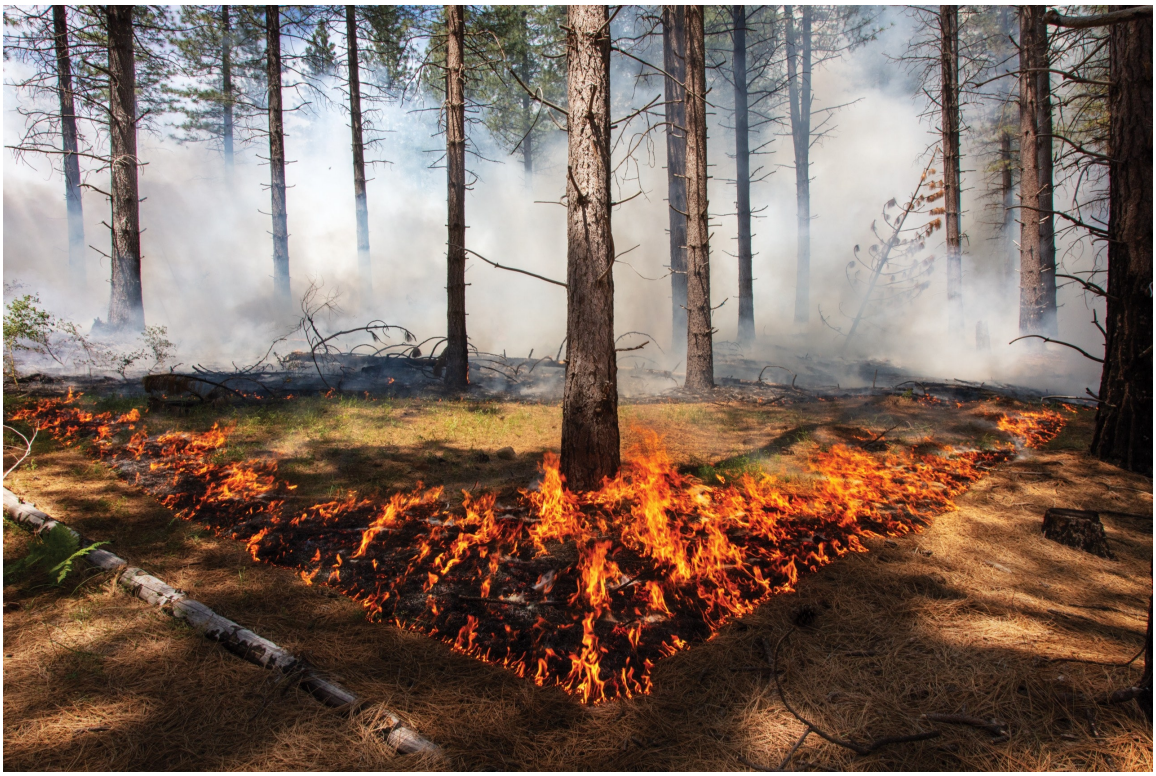
Future Forests
Arch 205a/205b
Professor Ronald Rael
Studio One: Year Long Masters of Advanced Architectural Design Studio



As megafires become the new normal, prescribed burns give trees breathing room and prevent the worst damage. Photograph by Kevin Cooley for The New Yorker

Overview
California is on fire. One of the primary reasons for the phenomena of seasonal fires in the state, particularly Northern California, is the excess of small diameter timber present in forest ecologies. While wood harvesting companies in the United States focus primarily on timber that is greater than 10" in diameter, leaving behind large amounts of small trees, brush and a flammable ecology that has been made vulnerable to the consequences of climate change, particularly drought and global warming, lending to disastrous outcomes. California also has a long, history of earthen construction, buildings made of unfired clay-rich soil (adobe) and the use of fired ceramic materials for the roof, which has been overlooked in contemporary design. Each of these material resources, wood and earth, have the capacity to be rethought through technologies contributes to a fire-resistant strategy for building-making, but also for improving our forest to reduce their susceptibility to forest fires, while providing a resource to establish new models for technological development and application with the intent to establish Residential Urbanism through a Wildland-Urban Interface.

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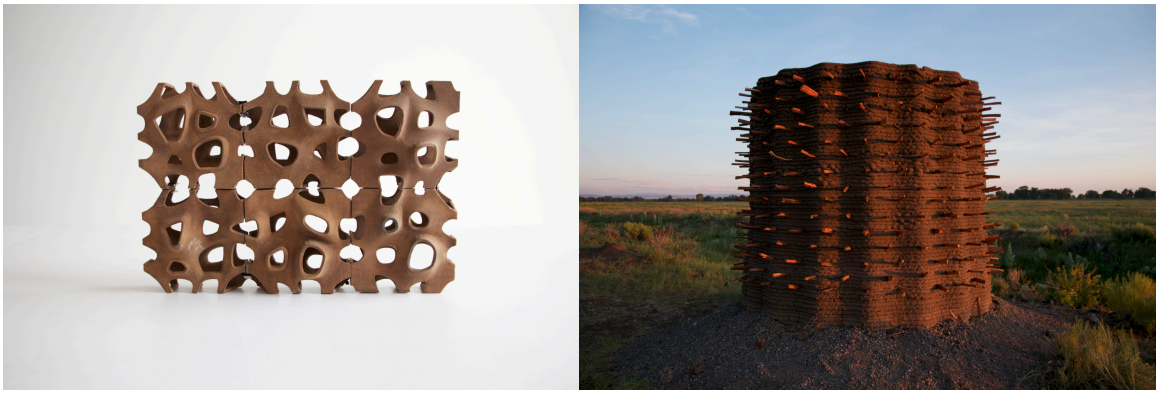

left: 3D printed wood. Right: 3D printed adobe

Provocation
By harvesting small diameter timber for the development of new wood technologies and using clay based materials for fire-proof building component systems, there is the potential to reduced the risk and hazards of fire, to both forests and our build environment. This year-long studio will look at two ways of conceptualizing a response to forest fires in California that pertain to the key issues of Technology, Society and Ecology:

1. Harvesting of small diameter timber for the production of cross-laminated timber (CLT) and wood based additive manufacturing applications and explores ways that contemporary technological building practices can arrive at new strategies for building

2. The exploration of California's traditional earthen building practices (adobe and ceramics) coupled with additive manufacturing to produce fire-proof building materials and systems.

Students will explore how material technology can serve as an investment in disaster risk for resilience and coupled with this premise, a foundation in representational skills for the course will established by developing skills in digital modeling and animation for the production of a video at the end of the year.

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Learning Objectives

1. Gain a deep understanding of the history of Fire Disasters in Northern California and the strategies proposed for *prevention, mitigation, preparedness, response, recovery and rehabilitation.*
2. Develop strategies for *recovery, rehabilitation, resilience, and reconstruction* in post and pre-fire scenarios through urban-wildland interface design.
3. Acquire an understanding of California's traditional earthen architecture history and culture
4. Develop a knowledge base of cross laminated timber technology
5. Ability to work with 3D printed sawdust processes
6. Gain advanced abilities in subdivision surface modeling, animation, and visualization techniques.
7. Gain insight into wildlife ecologies and their relationship to the fires, earthen materials, and the built environment.

Field Visits

The Tubbs Fire of 2017, at the time, was the most destructive wildfire in California history, burning 36,807 acres in parts of Napa, Sonoma, and Lake counties. The Camp Fire of 2018, which destroyed 153,336 acres, surpassed its destructiveness only a year later. Both fires had an immense toll on forest ecology, built structures, and human lives. The two sites will be the primary area of study for the studio.

Northern California is home to some of the most impressive sites for earthen architecture in the state, as well as home important manufactories of ceramic production. Visits to historic and contemporary sites of earthen architecture, as well as ceramic manufacturing companies will be a key component to gain a greater understanding of the relationship between material and place.

Established in 1951, Sagehen Creek Field Station is a research and teaching facility of the University of California at Berkeley located in the Central Sierra Nevada north of Truckee, California. The station is embedded within the 9,000-acre Sagehen Experimental Forest, which is cooperatively and collaboratively managed in a partnership between the University of California, the US Forest Service's Pacific Southwest Research Station and the Tahoe National Forest.

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Industry and Organizational Partners

Forust Corporation, San Francisco, California
3D Potter, Stuart Florida
Sagehen Creek Field Station, Truckee, Nevada
UC Berkeley Fire Research Group
Emerging Objects, Oakland, California