ENG2WINE 2026 Conference Summary

Industry Challenges and Innovative Engineering Solutions for Viticulture and Winemaking
Porto, Portugal | March 22–26, 2026

Introduction

The ENG2WINE 2026 Conference brought together researchers, engineers, technology developers, and wine industry professionals from across Europe and North America to discuss innovative engineering solutions for modern grape production and winemaking. Hosted across the Douro River from Porto, Portugal, at the Hilton Gaia, in one of Europe's most renowned wine regions, the conference focused on addressing the major challenges facing the global wine industry, including climate change, labor shortages, waste reduction, digital transformation, and advances in automation and artificial intelligence—basically applying technology to enhance process efficiency and operational sustainability.

Unlike many technical conferences that separate academic and industrial presentations into parallel sessions or focus only on basic science, ENG2WINE was intentionally designed as a small, highly interactive meeting where all delegates participated in every session. This encouraged networking and discussion across disciplines and promoted collaboration between researchers, equipment manufacturers, technology companies, and wine producers.

Conference Format

ENG2WINE followed the Engineering Conferences International (ECI) "Banff-style" conference format, which emphasizes discussion and networking over large numbers of presentations. There were no concurrent sessions, allowing attendees to participate in the complete technical program.

Each day generally consisted of:

- A keynote presentation introducing the day's technical theme.
- Short technical presentations throughout the morning and early afternoon.
- Extended networking and discussion periods, along with industry visits in the middle of the day.
- Poster sessions held during the evening, with each speaker that day having a poster, paired with wine tastings and activities to promote discussion and collaboration.

This structure provided ample opportunity for technical exchange while encouraging interaction among delegates representing academia, research organizations, and industry.

Technical Program Overview

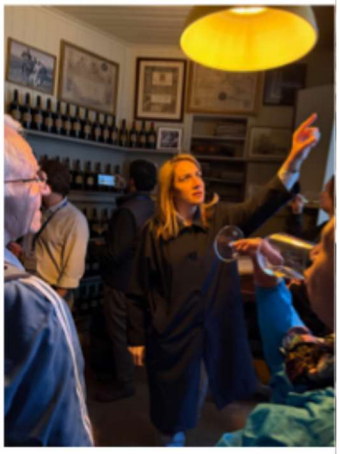
Day 1 – Engineering Innovation in Viticulture

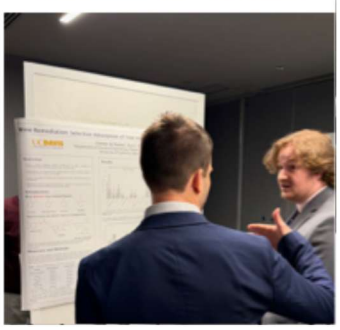
The opening day focused primarily on vineyard engineering and precision viticulture. Presentations explored how emerging technologies are transforming vineyard management through automation, sensing technologies, robotics, and advanced data analytics, with an initial keynote address from Antonio Graca, Head of Research and Development for Sogrape, a leader in the application of technology in vineyard settings.

Several presentations addressed precision agriculture and automation, including the use of remote sensing, machine vision, and artificial intelligence to improve vineyard monitoring. These technologies are increasingly being used to optimize irrigation scheduling, monitor vine health, detect disease pressure, and improve harvest timing. As many wine-producing regions continue to experience labor shortages, automation is becoming increasingly important for maintaining productivity while reducing production costs.

Climate resilience was also discussed extensively. New engineering approaches for smoke management, water conservation, and precision irrigation demonstrated how technology can help vineyards adapt to increasingly variable weather conditions.

In the afternoon, all participants visited the headquarters of Cork Supply to learn about the production of natural cork, along with innovative means for detecting mechanical and sensory flaws in individual corks. Upon returning to Gaia, all attendees walked to Niepoort Cellars, a company with over 150 years of experience in producing Port and table wines in Portugal, for a tasting and tour hosted by Beatriz Machado, Director of





Marketing and Tourism and a winemaker by training. During the evening poster session, Antonio Graca shared wines from multiple regions of Portugal produced by Sogrape.

Day 2 – Engineering the Winery

The second day shifted focus from vineyard operations to winery engineering and grape processing technologies.

Technical presentations examined improvements in grape handling, fermentation control, wine maturation, and post-fermentation processing. Considerable attention was given to process optimization using sensors, automation, and digital twin systems that allow winemakers to make better-informed decisions throughout production. Equipment to improve the production of no and low alcohol wine was also presented. Presenters demonstrated how predictive models can assist with fermentation management, improve quality control, and optimize production efficiency.

One of the keynote highlights came from Jessica Noble (Lallemand Oenology), whose presentation, *"From Nature to Performance: Exploring and Harnessing Yeast Biodiversity to Unlock Next-Generation Fermentation for a Changing Wine World,"* examined how naturally occurring yeast diversity can be used to develop fermentation strategies that improve wine quality

while helping producers respond to changing environmental conditions. The presentation illustrated the growing importance of biotechnology alongside engineering solutions in modern winemaking.

In the afternoon, the group traveled to the Douro Valley to visit the Niepoort Winery, outside of Peso da Régua. Along with amazing views of the terraced vineyards on both sides of the Douro River and its tributaries, the group was treated to a tasting of Niepoort table wines and a detailed tour of the winery by the winemaker.

Poster presentations during the evening provided additional opportunities for delegates to discuss emerging research, new analytical methods, and industrial applications in an informal setting, accompanied by a tasting of Vinho Verde wines from northern Portugal presented by representatives of the Comissão de Viticultura da Região dos Vinhos Verdes (CVRVV) based in Porto.

Day 3 – Packaging, Sustainability, and the Future of Wine Engineering

The final technical day focused on downstream processing, packaging, logistics, and sustainability, starting with a joint keynote address by David Block (UC Davis) and Dominik Durner (Weincampus Neustadt) on Sustainability from Grape to Glass: European and US Perspectives, a far reaching discussion covering topics from climate change implications to reducing energy and water use to increasing the global consumer base.

Presentations during the morning highlighted innovations in packaging materials and closures, logistics, and product quality management. Many presentations emphasized reducing energy

consumption, minimizing water use, decreasing chemical inputs, and adopting circular economy principles within both vineyards and wineries.

The conference concluded with a broader discussion of future research priorities and opportunities for greater collaboration between universities, technology developers, and the global wine industry.

Participants were treated to a wonderful Port and chocolate tasting at Taylor Fladgate in Gaia, followed by a guided visit to the World of Wine (WOW) museum. The meeting ended with a gala dinner back at the hotel.

Conclusions

ENG2WINE 2026 successfully demonstrated how engineering innovation is reshaping every stage of modern wine production—from vineyard management through fermentation, packaging, and distribution. The conference highlighted the increasingly interdisciplinary nature of wine science, bringing together expertise in engineering, data science, microbiology, automation, and sustainability.

Several themes clearly emerged as priorities for future research and industrial adoption, including artificial intelligence, robotics, precision agriculture, digital process monitoring, climate adaptation, and sustainable production systems. Equally important was the conference's collaborative format, which encouraged meaningful dialogue between academic researchers and industry practitioners.

Overall, ENG2WINE reinforced the importance of engineering innovation in helping the global wine industry address evolving product development, environmental, economic, and labor challenges while continuing to improve product quality and production efficiency.