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"Agricultural innovation is the process whereby individuals or organizations bring new or existing products, processes or ways of organization into use for the first time in a specific context in order to increase effectiveness, competitiveness, resilience to shocks or environmental sustainability and thereby contribute to food security and nutrition, economic development or sustainable natural resource management"

The International Symposium on Agricultural Innovation for Family Farmers, November 21-23, 2018, Rome. (http://www.fao.org/about/meetings/agricultural-innovationfamily-farmerssymposium/about/faq/en/)

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Innovation in agriculture isn't just interesting - it's essential to our survival!

http://innovationexcellence.com/blog/2018/08/06/5-innovativeagricultural-practices-that-are-changing-the-world/

Why innovations in Agriculture?

- Population growth
- Demand for food outpacing production
- Declining arable land for agriculture
- Flattening of yield per unit area
- Labor shortage
- Climate change
- Pests and diseases
- Water management
- Food safety

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- Precision agriculture: (one of many modern farming practices that make production more efficient)
- Climate-resilient crop
 varieties and cropping systems

(Photo credit: PHILIPPE DESMAZES/AFP/Getty Images)

Precision agriculture: drones, radio frequency (RF), autonomous tractors and IoT applications are playing a role in the transformation of agriculture.

Precision ag market is expected to grow from \$730 Million to \$2.42 Billion by 2020. (<u>https://www.forbes.com/sites/jenniferhicks/2018/04/30/why-precision-agriculture-will-change-how-food-is-produced/#1508572c6c65</u>).

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College of Agricultural, Human, and Natural Resource Sciences (CAHNRS)





Dr. André-Denis Wright Dean, CAHNRS

- Prosser Irrigated Agriculture Research and Extension Center
- Mount Vernon Northwestern Washington Research and Extension Center
- Puyallup Research and Extension Center
- Wenatchee Tree Fruit Research and Extension Center

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The World's Largest Irrigated Agriculture Center

The Washington State University, Irrigated Agriculture Research and Extension Center (WSU Prosser IAREC) is the focal point for the University, the U.S. Department of Agriculture – Agricultural Research Service (USDA-ARS), and the Washington State Department of Agriculture (WSDA) research, extension, and plant certification programs that address the concerns of irrigated agriculture.

An estimated two-thirds of the agricultural production in the state comes from irrigated land, making such research of vital interest to Washington's economy, both for intrastate distribution and exportation.

Learn more about Prosser IAREC >

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Multi-disciplinary team work



- Biological Systems Engineering
- Plant Pathology
- Horticulture
- Entomology
- Crop and Soil Science
- Food Science
- Extension
- USDA-ARS
- WSDA

Work with a wide range of crops

Tree fruits, wine and juice grapes, hops, small fruits, forages, biofuel crops, potato, legumes (beans, peas, alfalfa, etc).



Translational research

healthy soils-healthy plants-healthy people-healthy planet continuum



WSU Prosser IAREC The Birth Place of Wine Industry

Dr. Walter Clore



THE FATHER OF WASHINGTON WINE

In 1937, a young horticulturist by the name of Walter Clore was tasked to determine which crops would grow best in eastern Washington's arid landscape. During the ensuing 40 years, Dr. Clore's work saw more than 300 grape varieties take root at Washington State University Irrigated Agriculture Research and Extension Center (IAREC) at Prosser. Aided in later years by winemakers George Carter and Dr. Charles Nagel, Dr. Clore convinced farmers and the wine industry that premium wine grapes could flourish in eastern Washington

> WSU HAREC in Prosser i research focused prima otatoes, corn, wheat, ar grains. His initial task v vestigate the success of

s grapes, with the

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Dr. Troy Peters

Water Management

- Collect research data through sensors to monitor and control irrigation.
- Provide tools to help growers when to deliver the right amount of water to the right place at the right time.

Advantages:

- Improved water use efficiency
- Reduced disease pressure
- Optimized crop growth and yield



Automation and mechanization

Center for Precision Agriculture and Automation Systems (CPAAS)



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Agricultural automation and robotics for orchard management

Dr. Manoj Karkee

Mobile phone application to assess crop load in apple canopies An intelligent bin dog—an electric bin carrier that can go out into the orchard to deliver empty bins and pick up full ones.



Innovations in Agriculture WASHINGTON STATE SUBJECT VIEWSITY



Dr. Michelle Moyer



Fungicide Resistance Management

- National USDA-SCRI project on monitoring for, and mitigating loss from, fungicide resistance in grape powdery mildew
- Project timeline: Sept 2018 Aug 2023

Powdery mildew damage in wine grapes



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Cellulose nanocrystals to insulate sensitive trees and buds against the cold <u>Teamwork:</u> Horticulture

Dr. Matt Whiting Center for Precision Agriculture and Automation Systems Bioproducts, Sciences, and Engineering Laboratory (BSEL)



Forms an insulating layer on plant tissue that both keeps the cold air out, but also keeps tissue heat inside.

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Food/produce safety



Postharvest Handling

- Listeria control on food contact surfaces in apple packinghouses.
- Evaluation of hygienic indicators in tree fruit packinghouses.

Dr. Faith Critzer with PhD Student Alexis Hamilton

Agricultural Water

- Evaluation of antimicrobial water treatments for in-field application on produce farms.
- Development and dissemination of an agricultural water treatment curriculum for produce growers.

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Remote sensing, artificial intelligence, UAV's, and precision agriculture for managing viral diseases in vineyards







Thank You