**Cooperative Extension Specialist in Enology/Microbiology – Viticulture and Enology, UC Davis**

**Position Description:** Understanding and controlling microbial ecology is arguably the most important aspect of wine production. The presence of specific organisms (e.g. *S. cerevisiae and O. oeni* and other organisms that come from the vineyard and winery environments) is essential to the successful completion of the primary sugar fermentation and secondary malolactic conversion. Equally important is the control of environmental microbes at all steps of wine production, including post-fermentation processing all the way through packaging. If present at sufficient numbers, these undesired environmental microbes can be harmful to the vinification process impacting both the quality and stability of the product. Processing of liquid and solid waste streams is also dependent on microbiological processes (e.g. aerobic ponds, anaerobic digesters, and composting) and can directly impact wine production if these materials are used in the vineyard or winery after treatment. However, encouraging growth of beneficial organisms while discouraging growth of other organisms is a non-trivial problem in a commercial winery that requires expert knowledge and continued research to provide needed solutions.

Moving forward, new information gained through research and its application is critical for the industry as an understanding of microbial metabolism and ecology in both the winery and vineyard will lead to higher quality wines and more sustainable wine processing. For example, new methods to control microbial ecology through sanitation and cleaning would be expected to improve wine quality and lower water usage that is typically 4-6 volumes of water per volume of wine for a commercial winery. To achieve these goals, the industry requires the creation of less water-demanding cleaning technologies that will have the desired impact on the ecology of winery microbes and be safe for associated ecosystems.

This position will be focused on these, and other issues related to microbiology and enology, and will be located in the Department of Viticulture and Enology at UC Davis to take advantage of one of the most advanced and sustainable wineries in the world. The person filling this position will hold a doctoral degree in a field related to microbiology or environmental engineering or the equivalent and have expertise in analysis of microbial physiology and complex microbial ecosystems. While the focus of this position will be microbiology, the person in this role will be expected to address a wide range of issues facing the California wine industry in collaboration with the existing CE Specialist in Enology, Dr. Anita Oberholster, who specializes in chemistry, and other departmental faculty.

**Justification:** The wine and winegrape industries are important to the California economy. Winegrapes had a $3.1 billion farmgate value in 2016 from 602,000 acres representing 5900 grape growers. This represents a greater than 60% increase in winegrape acreage in the last 20 years. The California wine industry generated $34.1 billion in domestic sales in 2016 with a total economic impact of $57.6 billion just in state. There are currently over 4500 bonded wineries in California, an increase of over 300% in the last 20 years. As such, the first critical issue addressed by this position is understaffing in Cooperative Extension for the wine industry. There is no equivalent of a farm advisor for production facilities, and the California wine industry is currently served by a single Cooperative Extension Specialist in Enology. This position would add a second CE Specialist in Enology with expertise in microbiology/environmental engineering to complement the current CE specialist’s expertise in wine chemistry. In addition, we have recently lost Prof. Linda Bisson to retirement. Prof. Bisson was one of our two Senate wine microbiology faculty and played a key role in developing our department’s expanded on-campus extension programs (approximately 10 per year including our popular Flavor 101 courses). This position would fill both extension and research gaps in our department that will not only strengthen our department, but also give ANR the ability to better serve wine industry stakeholders. Finally, cleaning and sanitization to control microbial ecology in the winery setting is a major factor in winery water use and environmental sustainability. Efficient and effective use and reclamation of water will require creation of more effective sanitation practices to maintain food safety and quality. In addition, the unintended release of chemicals into the environment with reclaimed water can negatively impact delicate microbial and plant ecosystems, as well as soil structure when released on agricultural lands. There is a clear need for the development of better sanitation practices that still assure food safety *and* environmental quality. Success in achieving these goals will require a more fundamental understanding of production facility microbiota as well as of the microbiota of incoming materials and of the ecosystems impacted by discharge streams.

This knowledge and the extension of this data to industry will lead to more control over wine quality and stability, as well as more sustainable winery production facilities, enhance the image and economic viability of the wine industry, and be extendable to other food and beverage production facilities across the state. The goals of this position align well with the ANR 2025 Strategic Vision, especially with the initiatives related to water quality and quantity, competitive sustainable food systems, and green technology and energy security. The organizations, wineries, and individuals supporting this position include: Tony Stephen (Chairman)/American Vineyard Foundation, Allison Jordan (VP)/Wine Institute, Linda Reiff (President and CEO)/Napa Valley Vintners, Napa Valley Wine Technical Group, Jeff Meier (President/COO)/J. Lohr Vineyards & Wines, Nick Dokoozlian (VP, Viticulture, Chemistry, and Enology)/E. & J. Gallo, John Thorngate (VP, Operations Technical Services)/Constellation, Bruce Cakebread (CEO)/Cakebread Cellars, Jeffrey O’Neill (CEO)/O’Neill Vintners & Distillers and over 50 additional CEOs, winemakers (representing from small to large wineries), consultants, and industry suppliers from throughout the state.

**Extension:** We would expect the person in this position to create and maintain a vigorous extension program for wine microbiology and microbial ecology and to provide statewide UC/ANR leadership in keeping the industry aware of the latest research related to sound fermentation, sanitation and water use practices. Clientele groups include trade organizations, regional technical groups, and individual wineries that range widely in both size and experience. We would expect this person to offer workshops and short courses in collaboration with the Department of Viticulture and Enology and with industry practitioners, and participate in relevant departmental events such as our series of on-campus and off-campus (in conjunction with Viticulture Advisors) extension events, approximately 16-18 events per year, covering the scope of issues facing the state’s wine and grape industries. Other means to reach clientele will include publications, social media, and other web-based tools, such as e-extension. As this person gains seniority, we expect them to take on national leadership in enology extension.

**Research**: Key research areas would include increasing the understanding of the physiology and metabolism of production and spoilage microbes, as well as their diversity. Understanding and controlling microbial ecosystems by profiling of production facilities, vineyards, soils and waterways would be an additional focus of this position. We would expect this research to be published in various electronic and print venues such as California Agriculture, UC/ANR publications on sustainable production and refereed journals such as the American Journal for Enology and Viticulture and Catalyst.

**ANR and External Network:** The person in this position would immediately have a network of research collaborators including faculty ranging from basic to applied scientists in V&E and other departments at Davis, Riverside, and Berkeley, along with county-based Viticulture Advisors in key growing areas through the state. The person in this position would be expected to provide leadership in this network as they progress in their career. A wide array of wine companies, industry organizations and technical groups, and equipment vendors would supply an additional external network.

**Support:** This individual will have office and laboratory space in the Department of Viticulture and Enology, and have full access to the Teaching and Research Winery and the Jess S. Jackson Sustainable Winery Building and the technologies contained therein. The department maintains an active extension and industry relations program that is supported by dedicated staff members and an industry partnership program for additional financial support (approximately $180,000 per year for five years).

**Other support:** Research funding sources include the NSF, AVF, USDA, CDFA, and NGRA.

**Location:** This position will be located on the UC Davis campus and have statewide responsibilities.

**Developed and Proposed by**: The UC Davis Department of Viticulture and Enology (David Block, Chair) has developed this proposal. Significant supportive stakeholder comments were received during proposal development.