Connecting the Wine Science Center to the World

International Collaboration

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Canada
Argentina
Spain
France
Switzerland
Italy
Germany
Austria
Australia
New Zealand

VITICULTURE & ENOLOGY TAKE ROOT

The Viticulture & Enology (VE) Program at WSU began in the 1930s with the pioneering research of horticulturist Dr. Walter Clore. Clore collaborated with industry members to expand the wine and juice grape industries in Washington. He was joined in 1960 by microbiologist Dr. Charles Nagel whose knowledge of wines and winemaking practices advanced their research. This collaboration, along with contributions from economist Dr. Ray Folwell and partnerships with farmers and early investors, grew the Washington wine industry and the WSU research and education program that supports it. In 2002, the VE undergraduate major was officially instituted within the College of Agricultural, Human, and Natural Resource Sciences. In 2009, WSU hired the eminent wine scientist, Thomas Henick-Kling, as the first VE Program Director.

GROWTH OF AN INDUSTRY

In the late 1960s, fewer than 500 acres of grapes were grown in the state. Today, Washington has 14 American Viticulture Areas (AVAs), 55,000 acres of wine grapes, 24,000 acres of juice grapes, and over 890 wineries. Nationally, Washington ranks second in premium wine production and first in juice grape production; the wine and grape-growing industries contribute nearly $5 billion to the state’s economy. The growth and prominence of our unique, high-quality wine regions are largely a result of the over 60-year partnership between WSU and the industry. Together, WSU’s VE Program and its industry partners collaborate to:

- Build a strong, sustainable industry;
- Increase profitability and explore new opportunities;
- Produce regionally distinct, high quality wines;
- Identify new vineyard locations and optimal cultivars;
- Improve vineyard and winery practices by developing innovative tools; and
- Provide first-class educational programs for future industry leaders, researchers, and practitioners.

OUR VISION

Fostering passionate connections, discovery, and innovation for global leadership in viticulture and enology.
Washington State University’s Viticulture & Enology (VE) Program thrives on multidisciplinary collaborations across seven schools and departments: Horticulture, Entomology, Plant Pathology, Biological Systems Engineering, Crop and Soil Sciences, School of Economic Sciences, and School of Food Science. The number of faculty affiliated with VE has grown to 30 in 2016. Currently, VE supports 7 full-time and 23 part-time faculty and provides world-class teaching and research expertise for undergraduate and graduate students.

Undergraduate VE majors are part of the Integrated Plant Sciences Bachelor of Science degree program, which is offered through multiple departments. Undergraduates may also seek a VE minor in combination with Horticulture or Wine Business Management. Since 2009, 87 VE majors have graduated with their BS degrees; currently, 113 undergraduates are enrolled in the program.

Graduate students interested in viticulture and enology can choose MS or PhD degrees that focus on viticulture, enology, or grapevine diseases and pests, soils, climate, and engineering research through a number of departments and schools. Or, students may seek a PhD through the interdepartmental and interdisciplinary Molecular Plant Sciences program. Since 2013, 29 VE students have graduated with either a master’s or doctoral degree. Currently, 30 graduate students are actively engaged in VE-related research projects.

VE’s interdisciplinary, innovative undergraduate curriculum is the first of its kind in the Pacific Northwest, addressing every aspect of the grape and wine industries and taught by leading international experts. Together, technical, scientific, and practical experiences prepare students for a variety of career opportunities upon graduation. Students in the VE major can choose to pursue their academic goals on either the Pullman or Tri-Cities (Richland, WA) campus, home of the Ste. Michelle Wine Estates WSU Wine Science Center. Several scholarships and internships are awarded to help offset college expenses.
**FIRST CLASS TEACHING FACILITIES**

The new Wine Science Center (WSC) offers 40,000 square-feet of state-of-the-art research and learning spaces, including specialized laboratories, classrooms, and a research and teaching winery—all equipped with the latest technology. Hands-on, practical experiences are further enhanced through instructional and research activities in the on-site, two-acre Albert Ravenholt Research and Teaching Vineyard and research internship opportunities at the WSU Irrigated Agriculture Research and Extension Center in nearby Prosser, WA. Together, the WSC, WSU Pullman, WSU Prosser, and numerous commercial vineyard and winery partners provide an optimal balance of academic and real-world experiences, setting students up for success in the grape and wine industries.

**STUDENT ENGAGEMENT**

The core VE undergraduate curriculum spans a comprehensive range of topics to help students acquire the knowledge necessary to produce high-quality grapes and premium wines, including:

- Grapevine physiology
- Microclimate and soils
- Grape and vine diseases and pests
- Grape production, irrigation, and nutrient management
- Vineyard and winery equipment systems
- Wine production and winery management
- Chemistry and biochemistry of fruit and wine
- Wine microbiology
- Sensory evaluation of food and wine

Faculty are constantly upgrading and adding new courses. For example, a new wine chemistry/winemaking course began Fall 2016. Two more courses will begin Spring 2017: a winery operations post-fermentation course and a viticulture and enology capstone course.

In addition, VE majors participate in field trips and tours and in hands-on learning experiences in laboratories, vineyards, and wineries. Students are required to fulfill 2 credits of internship or professional experience, so that knowledge gained in the classroom can be applied in an actual working environment. Most of these experiences are paid and also create the opportunity to network with professionals, explore interests, hone skills, and increase the likelihood of post-graduation employment. Students also have the chance to engage in many extracurricular VE-related activities, including presenting posters, giving talks at conferences, and joining student wine club and professional organizational activities.

Recently, in response to the fast-growing Washington wine industry, a Wine Business Management major, minor, and an online, non-credit certificate program were developed in the School of Hospitality Business Management. These courses offer additional critical learning opportunities for our wine science majors.
In consultation with the Washington’s wine and grape industry, VE’s scientists use applied and basic research to help solve diverse challenges and identify opportunities for advancement. Research is conducted collaboratively by faculty, scientists, and graduate students across the state, and with WSU’s multiple campuses and Research and Extension Centers.

WSU’s VE researchers focus not only on innovations that benefit the Washington and Pacific Northwest industries but also the active exchange of information and ideas across the US and the world. Regionally, researchers have collaborated on projects with Oregon State, Southern Oregon, and University of Idaho. Nationally, past and current collaborators include universities such as UC Davis, Cornell, and Penn State, as well as government agencies such as USDA Agricultural Research Service and US Fish and Wildlife Service. International collaborations include universities in Canada, Germany, France, Australia, New Zealand, Spain, and Austria. VE researchers have also worked with international government agencies. Additionally, WSU’s VE Program and researchers attract graduate students from countries all over the world, including China, Lebanon, Ukraine, Argentina, Germany, Italy, Spain, Switzerland, and South Africa.

VE research aims to solve high-value problems in the grape and wine industry by contributing scientific solutions. Current research includes:

- Understanding how phenolic compounds change and interact during grape ripening, winemaking, and wine aging;
- Exploring how restoration of native plants and habitat areas into vineyard landscapes can be a strategy not only to attract biological pest control agents but also to provide larval hosts and nectar sources for threatened shrub-steppe butterflies;
- Determining pre-harvest timing, frequency, and type of vineyard irrigation to minimize yield loss, optimize vine and root health, and maintain grape and wine quality in arid climates with low precipitation; and
- Using sensory evaluation techniques to learn how different serving temperatures of a wine influence its aroma, taste, texture, and, in turn, the overall enjoyment of the wine.
FACILITIES

VE research facilities, technologies, and equipment are continually updated to support the rapidly expanding wine industry in Washington and the PNW—increasingly recognized as one of the premier grape-growing and winemaking regions in the world. In 2014, WSU’s Irrigated Agriculture Research and Extension Center (IAREC) in Prosser added a VE-dedicated building with newly renovated and updated laboratory space and equipment. IAREC maintains vineyards, greenhouses, meeting spaces, and housing for graduate students and visiting scientists conducting VE research.

The IAREC’s three subject matter centers support VE research: AgWeatherNet (AWN), Clean Plant Center Northwest (CPCNW), and Center for Precision and Automated Agricultural Systems (CPAAS). AWN is an automated weather station network, maintained by WSU scientists, that provides real-time weather data, advisory alerts, and decision support models to aid researchers and grape growers in increasing grape production and quality, resource-use efficiency, and environmental sustainability. The CPCNW maintains a Foundation Vineyard of clean, properly identified, and virus-tested grape foundation stock materials for use by researchers, commercial nurseries, and private growers. Student field trips to this vineyard provide learning experiences, and graduate students can engage in foundation stock material research here. Currently, more than 300 virus-tested grapevine selections including wine, table, ornamental, and juice grapes are available. CPAAS conducts research to improve vineyard water-use efficiency and develop innovative strategies and technologies for water conservation using precision management systems.

In 2015, the new Ste. Michelle Wine Estates WSU Wine Science Center (WSC) opened its doors to offer even more research space and learning opportunities for students and industry professionals alike. This expansive state-of-the-art facility is one of the most technologically advanced in the world. The WSC, together with IAREC and Pullman facilities, positions WSU and the region at the forefront of VE research and innovation, attracting students and renowned researchers from around the world. The WSC’s advanced research elements include:

- The TJ Rodgers Research and Teaching Winery with a unique fermentation system with real-time data monitoring, automation features, and wireless computer data transmission;
- Specialized labs for plant physiology, wine chemistry, microbiology, molecular biology, and sensory analysis;
- The two-acre Albert Ravenholt Research and Teaching Vineyard; and
- The future Bud Mercer Greenhouse, which will have two separate 400-square-foot greenhouse spaces, plus a headhouse.

“Washington and the Northwest must support the unparalleled growth its wine industry is experiencing, increase competitiveness for growers and vintners, seize the economic development and tourism opportunities it offers, and continue to establish itself among the most internationally-celebrated wine regions in the world.”

~ Ted Baseler, Chair, The Campaign for Wine

Melinda Garza, Intern, Hogue Cellars

“Just like an artist that applies paint to a canvas to create a portrait, winemakers apply their knowledge and skill in the field to create a sensory experience that people observe through their taste and smell.”
WSU Extension is engaged in research- and practice-based, collaborative learning with local grape growers, winemakers, and community stakeholders. Currently, 15 full- and part-time Extension faculty, educators, and staff are affiliated with the VE Program and provide consulting advice, educational materials, and hands-on, face-to-face educational events. Viticulture and enology advice is also available through the “Ask an Expert” site.

WSU Extension, in partnership with the VE Program, hosts or participates in field days, conferences, workshops, and lectures. These events create opportunities to share, learn, and network with growers, winemakers, researchers, students, and industry. A few examples include:

- **Washington Viticulture Field Day**: Held each summer, featuring guided vineyards tours with demonstrations and presentations about new techniques, research, and technology for Pacific Northwest growers. The event is co-hosted with the Washington State Grape Society.

- **WAVE (Washington Advancements in Viticulture & Enology) Conference**: New partner event with the Washington Wine Commission. The first annual event held in July 2016 sold out to a crowd of 60 guests and featured research presentations relevant to the industry.

- **Ravenholt Lecture Series**: Endowed lecture series provided by a gift through the Albert R. Ravenholt Trust. Lectures are meant to educate growers, researchers, and students on topics related to the local wine industry, such as one on crown gall disease which drew more than 45 industry members. The Climatic Extremes Symposium will feature presentations on the effects of extreme weather events in vineyards and potential solutions for mitigating these effects.

- **Practical Solutions for Vineyard Pest Management**: Held every three years, this workshop offers participants hands-on experience in designing various pest management programs and the proper calibration and maintenance of vineyard pest management equipment.
Learn More about VE
Additional avenues for obtaining updates, such as upcoming events and recently published research, include:

- **Voice of the Vine**, VE Program monthly electronic newsletter;
- **VE Extension News** (VEEN), published biannually;
- WSU Viticulture & Enology Facebook Page; and
- WSU Viticulture Extension Facebook Page.

“Being behind the scenes was very important to us since we could ask specific technical questions not raised in a tasting. Discussions on yeast selection, oaking techniques, aging, and bottling were insightful. Also, the marketing and distribution was something I hadn’t considered.”

~ Gary & Diane Forristall, Iowa Winery Tour Participants

CERTIFICATE PROGRAM
WSU Extension also offers the online, non-credit Viticulture & Enology Certificate Program, open to anyone interested in working in the wine and grape-growing industries. Each certificate requires two years of online coursework. Courses are taught by WSU faculty experts and established leaders in Washington’s grape and wine industries. Three weekend “camps” are also required, providing hands-on experiences in a vineyard and winery, as well as opportunities to network with instructors, fellow students, and industry professionals.

Since the program began in 2003, 608 students hailing from 30 states and four countries have been awarded certificates. Currently, prospective students often wait two years for a seat in this popular program. The program has contributed significantly to the wine industry, with certificate-holders going on to open 60 wineries or vineyards, advance their career in the industry, or secure their first job.

Winery Tours
In 2009 the VE Certificate Program offered the first winery and vineyard tour to profile wineries in Prosser and Red Mountain. Comments from participants solidified the educational value of a technical winery tour. Our first international winery tour—in New Zealand—received overwhelmingly positive feedback. Since then, participants have visited winemakers in seven countries and nine wine regions in Washington, California, and Oregon.

**WINERY TOUR LOCATIONS**

- WA, CA, OR
- Chile, Santiago Regions
- Argentina, Mendoza Regions
- France, North & South Regions
- Spain
- Italy, Tuscany & Sicily
- Australia
- New Zealand

For additional information please contact:
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