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**Teaching and Research Winery**  
and the **August A. Busch III Brewing**  
and **Food Science Laboratory**

**Flad Architects**

“It is a dream come true to have UC Davis’ pre-eminent wine, food, and brewing programs housed together in a brand new state-of-the-art complex. The new winery, brewery, and food processing facility will further advance our teaching, research, and outreach programs.”

Clare M. Hasler, *UC Davis Executive Director of the Robert Mondavi Institute*

# Research & Innovation

insights

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**A Venue for Discovery  
and Application**

The university envisioned a facility where bench-top science was integrated with applied process technologies — a place where research would serve California's winemakers and farmers, and students would connect directly with industry experts and consumers. The WBF achieves these goals by encouraging academic exploration and promoting research into new processes for cultivation and production in an industrial setting.

**WBF** *R&D Magazine*  
2011 Lab of the Year  
— High Honors



### Key Objectives

- **Complement the RMI with thoughtful expression of utilitarian functions.**
- **Reflect California's warm, open, and contemporary aesthetic.**
- **Create an academic environment that is welcoming, sustainably designed, and easy to maintain.**
- **Incorporate stunning views of the natural landscape and work within established circulation patterns.**
- **Increase production capacity to accommodate more students and more activity.**

### Synergy between Academia and Industry

The WBF provides a unique link between academic research and industrial application. Students in the Departments of Viticulture and Enology and Food Science and Technology learn about both standard practices and ground-breaking new methods and technologies in their fields. Using this extraordinary facility – one that functions as both a classroom and a state-of-the-art laboratory – the university educates future food science and wine professionals while conducting research that will lead to industry innovations.

**Housing 40 barrels of wine for aging and research, this area is open for public viewing and is used year round.**

# Viticulture and Enology

The Department of Viticulture and Enology has already made invaluable contributions to the creation and appreciation of wine. In this new facility, internationally recognized faculty will train grape

growers, wine makers, and researchers who will undoubtedly have an even greater influence on the future of the industry.

“The new teaching and research winery will have both an immediate, and a long-term impact on the wine industry. Now the department will be eligible for more research funding, while attracting the best and brightest faculty and students. Graduates of this program are going to have experience with the latest technology, and they will bring that expertise to the industry.”

Bill Murphy, *Clos LaChance Winery Founder and Chairman of the UC Davis Viticulture and Enology Department's Board of Visitors and Fellows*

## Technology Enhances Wine Research

- 152 networked, 55-gallon fermentation tanks monitor the sugar levels and temperature of the wine being processed. This data is transmitted through a wireless network, then stored in the lab's computers. This precise regulation of the fermentation process ensures that identical barrels of wine can be created. At the same time, intricate differences between barrels can be easily engineered, opening new opportunities for research.
- The precise, new system allows researchers to run up to 50 simultaneous fermentations per week, testing variables in wine such as clone, rootstock, crop level, or site. Current applications include studying the effect of temperature on extraction in red wine and examining how filtration affects the sensory characteristics of a wine.
- Programmable Brix meters measure the sugar content of fermenting wine and electronically transmit the information through a wireless network every 15 minutes – a significant labor savings over previous methods.
- Vintners currently test for compounds in their wines by sending samples to outside labs. But soon winemakers will have a new tool to accomplish this task, designed by students at the WBF. A spectrophotometer, submerged in the wine, will use light to measure the compounds and then transmit the results instantly over a wireless network.
- Students are also developing a computer program that will access the wine's complete fermenting history by simply scanning a barcode, as researchers move from tank to tank.
- A system of RFID sensors measures water temperature as it enters and leaves the facility – abnormally warm or cold water entering the lab could compromise the wine's quality, while water at the wrong temperature upon exit could indicate a problem with one of the tanks.



## Department of Food Science and Technology

Offering the only food science PhD program in California, the Department of Food Science and Technology pioneers research in the processing, preservation, quality evaluation, safety, and utilization of foods. At the crossroads of scientific and technological developments, their work ensures a safe and abundant food supply, contributing to a healthier population.

- The brewing science program prepares students for careers in the production of beer or other food fermentation industries (e.g., other alcoholic beverages, vinegar and cheese).

## Brewing

- Program participants study chemistry, biochemistry, microbiology, and engineering as they pertain to the malting and brewing processes. They also address issues of quality assurance, plant sanitation, and packaging.

- Commercial brewers and suppliers have access to a small-scale facility for testing new recipes and processes.

“Graduates of the UC Davis brewing program are engaged and passionate – we know they are being taught by the best in the industry”

*Mitch Steele '84, Head Brewer, Stone Brewing in San Diego*



# Food

The pilot plant is home to research on alternative food processing methods and their nutritional effects. For example, studies will analyze the quality and shelf life of fresh-cut produce, alternative uses for food processing by-products, and new food formulations that maximize nutritional value.

The dairy processing laboratory also supports a variety of research projects such as separating milk components into functional ingredients, analyzing milk from cows on different diets, and processing milk from specialized breeds of cows.

- Flexible utility distribution allows for easy re-configuration of equipment as research questions change.
- Adjustable dampers in solar tubes regulate light levels, depending on the needs of the lab environment.

“The pilot plant and labs were designed and constructed for food- and dairy-grade processing. That means that we can evaluate samples of the foods and milk-based products that are processed here, from a sensory or nutritional perspective.”

*John Krochta, Peter J. Shields Endowed Chair of Dairy Food Science in the UC Davis Department of Food Science and Technology*



Andrew Cunningham, RIBA, LEED AP, Principal, Flad Architects

**Andrew Cunningham** appreciates the built landscape. Growing up in Scotland, he studied the storied architecture of that country, from its historical monuments to the evolving contemporary architecture. Today he helps shape the landscape of his new home – California – preserving what is historically interesting and important, while planning for a dynamic, environmentally responsible future.

“I’m very proud that, through this LEED Platinum certified design, we’ve had such a positive impact on an entire commercial sector – it illustrates what can be done right now to improve processes, increase efficiency, and mitigate the environmental impact of food and wine production. Perhaps best of all, I know that the students who come through this program, who work and study and learn in this lab, will make even greater advances. With every new discovery, they will have a profound effect on the future of the industry.”

Andrew Cunningham, *Flad Architects*

Mr. Cunningham has more than 25 years of experience with research and development projects for private and public sector clients. He has served as project manager for an array of building types, ranging from pharmaceutical/biotech research and manufacturing plants, to vivaria and specialized containment facilities, as well as academic, retail, hospitality,

and office buildings. The Teaching and Research Winery and the August A. Busch III Brewing and Food Science Laboratory at the University of California, Davis, is his first foray into structures designed for cutting-edge viticulture and food processing.

**Flad Architects** ■

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