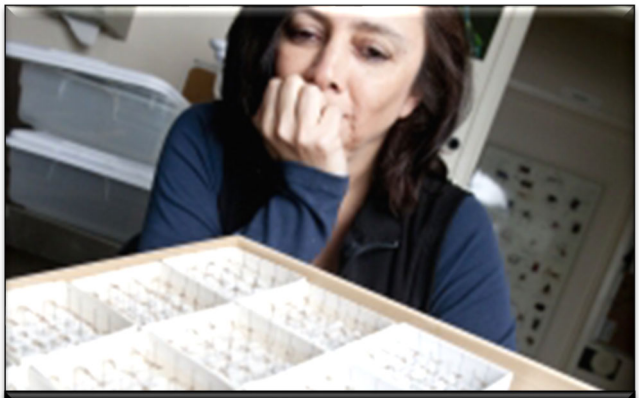
Photo Credit: Peggy Carr

PIVOTAL MOMENTS

A Quarterly Newsletter
For Friends of HAREC

FALL 2021

Hermiston Agricultural Research & Extension Center



Director's Corner

Silvia I. Rondon
Interim Director
Oregon Integrated Pest Management Director
Professor-Entomology Specialist

After record heat this summer, the weather finally is providing a much-needed break to the area. Welcome to Fall 2021. Our HAREC faculty and staff have been busy all summer long with research trials, helping the community, and hosting groups and visitors while providing a safe environment to all under the current situation.

In general, crops matured rapidly with the heat, and some pests were kept at bay by record high temperatures and drought conditions. As of today, all research wheat plots at HAREC have been harvested and crops like potatoes are being harvested. Corn, hemp, alfalfa, and blueberry trials are still ongoing and soon we will be ready for our winter planting. In addition to our crop-focused programs (e.g. Agronomy, Breeding, Molecular Biology, Horticulture, Entomology, Plant Pathology) working at HAREC and with our partners around the region, the Invertebrate Ecology program has been busy with a variety of projects focused on stream health, habitat restoration, and native pollinators.

We started the summer by welcoming several Oregon State University undergraduates and graduate students. All of them brought much-needed positive energy to our programs. We engaged students in our "Lunch and Learn" program, which takes place on the last Friday of

every month. This activity continues yearlong and is a good opportunity for all to learn about each member of HAREC, both personally and professionally. If you are interested in joining us, please let me know.

We also welcomed local students as part of our annual participation with the Hydromania Summer Science Camp Program sponsored by Umatilla Electric Company. We were able to welcome two out of three groups and it was a blast. HAREC students and postdocs led the program this year. It was a great way to connect and provide valuable information to our local students about agriculture.

We were also pleased to welcome back our signature in-person Potato Field Day. It was well-attended and was a good reminder of how much we enjoy having people around, discussing, learning, and enjoying good presentations in great company. We were unable to host other field days in person this year but I hope they will be back next year.

The first week of August, we had the chance to have two pre-doctoral scholars in Hermiston. Jesus Martinez-Gomez and Quincy Clark were invited by the College of Agricultural Sciences at Oregon State University to learn about what we do east of the Cascades and to learn more about all our research and extension activities, not only in Hermiston, but throughout the region. It was a great opportunity to visit colleagues in Union (Darrin Walenta), Pendleton (Francisco Calderon), and Hood River (Steve Castagnoli, Chris Adams and Kelsey Galimba).

We also had a visit from three of our new OSU water specialists for the state: Manuel Garcia-Jaramillo, Abigail Tomasek, and Maria Isabel Zamora.
I am sure we will hear a lot from them in the future. The same week, we had a visit from the College of Agricultural Science, Associate Dean Staci Simonich. Staci has been traveling around the state to get to know all of us and to hear about what we do in each corner of Oregon.

The last week of August, we had the Oregon Potato Commission at HAREC. They hosted their quarterly meeting in Hermiston. This was a great chance for many of us to learn more about the ins and outs of the potato business. The agronomy and potato-breeding program led by Ray Qin and Sagar Sathuvalli, respectively, provided an update about their programs.

At HAREC, we are committed to maintaining the safety of our faculty, staff, and clientele while continuing to deliver services. Beaver Healthy provides up-to-date information regarding the latest safety rules and regulations to keep our programs and activities going. Let's work together!!

Finally, I have been appointed HAREC Interim Director and there will be a full search for a permanent director later this fall. Stay tuned. In the meantime, I am also Director of the Oregon Integrated Pest Management Center and keeping the Irrigated Agricultural Entomology Program going. If you have any questions, comments, or concerns, please contact me. Have a safe end of the summer and beginning of fall!

UPCOMING EVENTS

Oregon State University

Tri-State Potato Variety Selection Tour
October 5th at HAREC

Farm Fair Virtual
December 1st, 2nd, 3rd
8 a.m. - 12 p.m. each day

Invertebrate Ecology Lab

David Wooster & Sandy DeBano
Invertebrate Ecologists

It's been a busy summer of research in the Invertebrate Ecology Lab. We've been working on a variety of projects at numerous eastern Oregon locations: native bees in Blue Mountain forests, exotic crayfish in the John Day Basin, impacts of extreme weather conditions on the lower Umatilla River, and sustainable ag practices in cherry orchards in The Dalles. When not in the field, members of the lab have been occupied with sorting and identifying insects, entering data, and working on sharing our results to stakeholders and the scientific community.

A bumble bee foraging on lupine
Photo by Katie Arstingstall

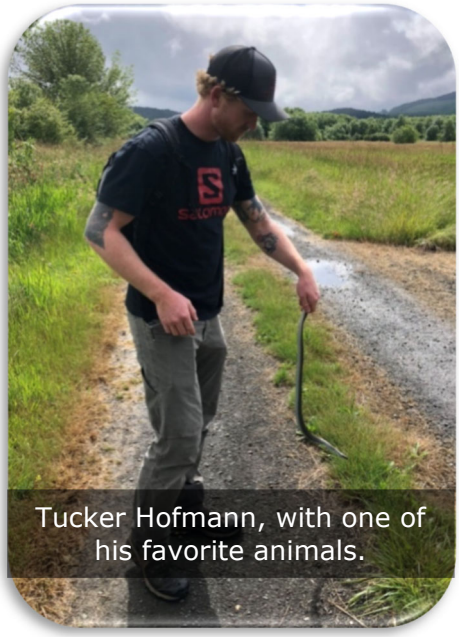
Our newest graduate student, Emma Manuel, made an excellent start on a master's project. Emma is part of HAREC's USDA NNF Fellowship program, which includes six graduate students being brought to HAREC to study issues in agriculture and natural resources.

Emma Manuel, posing with a trusty aquatic net, on the lower Umatilla River

Part of Emma's project focuses on how extreme drought and high temperatures affect stream health of the lower Umatilla River. Emma will be using aquatic invertebrates in the river to quantify changes in stream health.

Katie Arstingstall and Scott Mitchell both published their first papers from their masters' work in the Invertebrate Ecology Lab. Katie (in collaboration with the Plant Pathology Lab at HAREC) used DNA metabarcoding on pollen collected by bees, to see which plants bees rely on.

Scott Mitchell's project focused on understanding the importance of shrubs in riparian areas. It turns out that shrubs are not only important for providing shade that keeps streams cool, but they are also important sources of pollen and nectar for many native bees, especially early in the growing season.

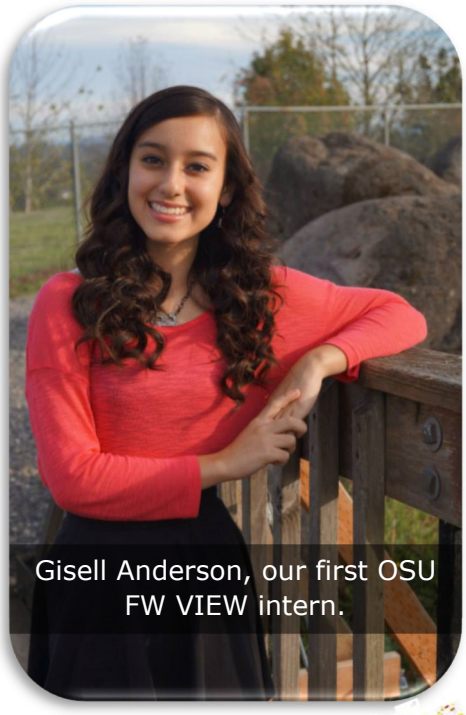


Tucker Hofmann, with one of his favorite animals.

Benjamin Moore measuring flow in the John Day River.

Alex Foley, in Iceland
(not one of our field sites)

All of our work this summer wouldn't have happened without our fabulous undergraduate interns! We thank Benjamin Moore, Tucker Hoffman, Alex Foley, and Gisell Anderson for all of their hard work, whether in the field, lab, or on a computer. Their enthusiasm and dedication were much appreciated, and we wish them all the best as they go back to school this fall!



Gisell Anderson, our first OSU FW VIEW intern.

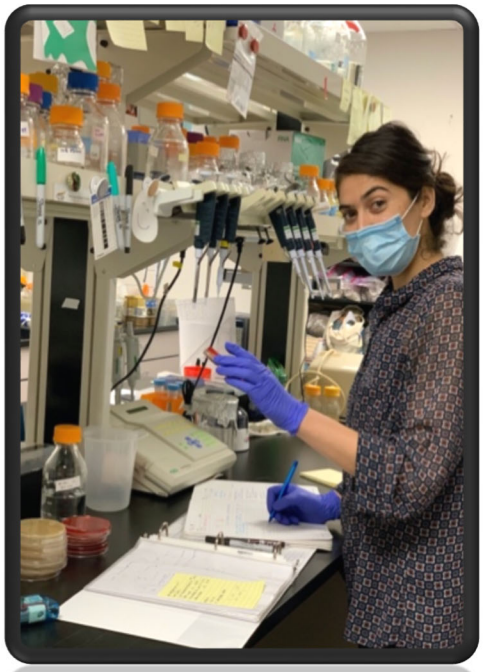
Plant Pathology Training, Change, and Rebuilding

As extension educators, part of what we do is try to support the development of a strong and diverse workforce to support our agricultural systems now and into the future. With students and advisees in my program, my primary goal is to foster their ability to become scientists, regardless of their career aspirations.

That said, over the last year, I've had 2 MS students graduate from my program, Jessie Brazil (Summer 2020) and Kayla Delventhal (Winter 2021). I also had two postdocs from my program move on to greener pastures. Xiaoping Li, spent 3 years in my program at OSU, took a position as a postdoctoral researcher at Virginia Tech in the fall of 2020 working on characterizing the boxwood microbiome and Bryn Evin, spent a year working on our potato soil health project, took a position with Syngenta as a Research & Development Scientist in the spring 2021. Finally, Hannah Rivedal, the most recent plant disease diagnostician at HAREC, started a position in the spring 2021 with the USDA as a Research Plant Pathologist in the Forage Seed and Cereal Research unit in Corvallis, OR. While it is challenging to lose such a large group of talented researchers, it is also very satisfying to see members of my program advance in their careers as (agricultural) scientists. I wish them all well in their new endeavors.

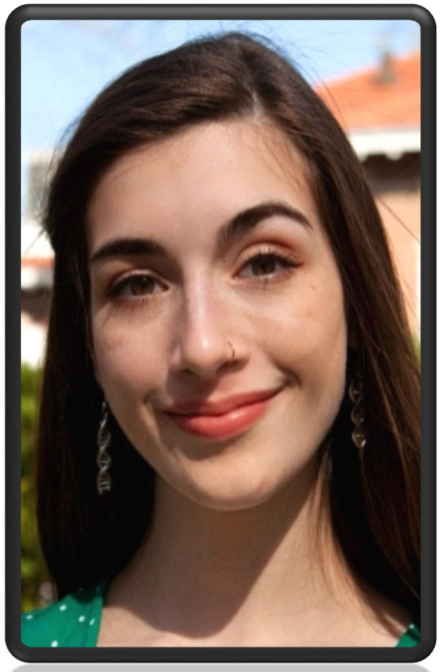
A couple of core members of the plant pathology program remain, Victoria Skillman and Cassandra Funke, and they have done a tremendous job handling the research and plant disease diagnostic responsibilities of the plant pathology laboratory through all of the personnel changes. There will be a bit of rebuilding and retooling happening in the next few months and a few new faces that will be joining my program include; Shaista Karim, Daniella Echeverria, and Abby Moore.

I look forward to working with these new faces and hope we can continue to serve your needs moving into the future.



Shaista Karim (PhD Colorado State University). Shaista will join my program as a postdoc working on our USDA SCRI Potato Soil Health Project https://potatosoilhealth.cfans.umn.edu/ and will likely play a role in several other related projects we have going on.

Daniella Echeverria (BS University of Wisconsin - Madison), who will join my program as a PhD Student and be funded by a USDA SCRI project Tuber Necrotic Virus Project. Daniella plans to work on the epidemiology and ecology of powdery scab disease.



Abby Moore (BS Ohio University), who will be a MS Student co-advised with Sagar Sathuvalli and is an USDA NIFA National Needs Fellow. Abby will be working on the genetics of the powdery scab pathogen as part of our Tuber Necrotic Viruses Project.

Plant Biology
Goyer Lab
Aymeric Goyer
Plant Biologist,
Associate Professor Senior Research

Summer is always an exciting time in the lab because crops are in full display and we get to welcome summer students who come to receive training in various aspects of research. Mentoring is one of my favorite parts of the job. It also is the low season to write grant proposals so I get to spend less time in the office and more time doing what I love the most: pipetting in the lab, taking care of plants in the greenhouse and getting my boots dirty in the field. Below are two stories from members in my lab. Enjoy, and have a great fall season!

Understanding how potato fights diseases: Research highlights

By Carol Bvindi (Postdoctoral Scholar)

Summer 2021 crew: *(From left to right)*
Maria Tejeda, Carol Bvindi, Kirsten Jones and Aymeric Goyer

In the Goyer Lab, my research focuses on finding ways to make potato better resist potato virus Y (PVY). PVY is a problem for the potato industry because it decreases yield and quality. PVY-infected plants are not always easy to identify in the field because infected plants do not always show symptoms, depending on the potato variety and the PVY strain. Therefore, seed growers may carry over infected tubers in the following years. I use molecular tools to study function of potato genes and proteins that may be helpful to fight PVY. I do this in the lab, greenhouse, and field. In the lab, I have been making plants that do not produce or on the contrary overproduce some of the genes. By artificially changing how much of the gene the plants produce and then testing the behavior of these plants in response to PVY infection, I can better understand what these genes do. The second step in the process is done in the greenhouse where I look at changes in

symptoms development in leaves and tubers and whether the virus is able or not to spread throughout the plant. If it is not, then Eureka!

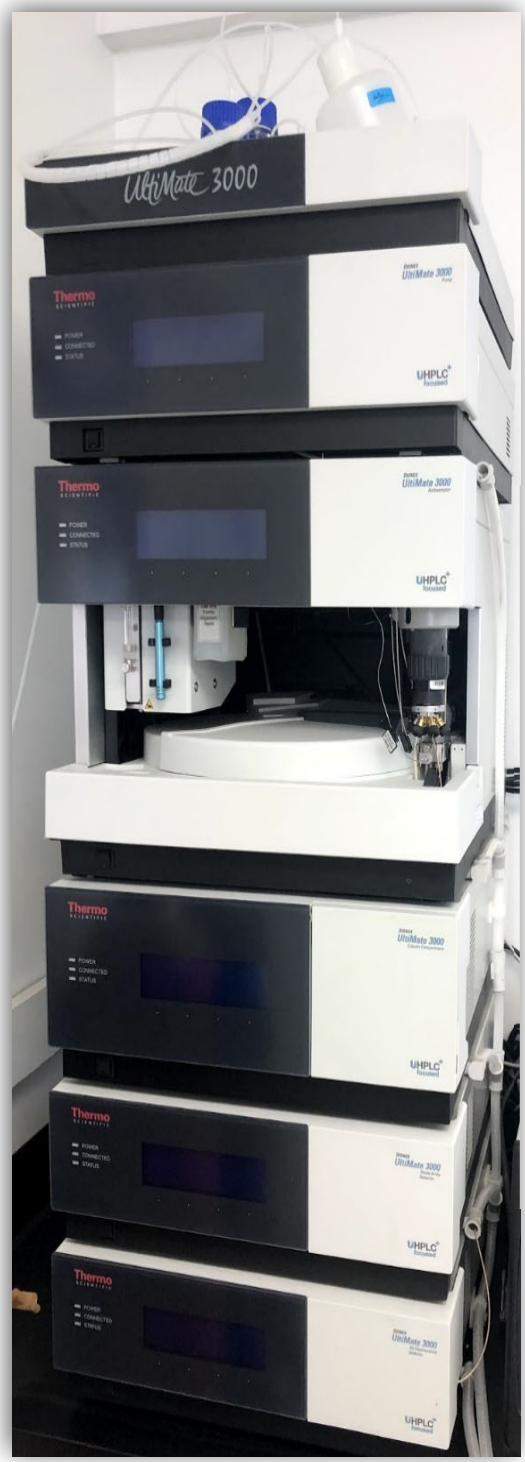
In the field, I have been taking a different approach to the PVY problem by testing whether spraying a short peptide to potato leaves can trigger symptoms in potato plants that are asymptomatic even when fully infected with PVY. If it works according to our hypothesis, it could provide a practical way to identify and rogue out PVY-infected plants. It has been a busy but exciting summer in our lab.

HPLC for you and for me

By Kirsten Jones (OSU Senior Student)

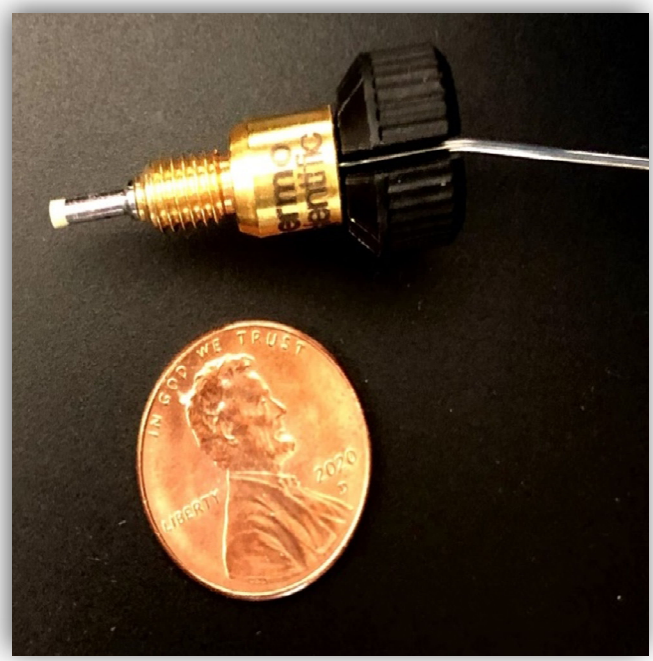
Hello! My name is Kirsten Jones and I am a senior student at Oregon State University. This summer I did an internship at HAREC in the Goyer lab. My research project was on metabolite analysis of potato tubers. The research question was to determine if potassium fertilization has an effect on the biochemical potential of blackspot bruising in potato tubers. In order to do this, I used high pressure liquid chromatography (HPLC) to quantify select compounds that may contribute to blackspot bruising.

HPLC is a modern practice that requires state of the art technology. HPLC uses the foundational concept of chromatography where a mixture is run through a media that will separate the chemical compounds of the mixture based on their varying levels of chemical attraction to the media. An instance of chromatography you may have witnessed before is black ink bleeding on wet paper and separating into different colors. HPLC elevates this concept by operating in a liquid phase and applying high pressure to allow for the analyses of very small particles. The liquid form is critical because it allows for the high pressure to be applied for the shockingly small scale of analyzation.



High Pressure Liquid Chromatography system

The liquid phase that contains the test material will be run through a tube and into a column for analysis. In HPLC the column is the media (like the paper is in the earlier example), and in this case is made of a carbon chain linked to a silica base. For perspective the internal diameter of the tubing in which the liquid runs through is less than a millimeter wide! For this experiment HPLC was used for plant metabolite analysis but its application can be useful in a variety of different fields. The pharmaceutical industry uses this technique to assess medicine for aspects like ingredient composition and shelf life.



High Pressure Liquid Chromatography tubing with insert for column shown in reference to a penny for scale.

HPLC is also used for practices of water quality analysis and such. Overall HPLC is a versatile tool for chemical and biochemical analysis that is made possible with the advantages of modern-day technology.

Post docs, Students, and Interns 2021

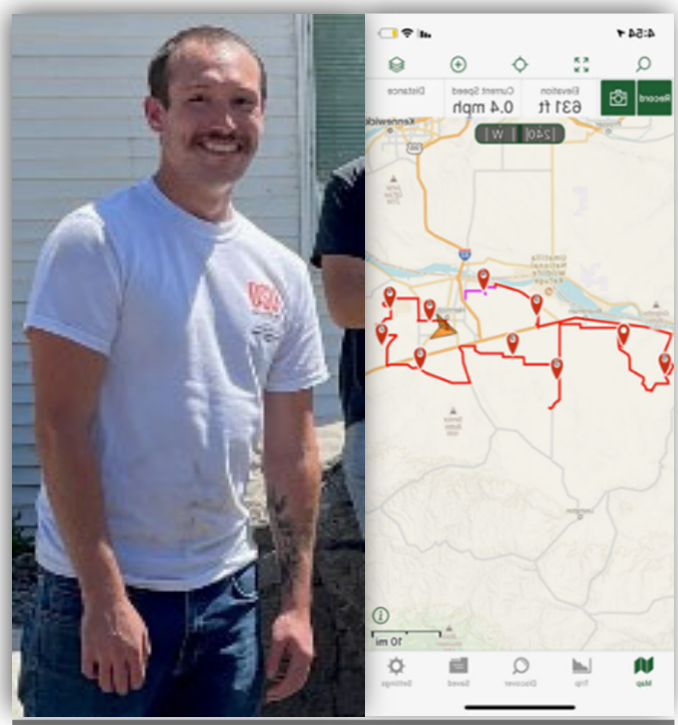
As we are wrapping up our summer, below are some unedited comments from our students. We are happy to report that overall they had a great experience. We are looking forward to having them back next Spring. We wish them all a successful and safe school year in Corvallis.

Lian Moy, Intern, Agronomy Program

"I worked with the Agronomy program and had a great summer at HAREC! My team was fun to work with and I am glad to have met and worked with them. We had so many projects this summer, including studies on alfalfa, spring and winter wheat, adzuki beans, and four different potato trials. It kept our hands busy every day, working on something different! I also got to help out the Potato Breeding and Entomology programs with harvesting and/or sorting potatoes (which was honestly one of the more fun jobs I ever had). The most impressive thing about HAREC is its diversity. There are so many different people, different cultures, from all over the world; it's the most diverse workplace I've been. I'm so glad to have gotten this opportunity to meet everybody at the HAREC and learn more about agriculture". Lian Moy, Intern, Agronomy Program.


Andrea, Kirsten, and Alex, HAREC students on a weekend hike at Angels Rest

"Performing agricultural research at HAREC provides one with ample opportunities to cultivate resilience. This year in particularly the rigorously precise and technical operations normally expected of students were coupled with unprecedented heatwaves, prolonged wildfire smoke, and an ongoing pandemic. By comparison, no working experience I have had to-date has been more difficult to achieve and more gratifying once successfully accomplished. These taxing working conditions are thankfully offset by the strong sense of community among faculty and students alike, and by the intrinsic motivation to perform high-quality research in the hopes that it will lead to real-world improvements to local and global agricultural systems. Between a healthy work culture and the unparalleled natural beauty of the Columbia Basin, summers at HAREC are an experience I will gladly carry with me for the rest of my life". Alexander Gregory, Master candidate, Horticulture Program.



Alexander Butcher learning to run trap routes

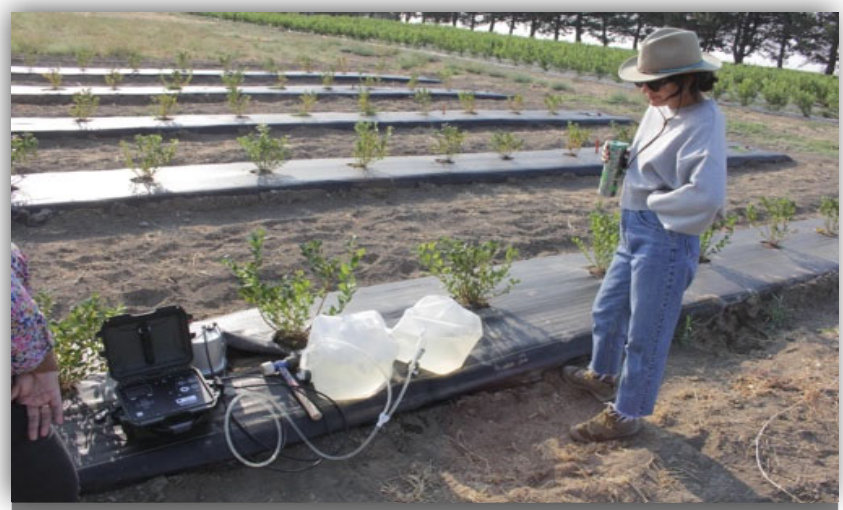
"This summer at HAREC I was able to complete a biocontrol study on the generalist predator, big eye bug, and its seasonal feeding preferences. I learned a lot about trapping and monitoring insects and was able to get involved with the entomology potato trap route for a few weeks. The trap route really helped me get to know the area and get a better feel for the spatial distribution of crops in the Lower Columbia Basin. My first summer at HAREC was a great experience and I am really looking forward to coming back next summer with the experience and skills, I was able to gain". Alexander Butcher, Master candidate, Irrigated Agricultural Entomology Program.

"I have been working as a postdoc at HAREC since January 2021, and it has been a great learning experience and opportunity for me. I really like the diversity of ongoing research at the station to address challenges faced by growers in this region. This summer was very busy but extremely rewarding as we learnt and accomplished many projects. It feels good to see our blueberries growing! One thing that I really liked about being here this summer is that everyone is super helpful and willing to lend a hand to work as a team. Honestly, I, as an individual and as part of a group, never was stuck during my work, as someone was always available to help. It has been a great opportunity for me to be a part of this amazing group of people. I am grateful for all the help and support during summer 2021". Shikha Singh, Postdoctoral Scholar, Horticulture Program.

Shikha Singh Postdoctoral Scholar Horticulture Program

Tiziana Oppedisano Postdoctoral Scholar Irrigated Agricultural Entomology Program

"Harvesting and wrapping up the last field season reminds me that we are spending the last weeks of summer 2021! I have mixed feelings during this time of the year since I am happy to take a "break" after long days of hard work in the field and I am sad because our students (our force and joy!) are moving back to the main campus, and we will have to wait until next April to be all together. This year has been my third summer at HAREC, and I have so much to be thankful for. In these three years, I have experienced guidance from three directors, worked with insect pest management in four different crops, survived a pandemic, said goodbye to friends and welcomed others. "Keep growing HAREC" would be my motto. I am genuinely glad about how summer 2021 went… a big sense of relieve after 2020. Thanks to the COVID-19 vaccine availability and the policies OSU adopted, we were able to conduct our research and still get the chance to get to know each other and spend good time in in-person meetings. My main project this year focuses on hemp. During the summer, I was able to conduct fieldwork evaluating corn earworm pressure. This project is still ongoing and I am very excited about it and can't wait to share my results with the scientific and local community". Tiziana Oppedisano, Postdoctoral Scholar, Irrigated Agricultural Entomology Program.



Andrea Retano Master Candidate Horticulture Program

"My introduction to graduate school has been cemented by my summer experience at the HAREC. I arrived at the station in June 2021. I was immediately greeted by friendly faces from faculty, staff, and other graduate students—and knew that I would be working alongside some kind and knowledgeable folks. While I was not sure what to expect, any reservations I had about this summer quickly were put at ease upon meeting everyone. While I'm proud about my fieldwork experience, I have been humbled many times by the summer projects. From taking the entirety of an eight-hour day to replace a John Deere seat on a gator—to building and implementing an irrigation system for one of the hemp field studies—I have come a long way and have only grown more confident in my skills and abilities. This summer has been both difficult and rewarding. The transition from

graduating undergrad at the beginning of the pandemic, taking a year off to work, and then returning to school—very much still in the pandemic—has been incredibly exhausting. If it were not for the guidance, mentorship, and support from those around me, I am hesitant to say that my transition into the next 2-3 years would not have been as positive as it was. I am optimistic about the future of myself and my peers at HAREC". Andrea Retano, Master Candidate, Horticulture Program.

Mission Statement

To advance scientific knowledge in agriculture, natural resources and biofortified crops, and support and educate our diverse local clientele and community in the areas of irrigated agriculture, plant breeding, natural resources, human health and youth development.

Pivotal Moments A Quarterly Publication
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