



Western Center for Agricultural Health and Safety • University of California, Davis

WCAHS funding successfully renewed for 25th year of service

Letter from the Director

We are pleased to announce that the Western Center for Agricultural Health and Safety (WCAHS) just received a \$10 million grant renewal from the National Institute of Occupational Safety and Health (NIOSH).

Agriculture still remains one of the most hazardous industries in the United States, based on occupational fatality rates. Agriculture is also the largest industry in California and employs up to one million farm workers, primarily Latino immigrants who are a vulnerable population.

WCAHS' mission is to understand and prevent illness and injury in western agriculture. We have had great success, including developing real-time pesticide exposure bioassays, ergonomically improved tools to reduce cumulative trauma injury in agricultural workers, and a state-mandated heat-related illness education campaign. Our outreach programs have reached thousands of farmers, managers and farm workers with programs to reduce the health hazards of agricultural work.



Marc Schenker, MD, MPH

I am delighted that outreach funding is more than quadrupled with the renewal. We plan to ramp up WCAHS' educational health and safety efforts through more on-site trainings, social media, videos, and publications. WCAHS has an exciting new collaboration with the Natividad Medical Foundation in Salinas to reach indigenous farm workers, and we continue our successful work with the Health Initiative of the Americas at UC Berkeley. From past experience, we know that creating materials and programs that are culturally, linguistically and educationally tailored to each stakeholder group – from farm workers to regulators – is key to success.

The renewal also introduces two new areas of research. Christopher Simmons will

study biosolarization as an alternative to fumigation (see article on page 2). Stephen McCurdy will examine the risk factors and prevalence of workplace sexual harassment experienced by women Hispanic farm workers.

We continue advancing research on respiratory health, ergonomics, and heat illness in the renewal. Kent Pinkerton will focus on determining which agricultural practices pose the greatest risk in terms of worker exposure to airborne particulate matter. Fadi Fathallah will study balancing the need for crop picking productivity versus preventing musculoskeletal disorders with the use of mechanical and robotic strawberry harvest-aids. My team and I will be translating the economic, socio-cultural and physiological factors of

heat illness into effective interventions, such as a phone app for farm supervisors.

In conclusion, I want to recognize the tremendous achievements provided by the many faculty and staff of WCAHS. It is their work that makes us what we are.

You can continue to expand these efforts by donating to WCAHS (give.ucdavis.edu/C4HA). Donations help support future leaders (students), research solutions, education outreach, and recommendations to state and policy makers on agriculture-related occupational health and safety.

Be sure to check us out on our website, blog, Facebook, and Twitter.

Sincerely,

Marc Schenker

WCAHS website: agcenter.ucdavis.edu

Blog: westernaghealthandsafety.wordpress.com/



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www.facebook.com/NoticiasSaludAgUcDavis (NEW!)



@Westernaghealth

Christopher Simmons studies alternative to soil fumigation

WCAHS welcomes new investigator Christopher Simmons to the research team. Simmons, an assistant professor in the UC Davis Department of Food Science and Technology, will be conducting a study on biosolarization as an alternative technology to soil fumigation. Soil fumigants are used to kill nematodes, weeds, bacteria, fungi, and insects that damage crops. Here, he talks about his research.



Christopher Simmons

Why are alternatives to soil fumigants needed?

Conventional soil fumigants have been identified by federal and state regulatory agencies as carcinogens and both acute and cumulative toxins. Several instances of disease stemming from accidental fumigant exposure involving both agricultural workers and nearby residents in agricultural communities highlight the need to reduce exposure risk. For perspective, chloropicrin, one

of the most widely used fumigants, was used in World War I as a nerve gas. A safer, effective method to suppress soil-borne pests would benefit everyone – farmers, farm workers, and local communities.

What is biosolarization?

Biosolarization is simply an extension of solarization, which many people do in their garden. A plastic tarp is placed on top of moist soil to trap solar radiation and heat the soil to a high enough temperature to kill soil-borne pests. While effective, solarization can take four to six weeks, which is too long for many growers to have their field lay fallow.

Biosolarization seeks to speed up and improve solarization. This is done by adding organic amendments, such as fruit and vegetable processing residues or compost, to the soil before it is tarped with plastic. The organic amendments promote the growth of thermophilic (heat-tolerant) bacteria that tend to compete with plant pest organisms. In addition, these bacteria produce volatile fatty acids (example, acetic acid) that temporarily make the soil more acidic and less hospitable to pests. Combined, the soil heating and microbial activity can decrease the soil treatment time to a matter of days.

Simmons continued on 3

Migration and agricultural health and safety in a global context

WCAHS Director Marc Schenker to hold conference on Migrant Labor and Global Health in March 2017

Agricultural health and safety will be a featured topic at the upcoming Migrant Labor and Global Health (MLGH) Conference to be held at UC Davis March 2-3, 2017. Often referred to as a “megatrend” of our

time, global migration is a phenomenon that involves over 244 million people worldwide, most of whom move in search of work and wellbeing. In the United States alone, 80 million people are first- or second-generation immigrants.

Migration is an issue closely related to agricultural health and safety in California, given that 7 in 10 California farm workers are foreign born. California is heavily dependent on immigrants to support its \$47 billion agriculture industry,

which produces two-thirds of the fruits and nuts, and over a third of the vegetables in the U.S. Agricultural jobs are among the most hazardous for workers, and occupational risks are exacerbated when workers do not speak English and have low education levels, which is characteristic of California’s ag workforce.

The MLGH Conference is a two-day exploration of migration and its occupational health, demographic, economic, and political aspects. The conference brings together an interna-

Conference continued on 4



Migrant Labor and Global Health Conference
March 2-3, 2017
UC Davis Conference Center

For free registration visit
www.mlghconference.com
or email: info@mlghconference.com

Presented by:

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MIGRATION AND HEALTH RESEARCH CENTER
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Students study effects of ag particulate matter exposure

This issue highlights three students who have worked with WCAHS Associate Director Kent Pinkerton to better understand how exposure to California agricultural particulate matter contributes to allergic airway inflammation.



Yoomin

Yoomin Ahn has been involved in studying the mechanisms of adult-onset asthma due to the high incidence of this condition in women in the California Central Valley. Her studies have been instrumental in establishing age-based immune responses leading to enhanced inflammation and greater degradations in lung function in older female mice as a model of adult-onset asthma. Yoomin graduated in September with a master's degree in forensic science and plans to pursue additional training in forensic techniques prior to entering medical school.

Alexa Kim Pham has been studying immune-mediated mechanisms of chronic lung inflammation and pulmonary hypertension due to particulate matter exposure. Her research has established a unique role in the transition of the alveolar macrophage being part of the acute inflammatory

process to adapting the lungs to activate repair mechanisms. Alexa is graduating in December with a Ph.D. in immunology and will return to San Diego to pursue research career opportunities in industry and/or academia.

Alfonso Magaña-Méndez, from the Universidad Autónoma de Baja California, Mexico, studied the pulmonary inflammatory effects of California Central Valley particulate matter in comparison to Chinese particulate matter this



Alexa



Alfonso

summer through a mentoring summer research internship program. The study was done to help both the United States and China better understand how the chemical composition of particulate matter influences health effects. Alfonso worked in the lab as well as lectured to pre-veterinary UC Davis students on the respiratory system and the cardiovascular system.

Simmons *continued from page 2*

What does your research project involve?

We will be validating biosolarization under commercial agricultural conditions. In order for growers to adopt biosolarization, they must feel that it is effective, timely, and economical. We will use grape and tomato processing residue along with yard waste compost to amend soil for biosolarization and assess efficacy against two common crop pests – puncture vine, a major North American agricultural weed, and the roundworm *Meloidogyne incognita*, which causes root knot disease.

Optimal pest eradication conditions will be determined first in laboratory bioreactors – small bottles with soil and inserted pests that mimic biosolarization conditions in the field. Next, real field trials that compare biosolarization with and without soil fumigation will be held at a farm associated with the Sunnyside Packing Company in Fresno, California, and the UC Kearney Agricultural Research and Extension Center in Parlier, California.

Will you be testing for potential worker exposure to toxic fumes?

Yes, a third part of the study is taking gas samples from the fields undergoing no treatment, biosolarization, biosolarization with minimal fumigation, or fumigation only. Gas will be sampled at height levels that workers would likely be exposed. It is expected that biosolarization will contribute the least amount of toxic gas levels, other than the control, and thus be safer for workers and the surrounding community.

What is your ultimate goal with the project?

Currently, small organic farmers and leafy green growers in the California Imperial Valley use biosolarization. Not only is biosolarization a sustainable approach to pest control by recycling food waste, but it also holds great potential for western states that have hot, sunny climates. Results from this study will help determine the safety and health benefits of biosolarization as well as provide actionable information to growers on how to adopt biosolarization in place of conventional soil fumigation.

Conference *continued from page 2*

tional group of experts to discuss international migration, labor and health issues from a multidisciplinary perspective. A full afternoon is dedicated to occupational health issues with a keynote session provided by John Howard, Director of the National Institute for Occupational Safety and Health. The afternoon will include a panel session on vulnerable groups of workers with three dynamic speakers: Michael Flynn, who manages research on improving the occupational

health of immigrant workers; Thu Quach, an accomplished research scientist who studies the impact of environmental health issues on disadvantaged populations; and Thomas Arcury, whose research concerns pesticide exposure, green tobacco sickness, skin disease, injuries, housing conditions, and food security among migrant and seasonal farmworkers, concerns that are particularly relevant in agriculture in the Western region. The conference also includes panel sessions on demography, economics of labor migration and public policy.

Marc Schenker, director of WCAHS, will co-host the event along with Giovanni Peri of the Department of Economics at UC Davis. Of immigrant occupational health, Schenker says, "There are higher rates of occupational injury and illness in sectors that heavily employ immigrants. These disparities are generally unknown to the public and to legislators. We need to understand the reality beyond the political hyperbole."

In addition to occupational health, MLGH will address demographic, legal and economic issues, bringing

together renowned scholars and leaders from national and international organizations working towards protection of immigrants' health.

Students and researchers working on issues related to migration and health are encouraged to submit posters for consideration at mlghconference.com/posters.php.

Registration for the conference is free at www.mlghconference.com. The event will be held at the UC Davis Conference Center.



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Calendar

Monday, Nov. 7, 4–5 p.m., CHE, Old Davis Road, Davis "Complex Relationships: Farm Labor Contractors/Employees," **Lupe Sandoval**, Calif. Farm Labor Contractor Assoc.

Monday, Dec. 5, 4–5 p.m., CHE, Old Davis Road, Davis "Solarization and Biosolarization as Sustainable Fumigation Alternatives for California Agriculture," **Christopher Simmons, Ph.D.**, UC Davis

Monday, Feb. 6, 4–5 p.m., CHE, Old Davis Road, Davis "Health Care and Coverage for California Farmworkers: What are the Policy Opportunities?" **Joel Diring, J.D., MPH**, Diring and Associates

March 2–3, UC Davis Conference Center, Migrant Labor and Global Health Conference (see article that begins on page 2)

GIFTS TO WCAHS help advance science and training to promote farmworker health and safety and disseminate knowledge to our stakeholders. If you would like to donate, please visit: give.ucdavis.edu/C4HA on the web.

NIOSH National Institute for
Occupational Safety and Health
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