Virginia Polytechnic Institute and State University
Proposal Cover Sheet

PROPOSAL INFORMATION

Virginia Winegrowers Advisory Board
Sponsor

Solicitation No.

Laboratory Technical Assistant
Proposal Title

$45,959.00	7/1/04	6/30/05	☒ New or ☐ Renewal of
Amount	**Begin Date**	**End Date**	

PRINCIPAL INVESTIGATOR(S)

Bruce W. Zoecklein		
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Professor		
PI Title	Co-PI Title	Co-PI Title
Food Science and Technology		
Department / Center	Department / Center	Department / Center

INSTITUTIONAL INFORMATION

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VIRGINIA TECH ENDORSEMENT

	3-10-04	04-1751-03
David W. Richardson	**Date**	**VT Proposal No.**
Director of Sponsored Programs		

RESEARCH PROPOSAL

A. TITLE: Laboratory Technical Assistant

B. DATE: July 1, 2004-June 30, 2005

C. DURATION: 1 year of a multi-year request

D. OBJECTIVES: To follow the goal established by the Virginia Winegrowers Advisory Board, in continuing to increase wine quality by providing extension and research assistance. The activities of the Laboratory Technical Assistant for the next year include the following:

- Sampling of grapes from research plots.
- Analysis of research grapes, juices, and wines.
- Collection of extension survey data.
- Preparation of wines and reagents for short course programs and winemaker roundtables.
- Assistance in conducting short courses, seminars and workshops for the Virginia industry.
- Statistical analysis of research and extension data.
- Assistance in experimental wine production.
- Helping to establish and maintain the Enology-Grape Chemistry website (www.vtwines.info).
- Development of rapid diagnostic tests for wine quality control and government compliance.
- Supplemental chemical, physical, microbiological and sensory analysis of wines submitted to the Enology-Grape Chemistry Laboratory, at Virginia Tech, Blacksburg, by Virginia wine industry members.

E. JUSTIFICATION/PRACTICAL IMPORTANCE: The goals of the Enology-Grape Chemistry Group are to increase wine quality, processing efficiency and, therefore, profitability of the Virginia wine industry. The Laboratory Technical Assistant's efforts are designed to help attain those goals.

For most businesses, including wine, consistent profitability is elusive. Economic risks for the Virginia wine industry are considerable. Competition from foreign and California producers, agricultural and

environmental cycles, and changing consumer demands are difficult to control. Although seemingly profitable on a sales basis, the pre-tax return on assets of some Virginia wineries is often much less than 10%. Indeed, for new or young wineries struggling to establish an identity, the earning power of their total assets may be below the cost of debt financing. The ever-increasing availability of high quality products at low prices places a strain on our emerging industry. An additional confounding factor is the limited number of technically-trained winemakers and grape growers in Virginia. In order for the industry to continue to compete, it is essential that viable new technologies, which lower the cost of production and/or increase wine quality, are utilized.

The Laboratory Technical Assistant position is designed to impact the industry in several ways. Applied research projects will continue to aid in increasing wine quality, lowering the cost of production, or both. Additionally, the position aids in the determination of research-based extension information on issues of wine quality and wine quality control.

F. Background: Attempts to improve Virginia wine quality control have taken two basic forms: 1) laboratory and non-laboratory research-based extension, including short course programs, winemaker roundtable meetings, extension publications, newsjournals (*Vintner's Corner* and *Enology Notes*), expansion of our website, development of a laboratory certification program, and direct contact, and 2) supplemental quality control (QC) analysis performed at the Enology-Grape Chemistry Extension Laboratory. The following is a list of the quality control-oriented extension publications written and distributed:

Controlling microbial growth in wine - No. 463-011

Protein fining agents - No. 463-012

A review of potassium bitartrate stabilization in wine - No. 463-013

Bentonite fining of juice and wine - No. 463-014

Protein stability determination - No. 463-015

A review of *Méthode Champenoise* Production - No. 463-017

Enology Notes, Electronic Newsjournal (72 written to date)

World Wide Web site (www.fst.vt.edu/Zoecklein/index.html or www.vtwines.info)

The above-listed publications highlight the importance of monitoring wine quality control, including the establishment of HACCP (hazard analysis critical control point) programs. HACCP-like short courses and activities involving the Laboratory Technical Assistant include the following:

- Annual Juice and Wine Analysis Workshop. This is a two- or three-day, hands-on analysis course conducted in Blacksburg. This course series began in 1999.
- Winery Planning and Design workshop. A one-day course is being planned for June, 2004.
- Laboratory Certification Program for wineries. Our analysis efforts at Virginia Tech are supplemental, designed to help complement in-house quality control performed at the winery. The initial phase involved the analysis of pH, titratable acidity and alcohol. The second phase involved the analysis of free amino nitrogen levels by Formol titration.
- The analysis of the lead content of Virginia wines.
- An annual Pre-harvest Workshop
- The determination of pesticide residues in Virginia wines.
- A survey of malolactic fermentation, and a review of production practices in the state.
- Surveys of the industry's research needs. The results of one of these surveys has been posted on the Enology-Grape Chemistry Group's website at: www.vtwines.info.
- An annual Norton Winemakers Roundtable
- Technical Winemakers Roundtable meetings

- The Synergy of Wine Structure and Flavor, a one-day program of the Virginia Vineyards Association.
- Cork Quality Winemakers Roundtable with Scott Laboratory.
- A Malolactic Fermentation Roundtable with Lallemand.

G. Procedure: The Laboratory Technical Assistant has also been involved in research efforts designed to help resolve practical and limiting problems facing the Virginia industry. A list of the scientific publications which have resulted from these efforts is provided in the PI's CV. The practical significance of each research effort has been conveyed to the industry in the form of the printed newsjournal (*Vintner's Corner)*, my electronic newsjournal (*Enology Notes*), short courses, and industry meetings, such as Winemaker Roundtables. The current research involving the aid of the Laboratory Technical Assistant is listed below:

- The effects of crop load and selective leaf removal on glycoconjugates of Cabernet Sauvignon and Chardonnay grapes (with T.K. Wolf).
- The effects of flavor trapping on wine volatiles and quality.

  Wine grape cultivars, clone and training system evaluation (with T.K. Wolf).
- The evaluation of cold soaking and post-fermentation thermal processing on wine quality.
- Effects of *Brettanomyces* in winemaking: chemical, microbiological and sensorial comparison of ten genetically characterized strains of *Brettanomyces intermedius* in red table wines.
- The effects of delestage on red wine quality.
- The effect of microoxygenation on red wine quality.
- Nitrogen status of grape juice as an indicator of wine quality.

H. Personnel and Facilities: Dr. Bruce Zoecklein supervises this position.

I. Other Entities: None

J. Source of Other Funding: None for the position. It should be noted that while the Board has supported this position, the Department of Food Science and Technology has funded the extension laboratory operation

(reagents and supplies). This does not include indirect cost, such as secretarial support.

K. Budget:

Salary:	$37,365
Fringe benefits (23%)	$8,594
Total	$45,959

Submitted By:

Bruce W. Zoecklein
Professor of Food Science and Enology Specialist
Department of Food Science and Technology

BRUCE W. ZOECKLEIN
Associate Professor
BRIEF PROFESSIONAL BIOGRAPHY

I. Résumé

Educational Background:

Ph.D., Food Science and Technology, Virginia Tech. 1995.

M.S., Horticulture, Virginia Tech. 1993.

B.S., Microbiology, California State University-San Diego. 1972.

Previous Experience:

Associate Professor, Enology Specialist, Department of Food Science and Technology, Virginia Tech. 1999.

Assistant Professor, Enology Specialist, Department of Food Science and Technology, Virginia Tech. 1995.

Research Associate, Enology Specialist, Department of Food Science, Virginia Tech. 1994-1995.

Research Associate, Enology Specialist, Department of Horticulture, Virginia Tech. 1985-1994.

Extension Specialist-Enology, Department of Horticulture, University of Missouri. 1980-1985.

Research Specialist-Enology, Viticulture Research Station, California State University, Fresno. 1978-1980.

Instructor, Department of Food Science-Enology, California State University, Fresno. 1977-1980.

Production Manager, Oliver Wine Company, Bloomington, Indiana. 1975-1977.

Winemaker, A. Perelli-Minetti and Sons Winery (California Wine Association), Delano, California. 1973-1975.

Winemaker, Pleasant Products Food Corporation, San Diego, California. 1971-1973.

Honors and Awards:

Virginia Tech Gamma Sigma Delta Teaching Merit Award. 2000.

Napa Valley Wine Council Research Award, shared with K.C. Fugelsang. 1999

Virginia Tech Gamma Sigma Delta Extension Merit Award. 1999.

Virginia Tech Alumni Extension Excellence Award. 1997. The highest honor given by Virginia Tech for excellence in extension programs.