



**DEPARTMENTS
& PROGRAMS**

**WSU
CAMPUSES**

**PARTNER
INSTITUTIONS**



**WSU
EXTENSION**



WASHINGTON STATE UNIVERSITY
Prosser Irrigated Agriculture
Research and Extension Center

IAREC

A HUB FOR BUILDING A



**Resilient
WASHINGTON**

2023 REPORT

**RESEARCH &
EXTENSION
CENTERS**



STAKEHOLDERS





INTRODUCTION

The Uniqueness of IAREC

For more than 100 years, Washington State University’s Irrigated Agriculture Research and Extension Center, IAREC, has created a more resilient future for Washington and the world.

Irrigated agriculture is a cornerstone of Washington’s economy, encompassing two-thirds of all crop production and many of our state’s leading commodities, from apples, cherries, and grapes to potatoes, hops, and hay. IAREC is poised to harness modern science and technologies to address a myriad of complex issues facing sustainable crop production in irrigated agriculture, benefiting communities that we serve.

Our unique location at Prosser, Washington, in the heart of the Columbia Basin and the gateway to the Yakima Valley, places our science in close collaboration with growers and industries.

Discovery at IAREC is more than the sum of its parts. A team of WSU faculty, staff, and students from diverse cultures and nationalities work together, while longstanding partnerships with state and federal colleagues at the Washington State Department of Agriculture (WSDA) and Agricultural Research Service of the U.S. Department of Agriculture (USDA-ARS) help Northwest growers and communities stay productive and successful.

Today, IAREC is making strides to solve challenges, develop improved crops, embrace new technologies, modernize our campus, and welcome diverse communities of learners. Ahead, learn about our ongoing discoveries and our role as a hub for research, training, and service.

“Washington State University acknowledges that its locations statewide are on the homelands of Native peoples, who have lived in this region from time immemorial.”

Diversity, Equity, and Inclusion at IAREC

As a diverse group of faculty, students, and staff working in the field of agriculture, IAREC succeeds thanks to contributions from a wide range of communities, including historically marginalized communities. The increasingly diverse group of people responsible for our successes has brightened our path forward benefiting local, regional, and global communities.

Our Center is committed to engaging and supporting local community development in south-central Washington; to promoting awareness and belonging through human interactions; and to cultivating diverse, equitable, accessible, and inclusive space for all people.

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Message

FROM THE DIRECTOR

I am pleased to present IAREC's 2023 Annual Report, highlighting our accomplishments in agricultural research, Extension, and education advancing Washington State University's land-grant mission ideals. I want to express my sincere gratitude to our dedicated and talented team of faculty, staff, and students for their contributions to the Center's success, and to the leadership of the College of Agricultural, Human, and Natural Resource Sciences (CAHNRS) for supporting our endeavors.

Co-location of WSU faculty with researchers from USDA-ARS and the WSDA fosters a transdisciplinary and collaborative environment. Here, we work to solve complex challenges in irrigated agriculture, ensuring sustainable intensification of crop production. Our mission is to research and share our expertise with Washington state's agricultural community and beyond.

IAREC's impactful research affects global food security, and the influences of our work can be seen all over the world. Our Center is a dynamic hub where members from diverse cultures and nationalities work together to foster innovation, train a competent workforce, share evidence-based knowledge, and maintain the Center's excellence in irrigated agriculture. As we look ahead, IAREC's century-long legacy in Washington's agriculture and economic development remains strong. Our commitment to innovation,



community engagement, and the cultivation of a diverse workforce for the future is unwavering.

I invite friends, supporters, and partners to join us in advancing IAREC's mission through partnerships, cooperation, and collaboration. Your steadfast support has propelled us this far, and we eagerly anticipate the opportunities that lie ahead to keep our work relevant, accessible, and applicable for agricultural and food systems resiliency.

Naidu Rayapati

Director, Prosser Irrigated Agriculture Research and Extension Center



Welcome!

NEW FACULTY

In 2023, we welcomed Assistant Professor and Food Safety Extension Specialist **Claire Murphy**, faculty member in the School of Food Science, who will focus on reducing foodborne pathogen contamination in the produce supply chain.

PRODUCTIVE FACULTY



57

Peer-Reviewed Research Publications in Scientific Journals



4

Book Chapters



11

Extension Publications



Letter

FROM THE DEAN

As I begin my third year as the Cashup Davis Family Endowed Dean of the CAHNRS, I remain impressed by the work conducted at IAREC through partnerships with USDA-ARS and WSDA, agriculture commodity groups, and our surrounding communities. Together, we make a difference in the Pacific Northwest, ensuring access to nutritious food while protecting our natural resources, training a strong workforce, and contributing to healthy communities.

This year's report highlights the crucial partnerships and collaborative projects underway at IAREC as well as the achievements and successes of the past year.

The IAREC team continues its success in garnering competitive grant awards to advance knowledge and put it in the hands of the end user. Students at all levels of education are core team members who have numerous opportunities to explore agriculture and related fields across a variety of career paths, ultimately contributing to today's science and the transformations of tomorrow. I am excited to see your accomplishments and remain committed to working



with Dr. Rayapati and the entire IAREC team to expand our impact and contribution toward a resilient Washington.

Wendy Powers

Cashup Davis Family Endowed Dean, College of Agricultural, Human, and Natural Resource Sciences

Serving the Land-Grant Mission

Land-grant universities were established in 1862 to provide practical education in agriculture and mechanics to all people.

Washington State University (WSU) was founded in 1890 to help fulfill the mission of education, research, and extension. IAREC was established in 1919 to advance WSU's land-grant mission and empower Northwest growers and communities to stay productive, forward-thinking, and resilient for more than 100 years.

Jim Menzies (left) and two visitors in a potato field on a field day in 1950.



WSU, USDA ARS, and WSDA Researchers at Prosser IAREC

WSU CAHNRS

Biological Systems Engineering

- Manoj Karkee
- Lav Khot
- Troy Peters
- Qin Zhang (Retired)

Crop & Soil Sciences

- Steve Fransen (Retired)
- Rui Liu

Entomology

- Doug Walsh
- David James

Horticulture

- Per McCord
- Matt Whiting

Plant Pathology

- Gary Grove*
- Scott Harper
- Naidu Rayapati*
- Youfu 'Frank' Zhao

School of Food Science

- Claire Murphy

Viticulture & Enology

- Markus Keller
- Michelle Moyer

WSU Extension—ANR

- Bernardita Sallato

**Joint appointment with Viticulture & Enology*

USDA ARS

Forage Seed & Cereal Research Unit

- Kayla Altendorf
- Francisco 'Paco' Gonzalez

Grain Legume Genetics Physiology Research Unit

- Phil Miklas
- Svetlana Yurgel
- Lyndon Porter

Horticultural Crops Production & Genetic Improvement Research Unit

- Devin Rippner

Plant Germplasm Introduction & Testing Research Unit

- Brian Irish
- Longxi Yu

Temperate Tree Fruit & Vegetable Research Unit

- Max Feldman
- Kylie Swisher-Grimm
- Roy Navarre

WSDA

Fruit Tree Certification Project

- Segun Akinbade

Research Discoveries

That Serve Washington Agriculture

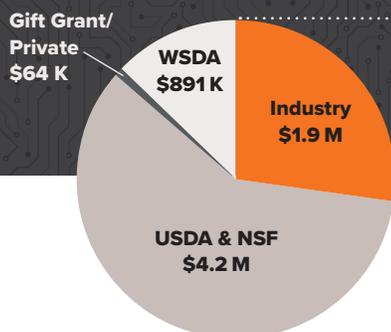
IAREC is a preeminent center for irrigated agriculture spanning a range of methods, topics, and applications to provide innovative solutions for growers, increase returns per acre, and prevent crop losses due to biotic, abiotic, and environmental challenges. These efforts support the viability and competitiveness of the agricultural industry while also benefiting growers financially. Our scientists develop smart technologies to mitigate the constant threat of pests and diseases to crops and leverage cutting-edge technologies to safeguard soil health and crop productivity from rapid changes and extreme conditions.

IAREC RESEARCH FUNDING

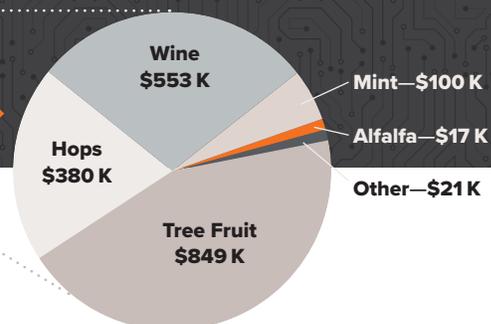


Smart Agriculture

FUNDING SOURCES



INDUSTRY SOURCES



IAREC faculty are at the forefront of innovation in smart technologies. We harness the power of artificial intelligence to provide growers with data-driven decision-support tools for crop resiliency and risk mitigation in an ever-changing climate.

Faculty, staff, and students in the Department of Biological Systems Engineering conduct team-based trans-disciplinary research with faculty in the Departments of Plant Pathology, Horticulture, and Viticulture and Enology to enhance decision-making, improve crop productivity, and address the many challenges growers face from pests, disease, climate change, and extreme weather events.

Professor **Manoj Karkee** develops robotic systems for specialty crop operations including fruit picking, crop thinning, pollination, crop load estimation, and pruning. These innovations are expected to save the Washington specialty crop industry hundreds of millions of dollars.

Associate Professor **Lav Khot's** team is developing agricultural cyber-physical systems that mitigate heat and frost stress in perennial specialty crops. This work increases economic efficiency, resource conservation, labor safety, and can be adapted for other high-value crops.

INTRODUCING THE AGAID INSTITUTE

IAREC is playing a key role in WSU's AgAID Institute, which is pioneering the use of artificial intelligence to equip growers with innovative tools that enhance crop resilience and manage risks in a volatile climate.

Funded by a \$20 million USDA National Institute of Food and Agriculture (NIFA) and NSF grant and involving a collaborative team across six universities, the institute will develop advanced AI technologies and decision-support tools to address pressing agricultural challenges such as labor shortages, weather variability, and water scarcity. This project helps enhance the profitability and sustainability of diverse crop systems.



AgAID

AI Institute for Transforming Workforce & Decision Support

Artificial Intelligence (AI) Institute: Agricultural AI for Transforming Workforce and Decision Support (AgAID)

Funded by USDA-NIFA through National Science Foundation (NSF) AI Research Institutes program (09/2021–08/2026) \$20 million

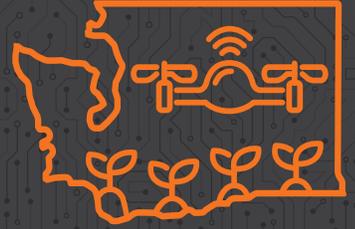
Principal Investigators: Anantharaman Kalyanaraman (lead), Margaret M. Burnett (co-lead), Alan Fern (co-lead), Lav Khot (co-lead), Joshua H. Viers (co-lead)

WSU IAREC Co-PIs: Manoj Karkee, Qin Zhang, Troy Peters, Markus Keller, Bernardita Sallato, Matthew Whiting, Gwen-Alyan Hoheisel

Learn more about efforts in integrating AI with agricultural practices at agaid.org.



Advancements in Crop Health and Management



Research that Benefits the Bottom Line

From tree fruits to grapes to hops, alfalfa to potatoes, scientists in IAREC are making an economic impact for Northwest farms and growers.



\$600

For a 50-acre farm

Potential savings from annual maintenance of sprayers and other best practices shared by Perennial Crops Spray Application Technology Team, performed by 92% of workshop participants.



\$900

Per acre

Increased returns in WA 38 orchards from supplemental pollen practices studied at WSU.



80%

Of total sales

Sales of certified planting stock by Washington's largest grapevine nursery. Up 20% from prior decade following viral disease research.



18%

Less water

Reduction in water usage while maintaining crop yield using improved center pivot irrigation systems.

Faculty at IAREC work closely with USDA-ARS and WSDA researchers to conduct multi-disciplinary research and extension benefiting many of our state's leading commodities, from tree fruits, grapes, hops to potatoes, legumes, and hay. Projects summarized below reflect team research transcending traditional boundaries to deploy evidence-based strategies for sustainable intensification of crop production in irrigated agriculture.

GRAPES

Professor **Markus Keller** leads the multi-institutional HiRes Vineyard Nutrient Management project funded by USDA-NIFA's Specialty Crop Research Initiative. This team develops a better understanding of nutrient challenges in spatially heterogeneous vineyards across U.S. wine regions and climates, deploying grower tools for improved productivity, yield, and quality. Decades of research on vine responses to fluctuating winter temperatures led to robust predictive models in diverse wine and juice grape cultivars. In partnership with AgWeatherNet, he deployed cold damage alert systems, helping growers implement cold damage mitigation strategies in a timely and cost-effective manner.

Wine grapes are susceptible to powdery mildew, and management of this disease requires routine, multiple in-season sprayings. Professor **Michelle Moyer** and her team used research, Extension articles, in-person seminars, and hands-on workshops to train grape growers on key management factors, and helped them better understand the roles of weather, spray technology, product formulation, and pathogen and host biology. Through these and other efforts, Washington growers collectively reduced the average number of seasonal fungicidal sprays by one, an overall savings of \$2 million per year.

Professor **Naidu Rayapati** researches the epidemiology of economically important viral diseases in vineyards. He demonstrated that removing symptomatic vines and replanting with virus-tested ones are cost-effective in successfully controlling red blotch disease. Multi-year diagnostic research conducted in collaboration with grapevine nurseries and the Plant Services Program of the WSDA revealed that nurseries in the state are free of grapevine red blotch virus, which has plagued nurseries in other wine grape-growing regions.

Devin Rippner, USDA-ARS scientist in the Horticultural Crops Production and Genetic Improvement Research Unit, works to better understand relationships between soil health and vineyard production. His program conducts research on how different management practices improve soil health for long term vineyard sustainability.

TREE FRUITS

Little Cherry disease caused an estimated \$100 million in losses in 2010 across the Pacific Northwest (PNW). Researchers at IAREC are working to better understand and prevent Little Cherry disease outbreaks.

WSDA scientist **Segun Akinbade** and his team rigorously test mother trees in tree fruit nurseries for pathogens using advanced diagnostics, helping swiftly remove infected trees from a certification program maintaining roughly 90,000 mother trees. Associate Professor **Scott Harper** and a multidisciplinary team of colleagues at Prosser, Wenatchee, and the USDA-ARS Wapato location are developing sustainable integrated disease management solutions for Little Cherry disease.

Associate Professor **Per McCord** focuses on breeding and genetics, developing superior cultivars for the PNW cherry industry. His team uses DNA marker techniques to more quickly develop new sweet cherry varieties. The Center's new, state-of-the-art optical sorter makes the breeding program more efficient to meet the changing needs of the cherry industry.

Professor **Gary Grove's** research on emerging canker diseases in PNW cherries is guiding new management strategies to mitigate outbreaks and reduce crop damage.

Professor **Frank Zhao** discovered, for the first time, kasugamycin resistance in Washington apple and pear orchards. Zhao and his team are also researching copper resistance in apple, pear, and cherry pathogens helping to save labor and control costs and prevent excessive use of copper and antibiotics.

Professor **Matthew Whiting** and his team developed frost protection technologies using cellulose nanocrystals to protect cherry crops during spring frost events. Growers can apply frost protection technology quickly and inexpensively, dramatically decreasing bud mortality.

POTATOES

USDA-ARS researchers with the Temperate Tree Fruit and Vegetable Research Unit develop disease and pest resistant potato cultivars. WSU alumnus **MaxFeldman** leads the potato germplasm enhancement genetics lab, which focuses on disease and pest resistance trait discovery, genetic mapping, and cultivar development as part of the Tri-State potato breeding program. **Kylie Swisher Grimm** studies new and emerging potato pathogens, recently focusing on two soilborne tuber necrotic viruses, Tobacco rattle virus and Potato mop-top virus. **Roy Navarre** works to develop superior potato cultivars with better disease resistance, quality, and higher amounts of phytonutrients.

HOPS

Funded by the USDA-NIFA Specialty Crop Research Initiative, Professor **Doug Walsh** leads a trans-disciplinary team to enhance supply chain stability, market access, and global competitiveness for the PNW hop industry. His program on pesticide residue trials through USDA's Interregional Research Project #4 is crucial for overcoming trade barriers and ensuring market access for hop growers.



Developing superior hops and resilient production systems, USDA-ARS scientist in the Forage Seed and Cereal Research Unit and WSU alumnus **Francisco "Paco" Gonzalez** focuses on mitigating hop abiotic stress pressures, particularly drought, to enhance sustainability.

In the same unit, USDA-ARS scientist **Kayla Altendorf** leads a hop breeding program to develop cultivars with improved disease resistance, yield and agronomic characteristics, and better aroma and brewing attributes. She and her team developed DNA molecular markers for quick determination of sex in hop breeding populations.

LEGUMES

Scientists in the USDA-ARS Grain Legume Genetics Physiology Research Unit develop cultivars that are disease resistant, high-yielding, and environmentally resilient. **Phillip Miklas** leads the dry bean cultivar development project, which has introduced new cultivars with enhanced disease resistance and high yield potential. WSU alumnus **Lyndon Porter** works in disease and pest management in legumes, recently focusing on identifying genetic resistant resources in lentils and peas to defend against the pea aphid. **Svetlana Yurgel's** group research helps increase environmental resilience and profitability of dryland legume production systems.

ALFALFA

Brian Irish with the USDA-ARS Plant Germplasm Introduction and Testing Research Unit manages genetically diverse collections of important crops including alfalfa, clover, birdsfoot trefoil, and many of their wild relatives. These collections are freely available to researchers and educators.

WATER CONSERVATION

Water is the lifeline of irrigated agriculture in eastern Washington. Efficient water use and conservation are critical as demands increase due to a changing climate. Professor **Troy Peters** and his team conduct on-farm research to improve water use efficiency. They replaced conventional sprinkler systems with low-elevation systems controlled by automated sensors. The team helped growers implement best practices and adopt precision irrigation systems to deliver the right amount of water to the right place at the right time. Peters also developed free web-based tools to aid informed decision making.

PARTNER INSTITUTIONS

IAREC has a history of productive collaborations with regional, national, and global partners for research, education, and outreach addressing major problems facing our food supply, environment, and the future of our workforce. Partners include institutions within the United States and globally, USDA-ARS, WSDA; Pacific Northwest National Laboratory; Hispanic- and Native American-Serving institutions (Heritage University and regional colleges), and high schools.

WASHINGTON
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PROSSER
IAREC
Hub for a
Resilient
Washington

DEPARTMENTS AND PROGRAMS

Interdisciplinary connections help our scientists spark new ideas and find novel ways to solve problems. The Center brings together eight WSU schools, departments, and programs, including faculty in the School of Food Science, the departments of Biological Systems Engineering, Crop and Soil Sciences, Entomology, Horticulture, Plant Pathology, Viticulture and Enology, as well as WSU Extension's Agriculture and Natural Resources Program Unit.

WASHINGTON
STATE
UNIVERSITY
CAMPUSES

IAREC-based WSU Extension specialists educate growers and industry experts on research adoption and implementing best practices. With 40 locations throughout the state, WSU Extension empowers individuals, organizations, and communities to solve challenges and build a culture of lifelong learning. Extension provides research-based knowledge to help individuals succeed in their jobs, raise healthy families, and build safe and vibrant communities for the next generation.

RESEARCH AND EXTENSION CENTERS

IAREC partners with its three counterpart WSU Research and Extension Centers (RECs) across the state to deliver sound science, instruction, and service projects that meet local and regional needs. WSU scientists at each REC work to solve challenges facing agriculture, our environment, and our economy. IAREC manages WSU's Othello research farm for field research and education by WSU faculty and USDA-ARS researchers impacting agricultural food production.

STAKEHOLDERS

IAREC serves a range of stakeholders: producers, crop consultants, and marketers of irrigated crops in Washington, including tree fruits, grapes, potatoes, hops, alfalfa, and other smaller (mint) and emerging crops (industrial hemp); employers in agriculture and technology; state agencies involved in supporting agriculture and controlling invasive pests and diseases; students from diverse backgrounds exploring and joining STEM careers; local communities seeking training and support through WSU Extension; and many more.

WSU is one institution reaching statewide, and beyond, through six campuses: Pullman, Spokane, Tri-Cities, Vancouver, Everett, and the online Global Campus. Many of our scientists join interdisciplinary research efforts based at Pullman that cross many fields, from food safety to new crop breeding to AI, sensors, and drones. Viticulture and Enology discovery and training is supported by our neighbors at the WSU Tri-Cities Campus.



The Irrigated Agriculture Research and Extension Center at Prosser is a converging point for people, ideas, and achievements that together foster a more resilient Washington and world.

Research projects and partnerships reach beyond our labs, farms, orchards, and classrooms to connect growers, partner agencies, community members, students, and stakeholders with innovative ideas that extend across the WSU system, our wider state, and the world at large.

We all work together to make an impact for strong and sustainable agriculture, healthy families and communities, a safe environment, and a workforce ready for the challenges of tomorrow.



Subject Matter Centers

At the Core of Our Mission



Three subject matter centers located at IAREC support Washington agriculture, natural resources, people and animals, and our economic well-being.

AgWeatherNet, Lav Khot, Director

WSU AgWeatherNet (AWN) is the first and the largest agricultural weather network in the United States. AWN collects and delivers quality spatiotemporal weather data across the state of Washington that drives on-target forecasts, models, and climatology.

The network includes more than 350 public and private stations recording air temperature, wind speed, relative humidity, solar radiation, precipitation, soil temperature, and water potential.

Data and associated products flow through a free-to-use network web portal at weather.wsu.edu. This site has over 23,000 registered users and receives an average of 50,000-page views per day; it includes tools addressing crop phenology, cold/heat stress indicators, and irrigation scheduling tied with a station-specific 10-day weather forecast.

This data is critical for effective management of crops, human and animal health systems, and for generating climatology for the state of Washington. Access to quality weather data and associated decision support tools is critical for many sectors of our state. Our stakeholders include those in agriculture and animal production (with over \$10 billion in annual impact), natural resource conservation, emergency management, aviation, utilities, climate change research, and education.

Center for Precision and Automated Agricultural Systems, Manoj Karkee, Director

WSU's Center for Precision and Automated Agricultural Systems (CPAAS) advances development and adoption of smart farming solutions for a resilient and sustainable agricultural industry.

Core faculty members include Professor **Manoj Karkee**, with expertise in sensing, machine vision and agricultural robotics; and Associate Professor **Lav Khot**, experienced in precision and smart agriculture, ground and aerial crop sensing, data to decision support, and variable rate technology development.

The Center's research and outreach in precision, automated, and smart farming technologies support rapid growth of commercialization efforts by private companies and adoption by farmers.

Technologies developed at CPAAS have been patented and commercialized. One is the "hand-held blossom thinning device" commercialized by Automated Ag of Moses Lake, Wash., adopted by cherry growers to improve productivity and health and safety of farm workers. With labor availability and costs becoming the most challenging problems faced by specialty crop industries in Washington and around the country, this technology makes a huge positive impact on the industry.

Clean Plant Center Northwest, Scott Harper, Director

Propagation of infected planting stock is, unfortunately, the most effective means of spreading viruses and other plant pathogens. This costs Washington fruit tree, grapevine, and hop growers millions of dollars in crop losses, reduced yield, and replanting costs. WSU's Clean Plant Center Northwest (CPCNW) is the first line of defense in preventing the introduction and spread of harmful viruses.

Each year, CPCNW brings in fruit tree, grapevine, and hop cultivars of interest to growers and producers across the Pacific Northwest, testing them for viruses and other pathogens. Infected plants are 'cleaned' of pathogens and maintained in the Center's repository. The team then distributes the clean, virus-tested material to propagators nationwide.

CPCNW's role is to prevent pathogen introduction and spread and is best understood in terms of losses prevented. Each dollar spent on clean plants saves up to \$100 per plant by the grower in pest and disease management.



Extension

Sharing Our Results

Extension and community outreach to our community are integral parts of the IAREC mission.

We share our research findings via several dissemination pathways, provide training and education to growers, consultants and industry representatives, and facilitate knowledge exchange within Washington's agricultural community, translating discovery into action and promoting adoption of beneficial practices. While all of our scientists interface with the public, there are a few who specialize in Extension and outreach services.

Exemplifying the center's strong emphasis on Extension activities and services, Tree Fruit Extension Specialist **Bernardita Sallato** provides leadership in applied research and outreach for the Pacific Northwest tree fruit industry. Her program improves orchard efficiency and fruit production through horticultural management practices and technology. In 2023, she hosted, co-hosted, or spoke at more than 20 meetings and field days.

Through Professor **Michelle Moyer**'s collaborative research and extension efforts with the FRAME Networks project funded by the USDA-NIFA Specialty Crop Research Initiative, stakeholders across the grape industry are equipped with the necessary tools and knowledge to effectively combat fungicide resistance and foster sustainable powdery mildew disease management practices.

Professor **Doug Walsh** presented more than 20 industry meetings including with the Washington Grape Society, Pacific Northwest Vegetable Association, Western Region IR-4, Hop Growers of Washington, and the National Alfalfa and Forage Alliance.

Assistant Professor **Rui Liu** built collaborative relationships with stakeholders, enhancing access to comprehensive weed management solutions and addressing challenges to weed control for specialty crop growers.

Since joining IAREC in August 2023, Assistant Professor and Extension Specialist **Claire Murphy** has led trainings for over 200 produce industry professionals, focusing on Food Safety Modernization Act regulations to enhance safety, ensure compliance, and reduce outbreak risks.



Faculty Outreach

Faculty at IAREC lead interdisciplinary, team-based education and outreach events on management of pests and diseases, as well as other production challenges.

IAREC-based scientists conducted hands-on workshops and field days and produced Extension publications and videos as well as popular articles in trade magazines.

The Tree Fruit Team disseminated the latest information via Fruit Matters, a monthly online newsletter posted on the WSU Tree Fruit website that benefits growers and other industry stakeholders. Learn more at treefruit.wsu.edu/newsletter.

Viticulture and Enology Extension News is published twice a year and shares articles covering different aspects of grape growing; it provides research-based information for stakeholders, students, researchers and Extension faculty. Visit wine.wsu.edu/extension/viticulture-enology-news-veen.

Educating the Next Generation at IAREC

IAREC faculty offer teaching and hands-on learning opportunities to undergraduate and graduate students to prepare a new generation of global scholars with a breadth of knowledge and essential life skills capable of addressing agricultural challenges of the 21st Century.

During 2023, they taught one undergraduate and 10 graduate courses and guest-lectured to classes in their area of expertise. Faculty provided exceptional mentoring to 39 graduate students (12 MS and 27 PhD) and hosted many tours and events for area students and adult visitors.



**Mark "Jake"
Schrader**

PhD

**Dr. Lav Khot
(Chair)**



**Chenchen
Kang**

PhD

**Drs. Qin Zhang
& Manoj Karkee
(Co-chairs)**



**Karisma
Yumnam**

Master's

**Dr. Lav Khot
(Chair)**



**Basavaraj
Amogi**

PhD

**Dr. Lav Khot
(Chair)**



**Claire Marie
Castillo**

PhD

**Dr. Troy
Peters (Chair)**



Noah Ault

Master's

**Dr. Naidu
Rayapati
(Chair)**



**Alexa
McDaniel**

PhD

**Dr. Michelle
Moyer (Chair)**



**Uddhav
Bhattarai**

PhD

**Dr. Manoj
Karkee
(Chair)**



**Amber
Loptien**

Master's

**Dr. Naidu
Rayapati
(Chair)**



**Geraldine
Diverres
Naranjo**

PhD

**Dr. Markus
Keller (Chair)**

Wapato MESA Visit Brings Young Learners to IAREC

Faculty and students in WSU's AgAID Institute hosted nearly 40 young learners from Wapato Middle School who visited the center as part of MESA, the Mathematics, Engineering and Science Achievement program. This project supports academic development in grades 6–12 statewide to diversify the STEM workforce. The Wapato students saw demonstrations and collected atmospheric data from sensors that each student built, then compared those findings against data AgWeatherNet shared for that same location.



GRADUATES



Pink Boots Society Tour Hosted by USDA Hop Breeding and Genetics Lab

The Pink Boots Society assists, inspires, and encourages women and non-binary individuals in the fermented and alcoholic beverage industry to advance their careers through education. The USDA Hop Breeding and Genetics Lab led by **Kayla Altendorf** hosted the group during a tour in August 2023.

The Hop Breeding and Genetics team, which includes Altendorf and two biological science technicians, **Anna Tawril** and **Rain Freeman**, showed the stages of their breeding program, from field visits to lab work implementing marker assisted selection and genomic prediction. Each participant had an opportunity to make crosses from male to female hop plants with pollen, creating hybrid varieties.

Participants described the tour as an absolute blast.

IAREC Experts Join HUGGS

Scientists at IAREC shared their research alongside Heritage University undergraduate students during the Honoring Undergraduate and Graduate Scholars Symposium (HUGGS), March 31, 2023. Held at Heritage University in Toppenish, Wash., the event is part of an ongoing alliance between the two universities that helps graduate students improve their mentoring skills.

“The symposium allows students to present research results and enables WSU to reach out to more Heritage University students, encouraging them to work with us in the summer and beyond,” said IAREC Director **Naidu Rayapati**. “HUGSS also demonstrates the value of WSU’s mutually beneficial partnership with Heritage University.”

Because of its casual atmosphere and relatively small number of participants, the symposium supports undergraduates in building confidence as they ask questions, learn about different fields of research, and interact with graduate students. It also provides a pathway for students from underserved communities to enhance their education, which could lead to more job opportunities.

Interns Explore Research, Careers at IAREC

IAREC continues its partnership with regional Hispanic-Serving and Native American Serving Institutions to support a diverse and adaptable workforce in science and agriculture. With funding from the National Science Foundation and USDA-NIFA under the Hispanic-Serving Institutions Program, summer research interns learned about career pathways in STEM and gained hands-on skills in orchards, vineyards, and laboratories. Three students from Heritage University and six students from Columbia Basin College completed eight- to 12-week summer research internships gaining hands-on skills in orchards, vineyards, and laboratories with USDA and WSU scientists and graduate students. Funded by NSF, one recently graduated Hispanic student from Heritage University completed a one-year post-baccalaureate program and enrolled in a WSU master’s program in horticulture.



Tours Give High School Students Close-up Look at Research

In 2023, IAREC continued its tradition of hosting educational tours for high school students, demonstrating our commitment to community engagement and education. Throughout the year, we welcomed students from local schools. For a tour with our Columbia Basin College partner, 60 students from four local high schools—Richland, Kiona-Benton City, New Horizons, and Chiawana—explored the center, hearing from several programs about their work.

IAREC also hosted 30 students from the local Boys & Girls Club for another insightful tour showcasing agricultural research. Additionally, the Washington State History class from Prosser High School visited to learn about both the history of IAREC and the local and global impacts of our research and extension work. During these visits, faculty and graduate students informed high school students about ongoing research in their own backyard, aiming to inspire careers in agriculture and agricultural research.



Prosser Students Host Holi Celebration

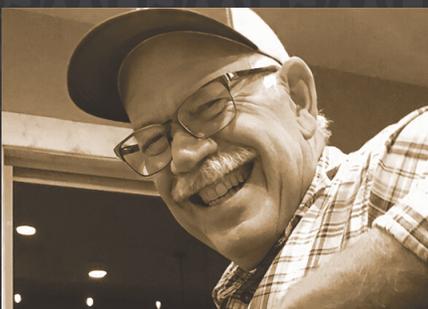
The Prosser Graduate Student Association (PGSA) hosted a celebration of Holi, the Hindu festival of colors, love, and spring, on March 8, 2023.

PGSA officers presented posters on the history and importance of the festival, as well as how it's celebrated today. Participants were invited to eat delicious Indian snacks and sweets, dance to cultural music, and play with vibrant colors.

The Festival of Colors is a vibrant celebration in India that marks the arrival of spring. This exuberant event brings people together, transcending social boundaries. Participants playfully drench each other in colored powders, symbolizing unity, love, and the triumph of good over evil. The air is filled with laughter, music, and camaraderie as communities indulge in festivities. Holi transcends cultural and religious lines, fostering a sense of togetherness. It is a jubilant expression of life's colorful tapestry.

Various cultures around the world celebrate festivals of color, each with its unique customs and significance. In Spain, the La Tomatina festival in Buñol involves throwing tomatoes at each other, creating a spectacular red spectacle. Nepal celebrates Holi much like in India, with vibrant powders and water fights. "Songkran" in Thailand marks the Thai New Year, featuring water fights and colorful processions. Notting Hill Carnival in London incorporates vibrant costumes and lively parades. In the Caribbean, Junkanoo festivals include costumes, music, and dancing. These diverse celebrations globally highlight the universal theme of joy, unity, and the symbolic power of colors in fostering community spirit.

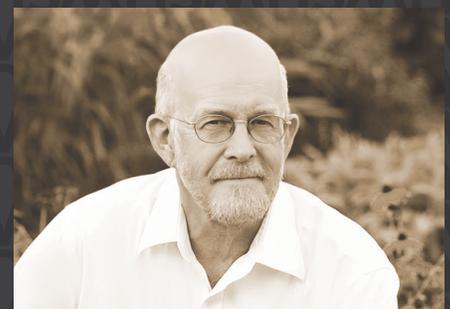
In 2023, IAREC said goodbye to three team members who supported the Center and its mission for decades. Professor Robert "Bob" Stevens passed away on July 4, Larry Helweg on August 17, and Jeff Lunden on October 31.



Bob joined IAREC in 1985 as a faculty member in Crop and Soil Sciences and served as Director from November 2004 to October 2009. He made significant contributions to agricultural communities with valuable insights and practical solutions. Actively involved in his community, Bob served as a church elder, co-founder of the Prosser Scholarship Program, and president of the Prosser Mustang Booster Club.



Larry joined IAREC in 2012 and quickly became known for his remarkable ability to repair almost anything on the farm. Away from IAREC, he enjoyed fishing, regular poker games with friends from the neighborhood, and restoring a 1964 Chevy pickup. Larry was a cherished friend and colleague, brightening everyone's day with his smile and laughter.



Jeff started his 36-year career at IAREC in 1983 as an Agricultural Research Technician, rose to Facilities Manager in 2010, and added in Farm Manager duties in 2013, serving in these roles until his retirement in 2019. Beyond IAREC, Jeff was a dedicated beekeeper and operated his own small farm. He was deeply involved in his church, devoted to his family, and treasured time spent at his property on Lake Quinault.

In Memoriam

Achievements

AWARDS AND MILESTONES

FACULTY Awards

Lav Khot

- Distinguished Alumni Award, Alumni Association of the College of Agricultural Engineering, Mahatma Phule Agricultural University



Michelle Moyer (with Wendy Powers, CAHNRS Dean, right)

- First place, Professional Poster category for “Effect of Rootstock on Scion Nutrient Status” at the 2023 Washington WineVit® Conference at Kennewick
- Auction of Washington Wines: TOAST! Emerging Leader Award
- Second place, Professional Poster, “Rootstocks 101—Ordering and Quality Checks at Delivery, 2023 WineVit® Conf.
- Faculty Excellence in Extension Award, WSU CAHNRS

Claire Murphy

- Feeding Tomorrow Top-Ranked General Graduate Scholarship, Institute of Food Technologists
- Outstanding Ph.D. Student, Virginia Tech College of Agriculture and Life Science
- Virginia Tech Food Science and Technology 2023 Extra Mile Award



Doug Walsh (with Alvin Simmons, left)

- Fellow; Entomological Society of America

STAFF Awards

Michael Clouse

 (right with Dean Powers)

- CAHNRS Administrative Professional Technical Staff Excellence Award

Lynn Mills

- Third Place, WineVit® 2023 Annual Meeting

POSTDOC Awards

Safal Kshetri

- \$50,000 Commercial Gap Fund award, WSU Office of Commercialization

STUDENT Awards

Noah Ault

- First Place, Graduate Student Oral Presentation, Honoring Undergraduate and Graduate Scholars Symposium, Heritage University (HU)

Achyut Paudel

- Outstanding Graduate Student Award, Biological Systems Engineering (BSE)
- Scott and Betty Lukins Graduate Fellowship —Foley Award, Foley Institute for Public Policy and Public Service

Atif Bilal Asad

- Outstanding Graduate Student Award, BSE

Dawood Ahmed

- ASABE Annual International Meeting Presentation Award, American Society of Agricultural and Biological Engineers

Martin Churuvija

- Dissertation Grant, Graduate and Professional Student Association (GPSA)
- Outstanding Graduate Student Award, BSE
- Second Place, WSU BSE Graduate Seminar Presentation
- Second Place, Poster Competition, Honoring Undergraduates and Graduate Scholars Symposium (HUGSS), HU

Priyanka Upadhyaya

- Outstanding Graduate Student Award, BSE
- Third Place, Poster Competition, HUGSS, HU

Ranjan Sapkota

- Outstanding Graduate Student Award, BSE

Mark Jake Schrader

- First Place, 3-minute Thesis, Dept. Level

Basavaraj Amogi

- Walter and Vinnie Hinz Outstanding Graduate Student Award, BSE
- ASABE Presentation Excellence Award
- ASABE Student Oral/Poster Competition Award

Bernadette Gagnier

- First place, WineVit® 2023 Annual Meeting

Pierre Davadant

- Second place, WineVit® 2023 Annual Meeting

Alexa McDaniel

- Third place, WineVit® 2023 Annual Meeting

Stephen Onayemi

- Best Oral Presentation, WineVit® 2023 Annual Meeting



INTERN Awards

Selina Oronia

 (above)

- First place, WineVit® 2023 Annual Meeting

Melissa Manzo

- Second place, WineVit® 2023 Annual Meeting
- Oronia and Manzo Parra served as summer research interns from Columbia Basin College in David James' and Markus Keller's programs, respectively

Length of SERVICE Awards

Sally O'Neal	25 years
Doug Walsh	25 years
Sam Fitch	10 years
Maurisio Garcia	10 years
Jason Mieirs	10 years
Adilakshmi Movva	10 years
Juan Magana.....	5 years
Jamie Meek	5 years
Liz Mieirs	5 years

RETIREMENTS

Steve Fransen, February 16

- 40 Years—Associate Professor, Department of Crop and Soil Sciences.

Lynn Mills, June 30

- 40 Years—Science technician and member of the viticulture and enology team.

Guy Reisenauer, July 3

 (below with Naidu Rayapati, IAREC Director, left)

- 40 Years—IT wizard and electronics support.

Elmer Wilcowski, July 31

- 36 Years—Plant technician for CPCNW.

Ray Baker, August 2

- 37 Years—Agricultural research technologist.

Qin Zhang, September 31

- 15 Years—Professor, Department of Biological Systems Engineering and served as the Director of CPAAS.



These talented people have all influenced the course of IAREC and furthered our successes. We are honored that they chose to spend their careers with us. We will miss their presence and wish them all the best in this next chapter of their lives.



Creating a Modern, Robust Infrastructure

Much of IAREC’s infrastructure—the buildings that house our research labs and equipment—was built in the 1940s, ‘50s, and ‘60s, and is now past its effective lifespan.

“Bandage approaches to keep aged facilities in operation have become costly and unsustainable,” said IAREC Director **Naidu Rayapati**. “It’s time for us to make solutions for the long term.”

Built in 1965, Hamilton Hall (pictured above) is the center of IAREC, housing WSU and allied research into tree fruits, grapes, hops, legumes, potatoes, clean plants, crop pests and diseases, soil health, and a host of other emerging challenges and opportunities. Critical improvements are needed here to serve growing research endeavors for strengthening agricultural and food systems resiliency in Washington state.

Using WSU capital improvement funds, the Hamilton Hall roof was replaced to prevent severe leaks, safeguarding valuable equipment, and improving the workplace environment.

IAREC’s 1950s-era West Building has seen ongoing modernization as it becomes a base for regional tree fruit research, education, and outreach. Upgrades there were completed in 2023 through support from AgWest Farm Credit and funds from WSU’s industry funded Tree Fruit Endowment.

At the West Building, AgWest helped fund the purchase and installation of a new state-of-the-art InVision2 optical cherry sorter (below with Per McCord). The device modernizes cherry breeding and allied research and extension programs benefiting Washington tree fruit.



“This new equipment enables faculty to conduct more accurate and higher-throughput evaluation of cherry varieties for fruit quality attributes in a way that’s well understood by our partners,” said **Per McCord**, associate professor for Stone Fruit Breeding & Genetics. “It also provides new educational and research opportunities for students and interns here at IAREC.”

The center also upgraded labs in Hamilton Hall for newly recruited Weed Science faculty member **Rui Liu**, part of the Department of Crop and Soil Sciences.

JOIN US

Help IAREC improve infrastructure for the future!

You can make a difference in keeping IAREC strong for our second century.

To get involved and make future-oriented infrastructure and research possible at IAREC, donate to:

- **Prosser IAREC Excellence Fund**
Gifts aid excellence in research.
- **H.P. Singleton Fund**
Gifts support infrastructure improvements at IAREC.

CONTACT

Jim Smith, CAHNRS Senior Director of Development
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cahnrs.development@wsu.edu

Thank You to our Supporters

The development of IAREC infrastructure is supported by AgWest Farm Credit and the WSU Tree Fruit Endowment, with additional funding from the Universal Leaf Foundation for agricultural research and education.

