EXHIBIT E

Dr. Kelly's Second Promotion Dossier (2024-2025)

PennState Extension

Dr. Molly Kelly

Extension Educator (Level 4)

Dossier for the Promotion to

Extension Educator (Level 5)

November 15, 2024

Candidate Signature: Molly Kelly _____Date: __11/14/2024_____

ADP Signature: Elise Gregory _____ Date: ____11/14/2024__

Table of Contents

I. Candidate and Position Information

Name: Dr. Molly Kelly

Penn State Grape and Wine Team: co-Team Leader

Extension Unit: Industrial Food Safety and Quality

Current Educator Level: 4

Rank for which applying: 5

Date of Hire: February 1, 2018

Date of Last Promotion: Not applicable

Education

PhD. 2013. Enology-Grape Chemistry Group, Department of Food Science, Virginia Tech, Blacksburg, VA

Dissertation: *Effect of Foliar Nitrogen and Sulfur Applications on Aroma Profile of Vitis vinifera L. cv. Petit manseng using Modified Quantitative Descriptive Analysis, SPME GC-MS and Electronic Nose Technology*

AA 2006. Viticulture and Enology, Surry Community College, Dobson, NC.

MS 1994. Biology, University of Texas at San Antonio, San Antonio, TX.

BS 1987. Medical Technology, Indiana University of Pennsylvania, Indiana, PA.

AA 1984. General Studies, Pennsylvania College of Technology, Williamsport, PA.

Certifications and Fellowships

Certified ServSafe® Proctor

Responsible Alcohol Management Program (RAMP)

Centers for Disease Control Emerging Infectious Diseases Fellow, 1998-2000

License

Medical Technologist (ASCP): Laboratory Technologist (Microbiologist)

Position Description

Dr. Molly Kelly has served as an Enology Extension Educator at University Park since February 1, 2018. She serves the Pennsylvania winemaking industry statewide. She is also a Grape and Wine Team member and a co-team leader.

The candidate's position is quite different from most Extension Educators. While successfully executing statewide responsibilities as the sole Enology Extension Educator, she is also actively involved in the Department of Food Science. Duties include conducting laboratory research, training undergraduate and graduate students in research winemaking, collaborating with faculty members on grant-funded research, and supervising undergraduate wage-payroll students. She also oversees all research winemaking conducted within the department and serves on departmental committees.

Her programming aims to make Pennsylvania wineries more competitive and sustainable through improving quality and operational efficiency. This is accomplished through educational programming, collaborating directly with constituent members and conducting valuable research to support the industry. She is actively involved in various associations, has been a prolific speaker at various technical meetings, promotes undergraduate research, and has built a significant network through developing strategic partnerships. Before coming to Penn State, Dr. Kelly served as the Enology Extension Specialist at Virginia Tech Extension, providing educational programming, and conducting enology research. She brings that experience and knowledge of working with a more recognized wine industry to Pennsylvania.

Dr. Kelly has provided an array of educational programming to improve the knowledge of winemakers. She has helped winemakers and their employees better evaluate wine and manage wine operations through face-to-face workshops and webinars. Utilizing her expertise in microbiology, both as a Medical Technologist and CDC fellow at the most prominent health department in the nation (New York State DOH), in addition to her commercial winemaking background (including international awards), the candidate has developed and delivered programs focused on the analysis of juice and wine, to include chemical, microbiological and molecular protocols. She is creating the first online winemaking certificate program offered by Penn State Extension. She has collaborated with the creative team to develop six animated videos, seven videos, and program content. This will be one of the nation's most extensive online winemaking courses, with fourteen modules, including microscopy and other laboratory procedures. She recently published an extension publication used in her Juice and Wine Laboratory Analysis Workshop.

The promotion committee should note that this is the only wine laboratory analysis workshop on the East Coast. Her Wine Microbiology Workshop is the only one offered east of the Rocky Mountains. All of Dr. Kelly's other workshops have been developed by her alone from the ground up. She updates them, makes adjustments, and strives for perfection.

Direct consultations are a critical aspect of helping wine operations, especially regarding problem-solving and process improvement. Dr. Kelly has conducted over fifty onsite visits (1/22-11/24) to provide one-on-one instruction to wineries. This is in addition to direct interaction via phone and email.

Dr. Kelly maintains a dynamic applied enology research program. She has written and secured grants as part of a collaborative Grape and Wine Team member. She is also PI/co-PI on **seven** Food Science faculty grants (funded by the Pennsylvania Wine Marketing Research Board (PWMRB) and USDA). Her current research grant funding, including three beginning 1/1/25, totals **$798,703**.

Dr. Kelly is actively involved in various organizations that support the wine industry in board membership roles, conference planning and execution, and delivering technical presentations. She is a diligent member of the American Society for Enology and Viticulture (ASEV), a professional organization for enology, serving on the board of directors for the eastern section branch. She is also engaged in the national organization, serving on the student paper competition committee. Dr. Kelly was invited to be on the planning committee for National ASEV for the 2025 conference in California. She is the only woman from the East Coast asked to serve on this conference planning committee.

Dr. Kelly is heavily involved in the Eastern Winery Exposition Conference, an essential conference for supporting the wine industry on the East Coast. Each year since 2019, she has been an invited speaker, providing information on wine processing, fermentation control, and flavor enhancement for novel grape varietals. This year, she will present two presentations: Bioprotection Strategies for Grapes and Wine, as well as a presentation on current research identifying novel yeast strains in native fermentations.

Dr. Kelly continues to develop her skills to create new opportunities for Extension. She is currently pursuing a Brewing Certificate, on her time, through the Penn State Berks continuing education program to better support the cider and craft beer industries. She continues to hone her educator skills and knowledge through participation in appropriate continuing education and professional development activities, including those supporting DEI. The candidate is also a Master Gardener Training volunteer, utilizing her time to gain knowledge that will help Pennsylvania growers address vineyard concerns.

Dr. Kelly has continued to build a network of partnerships with winery owners, winemakers and home winemakers, suppliers, and other land grant universities. She has established strategic relationships with suppliers who support her research program through charitable support. She has procured much of her research winemaking supplies free of charge. They also donated yeast strains, valued at thousands of dollars, that she distributed across PA, substantially increasing wine quality.

Dr. Kelly has also been an invited lecturer, for three years, for the Rutgers Winemaking Certificate Program offered annually at Rutgers University. The candidate covers two days of wine production, analysis and microbiology instruction.

As a Penn State Grape and Wine team member, she collaborated with sixteen land grant institutions to offer Eastern Enology and Viticulture Town Halls, to provide timely answers to viticulture and enology questions. This webinar series ran from June 2021 to September 2021. The team recently collaborated with Virginia Tech and Cornell on the Eastern Viticulture and Enology Forum to offer webinars on important winemaking/grape-growing topics. She presented, invited speakers, and organized and moderated most webinars. This series has run from November 2020 until April 2024. The enology forum will resume in November 2024 under her leadership and direction.

Demographics of Audience

The Penn State Extension Grape and Wine Team delivers programs to refine Pennsylvania grape and wine quality and enhance awareness of the wine industry throughout the state, Mid-Atlantic region, and the United States. Grape production and winemaking are significant and growing industries in Pennsylvania, and the team aims to deliver both research and science-based education that will ensure sustained growth for these partners. Target audiences include the Pennsylvania commercial grape and wine industries, Penn State Extension, Pennsylvania Winery Association (PWA), Pennsylvania Wine Marketing and Research Board (PWMRB), Pennsylvania residents, and the Mid-Atlantic wine region.

In April 2021, the team conducted a Winegrower Needs Assessment in Pennsylvania. The needs assessment survey, open for 5 weeks, collected 46 responses, with 35 participants completing the entire survey. Regarding information gathered about demographic characteristics, respondents were most likely to be male (82.62%, *n* = 26), non-Hispanic or Latino/a (92.31%, *n* = 26), and white (88.46%, *n* = 26).

The Pennsylvania wine industry includes a total of 376 wine producers as well as 943 acres of vineyards. Pennsylvania wineries are the home to multi-generational winemakers, international winemakers, emerging winemakers under the age of 30, and winemakers who have embraced wine production as a second career.

Serving the entire state as the sole enologist can present a challenge. Most wineries are in the southcentral and southeastern parts of the state. These are also predominantly those producing higher-priced *Vitis vinifera* wines. They can ripen *Vitis vinifera* more easily than other parts of the state. However, there are wineries in all six regions of the commonwealth: Approximately 40 in the Northwest, 61 in the Southwest, 50 in North Central, 62 in South Central, 46 in the Northeast, and 89 in the Southeast region. Dr. Kelly, therefore, strives to reach all of them. In addition to year-round site visits and workshops, she travels 6 weeks annually to all six state regions (~2000 miles/yr.). The candidate offers a community preharvest roundtable in each region. She uses social media (Facebook) to post about upcoming events and keeps the industry engaged in ongoing enology activities.

Data gathered from Wine America and the Pennsylvania Wineries Association shows that the wine industry generates close to $7.09 billion in total economic activity in Pennsylvania, dramatically illustrating that wine is the ultimate value-added beverage. The broader economic impact flows throughout the state, generating business for firms unrelated to the wine industry. These industries include farming, banking, accounting, manufacturing, packaging, transportation, printing, and advertising.

When Dr. Kelly was hired to serve the PA wine industry, she realized that, as in VA, the audience was rather narrowly focused on a typical population of wealthy, white males. She has, however, been highly successful in establishing a more diverse audience by encouraging women, minorities and members of the LGBTQ community to participate in programming. Dr. Kelly also visits and provides technical support to the community of Sisters at a Greek Orthodox Monastery in White Haven, PA. The USDA grant totaling $393,649, “Undergraduate Experience in Viticulture and Enology”, for which the candidate is a PI, specifically targeted minority institutions for applicants. Two minority students applied to the program, and both were accepted.

The Pennsylvania wine industry directly employs as many as 31,905 people. It generates an additional 8,844 jobs in supplier and ancillary industries, which supply goods and services to the industry and whose sales depend on the wine industry's economic activity. Ultimately, 53,943 jobs are created and supported by the wine industry.

In his dissertation, A Comprehensive Analysis of the Pennsylvania Wine Industry with Actionable Recommendations for Industry Improvement and Growth (2022), Seth Porter made policy recommendations for the industry, including: "Individual wineries and producers should attend Penn State Extension winemaking training. This simple action would improve the overall quality and, specifically, human capital within the state through the professionalization of aspects of the trade. Training and information sharing sessions include multiple overviews on important winemaking processes."

References:

Dunham, J. (2017). Wine America PA economic impact report. The National Association of American Wineries. John Dunham & Associates. 2017-WineAmerica-PA-Economic-Impact-Report.pdf (pennsylvaniawine.com).

Dunham, J. (2018). Economic impact of the Pennsylvania wine and grape industries. Pennsylvania Winery Association. John Dunham and Associates. https://pennsylvaniawine.com/wp-content/uploads/2020/02/PWA_EconomicImpact-FNL.pdf

Porter, Seth, "A Comprehensive Analysis of the Pennsylvania Wine Industry with Actionable Recommendations for Industry Improvement and Growth" (2022). West Chester University Doctoral Projects. 139. https://digitalcommons.wcupa.edu/all_doctoral/139

II. Extension Education Programs

II.A. Improving Wine Quality Initiative

Needs Assessment

One significant way to improve wine profitability is to improve overall wine quality. Three programs to achieve wine quality have been presented. Due to two-page space constraints, the two-day Wine Quality Workshop is not shown here. Two others are highlighted: The Juice and Wine Laboratory Analysis Workshop and the Winery Sanitation Monitoring Study.

As part of the needs assessment (phase 1 of the PDP), data from the initial focus groups was gathered with 11 respondents in the winery owner session and ten respondents in the winemaker session.

The two groups combined prioritized topics with juice/wine laboratory analysis and winery sanitation ranked important (56% and 63%, respectively). Fifty-seven percent of respondents reported that controlling microbiological contaminants during aging was very important.

Educational Objectives

1. Producers will increase their knowledge of chemical assays to determine wine quality.
2. Producers will increase their likelihood of using the information from the Laboratory Analysis Workshop in the next six months.
3. In a one-year follow-up survey, producers will indicate that they applied increased laboratory skills and knowledge from the course to their business practices.
4. Students will increase their knowledge of winery sanitation monitoring protocols.
5. Producers will increase their understanding of current sanitation monitoring protocols.
6. Producers will change sanitation practices as indicated by PCR testing.

Program Activities and Teaching Methods

The Juice and Wine Laboratory Analysis workshop is a two-day, in-person event that offers instruction both in the classroom and the laboratory. Topics covered include basic and intermediate laboratory analysis of juice and wine, proper laboratory techniques, lab safety, testing, and interpreting lab results.

Dr. Kelly developed the **Winery Sanitation Monitoring Study** to meet a USDA grant objective ($393,649). The Summer Viticulture and Enology Experience Program is an 8-week, USDA grant-funded program at the Lake Erie Grape Research Station in Northeast, PA. Undergraduate students from across the country apply and up to six are selected for this program (year 3 of 4). Dr. Kelly developed a winery sanitation project for students to participate in applied research. The candidate works with students to assess winery sanitation practices. Students take samples and analyze for spoilage organisms using polymerase chain reaction (PCR). Results are shared with wineries, and recommendations provided to improve sanitation protocols. Dr. Kelly is statistically analyzing the three years of multiplex PCR results for publication in the Journal of Extension or Journal of Wine Science. In addition, follow-up interviews are being conducted.

Impact

Program Impact: Juice and Wine Laboratory Analysis

Twenty-five participants (*N* = 25) enrolled in the course during the 2022 program year.
A post-course evaluation was distributed at the end of day two, with 25 participants (*n* =25) responding (100%).

Eighty-four percent (*n* = 25) increased their knowledge of chemical laboratory analysis practices and techniques to assess and increase wine quality (*Obj. 1*). One hundred percent stated they were highly likely to use information from the course within the next 6 months (*Obj. 2*).

A one-year follow-up evaluation was conducted during the 2023 program year, with 6 participants (*n* = 6) choosing to respond for a response rate of 24%. One hundred percent of participants applied increased laboratory skills from the course to their business practices, including one participant who went from doing no wine testing before the course to conducting weekly testing on their wine. Another responded, "The quality of our wine has increased by an order of magnitude.*"(Obj. 3)*

Supporting document: Juice and Wine Laboratory manual pages 6 of 32 (now available as an extension publication) (*Supp. II.A1*).

Program Impact: Winery Sanitation Monitoring

As part of the USDA grant, interns collected environmental samples at four different wineries for spoilage organisms over three years. Six students total (N=6) participated in this project. One hundred percent increased their knowledge of sanitation monitoring protocols (*Obj. 4*). All commercial wineries (N=4) indicated that their understanding of sanitation monitoring protocols increased (*Obj. 5*).

In addition, 100% (n=4) of producers indicated that they made necessary changes to standard operating procedures, as indicated by PCR results (*Obj. 6*). PCR results showed a significant decline in microbial populations.

Supporting document: Statistical analysis of three years of monitoring data (*Supp. II.A2*).
This graph *(Supp. II.A2)* shows the abundance of various microorganisms and how the population changed over three years. This graph was generated by statistical analysis and is referred to as a "heat map". It is a data visualization tool that uses color to represent data points in a two-dimensional matrix. It clearly shows the change in microbial populations over a period of three years, due to improved sanitation practices.

Evaluation Methods

Evaluation data was collected using various methods. Dr. Kelly conducted pre- and post-evaluations at **the Laboratory Analysis workshop**. A one-year follow-up evaluation was conducted using Qualtrics. **The Sanitation Monitoring study** participants provided evaluations over the phone and via email. Interviews are ongoing for this project before submission to a peer-reviewed journal this spring.

II.B. Grant Funded and Applied Research

Needs Assessment

Due to space constraints (2-page limit), two other outstanding research efforts of Dr. Kelly's cannot be highlighted. These include her vital work with the impact of the spotted lanternfly (SLF) on wine quality including adding increasing amounts of SLF to fermentations to gauge the impact on sensory aspects of finished wine. She secured IRB approval is working with the Sensory Evaluation Center in the department of Food Science to perform this analysis later this month. In addition, she is working with a laboratory on campus, performing gas chromatography/mass spectroscopy to measure volatile aroma compounds in the research wines.

Dr. Kelly is in year two of a study at a New York State winery in the Finger Lakes. She is isolating and identifying non-Saccharomyces yeasts present throughout the fermentation process and determining their impact on wine quality. This preliminary work led to securing a PWMRB grant ($89, 993) as co-PI, examining the winegrape microbiome using next generation sequencing, a sophisticated molecular technique used to identify all microorganisms present.

The grant funded research highlighted here is a USDA grant that is in year 3 or 4. A Winegrower Needs Assessment (April 2021) identified that securing labor was of the highest concern on average (60%, *n* = 27), followed by the importance of apprenticeships or internships (56%, *n* = 27). The workforce in the grape and wine industry is aging. Younger individuals are urgently needed to enter the industry.

Educational Objectives

1. Increase USDA students' knowledge of the wine industry and develop the skills needed to succeed and gain employment.
2. USDA students will establish a vineyard trial of nine grape varieties to investigate their potential for the PA wine industry.
3. USDA students will gain expertise in conducting research, putting together a poster and presenting that poster at scientific meetings.

Program Activities and Teaching Methods

<u>Undergraduate Experience in Viticulture and Enology (USDA funded) $393,649</u>

A USDA grant was secured to address the need for trained interns in the vineyard and winery (Summer Experience in Viticulture and Enology). The program has run for three summers and has had 17 interns and two student mentors. Two industry partners hosted interns and instructed them in winemaking, sanitation, and laboratory analysis.

The candidate mentored students in the production of four Learn Now videos that are available through the extension website. These videos focus on winemaking topics of interest, such as volatile acidity and *Brettanomyces* spoilage. Please refer to the supplemental document (*Supp. II.B1*).

Students also participated in a winery sanitation monitoring project developed by the candidate (*II.A2*).

Impact

Undergraduate Experience in Viticulture and Enology

Seventeen undergraduate students from across the US, one from a minority institution (Florida A&M) and another native American, have completed the program. One former student is a winemaker in Pittsburgh; another is establishing a vineyard on a family farm in Missouri. Another works in the wine industry in Iowa. One student will graduate this December and will return to work at the Lake Erie Regional Grape Research Extension Center in Northeast PA (*Obj. 1*).

Another impact includes the establishment of a vineyard trial of nine grape varieties to gauge their potential success for the PA winegrape industry (*Obj. 2*)

Three student presentations were generated allowing them to gain experience in research data collection, poster preparation and presenting at scientific meetings (*Obj. 3*).

- One student presented at the 18th Regional Science Consortium, Presque Isle (November 2-4, 2022)
- Another student presented a poster at the Plant Biology conference in Savanna, GA (2023)
- Another student presented at the Annual Biomedical Research Conference for Minoritized Students in Phoenix, AZ (2023).

This program introduces young people to an industry they may not have known existed. After completing the eight-week program, one student commented:

“I love how the program was a great mix of lab work and physically being out in the vineyard. It introduced me to so many new things and emphasized teamwork.”

Supporting document: Links to Learn Now videos produced by students and Dr. Kelly (*Supp. II.B1*).

Evaluation Methods

For the Summer USDA program, students completed exit surveys upon completion of the program. Dr. Kelly also conducted interviews with those students working on enology-focused projects.

II.C. Eastern Viticulture and Enology Forum Webinars

Needs Assessment

The Eastern Viticulture and Enology Forum Webinar Series is a monthly webinar series that provides the latest in research results in viticulture and enology, focusing on concepts that underlie the practical aspects of growing grapes and making wine. Launched in the Fall of 2019, this forum is comprised and organized by researchers at Penn State Extension, Cornell AgriTech, and Virginia Tech Extension. These webinars bring together researchers, grape growers and winemakers across the country. Since its launch in the fall of 2019, 1,180 have registered for the webinars.

Data from the initial focus groups was gathered from two sessions, focusing on Pennsylvania-specific issues, varieties of wine, challenges, the PA wine market, sanitation practices, FSMA, business models, and marketing support.

Two webinars are highlighted here: Bioprotection Strategies to Control Spoilage Organisms during Winemaking and The Food Safety Modernization Act for Wineries. The needs assessment identified these two topics as “very important” (71% and 60%, respectively).

Educational Objectives

1. Participants will increase their knowledge about various strategies to control spoilage organisms in the winery.
2. Participants will apply knowledge or use skills they learned from the Bioprotection webinar, including:
   - Purchasing and incorporating bioprotection products into their businesses
   - Using recommended procedures using bioprotection products, including non-*Saccharomyces* yeasts
3. Participants will increase knowledge concerning the Food Safety Modernization Act and winery compliance.
4. Participants will apply knowledge or use skills learned from the webinar (intent to change).

Program Activities and Teaching Methods

All webinars were advertised via Cvent, the Grape and Wine Teams' Facebook page, and the quarterly newsletter. Webinars were also marketed by collaborators Cornell and Virginia Tech extension websites. Registration was free of charge. All webinars were live and recorded for later posting on the Enology website. The candidate invited 90% of program speakers (*n*= 12) and moderated 80% of webinars (answering questions in chat and asking speaker questions from attendees). She also co-presented a webinar with a colleague from Ohio State.

Impact

<u>Bioprotection Strategies to Control Spoilage Organisms During Winemaking</u>

This webinar was presented by Dr. Kelly and Todd Steiner, an Enology Educator at Ohio State University, on March 27, 2024.

- Fifty-eight participants (*N* = 58) attended the live webinar. Attendees were from 24 different states, including 18 from PA. Cornell University hosted and did not record the webinar.
- A post-course evaluation was conducted online following the webinar, with 50 participants (*n* = 50) choosing to respond for a response rate of 86%.
    1. 90% (*n* = 50) increased their knowledge about various strategies to control spoilage organisms in the winery (*Obj. 1*).
    2. 81% (*n* = 50) reported being likely (i.e., "somewhat" or "extremely" likely) to apply knowledge or use skills they learned from the webinar, including: (*Obj. 2*)
        - Purchasing and incorporating bioprotection products into their businesses
        - Using recommended procedures using bioprotection products, including non-*Saccharomyces* yeasts

Supporting Document: PowerPoint slides from the webinar (*Supp. II.C1*)

The Food Safety Modernization Act for Wineries

- Two hundred-seven participants (*N* = 207) registered for the webinar. Attendees were from 27 different states, including 51 from PA.
- A post-course evaluation was conducted online following the webinar, with 27 participants (*n* = 27) choosing to respond for a response rate of 13%.
    - 97% (*n* = 27) increased their knowledge about the Food Safety Modernization Act for their winery including winery compliance (*Obj. 3*).
    - 97% (*n* = 27) reported being likely (i.e., "somewhat" or "extremely" likely) to apply knowledge or use skills they learned from the course, including: (*Obj. 4*)
        - Documenting employee training related to food safety practices for wineries.
        - Posting handwashing signs for employees.
        - Creating standard operating practices documents for chemical storage, sanitation, and broken glass.
        - Creating pest mitigation action plans.
        - Additional topics of interest included legal implications and employee training protocols.

Supporting document: Post-webinar evaluations (*Supp. II.C2*)

Evaluation Methods

A Qualtrics survey was posted in the chat towards the end of each webinar, and attendees were encouraged to complete the survey throughout the webinar. Included in the survey was a question to gauge interest in other topics for future webinars. These comments were used to form the 2024 webinar series.

III. Leadership

Since 2020, Dr. Kelly has served as the Grape and Wine Team Co-Leader for the 9-member team. As team co-leader, she leads educator meetings and oversees the Program Development Process. The candidate also leads the enology needs assessment. She served on search committees for a university-based Food Safety and Quality educator position and served on the search committee for the Viticulture Extension Educator position.

The candidate has demonstrated leadership organization skills over the past five and a half years with various programs. She developed and delivered multiple innovative programs, including Juice and Wine Laboratory Analysis, Introduction to Wine Microbiology, Winery Tasting Room Training, and Wine Faults Training.

The candidate identified the need for updated winemaking equipment and led the effort to submit a sole source justification to purchase a new crusher/de-stemmer and a wine press ($83,882). She also negotiated a 12% educational discount with the supplier. This equipment will allow researchers and students to work with equipment they would encounter at a commercial winery. She has also updated the enological testing capabilities by purchasing a thermocycler to conduct polymerase chain reaction (PCR) testing for bacterial spoilage organisms.

Dr. Kelly has also partnered with two yeast-producing companies (Scott Labs and Chr. Hansen) to obtain thousands of dollars' worth of free wine yeasts to distribute across the commonwealth. These yeasts will undoubtedly increase wine quality in PA.

As Enology Extension Educator, she has mentored and supervised five Food Science undergraduate students. Students have received training in research winemaking, laboratory techniques (chemical, microbiological, and molecular biology), and extension programming. Two have moved on to graduate careers in fermentation science.

She has served on the educator advisory council since 2022 and is the Wine Division's Farm Show Committee Chair. In this role, she has worked to increase the educational content presented at the show. She has also served on the planning committee for the annual PA Grape and Wine Conference since her hire. She has also participated as a speaker and is responsible for all wine panel-tasting organization.

Dr. Kelly has revised the existing wine quality improvement workshop to serve the industry better, bringing her 30 years of microbiology, 7 years of commercial winemaking, and curriculum development experience to PSU extension. She is developing the first Penn State Extension online winemaking course. She has worked with the animation team and videographer to create many videos to include in the course and continues to work on content. This course is planned for a spring 2025 release. It will be one of the most comprehensive online winemaking courses on the East Coast, relying on the candidate's winemaking and laboratory expertise.

The candidate represents Penn State Extension nationally by being an invited speaker at many professional industry meetings. She has served on the board of directors for the American Society of Enology and Viticulture (ASEV) (Eastern Section) and as a student paper competition reviewer for the national ASEV. She is also the only woman from the East Coast invited to serve on the conference

planning committee for the 2025 national ASEV meeting.

Dr. Kelly has not received physical awards for her efforts but has received “awards” in the following forms: invitations as an expert speaker around the country, the success of many wineries (that receive actual awards) due to Dr. Kelly's technical assistance and expertise (see letter of recommendation from Armstrong Valley best of show Farm Show 2023), invitations to plan national conferences as the only woman representative from the east coast (American Society for Enology and Viticulture), the gratitude continuously expressed by the industry for unwavering support and assistance, being one of a handful of educators that colleagues, nationwide, reach out to when they have questions (University of Maryland, Cornell, Rutgers, Ohio State), being a respected peer in the Department of Food Science at University Park and finally, knowing that she has worked extremely hard, in all of her science-based careers, and she brings that expertise to Penn State and the PA wine industry.

IV. Educator Activity Form

Presentations

Extension Programs-List all presentations at meetings or conferences that Penn State Extension hosted. Please put an X to indicate that pesticide credits or CEUs were offered at this presentation.				
Date	**Title of Presentation**	**Meeting/Location**	**Attendance**	**Credits**
5/17/2022	Juice and Wine Laboratory Analysis: Brix, pH and Titratable Acidity	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/17/2022	Juice and Wine Laboratory Analysis: Nitrogen Supplementation	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/17/2022	Juice and Wine Laboratory Analysis: Reducing Sugars, Volatile Acidity and Alcohol Measurement	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/17/2022	Juice and Wine Laboratory Analysis: Free and Total Sulfur Dioxide	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/18/2022	Juice and Wine Laboratory Analysis: Protein Stability and Cold Stability	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/18/2022	Juice and Wine Laboratory Analysis: Malolactic Fermentation	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/18/2022	Juice and Wine Laboratory Analysis: Introduction to Spectroscopy	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/18/2022	Juice and Wine Laboratory Analysis: Copper Trials for Sulfur-Like Off-Odors	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
5/18/2022	Juice and Wine Laboratory Analysis: Pectin Instabilities	Food Science, University Park	25 In addition to the lecture, a hands-on laboratory exercise was presented	
7/12/2022	Winery Tasting Room Staff Training	Mifflin PA	20	
7/25/2022	Winery Tasting Room Staff Training	North East PA	15	
9/29/2022	Winery Tasting Room Staff Training	Landenburg PA	18	
8/20/2022	Winemaking Considerations for Compromised Fruit	Preharvest Workshop, 1723 Winery	45	
3/2/2023	The use of non-*Saccharomyces* yeast	PWMRB conference	70	

	in winemaking			
5/20/2023	Advanced Home Winemaking Workshop: Starting the Fermentation	University Park PA	24	
5/20/2023	Advanced Home winemaking workshop: Sulfur dioxide management	University Park, PA	24	
5/20/2023	Advanced Home winemaking workshop: Fining and filtration	University Park, PA	24	
5/20/2023	Advanced Home winemaking workshop: Faults detection	University Park, PA	24	
6/13/2023	Wine Microbiology Workshop: Microorganisms of significance in winemaking	Food Science, University Park	7	
6/13/2023	Wine Microbiology Workshop: Microbial Control Points in the Winery/ Introduction to HACCP	Food Science, University Park	7	
6/13/2023	Wine Microbiology Workshop: Introduction to Microscopy	Food Science, University Park	7 In addition to the lecture, a hands-on laboratory exercise was presented	
6/13/2023	Wine Microbiology Workshop: Identification of Wine Microorganisms /Slide preparation and staining techniques	Food Science, University Park	7 In addition to the lecture, a hands-on laboratory exercise was presented	
6/14/2023	Wine Microbiology Workshop: How to sample wines for microbial analysis	Food Science, University Park	7 In addition to the lecture, a hands-on laboratory exercise was presented	
6/14/2023	Wine Microbiology Workshop: Culturing for wine microorganisms	Food Science, University Park	7 In addition to the lecture, a hands-on laboratory exercise was presented	
6/14/2023	Wine Microbiology Workshop: Understanding results from a reference laboratory	Food Science, University Park	7	
8/15/2023	Spotted Lanternfly impact on wine quality	Spotted Lanternfly Update Workshop, Clover Hill Winery	23	
10/23/2023	Wine Fundamentals Workshop	Professional Development Day, Food Families and Community Units Food Science/UP and Happy Valley Vineyards and Winery	40	
5/1/2024	Impact of SLF on PA Wine Quality	Spotted Lanternfly Updates, LEGREC, North East PA	45	
5/7/2024	Wine Quality Improvement Workshop: Volatile Acidity	Food Science, University Park	15	
5/7/2024	Wine Quality Improvement Workshop: Brettanomyces	Food Science, University Park	15	
5/7/2024	Wine Quality Improvement Workshop: Bioprotection Strategies	Food Science, University Park	15	
5/8/2024	Wine Quality Improvement Workshop: Oxidation	Food Science, University Park	15	

5/8/2024	Wine Quality Improvement Workshop: Sulfur compounds	Food Science, University Park	15	
8/14/2024	Preharvest Workshop: Biocontrol	King View Winery, Harbor Creek, PA	9	
8/15/2024	Preharvest Workshop: Biocontrol	Winslow Winery, Perryopolis, PA	2	
8/20/2024	Preharvest Workshop: Biocontrol	Nimble Hill Winery, Mehoopany, PA	9	
8/22/2024	Preharvest Workshop: Biocontrol	Clover Hill Winery, Breinigsville PA	7	
9/3/2024	Preharvest Workshop: Biocontrol	Seven Mountains Winery, Spring Mills, PA	3	
6/24-28/2024	Fundamentals of Food Science	Food Science, University Park	16	

Guest Presentations- List all presentations hosted by industry or community groups.

Date	Title of Presentation	Meeting/Location	Attendance	Credits
2/20/2023	Understanding the Wine Microbiome	Ohio State Grape and Wine Conference/Dublin, OH	Over 150	
2/20/2023	How Clean is your Winery?	Ohio State Grape and Wine Conference/Dublin, OH	Over 150	
5/2/2023	Impact of Oxygen on Wine Quality	NJ Winemakers Coop/Princeton, NJ	~70	

Regional or National Presentations- List all presentations you delivered at regional or national professional organizations or conferences.

Date	Title of Presentation	Meeting/Location	Attendance	Credits
3/22/2022	Fining and Filtration	Eastern Winery Exposition, Syracuse, NY	Presentation: over 150 Meeting >2000	
3/14/2023	A Primer on Fining and Filtration	Eastern Winery Exposition/Lancaster, PA	Presentation: Over 100 Meeting: >2000	
8/2/2023	Yeast and Fermentation Management	Rutgers Wine Certificate Program/New Brunswick, NJ	25	
8/3/2023	Microbial and Chemical Analysis	Rutgers Wine Certificate Program/New Brunswick, NJ	25	
3/14/2024	Oxygen in Wine: Mitigating and Measuring	Eastern Winery Exposition/Syracuse, NY	Presentation: >100 Meeting >2000	

Poster Presentations- List all poster presentations at local, regional, and national events.

Date	Title of Poster	Meeting/Location	Attendance
6/2023	Vine to Table: An eight-week summer industry-academic program for undergraduates interested in viticulture and enology	Plant Biology 2023/Savannah GA	Over 1200
7/9-11/2024	Statewide Extension Efforts to Document and Share Wine Grape	American Society for Enology and Viticulture-eastern section/ Cleveland, OH	Over 300

	Cultivar and Vineyard Trends in Pennsylvania		

III.

One-on-One Assessments- List all one-on-one assessment consultations (i.e., farm visits, 4-H club meetings)			
Date	**Topic Discussed at Assessment**	**Location (County)**	**Attendance**
1/2022 to 11/2024	Wine spoilage, winery sanitation, sensory analysis, malolactic fermentation, laboratory analysis, winery equipment	Statewide	
Total Number of emails answered with educational information.		>300	
Total Number of phone calls answered with educational information.		>100	
Total Number of "walk-in" consultations you provided with educational information.		~50 winery site visits	
Total Number of social media posts you created to support team or unit social media presence.		~40 on Facebook (1300 followers)	

Extension Website Articles- List all articles for which you are a contributor that was published on the Penn State Extension Website or team newsletter.			
Date	**Title of Article**	**Authors**	**Website Link**
9/2022 (updated)	Volatile Acidity in Wine	Molly Kelly, Denise Gardner	https://extension.psu.edu/volatile-acidity-in-wine
12/2022	What's in the Wine Microbiome?	Molly Kelly	https://extension.psu.edu/whats-in-the-wine-microbiome
3/2023 (updated)	Incorporating Microbiological Techniques in Your Winery	Molly Kelly	https://extension.psu.edu/incorporating-microbiology-techniques-in-the-winery
6/2024	Preharvest Planning and Winery Sanitation	Molly Kelly	https://extension.psu.edu/preharvest-planning-and-winery-sanitation
10/2024	Veraison to Harvest Vineyard and Winery Considerations	Molly Kelly, Bryan Hed, Michaela Centinari, Cain Hickey	https://extension.psu.edu/veraison-to-harvest-vineyard-and-winery-considerations
10/2024	When, Why and How to Measure YAN	Molly Kelly	https://extension.psu.edu/why-when-and-how-to-measure-yan
10/2024	Non-*Saccharomyces* Yeast in Winemaking	Molly Kelly	https://extension.psu.edu/non-saccharomyces-yeast-in-winemaking
10/2024	Understanding Difficult Malolactic Fermentations	Molly Kelly	https://extension.psu.edu/understanding-difficult-malolactic-fermentations-a-review
10/2024	Cleaning and Sanitizing Winery Equipment: A Review	Molly Kelly	https://extension.psu.edu/cleaning-and-sanitizing-winery-equipment-a-review
2023-	Post veraison in Pennsylvania	Molly Kelly, Misha	https://extension.psu.edu/2024-

2024/weekly through harvest		Kwasnieski, Michela Centinari, Cain Hickey	post-veraison-in-pennsylvania

Products and Publications

Print/other publications- Please list articles for which you are a contributor that were published in the popular press. (i.e., local newspapers, agriculture publications, Lancaster Farming, etc.)			
Date	**Title of Article**	**Authors**	**Title of News Outlet**
7/2019	What's in the Wine Microbiome?	Molly Kelly	Wine Business Monthly magazine
Recording	The Uncorked Podcast: Rose in PA	Podcast Interview https://pennsylvaniawine.com/wine-education/podcast	Pennsylvania Wineries Association

Extension Products- Please list all Penn State Extension products you are an author or contributor to, such as Learn Now Videos, publications, online courses, fact sheets, etc.				
Product Type	**Title of Product**	**Authors**	**Role**	**Completion Status**
Recorded webinar	Trends in Wine	Duncan Hamm (Chr. Hansen yeast)	Arranged speaker/moderated /Q&A	2/22/2022
Web application	Cultivars in the Commonwealth	Molly Kelly, Michaela Centinari, Cain Hickey, Flor Acevedo, Bryan Hed, Andy Muza	Contributor	2022
Recorded webinar	The Food Safety Modernization Act (FSMA) and Your Winery	Martin Bucknavage	Arranged speaker/moderated /Q&A	4/22/2022
Recorded webinar	Reducing SO2 during the Winemaking Process: Why, When, and How	Eglantine Chauffeur (Bucher Vaslin)	Arranged speaker/moderated /Q&A	1/23/2023
Recorded webinar	An Introduction to Practical and Applied Winery Laboratory Quality	Patricia Howe (ETS labs)	Arranged speaker/moderated /Q&A	2/21/2023
Recorded webinar	Oxygen Management During Wine Production and Bottling	Todd Steiner (OSU)	Arranged speaker/moderated /Q&A	5/23/2023
Laboratory Manual	Laboratory Analysis for Small Wineries	Molly Kelly, Michael Leonardelli	Lead author	Available for purchase on the extension website 2024
Webinar	Malolactic Fermentation: Part 1	Sibylle Kreiger-Weber (Lallemand)	Arranged speaker/moderated session/Q&A	2/28/2024
Webinar	Malolactic Fermentation: Part II	Sibylle Kreiger-	Arranged speaker/moderated	4/24/2024

		Weber	session/Q&A	
Video	Answers from the Vineyard, Winery and Tasting Room: Why are Wines Cold-stabilized?	Molly Kelly Thomas Damon	Co-author	7/2023
Video	Answers from the Vineyard, Winery and Tasting Room: How can I prevent and test for Volatile Acidity in my wine?	Molly Kelly Laura Taraboletti	Co-author	7/2023
Video	Answers from the Vineyard, Winery and Tasting Room: What is Brettanomyces	Molly Kelly Bonnie Beres	Co-author	7/2023
Webinar	Pet-nat Production: An Industry Roundtable	Molly Kelly and a panel of winemakers	Moderator	4/2023
Webinar	Bioprotection Strategies to Control Spoilage Organisms During Winemaking	Molly Kelly Todd Steiner	Presenter	3/27/2024

Research Projects

Research Projects- Please list all research projects in which you participated.			
Title of Project	**Role**	**Partnerships (outside PSU)**	**Coverage Area (i.e., local, regional, statewide, multistate)**
Development of a Website and Digital Media to Educate and Support Grape and Wine Industry Stakeholders in PA	Co-PI (C. Hickey)		$47,040 (ongoing)
Improving PA Wine Quality Through Enhanced Diagnostic Capabilities for Wine and Grape Quality Parameters:	Co-PI (M. Kwasniewski)		$99,188 (ongoing)
Undergraduate Experience in Viticulture and Enology (USDA)	Co-PI (M. Campbell)		$393,649 (ongoing)
Spotted Lanternfly Risk Management Education for Grape Growers in the Northeast (NERME)	Co-PI (C. Schmidt)		$41,808 (ongoing)
Using wine grape microbiome to control dissolved oxygen and sulfur dioxide levels in final wines	Co-PI (J. Wee)		$89,993 (begins 1/2025)
Measuring oxygen uptake from harvest through bottling: identifying and mitigating negative impact of dissolved oxygen on wine quality	PI M. Kelly		$42,214 (begins 1/2025)
Characterization of wine oxygen pickup under different scenarios common in Pennsylvania wine production	Co-PI (M. Kwasniewski)		$84,811 (begins 1/2025)
			Current total funding: $798,703

Funding and Contributions

IV.

Sponsorships, Donations, and Gifts- Please list all sponsorships, donations, or gifts you obtained in support of Penn State Extension programming.			
Type	**Source of Funds**	**Total Funding Amount**	**Program funding will support**
Funding	PA Wine Marketing and Research Board	$16,000 annually	Enology extension programming
Equipment discount/Departmental savings	Bucher Vaslin Inc./ Secured 12% educational discount and sole source justification for new winemaking equipment	$10,022	Extension and research winemaking for both the Food Science and Plant Science departments.
			Current total funding: $26, 022

In-Kind Contributions- Please provide a description and estimated value for any in-kind contributions to support programmatic activities. These may include items such as donated meals, meeting space, or other non-cash items.		
Description	**Source**	**Value of Item**
All research winemaking supplies are donated annually	Scott Laboratories	$2000-$3000
Non-*Saccharomyces* yeast and Malolactic bacteria donated annually	Chr. Hansen yeast	$3000-$4000
Biocontrol agents for PA wineries	Bucher Vaslin	$1000-$2000
Revenue Generation (Cost Recovery)- Please list the revenue generated from the programs that you led.		
Name of Program	**Date**	**Amount**
Juice and Wine Laboratory Analysis	May 17-18, 2022	$1250
Wine Microbiology workshop	June 13-14, 2023	$1400
Wine Quality Improvement: Understanding Wine Flaws, Causes, and Recognition	May 7-8, 2024	$3750
Fundamentals of Food Science	June 24-28, 2024	$35,030
	TOTAL	**$41,430**

Volunteer/Employee Management

Number of NEW volunteers recruited, screened, oriented/trained 11_____
Number of volunteers that continue to be trained: 3_____

Volunteer Training developed, taught/led – record date, training title, attendance.		
Date	**Presentation Title**	**Attendance**
5/7-8/2024	Wine Quality Improvement Workshop	Four Food Science undergraduate students and one graduate student were trained and assisted with hands-on sensory laboratory components, including sample preparation, lab set-up, presenting samples and clean up/Attendance 15
5/17-18/2022	Juice and Wine Laboratory Analysis	Four Food Science undergraduate students were trained and assisted attendees with the

		laboratory component of the workshop/Attendance 25
6/13-14/2023	Wine Microbiology Workshop	Two undergraduate Food Science students were trained and assisted with the laboratory component of the workshop/Attendance 7

Number of NEW employees recruited, screened, oriented/trained-NA
Number of employees directly managed: Currently one undergraduate student. The candidate will hire an additional student on grant funds in January 2025.

Outreach and Community Service

V.

Service to Extension- Please describe the service supporting an area, team, unit, or Penn State Extension. This activity may include leading a program team, serving as a mentor, serving on a committee, or other similar activities.		
Description of Service (e.g., Committee or Task Group)	**Role**	**Dates**
Grape and Wine Team	Co-team leader	2020-present
Food Safety and Quality Outreach Team	Team member	2020-present
Educator Advisory Council	Council member	2022-2024
Presenter Educator Institute pre-conference program	Organized/Presented a day-long session to educators about enology	10/23/2023
Farm Show Chair: Wine division	Update submission guidelines, organize and manage the educational area, hand out awards at the ceremony, and be responsible for the content of the educational area (handouts, banners, etc.)	2018-present
Service to the University- Please describe service in support of the university. These activities may include committee service, peer review of award nominations, or other similar activities that are outside of Penn State Extension.		
Description of Service (e.g., Committee or Task Group)	**Role**	**Dates**
Search committee	Committee member to hire Viticulture Extension Educator	8/27-30/2019
Search committee	Committee member to hire Food Safety and Quality Educator	3/1-31/2022
Search committee	Committee member to hire Food Science Post-doc	2/10-14/2023
Service to your Community- Please describe the service performed as an Extension Representative for industry or community groups. This activity may include serving on a committee, judging contests, or other activities.		
Description of Service (e.g., Committee or Task Group)	**Role**	**Dates**
Mifflintown Masonic Lodge	Presented an overview of the PA wine industry	3/10/2022
American Wine Society	Presented to Scranton branch	1/18/2023
Great Lakes Science Boot Camp for Librarians	Presented at the annual conference in University Park	7/19/2023

Lycoming County Fair Wine Competition	Sole Wine Judge	7/11/2024

Outreach and Community Service

VI.

Service to the Profession- Please describe the service performed supporting your profession. These activities may include roles in which you serve for state and national professional development organizations.		
Description of Service (e.g., Committee or Task Group)	**Role**	**Dates**
American Society of Enology and Viticulture-Eastern Section	Served on the Board of Directors	2019-2020
American Society of Enology and Viticulture-Eastern Section	Best student paper committee	2018-present
American Society of Enology and Viticulture-National	Best student paper committee	12/15/2021-1/12/2022
American Society of Enology and Viticulture-National	2025 Conference planning committee	9/2024-present (*only female East Coast representative).
Ohio State Wine Competition_436 wines judged	2025 Judge for Wine Competition	5/16-18/2024
Pennsylvania Wine Marketing and Research Board Conference Planning Committee	Plan all enology sessions for the conference. Invite speakers, plan tastings, and present	2018-present
Rutgers Winemaking Certificate Program	Teach the next generation of industry members via face-to-face and Zoom sessions, including modules on wine production, fining and filtration, laboratory analysis and sanitation.	Two full days on Rutger's campus and one session via Zoom: June 2022-present
Eastern Viticulture and Enology Forum	Organize and lead educational webinars to advance the industry. Planned topics, invited speakers, and managed Zoom sessions and follow-up surveys in collaboration with Cornell and Virginia Tech. Also presented individually.	November-April 2020-2024 Total webinars (hosted by all institutions combined) =**24**
Penn State Extension online Winemaking Certificate Course	Developing an online course (14 modules) independently to educate the PA industry and potentially a worldwide audience. The candidate has developed 12 modules, six videos with Jon Cofer, and five animations with the animations team. She has continued to work with the creative team to develop content	Began project in 2020. The projected launch date is spring 2025.

Professional Development

Professional Development Activities- Please list all professional development activities completed during the review year. Note: Each educator is required to obtain 8 hours of diversity-related training each year.			
Date	**Activity**	**Total Hours**	**Diversity Hours**
2018-present	Eastern Winery Exposition	Minimum 10 hrs annually	4
7/23/2024	Bucher Vaslin Technical Winemaking Webinar: Harnessing Biocontrol: Empowering winemakers with sustainable solutions	1	
5/14/2024	Bucher Vaslin Technical Winemaking Webinar: Rose winemaking: Essential techniques and strategies	1	
4/23/2024	Bucher Vaslin Technical Winemaking Webinar: The power of the yeast in winemaking	1	
6/27/2023	Bucher Vaslin Technical Winemaking Webinar: The role of thiols: Elevating aromas in wine	1	
5/16/2023	Bucher Vaslin Technical Winemaking Webinar: Mastering Malolactic Fermentation	1	
1/2023	Bucher Vaslin Technical Winemaking Webinar: Focus on Fining agents: Vegan, allergen free options	1	
12/2022	Bucher Vaslin Technical Winemaking Webinar: Contol Microbes in wines during aging: alternatives to SO2	1	
8/2022	Bucher Vaslin Technical Winemaking Webinar: Understanding wine phenolic structure and color stability	1	
6/2022	Bucher Vaslin Technical Winemaking Webinar: Reduce SO2 with Bio-protection: Success stories	1	
2/2023	Bucher Vaslin Technical Winemaking Webinar: The key steps to prepare your wine for bottling	1	
4/4/2023	Bucher Vaslin Technical Winemaking Webinar: Balancing mouthfeel	1	
3/6/2024	Bucher Vaslin Technical Winemaking Webinar: Sustainable Tools for Cold Stabilization	1	
1/2023	Bucher Vaslin Technical Winemaking Webinar: Let's talk destemmers	1	
1/2022	Bucher Vaslin Technical Winemaking Webinar: Wine stability	1	
3/2022	Bucher Vaslin Technical Winemaking Webinar: Achieving Wine Balance	1	
4/2022	Bucher Vaslin Technical Winemaking Webinar: How to naturally reduce alcohol and increase acidity	1	
1/2023-present	Penn State Berks Brewing Certificate Program	30 completed	
10/2024-present	Penn State Master Gardner Program	Six completed	
Annual	Extension Annual Conference	8	1
Annual	DEI and Compliance Training		8
2018-present	Multiple site visits to women, minority-owned, and LGBTQ-owned wineries. Also provide technical expertise to nuns at a Greek Orthodox monastery.		10
5/15/2023	LRN-Values, Ethics and Compliance Training		1
4/10/2024	LRN-Values, Ethics and Compliance Training		1

9/24/2024	LRN-Understanding Civil Rights for Penn State College of Ag Sciences		1.5
Recording	PA and its People Part 1: Native Peoples in PA. Then and Now.		1
10/8/2024	Reporting Suspected Child Abuse	1	
10/11/2024	EHS Laboratory and Research Safety Refresher Training	1	
10/14/2024	CITI Program Yearly Biosafety Training	1	
	Annual Total:	**73**	**27.5**