

WRITTEN TESTIMONY OF
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Introduction

My name is Jim Moyer and I serve as the associate dean of research for the College of Agricultural, Human, and Natural Resource Sciences (CAHNRS) and as the Director of the Agricultural Research Center at Washington State University (WSU) in Pullman, Washington.

Washington State University is Washington's state university. Through our five campuses, four research centers and WSU extension, WSU is physically present in every county, delivering education, research, and core services that benefit Washingtonians in their communities every day. The University also has a presence abroad with a new online global campus and international research. As a premiere, tier one research university and the state's land grant university, WSU's mission is to drive education and innovation into our communities to support and grow the state's economy.

WSU is led by Interim President Daniel J. Bernardo, Ph.D. (former dean of the College of Agriculture, Human and Natural Resource Sciences) since July 2015 after the death of President Elson S. Floyd. President Bernardo is carrying on the legacy of Dr. Floyd to maintain WSU's land grant mission of advancing, extending and applying knowledge through local and global engagement.

WSU Research

Washington State University's research enterprise is driven by a diverse portfolio of extramural support with funding from state and federal sources as well as commodity groups and industry. Competitive federal funding streams from a variety of agencies are the primary source of funding for the institution.

WSU faculty have a strong history of success in winning federal competitive grants. For three of the last four years, the 5th Congressional District in Washington (which includes WSU) was in the top five U.S. congressional districts for receipt of USDA-NIFA awards. WSU faculty also compete strongly for federal awards from DOE, NSF, NIH, and DOI. These funds support a broad spectrum of programs that include biofuels and natural resource management, as well as the entire agriculture value chain to improve food

safety and security, lead to healthier foods, and enhance production of specialty crops, including organic production.

These grant awards support investigations in plant metabolomics, genomics and bioinformatics, plant breeding and animal reproduction, and pest management, as well as studies that affect end-use quality, transportation and marketing. Investigations supported by the NSF have contributed to our understanding of lipid metabolism in plants, as well as secondary metabolites such as riboflavin that contribute to healthier foods.

Genomics and bioinformatics investigations have not only led to an increased understanding of plant and animal genomes, but also the development of knowledge-based decision tools for pest management and other production practices. Federal research partnerships also support studies to ensure high end-use quality for new plant varieties as well as transportation and marketing research.

Our formula for success includes four research and extension centers located across the state staffed with over 50 faculty engaged in research, extension and teaching. Faculty at these centers and on the Pullman campus maintain strong relationships with growers and other members of the agribusiness community. This has translated into significant support for research, including endowed chairs designed to meet industry needs, as well as matching dollars and other forms of leverage, such as an internal seed grant program that enhances the competitiveness of faculty for federal research funding. Faculty in the College of Agricultural, Human, and Natural Resource Sciences generate over \$80 million dollars annually in extramural support.

WSU Specialty Crop Research Initiative-Funded Projects

Washington agriculture is one of the most diverse in the United States, growing over 200 different crops many of which are classified as “specialty crops.” Washington is number one nationally in the production of 10 of those crops, including apples, cherries, hops and pears, and second in production of eight others including grapes, onions and potatoes. Specialty crops represent more than half of Washington’s agricultural economy and play a significant role in the agricultural economy of many other states as well. Further, specialty crops provide the fruits and vegetables that are the foundation of a healthy diet for everyone.

Feeding an increasing global population in the face of 21st century challenges that include climate change, diminishing water supplies, plus disease and pests, requires 21st century research responses.

This morning I would like to highlight WSU’s unique contributions to the Specialty Crop Research Initiative (SCRI), funded by the USDA National Institute of Food and Agriculture, as part of the solution.

SCRI is designed to serve the needs of the broader, national agriculture industry by requiring multi-institutional and stakeholder involvement, a thoughtful feature that brings together the expertise needed to address complex problems and ensure relevance.

Since 2008, WSU faculty have been lead investigators or funded collaborators on 38 SCRI program grants that brought over \$36 million to WSU to support Washington's agriculture. A similar amount was awarded to collaborating land grant institutions. These grants funded research to improve production practices; develop systems approaches to crop management; study climate change, pest and disease management, precision agriculture and automation; and develop genomic and bioinformatics tools to aid plant breeding efforts.

I will highlight two projects that demonstrate the critical value of the SCRI. First is research on biodegradable plastic fabric for mulch. WSU developed mulch that suppresses weeds and saves water and can be used for high tunnels that prolong the growing season. This was only possible because of the research collaboration among five universities and farmers. In addition, the results allowed farmers from Washington, Tennessee and Texas to access niche markets for strawberries and to improve yields of other crops such as tomatoes. Further, researchers collected valuable information that was previously unavailable. They first collected information on the performance of biodegradable plastic fabrics used to construct the high tunnels and the mulch covers, a previous barrier to adoption. They also collected information on the effects of biodegradation on microbial communities in soil and the identity of fungi and bacteria responsible for degradation. This research led to a second project, now underway, focused on developing non-woven polymers that can be used to manufacture fabrics for biodegradable mulch.

The second example I'll share is actually two projects that seek to improve the accessibility and application of the vast amounts of genomic data available for several specialty crops. The data is valuable because it can be used to identify genes responsible for specific traits and then by plant breeders to integrate them into varieties. The first project is the Genomic Database for Rosaceae, which is led by Dr. Dorrie Main. This is a publicly available database with whole genome sequences of apples, peaches, and strawberries that can be used for breeding projects. In addition to SCRI funding, this research is supported by several other sources of funding, including the National Science Foundation and the Washington Tree Fruit Commission.

In the other project, known as RosBREED, scientists from WSU and Michigan State University are leading 35 scientists from 14 U.S. institutions to utilize information from 22 U.S. Rosaceae crop breeding programs. This initial project was so successful that a second phase was funded to develop and apply 21st century DNA tests and breeding methods to produce new varieties with improved horticultural quality and disease resistance.

WSU Projects for Specialty Food Crops funded by USDA

The WSU portfolio of competitively funded research from USDA that supports specialty crop foods includes research in five areas.

1. Production practices and systems management includes the previously mentioned projects for biodegradable mulches as well as three projects in fruit trees to support development of systems approaches to crop management.
2. Pest and disease management studies identified factors to reduce losses from insect pests such as the brown marmorated stink bug (tree fruit), the spotted wing Drosophila fruit fly (all fruit including wine grapes) and spider mites (hops). In addition, multiple projects have investigated viruses that cause internal necrosis in potato tubers as well as the transmission by insects of viruses that cause damage to specialty crops.
3. Genomics and breeding includes projects on peas and cranberries in addition to the highlighted projects above.
4. Precision and automated agriculture includes projects on water management, selective mechanical weed control, blossom thinning, and automated fruit canopy management.
5. The Organic Research and Extension Initiative (OREI) funds a number of WSU projects that support specialty crop production.

The movement by the Federal Government toward supporting projects that are multi-disciplinary and multi-institutional has challenged institutions to provide more advanced administrative support for these projects. The preparation of these grants requires greater emphasis on integrating the granting processes, contract management and research administration cultures from the participating institutions. This is a critical phase of grant preparation as well as grant management. Traditional administrative support for single investigator, foundational grants is not necessarily directly scalable, due to the increased complexity and organization of the projects.

Further, we have found that specific support for grant development to coordinate budgets, subcontracts and the compliance issues of the participating institutions is essential. In addition, the level of competitiveness requires support in the writing of the grants as well. Once the award is received, there is a high level of administrative work requiring additional resources to support team communication and organization. These additional resources not only detract from direct costs formerly available to the researchers, but also require institutional investments in a time when land grant institutions are facing cuts on the state and federal side. This is in addition to higher-level oversight needed to manage multi-institutional programs. All of this results in the lead faculty member devoting significant time to administrative tasks and less to the actual research. To respond to these needs, we have created positions specifically to support grant development, and we are experimenting with creating a group to assist with project management, which requires additional resources for administrative processes.

WSU's Grand Challenges

In addition to the ongoing research efforts in the College of Agriculture, Human, and Natural Resource Sciences, the WSU research agenda has recently undergone a comprehensive review to address complex societal problems that require the expertise of research universities for real world solutions. The identification of these grand challenges was a collaborative, university-wide effort with faculty, staff and administrators working together to unite behind the challenge.

Our strong federal, state and community partnerships are essential to the pursuit of these grand challenges. WSU's value to Washington State and Washington, D.C., has never been more evident than through the successes of our partnerships with our Congressional delegation in helping position and grow WSU's leadership in five areas:

- Sustaining Health: The Uncompromising Pursuit of Healthier People and Communities
- Sustainable Resources for Society: Food, Energy and Water
- Advancing Opportunity and Equity: The Land-Grant Mission in Today's World
- Improving Quality of Life through Smart Systems
- Fundamental Research in Support of National Security

These Grand Challenges are integral to the CAHNRS research portfolio, with many research programs in each of the five challenges. We have:

- 77 research programs in sustaining health,
- 157 research programs in sustainable resources for society,
- 47 research programs in advancing opportunity and equity,
- 28 research programs in improving quality of life through smart systems, and
- 15 research programs in fundamental research in support of national security.

The goal of the Grand Challenges is to increase collaboration between WSU faculty members and students, across disciplines and with researchers and partners worldwide, to explore integrated solutions.

Thank you for this opportunity to provide background on the importance of the Specialty Crop Research Initiative and the importance of Federal research to land-grant institutions like Washington State University.