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In partnership with UC RIVERSIDE Graduate Division

Riverside Postdoctoral Association

Postdoc Symposium

November 4th 2019

8.15am - 5.00pm • HUB 302 South

HADLEY BAJRAMOVIC IMMIGRATION LAW

UC RIVERSIDE Department of Botany & Plant Sciences

UC RIVERSIDE Center for Invasive Species Research

UC RIVERSIDE CAFÉ EST. 2015

Department of Molecular, Cell and Systems Biology (MCSB)

NEW ENGLAND BioLabs Inc.

UC RIVERSIDE Office of Technology Partnerships

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UC RIVERSIDE Environmental Sciences

UC RIVERSIDE Microbiology & Plant Pathology

UC RIVERSIDE Department of Psychology

UC RIVERSIDE School of Public Policy

AWIS ASSOCIATION FOR WOMEN IN SCIENCES UC Riverside

BioTek A part of Agilent

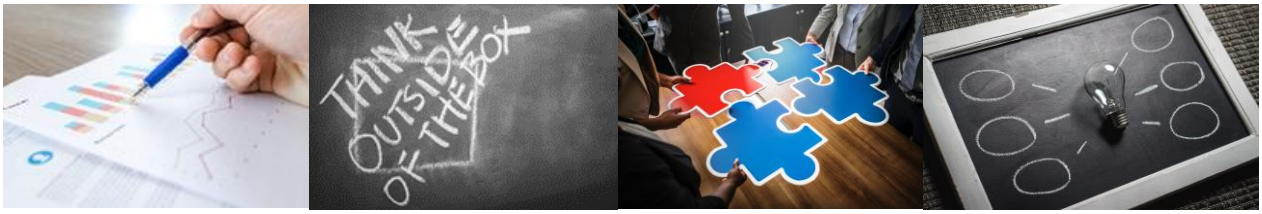
Riverside Postdoctoral Association

About RPA

The RPA was founded in 2014 as a non-profit organization and is driven by UCR postdocs that seek to improve the postdoctoral experience. Our aim is to advocate for the postdoctoral community and provide resources to address current and future needs. We support a culture of enhanced professional growth and high-quality research training where the contributions of postdoctoral scholars to the research community are fully valued and recognized. Postdocs represent tomorrow's leaders in research, academia, and industry who will drive advancement in culture, technology, policy, medicine, and the global research enterprise. UCR is America's fastest rising ranked university and is considered among the best colleges in the nation. Our diverse Postdoc community of over 230 individuals is deeply involved in driving such growth.

Postdoc Symposium 2019

Communicate **Explore** **Collaborate** **Invent**



The Postdoc symposium is a great opportunity for professional development and networking within the UC Riverside community. The goals of this event are for you to:

- **Communicate** your research
- **Explore** the diversity of postdoctoral research performed at UCR
- **Collaborate** with other postdocs
- **Invent** a world-changing idea

This day is designed to increase the visibility of Postdoc Research at UCR. The event will focus on the diversity of our community and contribution to the research excellence at UCR. It will be a great way for you to discover new fields of research, connect with future collaborators in other departments, increase your network in the research community, and stimulate innovative thinking. The symposium provides a unique opportunity to get more out of your UCR experience than spending days and nights in the lab, field, or office.

Riverside Postdoctoral Association

Symposium Agenda

8:15 am to 9:00 am	Registration and Breakfast
9:00 am to 9:10 am	Moderator **Dr. Anja Pahor,** Psychology, RPA President
	Opening Remarks **Dr. Rodolfo H. Torres,** Vice Chancellor for Research and Economic Development
9:10 am to 9:45 am	Session 1 Moderator **Dr. Salini Sasidharan,** Environmental Science, RPA Symposium Advisor
	Communication Panel: Public Engagement and Science Communication **Dr. Julia Bailey-Serres,** Director, Center for Plant Cell Biology **Dr. Hollis Woodard,** Department of Entomology
9:50 am to 10:30 am	Postdoc Talk Competition **Dr. Nina Yuan**, Medicine **Dr. Theodor Bughici**, Environmental Sciences **Dr. Arghavan Alisoltani**, Medicine
10:30 am to 10:50 am	Entrepreneurial and Intellectual Property Services at UCR **Dr. David C. Pearson,** Office of Technology Partnerships
10:50 am to 11:00 am	Break
11:00 am to 11:35 am	Session 2 Moderator **Dr. Anja Pahor,** Psychology, RPA President
	Postdoc Talk Competition **Dr. Kaycee Morra,** Earth Sciences **Dr. Kiranmayi Mangalgiri,** Chemical and Environmental Engineering **Dr. Daniel Pers,** Entomology
11:35 am to 12:00 pm	Delegation Skills Workshop **M.S. Seana Nuñez-Grider**, Human Resources Department

12:00 am to 1:00 am	Lunch and Networking
1:00 pm to 1:30 pm	Session 3 Moderator **Dr. Francesc Gómez Marco,** **Entomology, RPA Symposium Director**
	How to be Successful in a Multicultural Environment **Dr. Andrea Smith**, **Ethnic Studies**
1:30 pm to 2:10 pm	Postdoc Talk Competition **Dr. Adam Schreiner-McGraw**, **Environmental Sciences** **Dr. Maithili Ramachandran**, **Public Policy** **Dr. Huanhuan Jiang**, **Chemical and Environmental Engineering**
2:10 pm to 2:30 pm	Session 4 Moderator **Dr. Patricio Perez,** **Botany and Plant Sciences, RPA Secretary**
	Navigating the postdoctoral stage: Finding a balance between the personal life, professional uncertainty, and work demands **Dr. Evelyn Morales Vazquez**, **Medicine**
2:30 pm to 3:10 pm	Postdoc Talk Competition **Dr. Ting Yang**, **Environmental Sciences** **Dr. Monique Williams**, **Molecular, Cell, and Systems Biology** **Dr. Yingnan Hou**, **Microbiology and Plant Pathology**
3:10 pm to 4:10 pm	**Poster Session and Coffee Break** **P1. Dr. Marilia Palumbo Gaiarsa,** **Entomology** **P2. Dr. Amy Murillo,** **Entomology** **P3. Dr. Claudineia Costa,** **Entomology** **P4. Dr. Ida Karlsson,** **Psychology** **P5. Dr. Flavia Campos Freitas Vieira,** **Microbiology and Plant Pathology** **P6. Dr. Ravindra Shinde,** **Chemical and Environmental Engineering** **P7. Dr. Haiyang Wang,** **Chemical and Environmental Engineering**

	P8. Dr. Carla Hernández Garavito, Anthropology **P9. Dr. Si-Han Chen,** Chemistry **P10. Dr. Jonathan Nye,** Earth Sciences **P11. Dr. Karl Haro von Mogel,** Botany and Plant Sciences **P12. Dr. Samuel Faria,** Evolution, Ecology, and Organismal Biology **Dr. Daniela Cassol,** Botany and Plant Sciences **Dr. Anja Pahor,** Psychology
4:10 pm to 4:45 pm	**Awards and Closing Ceremony**

Keynote Speakers

Dr. Rodolfo H. Torres

Vice Chancellor for Research and Economic Development

Rodolfo H. Torres is the Vice Chancellor for Research and Economic Development at the University of California, Riverside (UCR). He is currently co-chair of the Human Resources Advisory Committee and member of the Board of Trustees of the Mathematical Sciences Research Institute (MSRI), Berkeley, California, and member of the Board of Directors of the Institute for Research on Innovation in Science (IRIS), Ann Arbor, Michigan. Torres received his Ph.D. in Mathematics from Washington University in St. Louis and held postdoctoral positions at the Courant Institute of Mathematical Sciences of New York University.

Prof. Julia Bailey-Serres

Director, Center for Plant Cell Biology

Distinguished Professor of Genetics

Prof. Julia Bailey-Serres is a Distinguished Professor, Department of Botany and Plant Sciences, UC Riverside. She is a Highly Cited Researcher, Plant & Animal Science, Thomson Reuters/Clarivate Analytics (top 1% in field) in 2018. Bailey-Serres received her Ph.D. from University of Edinburgh, Scotland, U.K. and held postdoctoral positions in University of Edinburgh, UK and University of California, Berkeley. The Bailey-Serres group performs translational plant biology from gene to field.

Dr. Hollis Woodard

Assistant Professor of Entomology, Entomology Department

Dr. Woodard is a Assistant Professor in the Department of Entomology. Woodard received her Ph.D. from University of Illinois at Urbana-Champaign. She is a recipient of 2013-2015 USDA-NIFA Postdoctoral Fellowship.The Woodard lab focuses on the feeding biology and nutritional ecology of native bees, one of our most economically and ecologically important groups of pollinators.

Dr. David C. Pearson

Office of Technology Partnerships

David Pearson, PhD, MBA is at the University of California, Riverside, leading the growth of a vibrant entrepreneurial ecosystem for UCR and the Inland Empire. UCR students, faculty and alumni have an untapped wealth of ideas, technologies and passion to build innovative businesses which will attract investment and partnerships and thus accelerate the growth of high-paying jobs in Riverside and San Bernardino counties. OTP's programs are being broadened to be the "go-to" regional resource for entrepreneurs, in close collaboration with the economic development teams of our cities and including the opening of a brand-new business incubator building with wet and dry lab space later this year!

M.S. Seana Nuñez-Grider

Human Resources Department

Seana has over 14 years of experience in training, facilitation, and organizational development. She has a Master's Degree in Industrial/Organizational Psychology. Seana works with staff across all levels at UC Riverside, and with leaders across the UC System as the program coordinator, and assessor and trainer for the UC Management Skills Assessment Program. She's been with UC Riverside for 10 years.

Prof. Andrea Smith

Chair and Professor of Ethnic Studies

Andrea Smith is Chair and Professor of Ethnic Studies at UC Riverside. Smith received her Ph.D. in History of Consciousness from UC Santa Cruz. She is an American academic, feminist, and activist against violence. Her work focuses on issues of violence against women of color and their communities. She is the author of Unreconciled: From Racial Reconciliation to Racial Justice in Christian Evangelicalism, Native Americans and the Christian Right; and Conquest: Sexual Violence and American Indian Genocide (all Duke University Press).

Dr. Evelyn Morales Vazquez

School of Medicine

Dr. Vazquez is a Postdoctoral Scholar in the School of Medicine at UCR. She received her Ph.D. from UCR. She is a qualitative social psychologist, my research interest focuses on: 1) faculty development; 2) community-based research; 3) mental health in academia, and 4) the impacts of neoliberal ideology in the academic profession, and 5) occupational health psychology.

Postdoc Ted-Style Talk Presenters

Dr. Nina Yuan, Medicine

Can Asthma Medication Protect Your Brain from NeuroAIDS?

As of 2018, UNAIDS estimates that the number of people living with human immunodeficiency virus (HIV) has grown to 36.9 million with 21.7 million receiving treatment. Around half of the HIV-positive population experiences problems in neurocognitive functioning which affects not only patient survival and quality of life but can also impact everyday functioning. Despite the availability of treatment to suppress viral levels, neurocognitive disorders persist. Studies in our lab and others have shown that anti-asthmatics are capable of protecting neurons from damage. Discerning how protection is conveyed by using asthma medication is critical not only in determining potential treatment options for HIV-induced neurodegeneration but for the multitude of other neurological and psychiatric disorders in which the receptor has been implicated. Due to its well-studied role in asthma, the wide distribution and availability of

CysLTR1 antagonists used as generic asthmatics would allow both patients and clinicians a safe, convenient, and affordable treatment for neurodegeneration.

Dr. Theodor Bughici, Environmental Sciences

Optimization of Irrigation Management of Row Crops by the Use of Numerical Weather Forecasting

A reliable forecast of potential evapotranspiration (ET0) and precipitation is key to precise irrigation scheduling for reducing water and agrochemical use while optimizing crop yield. A multi-objective optimization followed by a sensitivity analysis of a crop model (HYDRUS-1D) with two case studies was performed in order to assess the crop model sensitivity to ET0 forecast accuracy. The sensitivity analysis tested different ET0 forecast accuracy ranges spanning a plus/minus 1.25 to 20% ET0 error as ET0 based irrigation input. A 5% of ET0 bias was found to be threshold for ET0 forecast accuracy being a non-dominant parameter in both spring potatoes in a loamy sand soil and summer peanuts growing in silty clay soil case studies. For both case studies soil hydraulic parameters dominated model output and increased with increasing ET0 forecast accuracy. With respect to model output of actual transpiration, the maximum crop root depth parameter was also dominant and although precipitation for the test cases was scarce, rainfall bias dominated the model output of excess drainage of water and solutes. This analysis can help set priorities in crop management by ranking the importance of the field data that is more valuable for the farmer in optimizing the agricultural production.

Dr. Arghavan Alisoltani, Medicine

Tobacco smoking-induced changes in the population of immune cells across ten TCGA Cancer Types

Tobacco smoking is known to influence the immune system, including enhancing or suppressing various elements of both innate and adaptive immunity. Cancers that develop in an individual whose immune system is modulated by smoking may develop differently and lead to diverse outcomes. Publicly available databases such as The Cancer Genomic Atlas (TCGA) provide a unique opportunity for studying this effect and investigating such indirect consequences of tobacco smoking across different cancers. Here, we compared the proportion of major classes of immune cells between smokers (former/current) and life-long non-smokers in ten TCGA cancer types. We show that smokers have specific patterns of immune cell populations with statistically significant changes in the frequency of macrophages, mast cells, dendritic and NK cells as well as B and T cell subtypes. The significant differences between smokers and lifelong non-smokers are most pronounced in Lung adenocarcinoma (LUAD) and Head-Neck Squamous Cell Carcinoma (HNSC) but are also noticeable in the rest of the cancers for which smoking status of cases was available in TCGA. Such changes in the patterns of the immune cells are much stronger in female smokers in both LUAD and HNSC, but evident in other cancers as well. Overall, our findings suggest that the indirect effect of smoking on cancer via modulating host immunity could also be important for cancer survival and treatment in tobacco smokers.

Dr. Kaycee Morra, Earth Sciences

Decadal- and millenial-scale foraging habits of three Hawaiian seabirds: insights from stable isotope analyses

We document foraging habit differences among three Hawaiian seabird species using stable isotope datasets that extend back 50, 100, and thousands of years, respectively. Nitrogen isotope proxies reveal that all three species exhibited persistent foraging segregation over the past century and experienced a significant trophic decline during that time. We also explored the ways in which our novel hydrogen and carbon datasets reveal additional information about the foraging ecology or physiology of our seabirds. Both of these isotopic datasets are rarely generated for marine organisms or trophic levels higher than primary producers but may be useful for studying the food webs and physiology of marine predators. Information regarding foraging habits is necessary for conservation managers to assess at-sea risks and is especially critical for endangered species like the Hawaiian petrel and Newell's shearwater, which have experienced steep population declines in recent decades. Moreover, our study directs us to the perspective that a marked trophic decline was indiscriminate, affecting three Pacific seabird species that have distinct feeding strategies and population dynamics, and exhibit several other divergent morphological and behavioral traits. Potential explanations for this widespread trophic decline include industrial fishing and climate change. Collectively, our comprehensive isotopic approach provides much needed insight into alterations to vast Pacific Ocean food webs.

Dr. Kiranmayi Mangalgiri, Chemical and Environmental Engineering

New insight into UV-based treatment for water reuse: Impact of chloramines and trace contaminant removal

Growing concerns over water scarcity has increased interest in treating wastewater effluent for reuse. For potable reuse, advanced treatment typically consists of membrane-based treatment (microfiltration and reverse osmosis), followed by UV-based advanced oxidation processes, to remove low levels of ubiquitous organic contaminants. In these treatment trains, chloramines are added to wastewater to prevent membrane biofouling. However, chloramines (added as monochloramine) pass through RO membranes to enter UV reactors. The purpose of this study was to evaluate the impact of chloramine on the treatment efficiency of the UV-AOP, which used hydrogen peroxide (H2O2) as an photo-oxidant. Bench-scale experiments indicated formation of hydroxyl radicals (HO*) and reactive chlorine species. Competition kinetics using probe compounds was used to determine second order rate constants for reaction of relevant contaminants with radicals identified above. These data were used to evaluate treatment efficiency of a pilot-scale UV-AOP reactor in a full-scale water reuse system. Results indicate that increase in chloramines decreased degradation of target compounds. Furthermore, an increase in H2O2 levels at high chloramine levels provided limited improvement in treatment efficiency. These findings will be used to optimize UV-based systems for safe, reliable, and efficient water reuse, enabling timely response towards addressing water scarcity in arid and drought-stricken regions.

Dr. Daniel Pers, Entomology

Epigenetic regulation of an integrated animal-microbe metabolism throughout aphid development

Many eukaryotes contain intracellular bacteria capable of synthesizing essential compounds, allowing the host to thrive in otherwise uninhabitable niches. However, the process

by which the genomes communicate to regulate this integrated metabolism throughout host development remains elusive. Aphids utilize a long-term symbiont to obtain essential amino acids, allowing them to live on nutrient deficient sap. Transcriptomes and methylomes were generated from symbiont-containing aphid cells (bacteriocytes) from five developmental stages. Genes associated with signaling, transport, and biosynthesis pathways were differentially expressed and methylated between aphid life-stages. The most dramatic changes in gene regulation and methylation occur at the 3rd-4th instar transition, when aphid nutritional demands and symbiont titer both peak. These findings suggest that bacteriocytes are quite dynamic, changing rapidly to meet the nutritional demands of the host and regulate symbiont titer. Interestingly, de novo methylation may play a key role in the regulation of this long-lived symbiotic cell throughout development.

Dr. Adam Schreiner-McGraw, Environmental Sciences

Woody Plant Encroachment will have a Larger Impact than Climate Change on Dryland Water Budgets

Woody plant encroachment (WPE) into grasslands is a global phenomenon that alters dryland ecosystem structure and functioning. The impacts of this vegetation change, in particular for groundwater recharge, have been difficult to quantify due to nonlinearities in ecohydrological processes and a changing climate. Previous work has often assumed that deep-rooted woody plants are so efficient at collecting water that no water is able to escape the rooting zone into the groundwater. Using a physics-based model constrained by watershed observations, I find that impacts on the water budget depend primarily on the WPE pathway. In drier regions (rainfall < ~400 mm/year), conversion to shrublands with high bare soil cover increases groundwater recharge through streambeds by 29%. In wetter regions (rainfall > ~400 mm/year) however, the conversion to shrublands without creating additional bare soil reduces recharge through streambeds by 18%. Model simulations under independent and combined effects of WPE and climate change are used to assess their relative roles in a late 21st century condition. Results indicate that changes in focused channel recharge are determined primarily by the WPE pathway and not by climate change which instead yields a variable hydrologic response that can be considered as climate-induced non-stationarity. As a result, WPE should be given consideration when assessing the vulnerability of groundwater aquifers to climate change.

Dr. Maithili Ramachandran, Public Policy

The Impact of Extreme Temperatures on Newborn Health in California

This research studies the impact of exposure to extreme temperatures in utero on health at birth. We combine birth weight and gestation data for nearly 11 million births in California between 1991 and 2011 with ZIP code and trimester-specific measures of exposure to extreme temperatures. Using ordinary least squares with spatial fixed effects to identify the causal impact of temperatures, we find that warm-to-hot days have favourable effects on birth weight and gestational age in the first trimester, but adverse effects in the second and third trimesters. These impacts are disproportionately greater in ZIP codes where agriculture is the biggest employer. This suggests that primary sector occupations may render pregnant women more vulnerable to extreme temperatures than other employments. Separating births by season of conception, we find that the negative impact of extreme heat is not always confined to the second or third trimesters; rather, the negative impact emanates from the timing of a warm or hot day during a calendar year. Thus, unseasonably high temperatures – such as 80°F or 90°F days in the winter months – reduce birth weight but high temperatures in the summer inflict little harm. Policy-

wise, our results suggest that heat advisories and avoidance strategies like limiting outdoor time during hot days could be crucial to protecting pregnant women and newborn health in California.

Dr. Huanhuan Jiang, Chemical and Environmental Engineering

Still Vaping E-cigarettes? Quit now!

Recently, there have been several reports on the detrimental vaping-related conditions, such as lung injury, lipid pneumonia, and the occurrence of seizures, which illicit a great health concern regarding the usage of e-cigarette products. E-cigarettes have been considered as a safer alternative to traditional tobacco products for their reduced consumption of nicotine, and have gained popularity especially among adolescents. The majority component of e-liquid is the viscosity enhancer. It has been reported that the thermal degradation and oxidation of commonly used viscosity enhancers such as propylene glycol. They can produce a large amount of highly toxic aldehydes such as formaldehyde and acetaldehyde. Recently, a variety of new viscosity enhancers (e.g., triethyl citrate) has been used. However, to date, the chemical compositions and adverse health effects of vaping products from these viscosity enhancers are largely unknown. This project aims to provide a systematic molecular and toxicological characterization of e-cigarette vaping emissions from 8 different viscosity enhancers. Our results showed that there is an abundance of various carbonyls generated by e-cigarette vaping. A significant cytotoxicity of human airway epithelial cells has been observed after exposure to e-cigarette vaping emissions. Further work is underway to study the toxicity mechanisms of vaping products. The results of this study will alert public of e-cigarette related health risks.

Dr. Ting Yang, Environmental Sciences

Optimizing Water Management Practices to Minimize Soil Salinity and Nitrate Leaching in California Irrigated Croplands

Irrigation with a typical orchard-drip system in arid or semi-arid areas can lead to highly saline areas on the edges of the wetted area. Because of localized leaching, applying water as recommended by the normal leaching requirement (LR) based on the assumption of 1D flow and transport under drip irrigation can result in excessive leaching. Our work is focused on model adaptation to simultaneously simulate water flow, nitrogen movement and uptake, as well as transport and reactions of the major ions. Experimental work including soil column investigation in the lab and field experiments. The ultimate goals of above activities are to simulate localized leaching and solution chemistry effects (e.g., salt precipitation/dissolution) on leaching requirements and to identify optimal leaching requirements for drip and micro-spray (fan-jet) irrigation systems (including consideration of “deficit irrigation”), and to optimize salinity and nitrate leaching for major soils and crops in California.

Dr. Monique Williams, Molecular, Cell, and Systems Biology

Effects of Model, Method of Collection, and Topography on Chemical Elements and Metals in the Aerosol of Tank-Style Electronic Cigarettes

Electronic cigarettes (ECs) have undergone several evolutions resulting in devices that are larger and more powerful. The purpose of this study was to examine the effect of model, puffing topography (voltage, air-flow, puff interval), and method of collection on 19 elements/metals in aerosols from six second/third generation ECs. Aerosols were collected from six brands of clearomizers and mods using a cold trap or impinger and various puffing topographies.19 elements were quantified using inductively coupled plasma optical emission spectroscopy. 16

elements/metals were present and quantified in the aerosols. The total concentrations of elements/metals ranged from 43 to 3,138 µg/L with the impinger method of collection and 226 to 6,767 µg/L with the cold trap method. The concentrations of individual elements were often similar across brands and across topographies. Some elements (e.g., zinc) were present in most aerosols, while others (e.g., cadmium, titanium, and vanadium) were rarely found. Concentrations of some elements (e.g., lead) increased in aerosols as voltage/power increased. The model with fewest metal parts in the atomizer had the fewest metals in its aerosols. Most elements/metals in the aerosols have been found previously in the atomizers of EC. All tank style aerosols had elements/metals that appeared to originate in the atomizers, and concentrations increased with increasing power. Concentrations of some elements were high enough to be a health concern.

Dr. Yingnan Hou, Microbiology and Plant Pathology

Impossible Mission: Plant small RNAs Induce Trans-species RNAi in Oomycete Pathogens

Constantly facing challenges from potential pathogens in the environment, plants have evolved a myriad of defense mechanisms. Increasing evidence has accumulated to suggest a role of small RNAs (sRNAs) in plant immunity. sRNAs are small non-coding RNAs consisting of 20 to 30 nucleotides and regulate many biological processes. We identified a specific class of sRNAs that were important for defense response in Arabidopsis against the fungi-like oomycete pathogen Phytophthora capsici. In particular, secondary small interfering RNAs (siRNAs) generated from a subset of gene transcripts in Arabidopsis were translocated from plant host to pathogens as antimicrobial agents, and silence specific target genes in Phytophthora during infection. Production of these secondary siRNAs is induced during Phytophthora infection as a defense response. Plant mutants with declined siRNAs, generated through CRISPR/Cas9-based engineering technique, are significantly hypersusceptible to Phytophthora infection, while increased production of secondary siRNAs enhanced disease resistance. This study highlights the secondary siRNA pathway as an integral component of plant defense through trans-species gene silencing in an invading eukaryotic pathogen. More importantly, it offers exciting new opportunities to develop disease resistance in crops by engineering natural sRNA-based defense.

Poster Presenters

P1. Dr. Marilia Palumbo Gaiarsa, Entomology

Interaction flexibility predicts pollinator population dynamics

Global change alters ecological communities and may disrupt ecological interactions and the provision of ecosystem function. As ecological communities respond to global change, species may either go locally extinct or form novel interactions. In this talk I will focus on mutualisms, one of the most ubiquitous types of ecological interactions, to explore how species ability to change their interaction partners increase their persistence in the landscape. My results provide the first empirical evidence linking population dynamics to the role species play in their networks and to how flexible species are in their interaction partners. I will demonstrate the relationship between mutualistic networks and population dynamics, suggesting interaction flexibility as a

potential mechanism for communities to maintain ecosystem function, such as pollination, despite global changes and variations in community composition.

P2. Dr. Amy Murillo, Entomology

On-Animal Sensors to Assess Ectoparasite Effects on Poultry Behavior and Welfare

The northern fowl mite (NFM), Ornithonyssus sylviarum, is the most common and damaging ectoparasite of poultry in the United States. It is an obligate blood-feeding mite that causes direct damage to birds and decreases economic output. In this study, the physical condition and behavior of four cage-free flocks egg-layers were tracked before, during, and after mite infestation. The Welfare Quality Assessment® for poultry (WQA) was used to assess welfare, while on-bird sensors, which measure magnitude of force along 3-axes, were used to identify and quantify pecking, preening, and dustbathing behavior. At Week 1, WQA measures were recorded for each bird (no mites). Accelerometers were then placed on each bird for one week. WQA and sensor readings were repeated at Week 4 (low mite levels) and Week 7 (high mites). At Week 9, all birds were individually treated with an acaricide to remove all mites. WQA and sensor readings were recorded at Week 12 (no mites). Mites were then introduced to each bird in 2 flocks at Week 14, to allow for a head-to-head comparison between mite-infested and uninfested birds; the final WQA and senor readings were recorded at Week 19. Mite populations were scored for each bird weekly. Variation of WQA and behaviors among individuals is high, though trends emerged that relate welfare and behavior to mite populations on hens. To our knowledge this is the first study that relates WQA and sensor behavior readings to ectoparasite burden over time.

P3. Dr. Claudineia Costa, Entomology

What do we know about diapause in bumblebee queens? The diet and age acting at the pre-overwintering bumblebee

Diapause is a dormant state that allows the animals to survive seasons of adverse conditions. And nutrient sequestration is often a programmed part of the development and occurs, mainly, in the organisms that undergo diapause. Nutritional changes during pre-diapause could have many effects, including changes in the timing of entry into diapause. Using the bumblebee (Bombus impatiens) queens, we examined how diet and age during early adulthood influence gene expression in these queens, in the period immediately preceding their entry into diapause. We manipulated the different concentration of artificial diet for these queens during the 12-day pre-diapause nutrient sequestration period, employing concentrations that mimicked since a complete lack of sugar in the diet to realistic but high sugar concentration levels, collecting queens at multiple ages. We performed RNA sequencing to explore how diet and age impacted patterns of whole fat body gene expression. We identified differentially expressed genes related to pre-diapause processes in queens. We performed comparative analyses with genes previously identified to be associated with diapause in another species of bumblebees (Bombus terrestris). Further, queens fed the highest quality diet and were around the age of entry to diapause (12 d) began to show potential signatures of entry into diapause. This study sheds light on an essential but under-studied life stage in queen bumblebee and its potential impacts on survival.

P4. Dr. Ida Karlsson, Psychology

Age-dependent effects of body mass index on the risk of dementia – a genetic approach

While a high body mass index (BMI) in midlife is associated with higher risk of dementia, high BMI in late-life is associated with lower risk. This study combined genetic designs with longitudinal data to achieve a better understanding this paradox. We used data from 16,852 individuals in the Swedish Twin Registry born before 1959, with longitudinal information about BMI. Survival analysis was applied to investigate the risk of dementia associated with BMI at different ages. To examine if the associations are influenced by genetic susceptibility to overweight, results were stratified into those with low, medium, and high genetic predisposition to overweight, based on a polygenic score for BMI. At age 35-50, each 5 units higher BMI was associated with 50% higher risk of dementia among those with low genetic predisposition to overweight. No association between BMI and dementia was found among those with medium or high genetic predisposition. In contrast, after age 80, BMI was associated with 22% lower risk of dementia only among those with high genetic susceptibility to overweight. Not only the association between BMI and dementia differ depending age at BMI measurement, but also the effect of genetic influences. Importantly, a high BMI in midlife was associated with an increased risk of dementia only among those with low genetic predisposition to overweight, indicating that the association is mainly mediated through environmental factors, and is hence likely modifiable.

P5. Dr. Flavia Campos Freitas Vieira, Microbiology and Plant Pathology

Transit of a mechanically inoculated bacteria native to the citrus microbiome that can be used to manage the HLB vector

Huanglongbing (HLB) is the most devastating citrus disease worldwide, associated with a phloem limited bacterium, Candidatus Liberibacter asiaticus (CLas), vectored by the Asian Citrus Psyllid (ACP). In order to enable an environmentally benign, Bacillus thuringiensis (Bt) toxin-based approach for citrus growers to control ACP, the goal of this work was to identify the natural habitat of a native bacteria of citrus to be used as Bt-toxin delivery system. The putative phloem-inhabiting bacteria, Pantoea vagans, was identified in citrus trees of Florida and California, isolated and labeled with green fluorescent protein (GFP). The bacteria was inoculated mechanically in citrus trees branches using needle inoculation. After 3 and 8 days post inoculation, branches at, above and below inoculation point were collected and macerated to re-isolate the GFP-labeled Pantoea vagans. In addition, the tissue collected was sliced, fixed and prepared to observation under fluorescence microscope. GFP-labeled P. vagans was re-isolated from branches in both time-points at, above and below inoculation point and its identity confirmed by PCR. The bacteria was found to colonize the xylem vessels of the branches and move systemically. These results give us strong indication of one of the niches that this bacteria can inhabit in citrus and therefore continue the work to engineer it to express Bt-toxin in the citrus vascular system aiming to control ACP population.

P6. Dr. Ravindra Shinde, Chemical and Environmental Engineering

Nonlinear Polarization and Low-Dissipation Ultrafast Optical Switching in Phosphorene

Fundamental limits to the computation using silicon-based devices stimulate other emerging and viable alternatives. Manipulation of the electrical and optical properties with the ultrafast and intense electric fields offers one of such alternatives. Here, we study the interaction

of high-intensity pulsed femtosecond laser of various intensities and carrier frequencies with a monolayer phosphorene using the real-time real-space time-dependent density functional theory. The nonlinear induced currents are entirely reversible but are phase-shifted compared to low-intensity lights within the period of incident laser. We observe optical Kerr effect associating the changes in the number of free charge carriers with the change in the refractive index of the material, which subsequently characterizes the material's ability of dielectric switching. The transient changes in refractive index are reversible up to a certain threshold, suggesting that the properties can be switched on the timescale of an optical period, enabling the possibility of operating solid-state electronic devices at optical frequencies. The amount of irreversibly transferred energy into the system is found to be much smaller than that of the state-of-the-art metal–oxide field-effect transistor, thereby making phosphorene a promising candidate for high-speed electronics.

P7. Dr. Haiyang Wang, Chemical and Environmental Engineering

Ink formulation strategy of high loading nanothermite for 3D printing

The additive manufacturing of energetic materials such as propellants, explosives, and pyrotechnics has received the most worldwide attention and high energy density 3D-structured energetic material is highly desired. Here, we develop an ink formulation with only 10 weight percent (wt.) of polymers which can bind a 90 wt. % nanothermite using a simple direct-writing approach. The ability to have such high particle loadings would significantly open up new avenues for practical application and implementation of nanothermites which have thus far been unavailable. The key additive in the ink is a hybrid polymer of polyvinylidene difluoride (PVDF) and Hypromellose (HPMC), in which the former serves as an energetic initiator, and the latter is a thickening agent and a binder which can adhere particles with a small percentage of polymer. The rheology shear thinning properties of the ink was critical to make the formulation at such high loadings printable. The Young's Modulus of the printed stick is found to compare favorably with Polytetrafluoroethylene (PTFE), with a particle packing density at the theoretical maximum. The linear burn rate, mass burn rate, flame temperature, and heat flux were found to be easily adjusted by varying the fuel/oxidizer ratio. The average flame temperatures are as high as ~2800 K with near-complete combustion being evident upon examination of the post-combustion products.

P8. Dr. Carla Hernández Garavito, Anthropology

An Archeology of Crafting, Gender, and Resistance in the Central Andes

My work centers on how women in the Peruvian Andes reclaimed their role in social and political life through crafting during the first centuries of the Spanish Conquest. Archaeological evidence shows us that women in the past were not only part of public life, but leaders, crafters, and entrepreneurs. However, catholic evangelization in the Americas directly impacted the role of women in the political landscape. Indigenous women were shunned from the public sphere and displaced to household work. My research centers on the specific mechanisms used by women to reclaim their participation in public life. I focus on the archaeology and history of a disappearing community of potters, primarily women, in the Peruvian highland region of Huarochirí. My broad objective is to investigate whether crafting was a form of resistance by indigenous women. Through archaeological, historical, and ethnographic work, I examine how the creation of a "potters' identity" shifted the social relationships within the town and redefined gender roles in the region. Indigenous women in Latin America have been are the forefront of fights for social

justice. Through my work, I present the history of a specific group of women who, through crafting, found a way to escape colonial limitations and recapture their position in Andean society.

P9. Dr. Si-Han Chen, Chemistry

Structure-kinetics relationship study of CDK8 inhibitors with milestoning

This presentation discusses use of computer modeling to reveals factors that determine ligand-binding kinetics and to assistant drug design. Using metadynamics simulations, we obtained plausible dissociation pathways of 5 type-II inhibitors of cyclin-dependent kinase 8 (CDK8). By mapping the high-dimensional protein-ligand dissociation process into 2-dimensional space, we proposed a novel strategy to define milestones and reaction coordinates. Rugged free energy landscapes computed by the milestoning theory revealed multiple intermediates along the dissociation path. The protocol also obtained the correct rank of experimental residence times of the 5 compounds. Based on the high-resolution free energy profiles, we concluded that lacking multiple small energy barriers results in much short residence time than slower compounds. Furthermore, the milestones determined in this work retained the main interactions, conformation fluctuations, and solvent effects occurring during the dissociation. In accord with the unbinding free energy profiles, this information reveals potential interactions that may further stabilize the intermediate states, which are used to suggest modification in existing compounds. The agreement of the computed and experimental binding kinetics suggests that this approach can be utilized in drug design projects aimed at optimizing the residence time of large and flexible systems.

P10. Dr. Jonathan Nye, Earth Sciences

Ecological Crisis in the Salton Sea

The Salton Sea, California's largest lake, is undergoing significant changes as water levels decrease and salinity increases. The Salton Sea lies along the Pacific Flyway, a migratory path stretching from the Arctic to the tropics. The lake sees over 200 species of birds in the winter, including many endangered and threatened species. Many of these bird species rely on tilapia (Oreochromis mossambicus), the dominant fish species in the lake, which are approaching their physiological limits in salt intake. We use measurements of stable isotopes to identify changes in diets of birds and fish in the Salton Sea to see how tilapia, pelicans and other birds rely on this changing environment. We compared populations of birds and fish over multiple years using $\delta 13C$, $\delta 15N$ and $\delta 2H$, indicating resident individuals and those that migrate. Tilapia show increasing carbon and nitrogen values while birds show a mixed response over the last three years to Salton Sea ecosystem dynamics, which may indicate changes at the base of the food web and adaptive behavioral changes in higher trophic level individuals as animals struggle to survive in shrinking niches. These significant ecological shifts are presenting themselves rapidly and underscore the need for more immediate action to address potential food web collapse at the Salton Sea.

P11. Dr. Karl Haro von Mogel, Botany and Plant Sciences

Development of HLB Resistant Citrus Varieties for California Using CRISPR-Cas9

Huanglongbing (HLB), also known as citrus greening, is emerging as a threat to the citrus industry in California, and resistant varieties are needed. We are using genome editing with CRISPR-Cas9 to develop non-transgenic HLB-resistant varieties of Washington Navel Orange,

Lisbon Lemon (Limoneira 8A), and Tango Mandarin. We are targeting previously-identified candidate HLB-susceptibility genes for genome editing via protoplast isolation from embryogenic cells. Plants will be recovered, cultivated, and top-grafted onto mature scions in a greenhouse. The candidate plants will be challenged with the disease to evaluate the level of resistance. Our goal is to develop and release HLB-resistant varieties important for California that can be effective and sustainable solutions to HLB.

P12. Dr. Samuel Faria, Evolution, Ecology, and Organismal Biology

Coral phenotypic plasticity under climate changes reinforces the Southern Atlantic Ocean as a potential refugium

Coral reefs are threatened by climate changes. Ocean warming leads to disruptions of symbiosis (bleaching) between corals and photosynthetic micro-algae, promoting nutrient starvation due to impairments on energy availability. Reef communities at high latitudes may serve as refugia because of the shorter and less intense sunlight periods, or due to reduced irradiance and increased nutrient levels provided by water turbidity. Bermuda and Brazilian reefs illustrate such opposing water physicochemistry, and also represent the Northern- and Southernmost reefs of the Atlantic Ocean. We evaluated symbiont density and chlorophyll content in several coral species from both sites under natural conditions and simulated climate changes. We tested for a higher tolerance to bleaching in the Brazilian ones, and an environmentally driven evolution of coral-dinoflagellate symbiosis. Under natural conditions, symbiont density was greater in Bermuda; chlorophyll content did not differ between sites. After simulated treatment, mean symbiont density decreased ≈30% in corals from both sites. However, despite that mean chlorophyll content decreased 10% in the Northern corals, the Brazilian species increased it in 90%, meaning up to a 7-fold boost in the amount of chlorophyll per symbiont. These results reveal notable resilience and strong plasticity in the Brazilian corals, reinforcing Southern Atlantic Ocean as a potential refugium for marine life, deserving priority conservation policies.

Dr. Daniela Cassol, Botany and Plant Sciences

SystemPipeR - Automated Workflow and Report Generation Environment

systemPipeR is an R/Bioconductor package for building and running automated end-to-end analysis workflows for a wide range of NGS applications. Important features include a uniform workflow interface across different NGS applications, automated report generation, and support for running both R and command-line software, such as NGS aligners or peak/variant callers, on local computers or HPC clusters. The latter supports interactive job submissions and batch submissions to queuing systems of clusters. Efficient handling of complex sample sets and experimental designs is facilitated by a well-defined sample and metadata annotation infrastructure which improves reproducibility and user-friendliness of many typical analysis workflows in the NGS area. Our main development efforts for the next major upgrade of systemPipeR include: major enhancements to the workflow environment, as well as to the user and command-line interfaces; release of a total of 10 ready to use and community tested workflow templates developed in collaboration with NGS domain experts; addition of various convenience functions for building interactive analysis reports and visualization routines; a strong focus on community integration and performance evaluations provided by systemPipeR's current and future users. The latter includes options for users to contribute code or entire workflows, and extensive training of the target audience to analyze NGS data with systemPipeR and related Bioconductor resources.

Dr. Anja Pahor, Psychology

Multisensory Facilitation of Working Memory Training and Transfer

Exposure to stimuli presented in multiple sensory domains facilitates learning and memory. Here we test the hypothesis that training on a multisensory working memory (WM) task will improve performance on untrained tasks compared to visual WM training alone or training that contains the same amount of visual and auditory stimuli but are presented as separate WM tasks. Healthy adults (N = 109; data collection is ongoing) were randomly assigned to 4 conditions: Multisensory WM training (N = 25), Visual only WM training (N = 28), Alternating visual/auditory WM training (N = 26) and a Control group who did not do any training (N = 32). The three active groups trained for 12 days (up to 40 min per day) on an N-back WM task on tablet computers. All groups completed a battery of pre- and post-tests; here we focus on transfer to WM tasks. Results showed that participants in the Multisensory group showed the largest gains on the training task compared to the other training groups. Out of the four groups, only the Multisensory group showed significant improvement on an untrained N-back task and on two complex WM tasks, whereas no difference between the groups was observed on a simple WM task. These results suggest that incorporating multisensory objects in a WM training protocol can benefit performance on the training task and facilitate transfer to tasks that require manipulation of information in working memory.

RPA Board

Dr. Anja Pahor, Psychology
President

I am a psychologist with a Ph.D. in Behavioral and Cognitive Neuroscience. My research interests involve understanding the mechanisms underlying higher-level cognitive functions, particularly memory, reasoning, and learning. I enjoy being part of the vibrant and international postdoctoral community at UC Riverside and I am honored to work with the fantastic team that makes up the Riverside Postdoctoral Association.

Dr. Daniela Cassol, Botany and Plant Sciences
Vice President

Development of computational data analysis methods for genome biology.

Dr. Patricio Perez, Botany and Plant Sciences
Secretary

I am working at Yang Lab in the elucidation of the global mechanisms that spatiotemporally coordinate the pavement cell morphogenesis throughout the entire epidermis of leaves in Arabidopsis.

Dr. Sharma Yamijala, Chemical & Environmental Engineering
Treasurer

I am a computational/theoretical chemist and materials scientist. My current focus is on developing, implementing and applying various non-adiabatic molecular dynamics methods to study Hot-molecule/atom/electron mediated catalysis.

Dr. Marta Ruiz Valdés, Botany and Plant Sciences
Communications Director

Development of fast screening methods to detect resistance or tolerance to biotic stresses (Citrus nematode, Citrus tristeza virus & Huanglongbing) for citrus breeding in California.

Dr. Morgan Halane, Plant Pathology and Microbiology
Social Chair and Public Engagement Representative

The roles of secreted proteins from the citrus greening disease-associated bacterium (CLas)

Dr. Marta Pudzianowska, Botany and Plant Sciences
Graphic Design Representative

Turfgrass breeding and genetics. Improving warm-season grasses for winter color retention and drought tolerance.

Dr. Francesc Gómez Marco, Entomology
Symposium Director

Proactive biological control of the invasive pest, the Spotted Lantern Fly (SLF). Host specificity studies of the SLF parasitoid on the lantern fly native species from the west coast.

Dr. Salini Sasidharan, Environmental Science
Symposium Advisor

I am an Environmental Scientist with a Ph.D. in Environmental Science and Engineering from the Flinders University and CSIRO, Australia. My research focuses on developing next-generation engineering infiltration techniques and devices to resolve many water quantity and quality issues across the globe. I am passionate about advocating STEM education and effectively communicate science to the public.

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Judges and Evaluation Team

Dr. Scott A. Bradford, USDA-ARS Salinity Lab Research Soil Scientist

Scott A. Bradford is a Research Soil Scientist with the United States Salinity Laboratory in Riverside, California. He received Ph.D. degree in Soil Science (Soil Physics) from the University of California, Riverside. Dr. Bradford is an internationally recognized scientist who has 24 years of professional research experience. His current research focuses on understanding and simulating the transport and fate of microorganisms, colloids, colloid-associated contaminants, and nanoparticles in soil and groundwater environments. Bradford has authored over 140 peer-reviewed publications on a wide variety of topics in Soil Physics, Contaminant Hydrology, and Environmental Engineering. His publications have been highly cited by his peers and served as the basis for externally funded research. He is currently the Editor-in-Chief for Critical Reviews in Environmental Science and Technology (2017-present) and the 2019 Soil Physics and Hydrology Division Chair.

Dr. Deborah Pagliaccia, California Agriculture and Food Enterprise (CAFÉ)

Managing Director

Dr. Pagliaccia is a professional researcher in the Department of Botany & Plant Sciences and an academic coordinator at the Dean's office of the College of Natural & Agricultural Sciences (CNAS), at the University of California, Riverside. Dr. Pagliaccia is the managing Director of the California Agriculture and Food Enterprise (CAFÉ) at UC Riverside. Dr. Pagliaccia strongly believes that public engagement in science and education is critical for our society and that is particularly important to explore, invest and engage the public in novel sustainable horticultural practices as well as plant growth systems that emphasize biodiversity and have reduced environmental footprints, especially in water usage.

Dr. Jules L Bernstein, University Communications, UCR

Senior Public Information Officer

In her role as Senior Public Information Officer, Jules reports on and disseminates peer-reviewed research and other news related to the College of Natural and Agricultural Sciences. Jules comes to UC Riverside from Sandia National Laboratories, where she earned awards for writing about a variety of projects ranging from genetic engineering to biofuels and materials science. Prior to that, she spent 15 years as a journalist in San Francisco print, TV and radio outlets, as well as five years in public policy research.

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