

# THRIVING THROUGH MAKING: DIGITAL + MATERIAL

## DESIGN AS INFORMED DISCOVERY

Technology is enabling architects to tailor design processes. Combining material experiments with computation allows sensory engagement, tempered with control. Antonio Gaudi, Frei Otto, Mark West each developed new structurally efficient forms by carefully observing the material under different loading stress and support conditions. Whether cables, soap film, or fabric formwork, they created new aesthetic possibilities.

Parametric design, performance analysis and digital fabrication puts physical form-finding on steroids, allowing a designer to multiply and evaluate alternatives with rigor. The inhabitable result must have a tactile and haptic appeal.

In this studio, students will start with digital+material experiments to develop high-tech craft skills. Rhino Grasshopper lessons will coach students on generating algorithmic forms and flexible patterns, and testing forms with structural and solar simulations. They will then physically craft components to understand the aesthetic possibilities of surfaces, volumes, joints and assemblies. Focusing on wood will allow the class to benefit from the AAA Woodshop support and our OSU Wood Science relationships.

Complimenting hands-on exercises will be research investigations into site, program and biomimicry with computation. Students will look at how designers have translated Nature's beauty and efficiency into building components that work with sun, water, and wind. Biomimicry will be a source of inspiration for creating buildings that thrive in their ecological, social and constructed environments.

## PROGRAM: HANDS-ON VO-TECH LEARNING

In the Winter and Spring term, skills will be applied to the design of a new hybrid environment that combines learning with industry, looking critically at how the craft and technology of Maker culture can inform the design brief as well as their own process. This studio will examine how rebuilding the city can include growing its human capital. Students are invited to consider:

- Can income inequality be addressed by a new kind of educational program that empowers the underprivileged to be productive in new ways?
- What kind of Makerspace, or urban agriculture or micro-enterprises could promote vocational-technical training that benefits the individual, the environment and the economy?
- Can we engage creativity in generating authentic local industries that thrive by cultivating minds as well as making money?

By examining how entry-level or life-long learning can take place in local companies, students will consider the human side of capitalism.



## CHOICE OF SITE

Students may choose a site on the Portland Orange Line MAX light-rail or propose their own site. Students will study the environmental and cultural history as well as recent planning in order to understand how their building can be a catalyst for ecological, social and economic development.

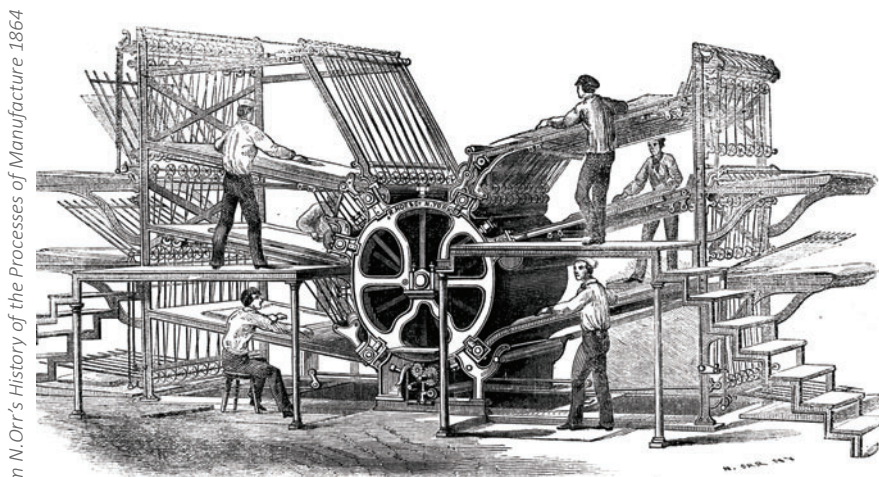
In September 2015, new MAX transit stations will activate sleepy industrial areas on both sides of the Willamette River. The potential for change is enormous as convenience increases and adjacent lots are activated by daily commuters and visitors.

Adjacent to prime residential neighborhoods, Portland's industrial Central Eastside and the South Waterfront Zidell Yards are ripe for development. Originally an area where produce was grown and distributed on the Willamette River, now the Central Eastside contains small-scale manufacturing, industrial service and industrial office uses, including designers and makers seeking low rents. The Zidell family is eager to turn its shipyards into a lasting legacy for Portland.

## IT TAKES A VILLAGE

For career development, students will be coached on digital communication skills and meet potential mentors in Portland for periodic feedback.

Nancy Cheng taught thesis studios 2011-13 when she directed the Portland Architecture Program.



from N. Orr's History of the Processes of Manufacture 1864