III. Program Summary Narrative

Introduction

I am a 1.0 FTE Assistant Advisor Step V, seeking a Promotion to Associate Step II. I cover Madera and Merced counties, with responsibilities to cover all tree crops aside from citrus in Madera county, as well as stone fruit and figs in Merced, with either research and/or extension. I focus my attention on almonds, pistachios, and figs. I cover almost 66% of the planted acres in Madera county. Fourty-five percent (168,000 acres) of the planted acreage in Madera County is devoted to almonds, and about 16% (almost 59,000 acres) is planted to pistachios. While figs are a small crop (6,500 acres) compared to almonds and pistachios, over 75% of statewide acreage is in Madera County. As a result, I am the only advisor working toward addressing the fig industry's needs, and this allows me establish fig production as a niche area of expertise. I cover less than 1% of the planted acreage in Merced County and as a result, mostly fulfil my duties there through farm calls.

During my time here, I have successfully been working on building a reputation with my clientele. My clientele are returning to me for help after initial farm calls. This is important to new advisors, as we need to build ourselves up as a local resource and getting call backs is a sign of trust and being valued. I've heard feedback from some of my clientele, letting me know that my advice worked, and I have also been hearing from new clientele who heard about me from others. This support is essential as it has helped me locate research sites and maintains local support for Cooperative Extension. I have even had growers and consultants outside the area I work in reach out to me for help with plant nutrition (an area of expertise), typically following a talk I've given or an article I've written.

Based on the needs assessment I conducted in my first year; issues that surface during farm calls, workgroups, and industry-hosted meetings; and my own personal values, I have been developing a program that will address several UCANR public values: promoting economic prosperity, developing a qualified workforce, protecting California's natural resources, as well as safeguarding abundant and healthy food. To do this, I have developed three broad themes: Agricultural Productivity and Sustainability, Pest Management, and Developing online, on-demand extension.

Theme #1: Agricultural Productivity and Sustainability

Background, Clientele, Goals, Inputs

***Background and goals*:** Nut crops are a growing part of the California agricultural landscape, and have been replacing other crops as well as expanding into previously unplanted areas, particularly in land that was thought to be too marginal for irrigated agriculture. These lands have issues, and failing to adapt management strategies to these sites risks wasting water, overapplying nitrogen, and reducing yield. This affects a grower's bottom line, and can result in

degraded natural resources. Nitrogen that leaves agricultural systems degrades surface water and can cause human health issues if it is in drinking water. Additionally, many costs of production are increasing and climate change is already beginning to cause issues for pistachios, narrowing profit margins and making it harder to make a living at farming. In contrast, the fig industry has shrunk severely over the last two decades due to competition with Turkey, which has lower costs of production, as well as changing consumer tastes. The fig industry needs research-backed methods for improving management. In order to further economic prosperity and protect California's natural resources, I have developed three goals:

1) Develop management strategies for orchards in marginal conditions (poor soil, poor weather conditions, etc.)
2) Reduce the environmental impacts of agriculture
3) Improve productivity via reduced costs or higher yields

Clientele: Primarily growers, secondarily pest control advisers and crop consultants

Inputs: I am addressing my goals in this theme through extension efforts and research. I have organized or co-organized seven meetings/short courses and given twenty-six talks that fit within this theme, many of which are in an area of expertise: nutrient management. I have also gone on over 170 farm calls (many of these also fall under pest management) and answered numerous phone calls and emails. I have also written or co-written 12 popular press articles. I am involved with ten research projects within this theme, two of which I am/was the principle investigator, three where I am the Co-Principle investigator, and the remaining ones I am a collaborator on. I discuss projects that currently require significant effort on my part. The ones not discussed are projects that I have become less involved with as I build my own research program, or that require little time and effort on my part at this time.

Outcomes and impacts*:* Most of the positive outcomes and impacts I have made have been in extension, as my research projects are either all extremely long term, or first steps along a much longer path. Evaluations for the three short courses and the 2021 statewide pistachio day are positive. I also gave a talk on interpreting lab reports for a continuing education webinar series and received feedback: 72% of respondents agreed or strongly agreed that they gained new knowledge from my talk and 76% thought that the talk was worth their time.

Effect of salinity, boron, and soil oxygen on pistachio performance; Principle Investigator (Goals 1 and 3)

<u>Importance and project goals:</u> Pistachio trees are known to be tolerant to salinity and high levels of boron and are increasingly being planted on marginal land with access to water that is naturally high in these ions. These conditions are typically accompanied by poor soil structure caused by high levels of sodium, which can be linked to poor water infiltration rates, saturated soils, and low soil oxygen which are additional plant stressors. Grower tendencies to overirrigate can exacerbate these issues. This reduces economic outcomes and wastes limited water supplies. I initiated this project to increase our understanding of pistachio physiology

when growing in these stressful conditions and designed the trial, wrote the grants, and manage day-to-day tasks. My collaborators and I will examine the interaction of these stressors in a controlled environment so we can observe plant responses independently, and more critically, in combination with one another. We will be implementing the actual trial in 2022, work up to this point has been to establish the plot.

Outcomes and impacts: This is the first step toward optimizing pistachio production in marginal, sodium-affected lands. If we find that low soil oxygen negatively impacts pistachio performance, this may provide incentives for growers to invest in better irrigation management practices. Future work would be to develop management guidelines in high salinity conditions that preserve below-ground tree health.

Field Evaluation of Almond Varieties; Co-Principle Investigator (Goal 3)

Importance and project goals: All agricultural industries remain relevant by continuing to adopt new genotypes to respond to new pests and diseases or to introduce valued production traits. These varieties should be evaluated on a commercial scale to identify issues before release or to give the industry a first look before planting. There are three sites across the valley; I manage and collect data from the southern-most one and have taken on Co-PI responsibilities. Many of these brand-new varieties are partially or fully self-compatible, which would eliminate the need for multiple varieties in a field. Adoption of these varieties would allow growers to simplify pesticide and harvest activities and could reduce production costs in some areas, increasing profitability.

Outcomes and impacts: A long-term outcome would be to identify a variety from a public breeding program that is fully suitable for commercial release. In order to fully evaluate new varieties, the trees' entire production cycle needs to be examined, which in almonds is 20 to 25 years. This trial will be entering its ninth year in 2022, so we can only give early impressions of varieties, however some have already been found to have severe flaws and we will no longer be following them. Anticipated impacts from this trial are that the top planted varieties that have desired qualities such as high yield and low disease susceptibility will be adopted, allowing the industry to remain profitable and avoid unnecessary pesticide applications by identifying a problematic variety before it is widely planted. One self-compatible variety we are evaluating has been released by the breeder, and there is a lot of industry interest in it based on extension outputs I have co-created, particularly a written article that has shared this variety's yields.

Field Evaluation of New and Underused Fig Cultivars; Principle Investigator (Goal 3)

Importance and project goals: This trial looked at twelve cultivars that are not currently used in the California industry but are being stored in the USDA National Germplasm Repository, the goal being to identify a variety that was suitable for both fresh and dried production. It was planted before I joined UCANR, and I assumed PI status due to the relative importance of my role to the fig industry. I managed the last three years of the trial. This trial was wrapped up in the spring of 2019, and I presented the results at the 2019 ISHS Fig Symposium in Croatia.

Outcomes and impacts: Unfortunately, there were no positive outcomes or impacts from this trial. While there were a few varieties that I felt warranted more research, the fig industry has an extremely limited pool of resources and decided that their research dollars would be better spent in other areas. However, I was able to learn from this experience – the industry was not given the opportunity to provide input on what sort of varieties were included, which likely contributed to the research board's decision to redirect funding elsewhere.

Nitrogen Management in Pistachios; Co-Principle Investigator (Goals 2, 3)

Importance and project goals: Pistachios are an increasingly important orchard crop in the Central Valley, however little is known about the nitrogen uptake dynamics in this crop, particularly in newer cultivars. Understanding when nitrogen should not be applied, and when uptake rates are high or low will increase nitrogen use efficiency and reduce nitrogen losses from farmlands. Work began in 2021 and will continue for two more years. As a Co-PI, I found several of our research locations and help with in-field data collection.

Outcomes and impacts: By developing nitrogen uptake timelines, we can develop fertilization guidelines that maximize application efficiency as well as prevent the leaching of nitrogen, which will save growers money and protect natural resources. Similar guidelines have been developed for walnuts and almonds and are widely used, and I anticipate that through diverse and persistent extension efforts, the same will be done with these research results.

Cracking the Black-box of dormancy in Pistachios: Tracking biochemical changes in inflorescence buds from dormancy to bud break; Co-Principle Investigator (Goal 3)

Importance and project goals: Many fruit and nut trees require a period of "rest" during the winter; some, such as pistachios, require a long dormancy period. Climate models are predicting that warmer winters will reduce the amount of rest pistachios may get, which in turn reduces yield or in extreme cases, impacts tree health. However, dormancy in deciduous trees is still very poorly understood, limiting our ability to tackle this issue. This project is aiming to try to find biochemical indicators of dormancy and dormancy progression. We are also trying to fine-tune the timing of "rest-breaking agents," which can push a tree out of dormancy early. These agents will not save the pistachio industry in the face of the most extreme climate change predictions, but they could provide a band-aid for the industry to rely on while researchers develop better long-term solutions. As Co-PI of this project, I helped find two research sites, gave input on experimental design, and help with in-field data collection.

Outcomes and impacts: We are still processing the last year of samples. It seems as though rest breaking agents work in some cases and may improve bloom overlap between male and female trees in pistachio orchards, which can be an issue after marginal winters. We will begin extending results to the industry. I anticipate that growers will be able to better manage orchards in years with borderline chill, increasing economic profitability.

Theme #2: Pest Management

Background, Clientele, Goals, Inputs

The agriculture industry is facing pressure from both the public and state regulators to reduce pesticide applications. Despite these pressures, pesticides are a useful tool that should be used in conjunction with other methods of controlling pests, a practice that is called Integrated Pest Management (IPM). Unfortunately, IPM approaches are not available for all pests. Even when diverse IPM practices are available, such as to control navel orangeworm (NOW) in almonds and pistachios, the industry may still not implement all available tools.

Figs in particular are struggling with a lack of IPM tools; this crop is extremely vulnerable to insect damage and growers routinely have insect damage levels that would be unacceptable in almonds and pistachios, reducing economic prosperity.

In my first few years I mostly worked on extension of already existing work, however a better understanding of these issues has led me to step into a more active role in this area. As I am not an entomologist, pathologist, or weed scientist by training, I am working on building teams that can help me meet industry needs. In some areas, such as weed science, this has been in a collaborative role where my primary goal is to increase my competency. In other areas, such as entomology, I am working toward developing IPM tools and understanding the barriers that are preventing the industry from adopting them to work toward protecting California's natural resources and ensuring food is safe to consume.

My goals in this theme are:

4) Increase the adoption of diverse IPM strategies to manage NOW
5) Develop IPM tools for managing fig pests
6) Work towards developing competency in weed management

Clientele: Pest control advisers, growers

Inputs: I have organized four pest management-specific meetings, given 18 talks (14 of which are invited) and written or co-written 9 pest-management specific articles. I am involved with or have concluded six projects, two of which I am/was the principle investigator, three where I am a Co-Principle investigator, and the remaining ones I am a collaborator. Each area of effort is discussed in more detail below, including specific goals we home to address.

Outcomes and impacts: My projects are all first steps to achieve my long-term condition change goals, as such my hoped-for outcomes and impacts are project specific and are discussed in the context of my work.

Insect pest control in figs (several research projects); Co-Principle Investigator (Goals 3 and 5)

<u>Importance and goals</u>: Early in this long-term collaboration, an entomology specialist and I conducted a damage survey and discovered that NOW is now the most significant insect pest in figs. This is because other crops that NOW attacks, almonds and pistachios, have increased in

acreage. Despite this, there are no research-backed tools for managing NOW in figs, including basic IPM tools such as monitoring tools and effective spray timings. Our work is unfortunately stymied by a lack of funding; our attempts to obtain CDFA and DPR funding to address this industry's needs were turned down, likely due to the small size of this crop. We are continuing with more limited support from the fig board; work can continue, albeit much more slowly. As Co-PI in this long-term endeavor, I give input on experimental design, locate field sites, collect all the field data, help with writing the reports and with extension.

Outcomes and impacts: We are still working on laying the foundations to developing effective pest management guidelines; currently we are establishing whether NOW traps correlate with insect damage in fruits. Anticipated outcomes are better spray timings that impact the industry by reducing insect damage and increase profitability.

Navel Orangeworm Management Survey; Principle Investigator (Goals 2, 3, and 4)

Importance and goals: Navel Orangeworm (NOW) is the most significant insect pest for almonds and pistachios and is a pest of concern in walnuts. Not only does it cause direct damage, but feeding is positively correlated with aflatoxin, a human carcinogen, thus damage negatively impacts a grower's bottom line and threatens food safety. I decided to conduct this survey based on a plea from the manager of the California Pistachio Research Board – the pistachio industry has been dealing with aflatoxin issues and there was little understanding as to what growers were actually doing to control NOW. I decided to conduct a survey to answer this question as I am extremely interested in reducing the environmental impact from agriculture. Additionally, at the time I had been thinking about how to increase my efficacy at extension, and I saw this as an opportunity to see whether UC's efforts had made a difference as well as find better ways to sell IPM practices to growers and consultants. I am incredibly glad that I took this project on a whim as it has been valuable to other UC personnel, the industry, and gave me much better insight as to barriers to adopting BMPs and will make me more effective at my job in the long term.

Outcomes and impacts: My Co-PIs and I had been expecting that pesticides would be the most commonly used control method and that costs would be the most important barrier to the foundational NOW IPM tool: sanitation (removing and destroying remnant nuts to kill overwintering larvae). Contrary to our expectations, we found that the industry already knows how important sanitation is and that barriers to adoption have to do with being unable to get equipment in orchards if soils are too wet. Increased extension efforts will not solve this issue: it requires research. As I do not have the skillset to address this, one outcome from this trial is that I reached out to an agricultural engineer who is interested in this topic. We are seeking funding to look at redeveloping equipment to address these issues. If we are funded, this could increase the adoption environmentally friendly NOW control methods. One short-term outcome is that the Almond Board of California is also using information from the survey to increase the use of another environmentally friendly NOW control method: mating disruption.

I also shared results from this at the 2020 ASHS conference and am working on getting a paper submitted to a refereed journal.

Field-Scale Evaluation of Anaerobic Soil Disinfestation; Collaborator (Goal 2, 3, 5)

Importance and project goals: Prunus Replant Disease (PRD) is caused by a complex of soilborne pathogens that affects *Prunus* orchards following another *Prunus* orchard. The most effective way to disinfest soils and prevent PRD is soil fumigation, however restrictions are being tightened due to its negative impacts on human health and the environment. There is concern in the industry that fumigation may no longer be permissible in the future, leaving few options for replant situations. Anaerobic Soil Disinfestation (ASD) is a non-chemical way to disinfest soils. It has been found in small scale trials to mostly be comparable to fumigation, albeit more expensive, which could limit its adoption. I am a collaborator on this USDA project, looking at its feasibility on a field scale across several sites and years. I have located a field site, given input on some of the experimental design, help collect field data, and extend the results.

An additional component that we added was looking at tree nutrition; ASD can add a heavy load of nutrients to soils, which we think may contribute to ASD's efficacy. If growers can fertilize to reduce PRD severity, it may be another non-pesticide way to avoid PRD.

Outcomes and Impacts: While work has not concluded on this project, it does work on a large scale, and a less costly way to implement ASD does seem to be effective, though it is still as costly as fumigation. I have begun to extend some early results and the industry does seem to be interested, as most recognize that soil fumigants have a limited future. If fumigant registrations are revoked, ASD could allow growers to continue to successfully replant *Prunus* orchards. There is a possible, more immediate impact: fumigation is not organically acceptable, and many organic orchards are either established conventionally, then converted to organic. Orchards that are established organically struggle and often lag behind conventional ones, and this could be a useful tool for organic growers.

Weed Management (several research projects); Collaborator (Goals 6 and 7)

Importance and goals: Weed management is the most expensive input in both conventional and organic orchards, yet UC's footprint in this area of expertise has been severely diminished. This not only leaves the agriculture industry less able to adapt to incoming pressures, but also cedes the ground to the industry. My current goals are modest, which is to become competent enough at weed science to answer extension questions. The best way is to learn by doing, and I am collaborating with a weed specialist on a few projects to increase my knowledge in this area. These projects are a crop safety trial in figs to get a preemergent herbicide registered for figs, and a project to best determine how to control a difficult to control weed, alkaliweed.

Outcomes and impacts: Current outcomes are personal, and I have successfully been slowly increasing my knowledge in weed science enough to the point where I've been able to answer some questions on farm calls and give a few talks on the subject. The projects I am

collaborating on will be of interest to the industry, and possible positive outcomes are improved control of alkaliweed, eliminating this competitor in pistachio orchards. Registration of pendimethalin may be moving forward, giving the fig industry another tool in the pest management toolbox.

Theme #3: Online, on-demand extension

Background, Clientele, Goals, Inputs

I am extremely interested in working to develop a qualified workforce through online, on-demand extension. Additionally, maintaining an up to date online presence is critical to being relevant in the 21st century: I believe that having a well branded online presence will increase the visibility of UCANR. To that end, I have developed a podcast with Luke Milliron, called Growing the Valley (www.growingthevalleypodcast.com). I took the lead on learning how to create, host, and distribute episodes, and I designed and maintain the website. Currently I have created or co-created 97 episodes, detailed in my bibliography. Episodes can be on single issues, or part of larger series covering important topics ranging from nitrogen management in the major orchard crops, to the impacts of climate change on agriculture. Since the majority of our podcast episodes are my cohost and I interviewing other experts, it also highlights the expertise and amplifies the work of other advisors, specialists, and faculty in the UC system. Because of this, Luke and I have been asked by faculty and specialists to help with the extension component of grants because of the podcast.

Additionally, contributing to a group newsletter led me to create a new website, San Joaquin Valley Tree and Vines, (www.sjvtandv.com) to be a blog, central location for meeting announcements, and a repository for all popular press articles written by orchard San Joaquin Valley (SJV) advisors, modeling what was already done in the Sacramento Valley. I also invited vineyard advisors to join, as many orchard growers in the SJV also manage vineyards.

To promote my podcast, the SJV website, as well as contribute to UCANR's "public face," I also maintain two twitter accounts, my program's account as well as one devoted to promoting the SJV website and all articles that are posted there.

Clientele: Growers, consultants, other allied industry personnel, researchers, and students

Outcomes and impacts: The podcast is well-received by clientele. In our first full year (October 2018 to September, 2019) we had 2120 unique visitors and 2833 page visits to the Growing the Valley website. In the last year of my evaluation period, October 2020 – September 2021, we have had more than 5,900 page visits, 4,300 unique visitors, and 10,000 page views, and many of these visits are from international listeners. Since podcasts are primarily accessed via apps on smartphones, we also began tracking downloads though a service called Podtrac, where we have a rolling average of 5,700 downloads (this includes recently posted episodes as well as downloads of older episodes) over a 90 day period. Accounting for listenership is notoriously difficult in podcasting, as visits and downloads do not necessarily equate to consumption,

however by all metrics we are still growing. To add to this, I have been told by a faculty member at UC Davis that they use some of our episodes as a teaching tool, and I've encountered students at CSU Fresno who independently found the podcast and listen to it. I have had multiple clientele approach me at meetings or mention to me on farm calls that they love the podcast – it allows them to consume information while driving (something everyone in the agricultural industry does a lot of) and that it's easy to listen to and learn from.

We also submitted our nitrogen and irrigation podcast episodes to be used as way for growers to get continuing education credits for certification and licensing required by the state. The podcast allows growers to get these continuing education credits when it is convenient for them. The licensing agency (CDFA) allowed us to collect evaluation data on whether listeners learned from the episodes, using a scale of 1 to 5 (1 being no knowledge, 5 being complete understanding). Out of five units we submitted related to irrigation management, we measured an increase in knowledge to be between 0.5 and 0.75 points (There were between 63 and 115 responses for each unit evaluation), and many respondents reported they would be implementing things they learned from an episode.

The number of visitors to the SJV website has also been growing, with 5,500 visits and 4,300 unique visitors from October 1, 2019 through September 30, 2020. In the following year, we had 11,000 website visits and 8,500 unique visitors.

University & Public Service

I've had the privilege to serve on a hiring committee for two advisors, and served as a workgroup chair for prunes, almonds, and pistachio (one-year terms each). I've also accepted the secretary role for the Academic Assembly Council. I've moderated at four short courses and several other UC Cooperative Extension events, as well as at a national research conference. I am actively serving on the Outstanding Extension Educator committee for the American Society for Horticultural Science. I have also taken on farm calls, emails, and phone calls for pistachio and almond growers in Merced County, as that position has not been filled since the previous advisor left in 2018.

I've also been active in the public service realm, where I've given guest lectures for general education classes at two local colleges: Merced College, where I give a lecture two times a year on soils and plant nutrition, and two at Fresno State; one talk where I focused on the plant physiological aspects of plant nutrition, and another on successes and failures in agricultural research and extension. I've also been able to participate in a Tulare County event aimed at getting young girls interested in science, as well as give a presentation at a summer camp in Firebaugh. Both were hands-on activities aimed at making agricultural science fun. Lastly, I was asked to serve as an alternate committee member for two years on the Almond Board of California's Global Communication Committee.

Professional Competency

I am an active member of four workgroups and one program team, have reviewed two manuscripts for two different journals, and I have been invited to give two talks in different areas of my expertise: figs at the Pomology Program Team meeting in 2019, and my work on mass media extension at the 2019 Pistachio Workgroup meeting. I presented the results on my fig variety trial project at an International Society for Horticultural Science meeting in 2019 and presented the results of the Navel Orangeworm Management survey at the American Society for Horticultural Science meeting in 2020. I have given several talks and written two articles for extension professionals on podcasting as an extension tool. I have also had several internal and external extension colleagues reach out to me to ask for advice on podcasting. I've been asked to serve on two committees revolving around educating industry members on nitrogen management based on my expertise in plant nutrition; one committee was directed toward a certification for Certified Crop Advisers, and the other for grower self-certification, and have sat on a panel discussing almond variety evaluation based on my work with the almond variety trial. Lastly, I've been able to guest lecture for several university classes on my work as an extension advisor. I have also attended 43 sessions that fit under professional development and training in order to learn my crops and the job. I will continue to attend relevant training events.

Affirmative Action

I am civil rights compliant due to A.R.E., and I am in parity with women and Latinos in areas where I was able to take demographic information in 2021. In the past I have typically also been in parity with African Americans. The pandemic made reporting civil rights compliance difficult – many industry hosted meetings do not collect this information, and I would frequently forget to record this myself during meetings that I hosted, which I will need to improve at doing. In order to extend A.R.E., I use Twitter, post notices, and use emails and bulk mail to send out meeting announcements. I have also worked with the California AgrAbility Program to try to get a disabled farmer in Madera County a USDA grant to outfit his tractor with modifications that would allow him to continue farming.

I am working on outreach to the Punjabi grower community in the state of California. I have been able to appear on a Punjabi language radio show several times to talk about orchard production (which also counts as targeted A.R.E.), and have hired an SRA who speaks Punjabi, who has begun to start translating articles when she has free time. While this is technically after the evaluation period, I conducted a brief needs assessment at a Punjabi Growers Association meeting on the language they prefer to learn in and how they prefer to receive information and will be working on extending information in a language and format they prefer in the future.

IV. Supporting Documentation

A. Project Summary

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Agricultural Productivity and Sustainability (10)				
2017 – Present Field Evaluation of Almond Varieties	Co-Principle Investigator; manage one of three research sites, taking the lead in extending the results through mass media	Roger Duncan @ UC ANR, Thomas Gradziel @ UC ANR, Bruce Lampinen @ UC ANR, Luke Milliron @ UC ANR, Dani Lightle @ UC ANR, Jay Mahil @ Grower	$432,920 since 2017; $75,293 awarded directly to me	Almond Board of California
2017 – 2019 Field Evaluation of New and Underused Fig Cultivars	Principal Investigator; collected data, wrote reports, presented results	Carlos Crisosto @ UC ANR, Louise Ferguson @ UC ANR, John Preece @ USDA ARS, Malli Aradhya @ USDA ARS, Howard Garrison @ USDA ARS, Chris DeBenedetto @ Grower	3,500 awarded for 2017-2018	California Fig Institute
2017 – Present Evaluating New Training Systems for Pistachio	Cooperator; limited role with field work, will help extend results when the project is concluded	Bruce Lampinen @ UC ANR, Elizabeth Fichtner @ UC ANR, Mae Culumber @ UC ANR, Katherine Jarvis-Shean @ UCANR, Jeb Headrick @ Grower	247,030, none awarded directly to me	California Pistachio Research Board
2017 – Present	Collaborator; I collect data in the spring and provide	Franz Niederholzer @ UCANR, Luke Milliron @ UCANR,	2,500 directed to me annually	California Prune Board

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Heat during bloom in French Prune	occasional input on reports	Katherine Jarvis-Shean @ UCANR		
2019 – 2021 Cracking the Black-box of dormancy in Pistachios: Tracking biochemical changes in inflorescence buds from dormancy to bud break	Co-Investigator; helped with project design, finding research sites, collected data, will help extend results	Louise Ferguson @ UC ANR, Gurreet Brar @ California State University, Fresno, Masood Khzeri @ California State University, Fresno, Daniel Syverson @ California State University, Fresno	$165,576, none awarded directly to me	California Pistachio Research Board
2020 – Present Quantifying the effects of rangeland conversion on ecosystem functions: Linking land use systems to enhance farm profitability	Collaborator; helped with trial design, field work, will help extend results	Laurent Ahiablame @ SDSU, Fadzayi Mashiri @ UCANR, Theresa Becchetti @ UCANR, Anthony Fulford @ UCANR, Daniel Sumner @ UC Davis, Kofi Akamani @ SIU, Rose Marie Burroughs @ Grower, Diane Bohna @ Grower, Paul Ichord @ Grower, Pamela Kan-Rice @ UCANR	$349,327 for total project; none directly awarded to me	Western SARE
2020 – Present Effect of salinity, boron, and soil oxygen on	Principle Investigator; wrote grants, reports, collect data, will	Giulia Marino @ UC Davis; Gary Banuelos @ USDA, Louise Ferguson @ UC Davis, Joy	$76,893	California Pistachio Research Board

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
pistachio performance	lead in extending results	Hollingsworth @ UCANR, Patrick Brown @ UC Davis, Florent Trouillas @ UC Davis, Bruce Lampinen @ UC Davis		
2021 – Present Remote-controlled evaluation of distribution uniformity and stem water potential: extending imagery to integrated decision support	Co-Principle Investigator	Mallika Nocco @ UC Davis, Troy Magney @ UC Davis, Luke Milliron @ UCANR, Doug Amaral @ UCANR, Tony Chang @ CSP, Ken Shackel @ UC Davis, Tom Devol @ ABC, Curt Pierce @ UCANR, Andrew McElrone @ UC Davis, Alfonso Torres @ USU, Isaya Kisekka @ UC Davis, Roger Duncan @ UCANR, Alireza Poureza @ UC Davis, Brian Baily @ UC Davis, Kyaw Tha Pau U @ UC Davis	$433,828 in total; $22,000 awarded to the "extension team," which I am a part of	Almond Board of California
2021 – Present Nitrogen Management in Pistachios	Co-Principle Investigator; helped with experimental design, finding research sites,	Doug Amaral @ UCANR, Patrick Brown @ UC Davis, Louise Ferguson @ UC Davis, Giulia	$91,352; none awarded directly to me	California Pistachio Research Board

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
	data collection, will help extend results	Marino @ UC Davis, Elizabeth Fichtner @ UCANR, Joy Hollingsworth @ UCANR		
2017 – Present Utilizing canopy light interception/yield potential data to improve management of almond	Collaborator; This project uses canopy light interception from many research plots for various projects and reutilizes that data; I manage one of them.	Brian Bailey, Irwin Donis-Gonzales, Alireza Pourreza, Ken Shackel, Astrid Volder, Greg Browne, Shrini Upadhyaya, Sam Metcalf, Loreto Contador, Mae Culumber, David Doll, Roger Duncan, Elizabeth Fichtner, Allan Fulton, Phoebe Gordon, Brent Holtz, Dani Lightle, Luke Milliron, Franz Niederholtzer, Katherine Pope, Mohammad Yaghmour any other interested farm advisors	$80, 986 annually, none awarded directly to me	Almond Board of California
Pest Management (7)				
2018 – 2019 Fig Pest Survey and Navel Orangeworm	Co-Principal Investigator; found research sites, collecting in-field data, contributed	Sam Wilson @ UC ANR, Brad Higbee @ Trece, Chris DeBenedetto @	$51, 266 over two years, none awarded directly to me	California Fig Institute

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Mating Disruption Project	to experimental design, objectives	Grower, Kevin Herman @ Grower		
2020 – Present Optimizing Management of Navel Orangeworm in Figs	Co-Principal Investigator; found research sites, collected in-field data, contributed to experimental design, objectives	Sam Wilson @ UC ANR, Chuck Burks @ USDA Chris DeBenedetto @ Grower, Kevin Herman @ Grower	$19,674, none awarded directly to me	California Fig Institute
2020 Navel Orangeworm Management Survey	Principal Investigator; co-designed trial, led data collection, analysis, writing, and extending results	Houston Wilson @ UC ANR, Brittney Goodrich @ UC Davis	$9,216	Almond Board of California, California Walnut Board, California Pistachio Research Board
2019 – Present Field-Scale Evaluation of Anaerobic Soil Disinfestation	Collaborator; help with field work, will help extend results	Greg Browne @ USDA ARS, Gary Cornaggia @ Grower	$90,687 +$5000 for a larger project; approximately 1/3 is directed to ASD. The $5000 was brought in by me	Almond Board of California
2021 – Present Investigation of *Aspergillus niger* causing Hull Rot and Conditions Conductive to Disease Development in Kern County	Co-Principal Investigator, helping with data collection at the Almond Variety Trial in Madera County	Mohammad Yaghmour @ UCANR	$6,444, none awarded directly to me	Almond Board of California

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
2020 Fig Crop Safety Trial	Collaborator	Brad Hanson @ UC Davis, Erik Herman @ Grower	Industry donation of herbicides	N/A
2021 – Present Alkaliweed Trial	Collaborator	Brad Hanson @ UC Davis, Doug Amaral @ UCANR, Elizabeth Fichtner @ UCANR,	Industry donation of herbicides	N/A

B. Professional Competence and Professional Activity

Professional Development and Training

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
May 14, 2017	Davis, California	Practical Methods for Measuring Outcomes
Oct 17, 2017	Davis, California	Programmatic Orientation
Dec 8, 2017	Davis, California	Almond Workgroup Meeting
Dec 13, 2017 - Dec 14, 2017	Sacramento, California	Prune Research Meeting
Jan 17, 2018	Visalia, California	Statewide Pistachio Day
Jan 24, 2018 - Jan 25, 2018	Bodega Bay, California	Walnut Research Conference
Feb 6, 2018 - Feb 7, 2018	Kearney Research and	Climate Change Workshop

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
	Extension Center	
Mar 28, 2018 - Mar 29, 2018	Davis, California	Pomology Program Team Meeting
Apr 9, 2018 - Apr 12, 2018	Ontario, California	2018 Statewide Conference
May 7, 2018	Madera, California	California Fig Institute Research Meeting
May 15, 2018 - May 16, 2018	Sacramento Valley	Prune Farm Advisor Tour
May 22, 2018 - May 24, 2018	Northern San Joaquin Valley	Almond and Walnut Farm Advisor Tour
Jul 18, 2018 - Jul 19, 2018	Harris Ranch	Pistachio Workgroup Meeting
Oct 15, 2018 - Oct 18, 2018	Las Cruces, New Mexico	Pecan Short Course
Nov 14, 2018	Davis, California	Administrative Orientation
Dec 13, 2018 - Dec 14, 2018	Kingsburg, California	Prune Research Meeting
Mar 27, 2019 - Mar 28, 2019	Davis, California	Pomology Program Team Meeting
May 8, 2019	Madera, California	California Fig Institute Research Meeting
May 21, 2019 - May 23, 2019	North San Joaquin Valley	Almond and Walnut Research Tour

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Jun 4, 2019 - Jun 6, 2019	Kearney Research and Extension Center	Nematode Class
Jul 16, 2019 - Jul 17, 2019	Coalinga, California	Pistachio Workgroup
Jul 31, 2019	Winters, California	Prune Breeding and Research Meeting
Oct 28, 2019	Zoom	Merits and Promotions Training
Oct 29, 2019 - Oct 30, 2019	Fresno, California	FREP WPHA Meeting
Dec 13, 2019	Davis, California	Almond Workgroup Meeting
Dec 13, 2019	Davis, California	Almond Workgroup Meeting
Jan 22 – 24, 2020	Monterey, California	California Weed Science Society Annual Meeting
Feb 26, 2020	Parlier, California	Joint Regional USDA NRCS and UCANR meeting
Mar 2, 2020 - Apr 3, 2020	Davis, California	Grant writing seminar
Apr 21, 2020 - May 12, 2020	Zoom	How to make videos for youtube
May 21, 2020 - Jun 25, 2020	Online education	Groundwater short course
May 21, 2020 - Jun 25, 2020	Online education	Groundwater short course

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Jun 5, 2020	Online	Weed Science Program Team Meeting
Jun 9, 2020	Online	Air-blast sprayer calibration webinar
Jun 10, 2020	Online	Webinar on pruning prunes
Jun 24, 2020	Fresno and Tulare Counties	Pistachio Research Tour
Jul 15, 2020 - Jul 16, 2020	Online	Pistachio Workgroup Meeting
Oct 28, 2020 - Oct 29, 2020	Zoom	FREP virtual conference
Oct 28, 2020 - Oct 29, 2020	Zoom	FREP virtual conference
Dec 1, 2020 - Dec 2, 2020	Online	Prune Workgroup
Dec 15, 2020 - Dec 16, 2020	Online	Almond Workgroup
Feb 1, 2021 - Feb 3, 2021	Zoom	Plant and Soil Conference
Mar 24, 2021 - Mar 25, 2021	Zoom	Pomology Extension Continuing Conference
Mar 29, 2021 - Mar 30, 2021	Zoom	Airblast Sprayer Conference

Disciplinary Society or Professional Association

Disciplinary Society/Prof. Assoc Name	Membership/Meetings Attended/Activities
American Society for Horticultural Science	Member since 2014. Attended the 2021 national meeting in Denver, Colorado and presented research results. Committee member for the Outstanding Extension Educator Award since 2020.
International Society for Horticultural Science	Member since 2018. Attended the 2019 symposium for figs in Rovinj, Croatia and presented research results.

Evidence of Professional Competency

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
January 2017 – current	UCANR	Member of almond, pistachio, and walnut workgroups, as well as the Pomology program team.
May 21, 2018	Horticulturae	Manuscript Review
Mar 28, 2019	Davis, California	Presentation at Pomology Program Team Meeting: Fig Biology and Production
Jul 24, 2019	Davis, California	Panelist for First Annual Almond Breeding and Field Day
Sep 2, 2019 - Sep 5, 2019	Rovinj, Croatia	Attended the VI International Fig Symposium
Jan 10, 2020 - Nov 24, 2021	Online	Next Generation CCA Training and Licensing Committee
Apr 23, 2020	Zoom	Gave a talk to Cooperative Extension peers on the eXtension website about podcasting as an extension tool
Jun 2, 2020	Online	Spoke to a class at UC Davis about Ag Extension

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
June 9, 2020	Online	Gave an expert interview to California Agriculture Journal about how COVID may affect farm labor
Sep 4, 2020	Online	Gave a fig Talk for Subtropical workgroup
Dec 1, 2020	West Coast Nut (interviewed by Cecilia Parsons)	Media interview
Dec 15, 2020	Online	Gave a talk at the almond workgroup meeting on a NOW survey update and discussion on extension methods
Jan 28, 2021	Zoom	Talk about NOW survey results at the walnut research conference
Mar 25, 2021	Given at PECC	Gave a presentation at the pomology program team meeting about podcasting as a form of extension
May 12, 2021	Zoom	Served on a panel for UC Riverside graduate students about entomology careers
May 12, 2021	West Coast Nut	Ag Media Appearance (adaptation of a written article on zinc)
May 24, 2021	MDPI	Peer review for Soil Systems
Jun 14, 2021 - Jan 11, 2022	Online	Ad Hoc Committee member for the Nitrogen Management Grower Training Program (CDFA program)
Jul 15, 2021	West Coast Nut	Ag Media Appearance (large and small plant bug control newsletter adaptation)
Aug 6, 2021	Denver, Colorado	Author on presentation at the American Society for Horticultural Science conference (Evaluation of new training system approaches for pistachio) [did not give this talk]

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
August 7, 2021	Denver, Colorado	Gave a research talk to academic peers at the American Society for Horticultural Science conference about the results of the Navel Orangeworm Management Survey

C. University Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Jan 18, 2017	Statewide Pistachio Day	Regional	Moderated one section
May 23, 2017 - Nov 16, 2017	Served on pistachio short course committee	Region	Committee member
Oct 12, 2017	Assistance with Viticulture advisor interviews	County	Tour Guide
Feb 15, 2018	Assistance with new employee interviews	Division-wide	Tour Gide
May 4, 2018 - Nov 28, 2018	Committee for recruitment of AP 17.14	Division-wide	Committee member
Nov 5, 2018	Walnut Short Course	State	Moderator
Dec 5, 2018	Almond Conference	State	Moderator
Aug 2, 2019	FAO Tour	International	Speaker
Sep 23, 2019	Research and Extension: Successes and Failures in Stakeholder Adoption of Best Management Practices	Region	Guest speaker at Fresno State
Nov 6, 2019 - Nov 8, 2019	Almond Short Course	Division-wide	Moderated one session and led groups around for the afternoon sessions of the field day

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Dec 3, 2019 - Dec 4, 2019	Prune Research and Workgroup Meeting	Division-wide	Organizer and Workgroup Chair
Jan 23, 2020 - Nov 19, 2020	Pistachio Short Course	Division-wide	Co-Chair
Feb 28, 2020 - Jan 19, 2021	Nitrogen Mangement Course and Exam Committee	State	Exam Committee Member
Jan 14, 2021	Prune Research Committee	Division-wide	Research Reviewer
Mar 26, 2020 (Term ends in 2022)	Outstanding Extension Educator Award Selection Committee for ASHS	National	Committee Member
Jul 16, 2020 - Jul 15, 2021	Pistachio Workgroup Chair	Division-wide	Chair
Nov 9, 2020	Advances in Pistachio Production Short Course	Division-wide	Moderator
Nov 10, 2020	Fig talk for Master Gardeners	Division-wide	Invited Speaker
Dec 16, 2020 - Dec 15, 2021	Almond workgroup chair	Division-wide	Chair
Aug 2 - continuing	Academic Assembly Council	Division-wide	Secretary
Aug 4, 2021- Dec 4, 2021	Served as a committee member for recruitment 21-16	Division-wide	Committee member
Aug 6, 2021	Moderated at the American Society for Horticultural Science meeting	National	Moderator

D. Public Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Mar 8, 2017	Recurring - Guest Lecture at Merced College	County	Guest Lecturer
Oct 11, 2017	Recurring - Guest Lecture at Merced College	County	Guest Lecturer
Nov 1, 2017	Guest Lecture on Plant Nutrients	County	Guest Lecturer
Nov 4, 2017	Expanding Your Horizons: Motivating Young Women in Science + Mathematics	County	Speaker and Activity Organizer
Feb 28, 2018	Recurring - Guest Lecture at Merced College	County	Guest Lecturer
Oct 10, 2018	Recurring - Guest Lecture at Merced College	County	Guest Lecturer
Nov 1, 2018 – Nov 11 2020	Almond Board Global Communications Committee	State	Committee Alternate
Jul 25, 2019	Firebaugh River Camp	County	Speaker
Mar 9, 2020	Recurring - Guest Lecture at Merced College	County	Guest Lecturer
Oct 21, 2020	Discussion on what it's like to work in extension	Region	Guest Lecture

E. Extension Activities

Meetings Organized

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Agricultural Productivity and Sustainability (7)					
Nov 14, 2017 - Nov 16, 2017	Advances in Pistachio Production Short Course	Botany and Physiology of Pistachios / 1	Organizing committee member, speaker	Visalia, California	180
Mar 20, 2018	Nitrogen Management Field Day	Nitrogen Management / 1	Organizer, speaker	Chowchilla, California	70
Jun 20, 2018 - Jan 7, 2019	Walnut Short Course	Walnut Production / 1	Committee Member	Davis, California	0
Aug 27, 2019	Madera County Irrigation Training Day	Water Potential and Water Movement / 1	Organizer, Speaker		29
Jul 29, 2020 - Aug 12, 2020	Establishing Nut Orchards Webinar	Establishing Nut Orchards / 1	Organizer	Online	40
Nov 2, 2020 – Nov 20, 2020	Advances in Pistachio Production Short Course	1	Committee leader	Zoom	180
Jan 12, 2021 - Jan 13, 2021	Statewide Pistachio Day	Pistachio production / 1	Meeting organizer	Zoom	200
Jun 11, 2021	Turning Lab Reports into Action	Salinity and nutrient management / 1	Organizer	Zoom	24
Pest Management (4)					
Dec 19, 2017	2017 Madera Winter IPM Field Meeting	Pest Management Meeting / 1	Organizer	Madera, California	40

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Dec 12, 2018	2018 Madera Winter IPM Meeting	Integrated Pest Management / 1	Organizer	Madera, California	41
Dec 18, 2019	Madera Orchard IPM Meeting	Integrated Pest Management / 1	Organizer	Madera, California	27
May 27, 2021 - Jun 10, 2021	Small Farms Orchard Management Workshop	Orchard Management / 1	Co-Organizer	Zoom	50 on Day 1, 38 on Day 2

Educational Presentations

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Agricultural Productivity and Sustainability (26)				
Nov 14, 2017	Botany and Physiology of the Pistachio Tree	Pistachio Physiology / 1	Visalia, California	180
Dec 5, 2017 - Dec 7, 2017	The Almond Conference	[Poster] Field Evaluation of Almond Varieties / 1	Sacramento, California	Unknown
*Jun 27, 2018	CASP Workshop with Almond Board of California	Postharvest Nitrogen and Irrigation Management / 1	Modesto, California	20
*Jul 10, 2018	Lunch and Learn with the Almond Board of California	Postharvest Nutrient Management / 1	Madera, California	10
Nov 5, 2018	Walnut Short Course	Mineral Nutrition of Walnuts / 1	Davis, California	155
Nov 5, 2018	Walnut Short Course	Soil and Water Evaluation and Modification / 1	Davis, California	155

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
*Nov 19, 2018	Tree, Vine, and Irrigation Workshop	Nitrogen in Tree Crops / 1	Madera, California	20
Dec 4, 2018 - Dec 6, 2018	The Almond Conference	[Poster] Field Evaluation of Almond Varieties / 1	Sacramento, California	Unknown
*May 8, 2019	California Fig Institute Research Meeting	Overview of Domestic and International Fig Nutrition Research / 1	Madera, California	30
August 27, 2019	Soil, Plant, and Atmosphere Continuum, Plant Water Stress Measurements, and Reduced Deficit Irrigation in Almonds	Irrigation Management / 1	Madera, California	29
*Nov 5, 2019	2019 Almond Short Course	Soil Characteristics, Salinity, and Soil and Water Reports / 1	Visalia, California	161
*Nov 6, 2019	Almond Short Course	Potassium in Almond Orchards / 1	Visalia, California	161
*Nov 8, 2019	Almond Short Course	ASD and Orchard Replant Fertilization (Field Day Station) / 1	Parlier, California	44
*Nov 12, 2019	Tree, Vine, and Irrigation Workshop	Nitrogen in Tree Crops / 1	Madera, California	15
Dec 10, 2019 - Dec 12, 2019	The Almond Conference	[Poster] Field Evaluation of Almond Varieties 2018-2019 / 1	Sacramento, California	Unknown
Dec 10, 2019 - Dec 12, 2019	The Almond Conference	[Poster] Can Fertilizer Overcome Replant Challenges? / 1	Sacramento, California	Unknown

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Dec 10, 2019 - Dec 12, 2019	The Almond Conference	[Poster] Non-fumigant Approaches and Diagnostics for Orchard Replacement and Soilborne Disease Management / 1	Sacramento, California	Unknown
*Jan 31, 2020	North San Joaquin Valley Almond Day	Evaluation of Soil Salinity, and Soil and Water Reports/ 1	Modesto, California	350
*Mar 10, 2020	Syngenta Educational Meeting	Replant Issues and Anaerobic Soil Disinfestation / 1	Fresno, CA	45
Jul 29, 2020	Establishing Nut Orchards	Fertilizing Young Trees / 1	Online	40
Oct 14, 2020	Ag Experts Talk Continuing Education Series	Understanding Laboratory Tests / 1	Zoom	147
Nov 2, 2020	Pistachio Short Course	Botany and Physiology of the Pistachio Tree / 1	Zoom	180
*Nov 12, 2020	Farm Bureau Meeting	Nitrogen Management in Tree Crops / 1	Zoom	20
Nov 16, 2020	Pistachio Short Course	Potassium Nutrition / 1	Zoom	180
*Dec 9, 2020	The Almond Conference	Variety Trial Update / 1	Online	Unknown
Jun 10, 2021	Turning Lab Reports into Action	Soil Fertility Reports / 1	Zoom	24
Pest Management (18)				
*Oct 24, 2017	Merced Pest Management Talk	Pests of Concern in Fruit Orchards / 1	Merced, California	61
*Oct 27, 2017	South Valley Nut Conference	Soilborne Diseases of Pistachio / 1	Visalia, California	50

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
*Mar 22, 2018	CAPCA PCA Educational Meeting	Review of Almond Pests in 2017 / 1	Fresno, California	190
*Sep 13, 2018	CAPCA PCA Educational Meeting	Phytophthora Management in Orchard Crops / 1	Fresno, California	100
*Oct 9, 2018	Merced Pest Management Talk	Fig Insect Survey (and Phytophthora in Orchard Crops) / 1	Merced, California	62
*Nov 2, 2018	Mid Valley Trade Show	An IPM Approach to Soilborne Diseases / 1	Modesto, California	40
*Nov 13, 2018	Fruit, Tree, and Vine Expo	Managing Stink Bugs and Other Fruit Orchard Pests / 1	Fresno, California	120
*Mar 12, 2019	Merced IPM Talk	Springtime Pests and Diseases of Almonds, Pistachios, and Walnuts / 1	Merced, California	73
*Jun 5, 2019	Mid Valley Ag Day	An IPM Approach to Soilborne Diseases / 1	Turlock, California	100
*Oct 22, 2019	Merced Pest Management Meeting	Bacterial Canker + Fig Insect Work Update / 1	Merced, California	65
*Nov 13, 2019	Winter 2019 Continuing Education Sessions	Orchard Pests of 2019 / 1	Madera, California	35
*Nov 19, 2019	Grape, Nut, and Tree Fruit Expo	Hemipteran Orchard Pests / 1	Fresno, California	30
Dec 18, 2019	Madera Orchard IPM Meeting	Hull Rot in Almonds / 1	Madera, California	41
*Feb 5, 2020	Simplot Almond Bloom Meeting	Almond Bloom Diseases / 1	Coalinga, California	40

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
*Oct 6, 2020	Merced Pest Management Continuing Education Series	Research Updates / 1	Zoom	0
Jan 13, 2021	Statewide Pistachio Day	Results of the Navel Orangeworm Management Survey / 1	Zoom	200
Jan 14, 2021	San Joaquin Valley Almond Day	Results of the Navel Orangeworm Management Survey / 1	Zoom	160
May 27, 2021	Weed Management	Weed management in orchards / 1	Zoom	0

Other (including websites, social media, blogs, collaborations with other agencies, organizations, policy engagement)

Begin Date - End Date	Description	No. of Instances
Agricultural Productivity and Sustainability (3)		
Jan 1 2017 – Sep 30 2017	Farm Calls 2017	38
Oct 1, 2017 - Sep 30, 2018	Farm Calls 2017-2018 period	30
Oct 1, 2018 - Sep 30, 2019	Farm Calls 2018-2019 period	36
Oct 1, 2019 – Sep 30, 2020	Farm Calls	33
Oct 1, 2020 – Sep 30, 2021	Farm Calls	33

Other (including TV and/or radio interviews/programs, newspaper/trade magazine interviews)

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
Agricultural Productivity and Sustainability (9)			
Nov 10, 2019	Gurreet Brar	Dormant Orchard Tasks	KBIF900 AM
Feb 3, 2020	Elaine Sweidler	Interview about Growing the Valley Podcast	Local Dirt on 90.3 FM
Feb 15, 2020	Jenny Holterman	In field observations	Ag Fax
Feb 26, 2020	Jessica Fu	Soil salinity	The Counter
Mar 14, 2020	Jenny Holterman	Orchard Observations	AgFax
Mar 15, 2020	Gurreet Brar	Spring nutrient management activities	KBIF900 AM
Sep 13, 2020	Gurreet Brar	Postharvest tasks	KBIF900 AM
Dec 1, 2020	Mitch Lies	Soil, leaf, water testing	West Coast Nut
Jan 7, 2021	Matthew Malcom	Potassium Fertilization	Pacific Nut Producer
April, 2021	Vicky Boyd	Ganoderma adspersum	West Coast Nut
Pest Management (1)			
Jan 22, 2021	David Eddy	Results from pest management survey	Western Fruit Grower

F. Publications (Bibliography)

Highlighted entries were published in the 2019-2021 evaluation period. For ease of reviewing, podcast episodes have been separated from other popular press articles

Peer Reviewed	
B - Peer-reviewed scholarly journal publications	3

Non-Peer Reviewed	
A - Popular press articles	120
D - Technical reports and other non-reviewed articles	19
E - Published abstracts	2

TOTAL	144

PEER REVIEWED

B - Peer-reviewed scholarly journal publications

Afsah-Hejri, L. (2021). Potential of ozonated-air (OA) application to reduce the weight and volume loss in fresh figs (Ficus carica L.). *Postharvest Biology and Technology*. 180, 111631.

Gordon, Phoebe; Preece, John; Ferguson, Louise; Aradhya, Mallikarjuna; Norton, Maxwell; Garrison, Howard; DeBenedetto, Chris (2021). Field evaluation of new and underutilized fig cultivars for fresh and dried markets. *Acta Horticultrae*. 1310, 173-178.

Holland, Leslie; Trouillas, Florent; Nouri, Mohamed; Lawrence, Daniel; Crespo, Maria; Doll, David; Duncan, Roger; Holtz, Brent; Culumber, Catherine; Yaghmour, Mohammad; Niederholzer, Franz; Lightle, Danielle; Jarvis-Shean, Katherine; Gordon, Phoebe; and Fichtner, Elizabeth (2020). Fungal Pathogens Associated with Canker Diseases of Almond in California. *Plant Disease*. The American Phytopathological Societ. August 5.

Non-Peer Reviewed:

A: Popular Press Articles: Trade Journals, Blogs, and Newsletters (Chronological order, newest to oldest)

Gordon, Phoebe (2021). Postharvest Nutrition of Nut Crops. *West Coast Nut*. https://www.wcngg.com/2021/08/05/postharvest-nutrition-of-nut-crops-when-and-when-not-to-fertilize/

Gordon, Phoebe (2021). Zinc Fertilization in California Orchard Crops. *San Joaquin Valley Trees and Vines*. June. www.sjvtandv.com

Gordon, Phoebe; Wilson, Houston (2021). Large and Small Bug Control in Pistachio. *San Joaquin Valley Trees and Vines*. June. www.sjvtandv.com

Milliron, Luke; Gordon, Phoebe (2021). Emergency Use (Section 18) Approved for Almond Bacterial Blast Material. Sacramento Valley Orchard Source. February 18. https://www.sacvalleyorchards.com/blog/almonds-blog/emergency-section-18-2021/

Gordon, Phoebe (2021). Other Resources: Fungicide treatment timing and efficacy tables. San Joaquin Valley Trees and Vines. January 27. https://www.sjvtandv.com/blog/other-resources-fungicide-treatment-timing-and-efficacy-tables

Gordon, Phoebe; Duncan, Roger; Milliron, Luke; Lampinen, Bruce; Gradziel, Thomas (2020). Field Evaluation of Almond Varieties. *West Coast Nut*. JCS Marketing. September, 4-15. http://www.wcngg.com/magazine-archive/september-2020/

Gordon, Phoebe; Culumber, Mae (2020). The Effect of Soil Compaction on Tree Health. *www.sjvtandv.com*. May 27.

Gordon, Phoebe; Milliron, Luke (2020). Podcasting Checklist for Extension Professionals. *Technology in Extension Education Blog*. eXstension. April 29. https://connect.extension.org/g/technology-in-extension-education/blog/podcasting-checklist-for-extension-professionals

Milliron, Luke; Gordon, Phoebe (2020). Expanding Engagement Through Podcasting. *Technology in Extension Education Blog*. April 22. https://connect.extension.org

Gordon, Phoebe (2020). Dust from mowing and tilling could reduce pistachio fruit set. *www.sjvtandv.com*. March 19.

Gordon, Phoebe; Yaghmour, Mohammad (2020). Bacterial Canker and Blast in California Fruit and Nut Trees. January 30. https://www.sjvtandv.com

Wilson, Houston; Ozeran, Rebecca Ozeran, et al. (2019). A river runs through it: UC scientists teach rural youth about river health. *UCANR Knowledge Stream*. November 5. https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=38713

Gordon, Phoebe (2019). Why you should be using stem water potential as an irrigation management tool. October 9. www.sjvtandv.com

Yaghmour, Mohammad; Gordon, Phoebe (2019). Iron Deficiency in Fruit and Nut Crops in California. *Progressive Crop Consultant*. JCS Marketing. July/August, 26-30.

Gordon, Phoebe (2019). Regulated Deficit Irrigation in Almonds to Manage Hull Rot. *UCANR Knowledge Stream*. July 12. https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=30788

Gordon, Phoebe; Niederholzer, Franz (2019). Potassium in Nut Crops: Plant Uses and Field Application. *West Coast Nut*. JCS Marketing. 14-18. March.

Gordon, Phoebe (2019). Alternaria Late Blight of Pistachios. *West Coast Nut*. JCS Marketing. 54-55. January.

Gordon, Phoebe; Niederholzer, Franz, et al. (2018). Harvest and post-harvest prune tasks. *Orchard Notes; Grower News from the California Prune Board*. August. https://www.californiadriedplums.org/august-2018-growers-newsletter-harvest-and-post-harvest-prune-tasks

Gordon, Phoebe (2018). Stink bugs and lygus bugs - bane to fruits (and nuts, too!). *Dispatches From the Orchard Newsletter*. March.

Lara, Jesus; Pickett, Charlie, et al. (2018). Stinky in high numbers: what's new with brown marmorated stink bug in California? *CAPCA Adviser*. California Association of Pest Control Advisers. February 2018, 44-48. February.

Gordon, Phoebe (2017). Assessing Infiltration in Orchards. *West Coast Nut*. JCS Marketing. November, 2017, 14-18. November.

Gordon, Phoebe (2017). Navel Orangeworm - what can we do to prepare for next year? *Dispatches From the Orchard Newsletter*. Winter 2017. December. http://cemadera.ucanr.edu/newsletters/Dispatches_from_the_Orchard72615.pdf

Gordon, Phoebe (2017). Remember fumigation and rootstocks when prepping for new orchards. *Dispatches From the Orchard Newsletter*. December. http://cemadera.ucanr.edu/newsletters/Dispatches_from_the_Orchard72615.pdf

A: Podcast Episodes (Chronological order, newest to oldest)

Khalsa, Sat Darshan; Gordon, Phoebe (2021). Nitrogen Part 11: Nitrogen Processes in Soil. *Growing The Valley*.P. Gordon. www.growingthevalleypodcast.com. 161. September 21.

Pathak, Tapan; Rijal, Jhalendra; Gordon, Phoebe (2021). Climate Change Part 5: Navel Orangeworm. *Growing The Valley*.P. Gordon. www.growingthevalleypodcast.com. 159. September 7.

Gordon, Phoebe; Milliron, Luke; Reyes, Clarissa (2021). September 2021 One Minute Challenge. *Growing The Valley*.C. Reyes. www.growingthevalleypodcast.com. 158. September 1.

Sosnoskie, Lynn; Gordon, Phoebe; Brar, Ramandeep (2021). Climate Change Part 4: Weeds. *Growing The Valley*.R. Brar and P. Gordon. www.growingthevalleypodcast.com. 157. August 24.

Swain, Daniel; Gordon, Phoebe (2021). Climate Change Part 3: Models and California's Climate. *Growing The Valley*.P. Gordon. www.growingthevalleypodcast.com. 156. August 17.

Bloom, Arnold; Gordon, Phoebe; Brar, Ramandeep (2021). Climate Change Part 2: Crops. *Growing The Valley*.R. Brar and P. Gordon. www.growingthevalleypodcast.com. 155. August 11.

Gordon, Phoebe; Milliron, Luke; Reyes, Clarissa (2021). August 2021 One Minute Challenge. *Growing The Valley*.C. Reyes. www.growingthevalleypodcast.com. 154. August 4.

Pathak, Tapan; Gordon, Phoebe (2021). Climate Chane Part 1: Introduction. *Growing The Valley*.P. Gordon. www.growingthevalleypodcast.com. 153. July 27.

Milliron, Luke; Gordon, Phoebe; Reyes, Clarissa (2021). July 2021 One Minute Challenge. *Growing The Valley*.C. Reyes. www.growingthevalleypodcast.com. 150. July 6.

Ledbetter, Craig; Gordon, Phoebe; Brar, Ramandeep (2021). Breeding Pt 4: The USDA Breeding Program. *Growing The Valley*.R. Brar and P. Gordon. www.growingthevalleypodcast.com. 147. June 15.

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E - Published abstracts

Gordon, Phoebe; Goodrich, Brittney; Wilson, Houston (2021). Adoption of Navel Orangeworm Management Methods Among California Nut Growers. *HortScience*. 56:9.

Culumber, Catherine Mae; Lampinen, Bruce; Fichtner, Elizabeth; Gordon, Phoebe; Jarvis-Shean, Katherine; Ferguson, Louise; Metcalf, Sam; Contador, Loreto; Poon, Syverson Daniel Yuenheen; Nguyen, Tran (2021). Evaluation of new training system approaches for pistachio. *HortScience*. 56:9.

Summary of publications

- Potassium in Nut Crops: Plant Uses and Field Application: https://www.sjvtandv.com/blog/kgkt2owv6lxnrb1o4i15lmfipj9y4w
  I wrote an article with a colleague a few years ago on potassium, an expensive plant nutrient that is often cut out during tough times. I began looking into this topic to debunk claims that fertilizer sales representatives were making to sell a more expensive potassium formulation. I summarized this information at a talk at a large statewide meeting, and then turned it into this article. In it, I describe how potassium is stored in the soil, plant deficiency symptoms, summarize the differences between forms of potassium fertilizer by discussing past research done on this topic, and discuss different fertilization strategies.

  My work has been very well received by clientele and my colleagues and I have been asked to talk on this subject several times subsequently. While I did not do the research that this article discusses, it exemplifies a large part of an advisor's extension efforts: repeatedly talking about best management practices. It also falls within a general area of my expertise: plant nutrition and soil science (as it pertains to salinity and plant nutrients).
- Gordon, Phoebe; Preece, John; Ferguson, Louise; Aradhya, Mallikarjuna; Norton, Maxwell; Garrison, Howard; DeBenedetto, Chris (2021). Field evaluation of new and underutilized fig cultivars for fresh and dried markets. *Acta Horticultrae*. 1310, 173-178. https://www.actahort.org/books/1310/1310_26.htm
  This is a paper I submitted as part of the VI International Symposium on Fig in 2019. It is a research paper on the fig variety trial that was concluded in 2019. While this research did not result in a positive outcome for the California fig industry, it was the first time I presented work that I did as an advisor to my peers, and my first first-name peer-reviewed publication, and I am proud of it nonetheless.
- Climate change series for Growing the Valley Podcast, favorite episode is: https://www.growingthevalleypodcast.com/climate-change/2021/8/11/climate-change-part-2-crops-with-arnold-bloom-ncsd3
  Climate change is a threat to agricultural profitability, and something that I don't think extension personnel talk about enough. Part of this may be because of past hostility from clientele and the unfortunate politicization of this topic. Despite this, it is our job as extension personnel to talk about upcoming issues, and this one will critically impact the California agricultural industry in many ways. I created a climate change series for my extension podcast, Growing the Valley. Since I can only share one piece of this series, I will share my favorite episode, in which I interview a professor at UC Davis about how plants will respond to increased carbon dioxide and increased temperatures. Podcasts can be fairly time consuming, requiring doing background research, building a set of questions, and may require extensive editing to make the interviewee sound good and ensure the take-home message is clear. I was extremely nervous to publish this series. While disgruntled clientele may have ignored this, one grower was so thrilled by the series that he found me on LinkedIn and told me that he thought it was great.