1. What are the top 3-5 grape related accomplishments of ARS during the past 3 years? What priorities of industry have been met?

Julie Tarara work on solar radiation and temperature- multiple applications. Such as trellis/water management. That it was done in the field- excellent. Approach for tannin analysis excellent. Could be used in the future for Aroma analysis.

Paul Schreiner project- whole vine nutrient uptake. Is pursuing further research in collaborations with analytical and flavor chemists to investigate relationship between vine nutrition and fruit quality and to determine optimum nutrient levels.

Deficit irrigation trials- quality. K. Shellie.

2. What major gaps still exist between ARS' research focus and the needs of industry?

Site selection: NE 1020 addresses. Terroir conference- mapped entire area for crop appropriateness based on weather, soils, topography, etc. Research priority for Washington State- site varietal pairing modeling system.

Nutrition/soil type and quality- BIG GAP.

Develop methods to measure quality. GAP

Vine balance – Canopy architecture. One pub on cluster spacing within vine- no effect on quality.

Effect of biodynamics on wine quality.

Canopy management and how it affects quality. Eg. Impact on leaf thinning and shoot thinning. U.C. Davis research- Mike Anderson. Dogma of cluster thinning. Mark Kliewer- Cabernet- Crop Quality and crop load- capacity of vine. Optimizing quality. Revisit dogma of green cluster thinning. Fruit exposure- thin on west side of vines. What are we doing to optimize uniformity on east and west side of canopy- trellis design, canopy management, and trellis management? Shoot positioning- spacing clusters within the canopy.

Optimal timing of canopy management practices.

Vineyard design- trellis design systems- may take 7-10 years for producible outcome. Plant density, spacing, vineyard floor management.

Hang time in relationship to quality and crop load. Winemakers want 2.5-3 tons/acre, wait 27-28-29 brix until ripe. Lohr sweet spot 2.4-4.6 tons /acre with 25-27 brix.

Integrative question- approach is important.

Need to integrate crop management with grape composition and wine quality.
Defining quality-
Vine balance? Excessive growth or

Soil characteristics, soil amendments impact on quality. Composts, biodynamics.

Irrigation and fertigation- relationship with quality. Think about things other than nitrogen. Phosphorus. Vine balance related to root growth. Don't know how important phosphorus is for root growth. Characterize root dynamics under deficit irrigation.

Water quality? Not an issue. Na long term effect is to dwarf the vine.

3. What future research <u>projects</u> could address these gaps?
Trellis design system?
Define chemometric parameters around quality.

4. Which teams of scientists (ARS, university, and industry), that currently exist or that could be created, are in the best position to address the research gaps?

Publish results from rootstock trials- eg. U.C. Davis, Lohr, Beck.
Provide monies to ARS Post-Doc.
Vineyard design: done by ARS, university, or industry.

Plant Physiologist.
NE 10-20,
Coordinate rootstock trials.

5. How can the progress and impact of ARS research on grapes be increased with existing resources?

Increase coordination with industry.

6. How will research results be extended to end users through an outreach plan? What is that outreach plan?

Websites are very effective. Meetings. Technology transfer. Industry request that ARS scientists get credit for publishing in trade journals. Vehicle for ARS researchers – extension educators.

Biggest difficulty is limited amount of fruit material.
Winemaking: Oregon state university, WSU, ARS Parma pilot plant,

Definitions for quality to use to analyze wines for quality. Whites- terpenes, preterpenes Reds- phenolics.

Determine key grape composition used to determine ripeness- Enologics. Eg.Screen Flavor profiles in the vineyard.

Quantitative analytical procedures.
Experimental winemaking facility that industry is comfortable will scale up.
Sensory analysis.
Like chemical analysis with sensory analysis.

All viticultural research should be taken through to winemaking, sensory, analytical.