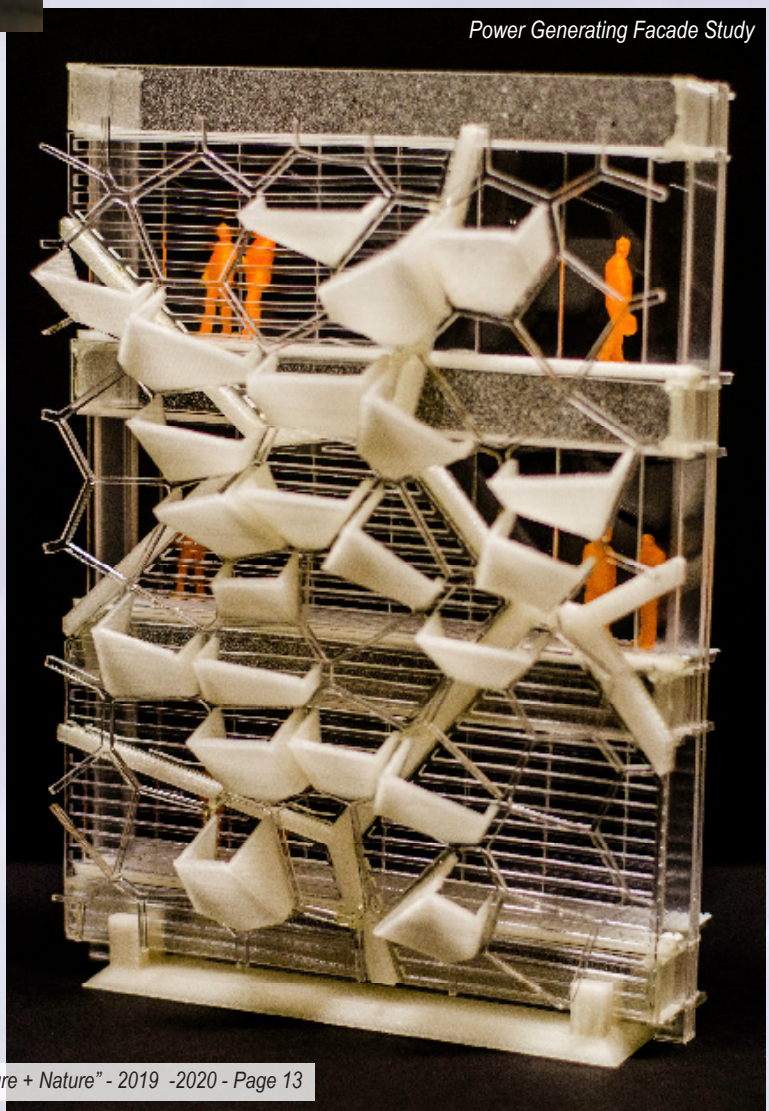


beetle: [hidrophilic bumps collect water]

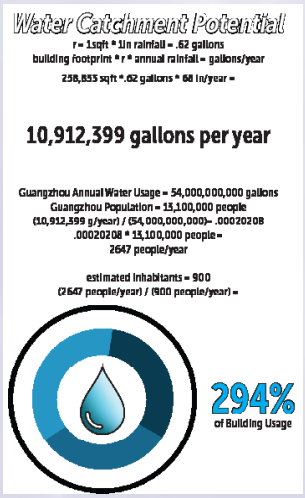


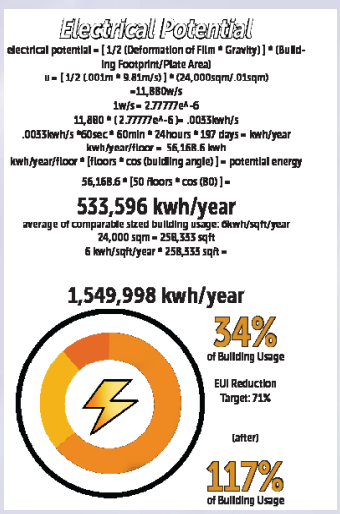


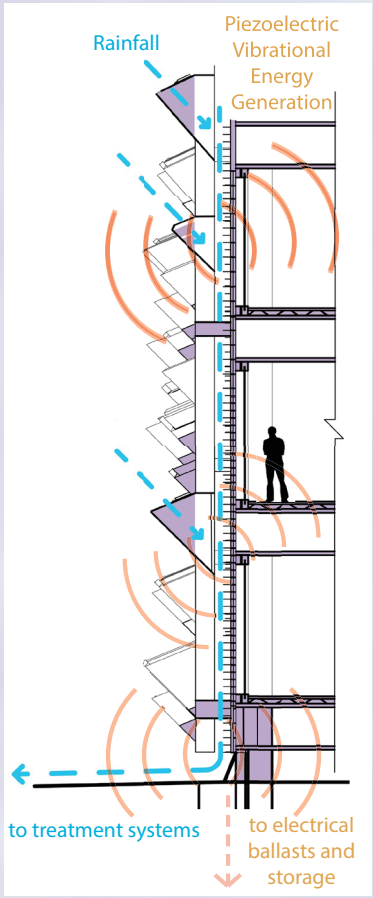
Air Purifying Facade Study

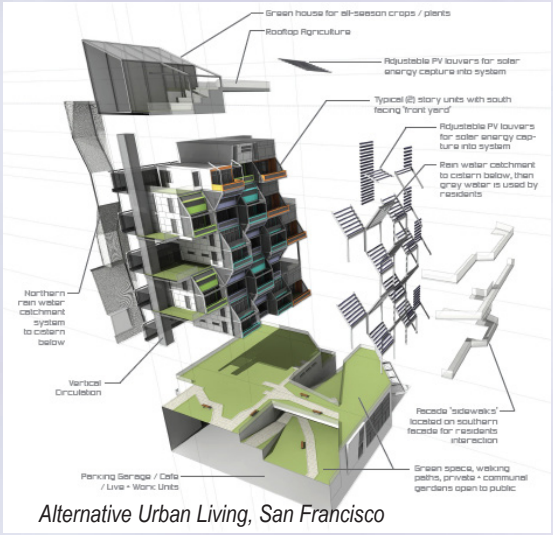


Power Generating Facade Study



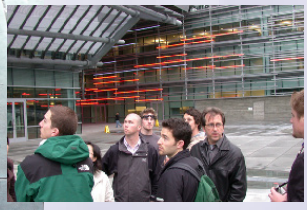






Alternative Urban Living, San Francisco

Cocoa Study Center, Ghana



Arbor Study Center

Graphic examples shown depict past Stannard student thesis projects. [Aine, Alameda, Ballachey, Barton, Bjorkman, Burford, Church, Eppink, Fairman, Gaines, Ghishan, Herbst, Holliday, Holmes, Jones, Kith, Lam, Laurel, Luty, Moser, Nakano, Ngo, Novak, Preston, Reddy, Rowe, Savannah, Stabler, Teich, Valles, Vargas, Wang, Weller, plus Solar Decathlon]

A Place To Be (Design/Build]

Solar Decathlon 2005 in Washington, D.C.

Sandy Stannard

Sandy studied architecture at UC Berkeley and University of Washington, including study abroad experiences in Italy and Denmark. She is a licensed architect and a LEED Accredited Professional. Sandy has had the opportunity to work on a variety of architectural projects, both public and private, at large and small scales, including design-build projects. She has taught architecture for over twenty years (University of Idaho, University of Washington, and Cal Poly San Luis Obispo), including summer studios in Rome at the Sede di Roma/Penn State. A few years ago she taught at the Universita' di Camerino in Ascoli Piceno, Italia, teaching design studios and materials classes in combined English and Italian. Just prior to joining the faculty at Cal Poly, she worked as a lighting specialist at the Pacific Energy Center in San Francisco. Recently Sandy was awarded three grants to complete design-build "outdoor classroom" projects and installations with thesis students for a local elementary school; this project received a design award as well. In the studio, Sandy has mentored a number of projects focused on global design and humanitarian endeavors, working with Journeyman International (JI), a SLO based non-profit that provides opportunities to solve real design problems to be implemented by global non-profits. In addition, Sandy was one of the faculty advisors for Cal Poly's 2005 and 2015 Solar Decathlon projects (an interdisciplinary design/build challenge to design + build a small 100% solar powered residence). Both the 2005 and 2015 Solar CalPoly projects received third place overall in the competition, with a 1st place in architectural lighting [05], 2nd and 3rd in architectural design, and 2nd in buildability/livability/marketability. Two thesis students used the Solar Decathlon for their thesis investigations. Sandy was gratified to receive a Cal Poly Distinguished Teaching Award in 2015 and a Department of Architecture Faculty Merit Award in 2017.