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Unity: Cultivating Diversity and Inclusion in PWA

PWA SCIENCE-IN-ACTION (SIA) SUMMER INTERN PROGRAM

The PWA Workforce Diversity Committee (PWA-WFDC) proposed a new initiative for the FY 2018 PWA Diversity/Inclusion Plan, namely a PWA Science-In-Action (PWA-SIA) Pilot Summer Training Program. This 8-week program was established to strengthen partnerships between ARS and Minority Serving Institutions (MSIs) (i.e., 1890 Historically Black Land Grant Colleges and Universities (HBCUs) and Hispanic Serving Institutions (HSIs), etc.), by creating summer paid-internship opportunities for eligible students.

In its first year, scientists from Albany, Corvallis, Hilo and Tucson locations answered the call to provide the scientific research and mentor experiences for the program. Over sixty highly competitive student applicants from across the nation applied for the four coveted positions. This is an overview of their stories.



ALBANY: Joshua Mathew

Joshua is a junior from the University of Texas Rio Grande Valley (HSI), Edinburg, TX, who was selected to work with Dr. James Thomson, Research Geneticist, Crop Improvement and Genetics (CIG) Unit. He reports that, “My internship in Albany was fantastic. I learned many valuable skills and knowledge that I can use for further endeavors. Under the guidance of Dr. James (Jim) Thomson, I researched specific gene promoters in *Arabidopsis thaliana*.” Joshua also chronicled his journey in an article that was published in The Ag Magazine, an Agricultural Lifestyle magazine of South Texas, found [here](#). His mentor reports that,

“Joshua had a positive attitude, kept up his daily notebook, was a quick learner, and was very enthusiastic!”



AREA DIRECTOR'S CORNER:

I'm glad to introduce the current issue of Unity, which focuses on student outreach, mentoring and education. The articles in this issue reflect solid contributions to STEM education and planting the seeds of scientific inquiry that influence career decisions. As an added benefit, the information on ARS research and accomplishments provided to students quickly finds its way to parents and the general public.

The lead-off article covers the experiences of four HSI students who were provided with research experiences with our PWA laboratories in the inaugural year of the Science in Action Program (SIA). I would like to express my appreciation to members of the PWA Workforce Diversity Committee who contributed to the new program's inception and got the word out to minority-serving institutions. Thanks to this effective outreach, we had sixty-four applications for the four available internships!

Although this issue of Unity spans 14 pages, there are many other long-standing examples of successful student programs across PWA that have been recognized by high-level Agency awards. ARS receives many inquiries about student outreach and education from special interest groups and Congress, which has led to the creation of the Student and Outreach Database (SOD). The SOD is an ARIS database that captures student and outreach data in one central location. Data is entered by locations in real-time and can be retrieved at any point throughout the year. All research units should keep their SOD entries current so that we can broadly share these fine accomplishments.

Thank you for your contributions to student outreach, workplace inclusion and diversity.

PWA SCIENCE-IN-ACTION (SIA) SUMMER INTERN PROGRAM

CORVALLIS: Corina Godoy

Corina is a junior at Humboldt State University (HSU), Arcata, CA who was selected to work with Dr. David Bryla, Plant Physiologist, in the Horticultural Crops Research Unit. Her research objective was to develop a technique using drones to measure drought stress in blueberry crops. The research experience she gained included collecting, preparing samples, and performing nutrient analysis, plot maintenance including irrigating and fertigating field plots and collecting data on yield and water status of the plants. Corina says: "Overall, I learned a lot in a short period of time and it allowed me to demonstrate and strengthen my skill set". "The internship prepared me for my future both professionally and socially by presenting opportunities and independence that I have never experienced before."



"I don't think I can fully express how much I value the lessons I was taught throughout my time in Corvallis, Oregon." Her mentor, Dr. Bryla states, "Corina was an outstanding intern. She was bright, motivated and an extremely hard worker. She was also very dependable and worked well with others." As

a result of her internship, Corina will receive academic credit. She plans to graduate summer 2019.

HILO: Mary Hillery

Mary began her senior year Fall 2018 at St. Edwards University (HSU), Austin, TX. She was selected to work with Dr. Scott Geib, Research Entomologist, in the Tropical Crop and Commodity Research Unit. Mary was tasked with developing markers to identify the agricultural pest, *Anastrepha fraterculus*. During her internship, Mary developed lab techniques: DNA isolation and PCR; computer skills: curating DNA sequences, phylogenetic analyses; additional research skills: notetaking, lab book keeping, how to think from different angles, how to better address science. She also had the opportunity to work with other mentors from the Hilo location, Dr. Jon Suzuki, Dr. Roxana Meyer, and Dr. Lisa Keith, to name a few. Mary states: "I was able to observe and work with such a variety of scientists each equally passionate and driven in their own way." "I now better understand what it means to work in a lab researching solutions." "My experience has been so rich and I truly feel as though I have gained so much experience and a broader understanding of science and how it is used in action." Mary's primary mentor, Dr. Geib, says this of Mary: "She was enthusiastic about coming to work and trying out different areas of research ..." "Mary was extremely punctual, she arrived early and was able to come every day" When asked: What were Mary's strengths, Dr. Geib responded: "Her attentiveness, communication and enthusiasm for the experience."



PWA SCIENCE-IN-ACTION (SIA) SUMMER INTERN PROGRAM

TUCSON: Katia Sanchez

Katia completed her sophomore year, at the University of Texas Rio Grande Valley (HSI), Edinburg, TX and was selected to work with Dr. Jason Williams, Hydrologist in the Southwest Watershed Research Center. Her research project was a field campaign conducting research on the impacts of vegetation management on hydrologic and erosion processes. The tasks she was able to complete were: installation of field pots, collection of vegetation and soils data, set-up and operation of rainfall simulator and overland flow simulator experiments. The skills she was able to learn were: data entry, reading vegetation point transects, bulky density and microtopography measurements, lab processing field collected samples, equipment and data management, and how to function as part of a crew. Katia says of her experience, that: "A transformation has occurred within me, for I feel stronger physically and intellectually, and now I have a sense of direction in regards to my academic and professional career." Her mentor, Dr. Williams, states: "She was exceptional in all regards and was a pleasure to have as a part of our crew."



Upon learning of the experiences of the students and the mentors alike, the Area Leadership readily agreed to sponsor another year for the program. PWA Scientists have already submitted requests for consideration to become mentors for the second class of this successful program. Without the commitment and support from the Area Leadership and the mentor scientists and all of the support from the various finance and local administrative support personnel the program success would not have been possible, many thanks on behalf of the PWA Workforce Diversity Committee. We look forward to even greater success in FY 2019!



ARS-PARLIER, CA SPOTLIGHT

2018 California Junior Ag Ambassadors

FRESNO, CALIFORNIA, July 25, 2018

The U.S. Department of Agriculture (USDA) Office of Partnerships & Public Engagement Hispanic-Serving Institutions National Program Central-Northern California & Washington Office announced the four participants of the seventh annual California Agricultural Ambassadors Program class.

The four Ambassadors were selected based on their academic excellence, interest in science and research, and demonstrated leadership qualities.

The program, a partnership with California State University, Fresno, University of Texas Pan American, the Fresno County Office of Education, Reedley College Upward Bound, and the USDA Hispanic-Serving Institutions National Program, provides high school students with the opportunity to intern at the USDA San Joaquin Valley Agricultural Research Service Center in Parlier, CA. for five weeks. Students research alongside and receive mentorship from USDA Scientists and professionals to find solutions to agricultural problems that affect Americans every day, from field to table.

In addition, the USDA Agricultural Ambassadors Program is an initiative by the USDA/Hispanic Association of Colleges and Universities (HACU) Leadership Group to increase access and participation in Science, Technology, Engineering, and Mathematics (STEM) fields.

The 2018 California Junior Agricultural Ambassador participants are:

Hope Duarte, Reedley High School, Reedley, CA.; Leslie Garcia, Dinuba High School, Dinuba, CA.; Martin Rodarte, Selma High School, Selma, CA.; and Gurbarn Singh Fowler High School, Fowler, CA.

For more information on the Junior Agricultural Ambassador program, visit: <https://www.outreach.usda.gov/education/hsi/student.htm>



NEVADA AGRICULTURE FIELD DAY SEPTEMBER 8, 2018

By Tye Morgan and Dr. Mark Weltz

The USDA-ARS-Great Basin Rangelands Research Unit (GBRRU) is located on the University of Nevada, Reno campus. For over 30 years, the university has hosted an annual event: Nevada Agriculture Field Day. The primary goal of this event is to increase the public's understanding of Nevada's agriculture encompassed within the College of Agriculture, Biotechnology and Natural Resources, Nevada Agricultural Experiment Station, as well as, the University of Nevada Cooperative Extension. The event is focused on educating families (K-12) and reaching out to underrepresented groups to show how sustainable agriculture is a community-wide common goal. Every year, this event provides space for 40 booth exhibitors and documents close to a thousand participants that visit the University's Main Station Farm for the day.

Over the past 10 years, the GBRRU research leader, Dr. Mark Weltz, supports this event and hosts a booth to showcase who we are and what we do. The public can meet different members of the GBRRU research team, learn about on-going rangeland research, obtain publications, view rangeland photos, and play match the rangeland plant to seed game. The public also has the opportunity to talk one on one and discuss any rangeland concerns with our team. This is always a fun and successful event that the GBRRU will continue to participate in for years to come.



Fay Allen sharing Nevada Geology



Fay Allen, Soils Technician at the 2018 USDA
-ARS GBRRU Booth



Tye Morgan, Soils Technician



Dr. Robert R. Blank, Soil Scientist

PENDLETON, OR THE JOYS OF A STUDENT INTERN

Hero Gollany (Research Soil Scientist) at the Soil and Water Conservation Research Unit (USDA-ARS-SWCR, Pendleton, Oregon) introduced a Portland State University student, Cenna Pacheco, to career opportunities in agriculture at the USDA-ARS. Cenna is currently working toward a degree in Environmental Science and needed a short project to fulfill requirements for an Environmental Science and Management class during her internship with us. She learned how to collect soil samples for aggregate stability analysis, performed analyses to determine soil structure properties for five cropping systems, and learned to analyze data and write a scientific report. She helped with wheat and pea harvest, plant tissue grinding, preparing tin caps with tissue samples for carbon, nitrogen and sulfur analysis, and collecting greenhouse gas samples in the field. She enjoyed working with all staff at the station and was self-motivated and eager to learn.



Cenna Pacheco preparing tin caps for wheat tissue analysis and recording weights on the tablet in soil chemistry laboratory



Cenna Pacheco in the field

RIVERSIDE, CA SUMMER OUTREACH

AAHHE Tour

For the third consecutive year, the Riverside ARS Location coordinated and hosted a tour by the [American Association of Hispanics in Higher Education \(AAHHE\) Caminos Fellows](#), March 09, 2018. The Caminos program is funded by USDA-NIFA and is open to “any Hispanic who has completed a thesis that focuses on Food and the Agricultural Sciences”. The tour for the Fellows is to provide information on potential USDA (all Agencies) employment.

This year, there were 13 Fellows (all female), accompanied by three AAHHE Mentors. The event was coordinated by Robert Krueger, ARS National Clonal Germplasm Repository for Citrus & Dates (NCGRCD). The tour started with a tour of the NCGRCD facilities and an introduction to the NCGRCD program. NCGRCD Technician Esteban Rodríguez assisted with a demonstration of cryopreservation of citrus germplasm. Next, the Forest Service Pacific Southwest Research Station was toured, hosted by Pamela Padgett. This was followed by a tour of the ARS US Salinity Laboratory, led by Jorge Ferreira. After the tour, Robert Krueger presented information on USDA employment, including the Pathways program and USAJobs. This was followed by USDA personnel presenting information on their personal pathways to USDA employment, as well as information on potential careers in their Agencies.

Presenters and their Agencies included:

Jorge Ferreira, ARS

Esteban Rodríguez, ARS

Armando González-Caban, FS

Desiree Garza, FSA

Guadalupe Solís, FSIS

Tomás Aguilar-Campos, NRCS



AAHHE Caminos Fellows, Mentors, and USDA personnel



Jorge Ferreira, ARS, leads tour of US Salinity Laboratory Facilities



Caminos Fellows observe research fire demonstration at USFS Pacific Southwest Research Station

RIVERSIDE, CA SUMMER OUTREACH

Diamondbacks

The San Bernardino County Diamondbacks Conservation Crew is a program sponsored by the San Bernardino Superintendent of Schools and the San Bernardino County Probation Department Gateway Program. Gateway is a San Bernardino area juvenile placement facility operated by the Probation Department that provides housing and vocational programming for 16 and 17 year old minors to prepare them for emancipation. Typically, these students are from underprivileged families that provided little incentive or direction in developing career goals. Educational and vocational offerings including job certification programs, college enrichment, public health issue awareness, GED preparation and testing, online college classes, job readiness, a mock restaurant program, a Forest Service Program, and a Regional Occupational Program.

The staff at the USDA ARS National Clonal Germplasm Repository for Citrus and Dates (NCGRCD) have volunteered to help train and prepare these (Diamondbacks) students in the care of citrus in both field and greenhouse environments, maintenance of greenhouses, and propagation of citrus plants from the collection of seed to grafting a scion onto a rootstock. They will be introduced to plant quarantine regulations and why it is important that they be followed. In addition, they will learn about job opportunities within the USDA and how to access the USAJobs web site.

For more information:

<http://wp.sbcounty.gov/dbh/mental-health-services/children-youth/jjp/gateway/>

<https://www.cpoc.org/sites/main/files/file-attachments/gateway.pdf>



Horticulturist Robert Krueger discusses NCGRCD operations with Diamondbacks interns.



Diamondback interns at work at NCGRCD

CORVALLIS, OR THE VALUE OF MENTORSHIP

The ARS Forage Seed and Cereal Research Unit is co-located on the Oregon State University campus in Corvallis, Oregon. As such, Research Scientists have ample opportunities to recruit undergraduate student workers to work in ARS' laboratories. Students approach ARS Scientists for work opportunities because they crave experience beyond the simplified lessons presented in classroom laboratories or they have a requirement to complete a senior thesis. However, instead of assigning them to dishwashing and other menial tasks, Dr. Kristin Trippe, Research Microbiologist, aims to provide them with the mentoring, training, and experiential learning opportunities that demonstrate the scientific process, that emphasize the importance of research in agricultural innovation, and that allow the students to participate in the creative processes that inspire them to pursue careers in science and engineering.

Dr. Trippe currently mentors five undergraduate scientists working on projects in her combined microbiology and soil health laboratories. Most of her students are recruited as freshman and are introduced to basic laboratory tasks and to the general scientific process. However, as the students mature, they are encouraged to work closely with technical staff to manage small projects, mine scientific literature, participate in laboratory meetings, and present data at local symposiums and conferences. Two of her current students are working on developing manuscripts for publication in their Junior and Senior years. As a result, the students improve the metrics on their CVs, and in turn, help Corvallis' laboratory increase its productivity, conduct impactful research, and create an atmosphere of innovation in Dr. Trippe's group.

Such undergraduate experiences have inspired Dr. Trippe's students to pursue careers at ARS. In the last four years, several of the undergraduates have taken on 180-day assignments to fill "gap years" between their undergraduate and graduate education. Others have gone into careers in clinical microbiology, engineering, and agricultural science. Others have left science for unrelated careers. Regardless, the students have formed lasting relationships, learned important lessons, and have been able to truly understand the impact, importance, and elegance of the scientific process.



Kenzaburo Sugimoto (Senior, Oregon State University) prepares to extract soil samples and analyze heavy metal concentrations.



The Trippe Laboratory. Pictured L-R: Prowshchal Mahato (Junior, OSU, Biology), Tom Wanzek (Bio Sci Technician), Octavia Hogaboam (Sophomore, OSU, Microbiology), Kelly Shannon (Sophomore, OSU, Microbiology), Claire Phillips (Research Associate), Alex Pederson (Senior, OSU Bioengineering), Kristin Trippe (Research Microbiologist), and Manuel Garcia Jaramillo (Research Associate). Not shown; Viola Manning (Bio Sci Technician) Kylie Meyers (Bio Sci Technician) and Kenzaburo Sugimoto (Senior, OSU, Chemical Engineering).

TUCSON, AZ TEAM OF PROMISING RESEARCHERS

Weaving through patches of whitethorn acacia, a firehose winds its way towards two large tents perched along a southern Arizona hillside. This was the setting for much of the research a team of recent college graduates and current students completed this past summer within the Walnut Gulch Experimental Watershed near Tombstone, AZ. Dr. Jason Williams, a Research Hydrologist with the Agricultural Research Service, led Justin Johnson, Kaitlyn Elkind, Dustin Curley, Cameron Burleson, and Katia Sanchez as they investigated some of the ecohydrologic impacts of a brush management treatment in a semiarid grassland.

Over the course of the summer, the team measured a host of abiotic and biotic variables. The aforementioned tents covered rainfall simulators, which were used to help quantify infiltration, runoff, and erosion during large rain events. Concentrated flow simulators were employed to determine how overland flow during storms is routed down a hillslope. The team also measured a number of soil and vegetation characteristics. Cameron Burleson, an undergraduate student in the School of Natural Resources and the Environment at the University of Arizona, said, "It was interesting to see just how much basic measurements can tell you about an area." As land managers throughout the Southwest consider the efficacy of numerous brush management strategies, the data collected by these promising young researchers will contribute to the growing body of knowledge about these systems.



Bulk density measurement: Kaitlyn Elkin (left), Cameron Burleson



Rainfall simulation: Katia Sanchez
(PWA-Science in Action intern)



Vegetation point frame measurements:
Kaitlyn Elkin (left), Cameron Burleson



Pounding in rainfall simulation plot borders:
Dustin Curley

HILO, HAWAII COMMUNITY OUTREACH

The Three Mountain Alliance

On March 19, 2018, Dr. Lisa Keith, Research Plant Pathologist of the Tropical Plant Genetic Resources and Disease Research Unit at the USDA ARS Daniel K. Inouye U.S Pacific Basin Agricultural Research Center (PBARC) in Hilo Hawaii hosted students and program leaders from a student enrichment program through “Imi Pono”, the outreach and education branch of “Three Mountain Alliance”. The Three Mountain Alliance is the largest member of the Hawaii Association of Watershed Partnerships which strives to sustain healthy forested watersheds for Hawaii’s communities. The goal of the Three Mountain Alliance is to sustain the multiple ecosystems of the mountains Kilauea, Mauna Loa and Hualalai on Hawaii Island, through responsible management of “watersheds, native habitats and species, historical, cultural and socio-economic resources”. Through components of the “Imi Pono” program, students learn how they can be stewards of the land we live on and how they can make a positive environmental change. The visitors to PBARC included thirteen 7th-9th graders and two leaders. Students learned about ohia varieties, how they are influenced by genetics and distribution, and the work the Keith lab is doing to combat the devastating disease Rapid Ohia Death (ROD). Ohia is the most ecologically and culturally significant Hawaiian tree that makes up the largest portion of Hawaii’s native forests. It is critical for the watershed, and the existence of innumerable native bird, plant and invertebrate species. Dr. Keith and her team were responsible for discovering and naming two new species of fungi that are the cause of the devastating disease.



Photos by Amelie Sterling

HILO, HAWAII COMMUNITY OUTREACH

Food and Culture of Hawaii

Dr. Jon Suzuki and PBARC scientists from the location units, TPGRDRU and TCCPRU.

On May 11th, 2018, USDA ARS Daniel K. Inouye U.S Pacific Basin Agricultural Research Center hosted two instructors and six students from the Illinois Wesleyan University (IWU) Summer course “Food and Culture of Hawaii”. This year marked the IWU course’s third visit since 2012. PBARC scientists gave presentations on their research work that supports U.S. and Hawaii agriculture. Special guest, former PBARC director, Dr. Dennis Gonsalves, who made critical contributions to Hawaii agriculture through development of virus-resistant ‘Rainbow’ papaya gave a presentation on key factors in his life that shaped his journey from a Hawaiian plantation boy to world class scientist. Students were also treated to Hawaiian music and hula performed by Dr. Gonsalves and his wife, Carol. Students were given a tour of PBARC laboratories and visited PBARC’s National Clonal Germplasm Repository for Tropical Fruit and Nut Crops.



Science in Action Hero Recognition

Janet (Mildred) Steele is the PSA for the Tropical Crop and Commodity Protection Research Unit (TCCPRU), one of the two units at the USDA ARS Daniel K. Inouye U.S. Pacific Basin Agricultural Research Center located in Hilo, Hawaii. Janet was absolutely essential in enabling us to bring and sustain our Science in Action intern in Hilo. Through her expertise and dedication she was able to complete the various required hiring and accommodation processes including security checks, flights, housing and all other necessary steps to ensure timely onboarding of our student. Without Janet, we would never have been able to bring in our student on schedule working with the narrow timeframe we had. A big Mahalo to her kind and dedicated work to support USDA ARS PWA’s mission and special emphasis efforts.



BOISE, IDAHO OUTREACH ON THE RANGE

Owyhee Hydrology Camp

The Owyhee Hydrology Camp (OHC) provides local high school students with the opportunity to gain a better understanding of arid hydrology. The OHC was conducted April 11 and 12, 2018 at the Reynolds Creek Experimental Watershed (RCEW) in Murphy, Idaho. RCEW has been hosting this event for many years lead by ARS Technician, Zane Cram. For 2018, 13 students attended along with 2 teachers!

Students were exposed to and participated in many scientific field activities such as; water supply forecasting lead by ARS scientist Dr. Danny Marks and ARS PhD student Andrew Hedrick. Vegetation monitoring lead by ARS Technician, Alex Boehm. GPS/Compass orientation lead by ARS Technician and CDSO, Mark Murdock. Stream invertebrates and water quality lead by ARS Hydrologist, Erin Murray. The students had a blast and learned a lot about science on the range.



BURNS, OREGON YOUTH OUTREACH

Traditional outreach programs typically focus on management practitioners and industry; and for good reason: these are important customers that frame the context for impact of ARS research. However, at Burns ARS they are putting increasing effort into providing outreach to students. These youth represent upcoming industry participants and leaders as well as future consumers of agricultural products... we think of it as a wise investment.

Burns staff have interacted in numerous capacities with local school districts for many decades. Beginning in the early 2000's, Burns has formalized that interaction through the "Second Grade Field Trip," which involves busing all of the second grade students in the Burns School District to our location, where they spend a half day immersed in age-focused activities that teach them about the science underlying area rangelands and rangeland agricultural production. These students include a number of economically disadvantaged students as well as members of the Burns Paiute Tribe. Burns is located in a very remote area (our county is 10,000 square miles and has less than 7,000 people) that has a number of rural, one or two room, K-8 schools, and we now spend the morning with local second grade students, and the afternoon with students from the rural schools.

In 2011 Burns expanded their youth outreach by targeting high school-aged students. Thus was born what they refer to as the High Desert Youth Range Camp. Held annually at the Burns ARS-managed 16,000 acre Northern Great Basin Experimental Range, this 3-day workshop focuses on attracting youth from across the Pacific Northwest to learn about the ecology and management of sagebrush rangelands. Most of the staff at the Burns location (including ARS, Oregon State University, and The Nature Conservancy) participate but Burns also bring other partners in to expand the knowledge and experience base of instructors. The Pacific Northwest Section of the Society for Range Management sponsors the top student for an all-expenses paid trip to the annual meeting of SRM, where they have an opportunity to participate in the SRM High School Youth Forum. The Youth Forum is an opportunity for high school-aged students from the US, Canada, and Mexico to gain leadership and public speaking experience while interacting with range management and science professionals from all over the world. Burns recently expanded this portion of their outreach program to include a second range camp for college-aged students that is attended annually by four to six universities.

Through these outreach programs, the Burns unit has impacted approximately 1,500 students. The second grade outreach has been operating long enough that numerous students who were initially exposed to rangeland science and management through this program have gone on to work for our unit during the summer months. Multiple high school students have chosen to pursue a college education in rangeland ecology and management after participating in our high school range camp, and many of the students in the college camp note in their end-of-camp review that this is one of the few opportunities they have had in their education to merge science with on-the-ground issues in an applied setting. It is Burns' hope to continue to attract a diversity of students across age groups and to help better their understanding of the ecology of rangeland ag production, or perhaps spawn interest that grows into a life-long career pursuit.

