

A tall, white, lattice-structured water tower with a rounded top. The words "UC DAVIS" are printed in large, bold, black letters across the top of the tower. The tower is set against a clear sky and is partially obscured by the branches and leaves of trees in the foreground.

UC DAVIS



**Western Center for
Agricultural
Health and Safety**

**2006 Asilomar Conference
Pacific Grove, California**

Welcome!

Along with Dr. Kent Pinkerton, the 2006 Asilomar conference chair, and Richard Fenske, Ph.D., director of the Pacific Northwest Agricultural Safety & Health Center (PNASH), I am honored to welcome you to Pacific Grove, Monterey County, California. Our conference, Health & Safety in Western Agriculture: Research to Practice r2p, has been exciting to put together. We are grateful for the generosity of our sponsors and the commitment of our staff and speakers. I would especially like to thank the 2006 Western Ag Conference planning committee: Fadi Fathallah, Karen M. Lewis, Marcy Harrington, Jim Seiber, Sabina Swift, Stephen McCurdy, Frank Mitloehner and Jennifer Weber.

In addition to our exceptional conference program, and the fun pre-conference barbecue at the boardwalk, a memorable event will be a Conference reception at the National Steinbeck Center. As a reception attendee, you will receive a complimentary copy of *The Grapes of Wrath*, John Steinbeck's Pulitzer Prize-winning epic about the migration of a Dust Bowl farm family to California and the conflict between the powerful and powerless during the great depression.

Thank you for joining us, let us know if we can be of assistance, and of course make time to walk on the beach and watch the sunset on the Pacific.

Marc Schenker, M.D., M.P.H.

Director of the Western Center for
Agricultural Health and Safety (WCAHS)

Fascinating Facts about the Monterey area

- A young woman by the name of Norma Jean was crowned Castroville's first "Artichoke Queen" in 1947. She was later to gain fame as actress Marilyn Monroe.
- Ninety percent of the Brussels sprouts grown in the United States are from Santa Cruz County.
- In 1945, the year John Steinbeck's famous book, *Cannery Row*, was published, nearly a quarter-million tons of sardines were processed at Monterey's Cannery Row, making a peak year for this once-thriving industry.
- Our rich, agricultural jewel known as the Salinas Valley covers 640, 000 acres.
- Carmel-by-the-Sea, a city encompassing just one square mile, has more than 100 art galleries
- The infamous 1906 earthquake left many San Francisco artists, writers and musicians homeless. Many moved to Carmel, forming a bohemian colony in the town now recognized as one of the world's finest art capitals.
- Neon signs, billboards and fast food establishments are prohibited in Carmel-by-the-Sea.
- First Theatre in Monterey, built in 1846, is California's first (and still operating) theatre.
- The California Rodeo, held annually in Salinas, is ranked (by total purse) in the top ten of the 650 rodeos sanctioned by the Professional Rodeo Cowboys Association. Its inception can be dated back as early as 1909, when the concept of "a Wild West Show with a few bucking horses to fill in the gaps between races at the track" was first discussed.
- The Bixby Creek Bridge, one of the world's highest single-span concrete arch bridges, is 714 feet long and 260 feet high. It was built by prisoners eager to earn "good Time" off their prison sentences. Dedicated in 1932, it is declared to be "one of the most photographed bridges in the world."
- Carmel Valley averages 283 sunny days a year.
- The first—and last—Annual Monterey International Pop Festival, held here in 1967, featured such rock stars as the late Janis Joplin and "unknowns" like Jimi Hendrix. The latter's performance at this event, however, launched him as an instant superstar.



HEALTH & SAFETY IN WESTERN AGRICULTURE: Research to Practice



**September 20-22, 2006
Asilomar Conference Grounds**

Presented Jointly by:

Western Center for Agricultural Health & Safety (WCAHS)
Kent E. Pinkerton, Ph.D., Conference Chair, WCAHS Associate Director
Marc B. Schenker, M.D. M.P.H., WCAHS Director, UC Davis PHS Department Chair
and the
Pacific Northwest Agricultural Safety & Health Center (PNASH)
Richard Fenske, Ph.D., PNASH Director, Professor, University of Washington

In collaboration with

Southwest Agricultural Center for Safety and Health, Texas
High Plains Intermountain Agricultural Center for Safety and Health, Colorado

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California Department of Occupational Safety and Health
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Hosted by

UC Davis Western Center for Agricultural Health and Safety (WCAHS)

HEALTH & SAFETY IN WESTERN AGRICULTURE:

Research to Practice

September 20-22, 2006

Asilomar Conference Grounds

Wednesday, September 20

- 1:00-5:00 pm Poster exhibits set up in Merrill Hall
- 1:00-5:30 pm Conference Registration in the P.A. Hearst Social Hall
- 6:00 pm Welcome BBQ dinner on the boardwalk at the Asilomar Fire Pit
- No-host bar
 - Dress warm and casual.

Thursday, September 21

- 7:00-8:20 am Breakfast: thematic tables for informal discussions with presenters/ag health & safety experts in the Woodlands Room at Crocker Dining Hall
- 7:30-5:00 am Open registration and poster viewing in Merrill Hall
- 8:30 am Welcome, introductions and overview in Merrill Hall
Kent E. Pinkerton, Ph.D.,
Marc B. Schenker, M.D., M.P.H.,
Richard Fenske, Ph.D.
- 9:00 am Keynote
From Research to Practice (r2p): The New NIOSH Initiative
George Conway, M.D.
- 9:30 am *r2p in Monterey County and the Impact on its Agricultural Populations Health*
John Snider, M.P.H., M.P.A.



10:00-10:30 am Break and Poster Viewing

Thematic Session I—Challenges and Opportunities of r2p

- 10:35 am *Challenges and Opportunities of r2p*
Chairs: Don Villarejo, Ph.D. and Richard Fenske, Ph.D.
- 10:45 am *Overview of r2p, History, Success, and Challenges*
Richard Fenske, Ph.D.
- 11:10 am *Mitigating Risks in the Agricultural Workplace: Opportunities and Responsibilities for Employees*
Ofelio Borges
- 11:35 am *Can We Make the Agricultural Workplace Safer Amid Rapid Technological Change?*
Don Villarejo, Ph.D.
- 12:00-1:15 pm LUNCH – Crocker Dining Hall
- 1:20 pm *Agricultural Health & Safety Challenges and Success in Monterey County*
Eric Lauritzen

Thematic Session II—Policy and Behavior Implications of r2p

- 1:45 pm *Policy and Behavior Implications of r2p*
Chairs: Jenny Weber and Sabina Swift, Ph.D.
- 1:50 pm *NIOSH – Research to Practice: Translating Research Results Into Action*
DeLon Hull, Ph.D.
- 2:15 pm *Policy and Practice in the Reforestation Industry: Evaluation of Occupational Health and Safety for los Pinos*
William Krycia, M.P.H., C.I.H.
- 2:35 pm *How Decision Making is Influenced in the Legislature*
Elizabeth McLoughlin, Sc.D.
- 3:00-3:20 pm Break

Thematic Session II—Policy and Behavior Implications of r2p... continued

- 3:20 pm Washington Growers League
Mike Gempler
- 3:50 pm Tractor Safety Initiative: The Process of an Initiative in the Making
Max Lum, Ph.D.
- 4:15 pm Closing Remarks
Kent Pinkerton, Ph.D.
- 6:00-9:00 pm Steinbeck Museum
- Substantial/dinner hors d'oeuvres will be provided with a no-host bar.
 - Buses will transport guests from the area between the Crocker Dining Hall and Hearst Hall at 6:00 pm.
 - Guests will return to Asilomar by 9:30 pm

Friday, September 22

Thematic Session III – Agrochemicals/Respiratory – r2p

- 7:00-8:00 am Breakfast: Informal discussions with presenters and ag health and safety in Woodlands
- 8:15 am Agrochemicals/Respiratory: r2p Issues in Merrill Hall
Chair: Kent Pinkerton, Ph.D.
- 8:20 am The Role of Research in Regulating Pesticides
Paul Gosselin
- 8:45 am Air Blast Applications: Pesticide Drift
Mike Yost, Ph.D.
- 9:10 am Does Air Quality Impact Agricultural Workers?
Frank Mitloehner, Ph.D.
- 9:35 am Preventing Respiratory Disease in Western Agriculture: Translating the Science
Marc Schenker, M.D., M.P.H.
- 10:00-10:15 am Break

Thematic Session IV—Community-Based r2p

- 10:20 am Community Based r2p
Chairs: Marcy Harrington, M.P.A., and Helen Murphy, M.H.S., F.N.P.

- 10:25 am Understanding Your Audience and Field Testing
Helen Murphy, M.H.S., F.N.P.
- 10:45 am Moving r2p Through Workers
Mary Jo Ybarra-Vega, M.S.W.
- 11:05 am Community-Based Participatory Research for Agricultural Worker Health
Panel: Jennifer Crowe, M.P.H.; Helen Murphy, M.H.S., F.N.P.; Zoe Cardoza Clayton
- 12:00-1:15 pm Lunch in Crocker Dining Hall

Thematic Session V—Agricultural Engineering

- 1:30 pm Dedication to John Miles, an r2p Success Story
Fadi Fathallah, Ph.D.
- 1:50 pm Agricultural Interventions: How is Research Implemented on the Farm?
John Miles, Ph.D.
- 2:15 pm Ag Engineering: The Necessity of r2p to p2r and Back to Practice
Chair: Fadi Fathallah, Ph.D.
- 2:35 pm Robotics & Mechanization in Agriculture: History and Future Trends
Jim Thompson, Ph.D.
- 3:00-3:15 pm Break
- 3:20 pm Orchard Automation and Mechanization Efforts in the Pacific Northwest
Karen Lewis
- 3:40 pm Ag Technology & Equipment Demonstrations: Work & Play
Fadi Fathallah, Ph.D.
- 4:00 pm Closing Remarks
Marc B. Schenker, M.D., M.P.H.

Saturday, September 23

- 10:15 am Depart for Post-Conference Farm Tour
Meet between Crocker Dining Hall and Hearst Hall
- 11:00 am Tour of Earthbound Farm on Carmel Valley Road
Lunch at historic Baja Cantina & Filling Station

ABSTRACTS

Poster #1

Putting Migrant Farmworker Research Results into practice through print, on-farm and website channels

Susan Ackerman, Giulia Earle-Richardson, Lynae Hawkes Stacey Viebrock, John J. May

Northeast Center for Agricultural Health, NYCAMH, Bassett Healthcare, Cooperstown, New York

Background: The Northeast Center has conducted over five years of occupational health and safety research related to migrant and seasonal farmworkers. While a number of safety materials exist in Spanish, well-designed low-literacy materials which are tailored to specific hazards and specific crop environments are not widely available.

Objective: In order to assure that these research results benefit farmworkers, these data have been translated into: a) on-farm safety training curricula for orchard workers and for vegetable workers; b) low-literacy safety posters and paycheck envelope stuffers; and c) downloadable Spanish and Haitian Creole materials on the NEC multi-lingual website section.

Methods: curricula and messages for all three media were developed using focus group research that pilot tested communication prototypes.

Results: farmworker focus groups demonstrated the following key principles for material design:

- Safety information highly valued by farmworkers
- Ability to explain the information communicated by a chart
- Preference for information categorized by state and/or crop
- Desire for data accompanied by information that can be acted on
- Desire that information be shared with the employer also

Application to prevention: Presenter will describe how these results were used to develop: a) on-farm safety

training curricula for orchard workers and for vegetable workers; b) low-literacy safety posters and paycheck envelope stuffers; and c) downloadable Spanish and Haitian Creole materials on the NEC multi-lingual website section.

Undertaken with support from NIOSH grant: 5 U01 OH07542.

Poster #2

Reaching Teen Farmworkers: An Evaluation of a High School ESL Health and Safety Curriculum

Suzanne Teran, MPH, and Robin Baker, MPH, Labor Occupational Health Program, UC Berkeley; Ron Strohlic, MA, California Institute for Rural Studies

Children and adolescents working in agriculture face significant health and safety risks and experience work-related injuries and illnesses at a higher rate than youth working in other industries. Most research has focused on youth on family farms, and very little data is available on hired teens. This study evaluated the impact of a high school English as a Second Language (ESL) curriculum, designed to provide teen agricultural workers with the knowledge and tools to protect their health and safety in the fields. Using a quasi-experimental design, the research consisted of two intervention groups and a comparison group, and included over 2,000 students from some of California's key agricultural communities. The research findings reveal that the curriculum had significant impact in terms of increases in knowledge and attitudes, and nearly half of the intervention group reported implementing new behaviors to protect their health and safety. The curriculum also had spill-over effects in the broader community, as the majority of students reported sharing the new information with others. The study found that a school-based ESL curriculum is an effective intervention to reach and educate teen farmworkers and that ESL classes can serve as a much needed access point for young farmworkers.

Poster #3

University of California, Davis Farmer Health Study: 1993-2006

TL Armitage, DC Mitchell, MB Schenker, Department of Public Health Sciences, University of California, Davis, CA

Introduction: Although California is the leading agricultural state, few health studies have considered the broad range of Californian farmers. The UC Davis Farmer Health Study followed a randomly chosen state-wide cohort with an aim to identify the prevalence and risk factors for acute and chronic disease.

Methods: 1,947 California farmers were interviewed by telephone in 1993, with follow-up surveys in 1998 (N=1349) and 2004 (N=866). Sub-studies using pulmonary function testing were completed in 1996 and 2003. Subjects answered questions on farming tasks, environmental exposures, and their health status. Both cross-sectional and longitudinal analyses tested associations between risk factors and health outcomes, adjusting for age and relevant covariates. Death rates were compared between farmers and the general California population.

Results: A selection of major findings follow: Farming time in dusty conditions was independently associated with the prevalence of persistent wheeze in 1993 (high dust exposure OR = 1.9, (95% CI = 1.1-3.3), and persistent wheeze was associated with a decline in work ability (p=0.0001) in a multivariate model. Those with respiratory symptoms in 1993 significantly reduced time in dust by 14% (95% CI = 7.2-20.7), the symptomless only by 3% (95% CI =0.5-4.7). Sprains and strains were the most common injury (42.9%). Risk factors for injury include previous injury, medium or high exertion level and workshop activity. Of 1797 tracked subjects, 233 (13%) were deceased by 2005. In 1998, adjusting for age, 35 male deaths were expected while only 22 were observed.

Conclusions: Major risk factors exist for farmers, especially with respect to injury and respiratory health. Effective communication of these risks and preventative measures must be the next priority.

This study is funded by NIOSH # 1U50 OH07550

Poster #4

Farmworker Injury Research To Practice: Farmworker Injury Data Translated Into Occupational Health Training For Migrant Health Center Clinicians

Melissa Brower, Julie A. Sorensen, Giulia Earle-Richardson, John J. May, Northeast Center for Agricultural Health, NYCAMH, Bassett Healthcare, Cooperstown, New York

Background: Results from Northeast Center research indicate that while a substantial proportion of adult migrant farmworker visits to health centers involve a work-related injury or illness, nearly 50% of clinicians report never having had any training in occupational medicine.

Objectives: Northeast Center researchers translated an extensive body of migrant farmworker injury and occupational illness data collected over 5 years and 7 states into an occupational medicine training curriculum specifically targeted to farmworkers. A manual developed collaboratively with the Migrant Clinician's Network is the first of its kind in the nation. The current presentation relates to the formative evaluation of this manual.

Methods: Interviews were carried out with 8 Northeast migrant clinicians to determine the optimal format and content for daily use. A prototype occupational health-training module was then developed and presented at a conference of migrant health professionals. Once a final draft was approved, a formal evaluation was undertaken to ascertain the level of use and degree of usefulness in a number of Northeastern migrant health centers. The manual was disseminated to 30 providers at several migrant clinics; some providers received a one-day training in its use by an occupational medicine physician, to others with no associated training, allowing researchers to also determine the optimal dissemination method.

Results: Important content sections identified by clinicians for inclusion were: Virtual farm visits, including extensive photos and common injuries and conditions (provided in the Commodity Profiles section), Diagnosis and Treatment of farmworker injuries, Cultural Competency, Workers Compensations Forms, Patient Education.

Conclusions: Evaluation results indicate that the NEC-MCN Clinician's Manual is useful to Migrant Clinicians,

and is utilized particularly well when combined with a one-day training session with an Occupational Medicine specialist. Presentation will illustrate the manual content, the evaluation process, and the study results. Supported by NIOSH grant: 5 U01 OH07542-04.

Poster #5

Understanding acculturation, health risk behaviors and the Hispanic Epidemiologic Paradox in the context of a bi-national investigation

Tamara Hennessy¹, Maria Stoecklin-Marois¹, Marc Schenker¹, and Fernando Meneses-Gonzalez²; ¹University of California, Davis, ²Instituto Nacional de Salud Publica, Cuernavaca, Mexico

Rationale: In the U.S., Mexican immigrant women often have better health outcomes than non-Latino white women despite having a higher health risk profile than many U.S. residents. Two hypotheses are often suggested to explain this "Hispanic Epidemiologic Paradox:" (1) selective migration of a healthy subgroup of persons from the sending country and (2) culturally favorable health behaviors which protect recent immigrants for some period of time after immigration. Unfortunately, many researchers have noted a relationship between adoption of negative health behaviors and subsequent impacts on health outcomes among Latinas with increasing levels of acculturation. Given the central role of the population of origin in explaining the paradox, an ideal study to investigate these two hypotheses would involve a comparison of health outcomes and risk profiles between Mexican-born women currently living in Mexico and Mexican-born women who have migrated to the U.S.

Methods: We conducted a bi-national cross-sectional pilot study comparing Mexican women living in Chavinda, Mexico and Mexican-born women living in Madera, California to characterize differences in risk factors and the role acculturation may play in these changes. Data were collected by interviewer-administered questionnaires and gathered information on major risk behaviors (smoking, alcohol and drug use, and sexual behavior) and acculturation level (U.S. women only).

Results: We interviewed 102 women from Chavinda and 93 women from Madera and found that while there were some differences in demographic characteristics and health risk behaviors, women in Chavinda and

low-acculturated women in Madera were likely to have similar health risk profiles, but these groups differed from more highly acculturated women living in Madera. Specifically, logistic regression models showed that women living in Chavinda were less likely to consume alcohol than U.S. residents (OR=0.29, 95% CI: 0.13, 0.68) and were less likely to have had more than one sexual partner (OR=0.23, 95% CI: 0.07, 0.73). High-acculturated women living in Madera were more likely to consume alcohol (OR=6.05, 95% CI: 1.79, 20.43) and have had more than one sexual partner (OR=4.44, 95% CI: 1.19, 16.59) than were less acculturated women living in Madera. We did not see differences between the relative odds of smoking, drug use or sexually transmitted diseases among the groups of women but this is most likely due to very small numbers of women reporting these events.

Conclusion: Our pilot data suggest that the process of acculturation has a more powerful impact on the observed changes in health status and health behavior when women migrate to the U.S. and the theory of selective migration seems less likely to account for these differences. Therefore, any local services or intervention programs must consider the ethnicity and acculturation level of the target audience. In addition, the 'r2p' applications of these findings are heavily dependent on the types of services available in the community.

Poster #6

Identifying Risk Factors for Cholinesterase Depression among Pesticide Handlers in Washington State

Jonathan Hofmann¹, Harvey Checkoway^{1,2}, Anneclaire De Roos¹, Richard Fenske², Clement Furlong³, and Matthew Keifer², ¹Department of Epidemiology, ²Department of Environmental and Occupational Health Sciences, and ³Department of Genome Sciences. University of Washington: Seattle, WA

In 2004, the Washington State Department of Labor and Industries (L&I), under mandate from the Washington State Supreme Court, initiated a new cholinesterase (ChE) monitoring program for agricultural workers who handle toxicity class I or II organophosphate (OP) and N-methyl-carbamate (CB) pesticides. Washington is only the second state in the union to establish a ChE monitoring program. This poster describes the methodology of a recently initiated cross-sectional study to identify risk factors for ChE depression among pesticide handlers in

this monitoring program. Approximately 300 handlers will be recruited for this study. Risk of ChE depression will be evaluated with respect to workplace, behavioral, and genetic characteristics (paraoxonase or PON1 status). A recently developed computer-based survey instrument is being used to collect information about potential OP/CB exposures and other factors that may be related to ChE activity. This survey instrument features audio-recorded questions and icon-based responses that are displayed on a touch screen Tablet PC. The poster also addresses efforts to validate reported exposures through worksite visits for a subset of participants, and analyses of blood specimens for determination of PON1 status for each participant. The overall goal of this study is to characterize potential mechanisms of pesticide overexposure, and determine how such exposures can be prevented among handlers. This study will also provide epidemiologic evidence to determine whether findings from animal-based studies that PON1 status is associated with susceptibility to OP pesticides are consistent in humans.

Support for this project was provided by the following grants: Center for Ecogenetics and Environmental Health Pilot Project Program (NIEHS Award # P30ES07033); Environmental and Molecular Epidemiology Training Grant (NIEHS Award # T32 ES07262); Northwest Center for Occupational Health and Safety (CDC/NIOSH Award # 1 T42 OH008433-01); and the Pacific Northwest Agricultural Safety and Health Center (CDC/NIOSH Award # 1 U50 OH07544-04).

Poster #7

Pesticide Effects: Integration into Health Care Provider Curricula

Keifer M, Murphy H, **Holland S**, Pacific Northwest Agricultural Safety and Health Center, University of Washington, Seattle

This multidisciplinary project is designed to introduce the National Pesticide Competencies for Medical and Nursing Education* into the primary curricula of health care providers. These competencies cover concepts that are key to the understanding of the human health effects of pesticides, with a focus on the occupational setting. The project includes participants from the University of Washington, Schools of Medicine, Nursing, Public Health, and Physician Assistants, Seattle Pacific University, Heritage University and the National Pesticide Information Network.

Goals:

- Develop pesticide related curriculum materials on core competencies for integration in the primary training of health care professionals
- Enlist committed students in the material development
- Identify topics, phases and processes in the curricula of health care professionals that provide insertion points for these materials
- Enroll key faculty in Seattle area and WWAMI institutions to develop strategies to integrate materials into existing curricula
- Evaluate strategy effectiveness and the impact of the insertion of material through classical pedagogical measurement methods
- Develop a dissemination plan for national distribution of successful curricular materials and strategies for integration into curriculum.

Expected Products:

- Tested modules designed for introduction into curricular formats
- Tested strategies for module introduction into health care provider training
- A cadre of young pesticide champions.

Examples of modules developed to date and project strategy will be shared. Funding provided by the US EPA, Grant#: 83273201.

*National Pesticide Competency Guidelines for Medical and Nursing Education, 2003. NEETF, www.neetf.org/health/providers/index.shtm

Poster #8

Research to Practice Feasibility Study of an Ergonomic Apple Harvest Bucket

Amanda Jones, Giulia Earle-Richardson, Suzanne G. Stack, Paul L. Jenkins, John J. May, Northeast Center for Agricultural Health, NYCAMH, Bassett Healthcare, Cooperstown, New York

Introduction: Previous research has demonstrated that an ergonomic apple picking bucket and belt is accepted by orchard workers, does not adversely interfere with productivity, and significantly reduces muscle recruitment in a number of key back muscles in the laboratory.

Objective: To evaluate the intervention's effect on muscle load in the orchard with actual harvest workers using electromyography (EMG).

Methods: Mean amplitude measurements on five muscles were taken from 10 farm worker volunteers who were working an ordinary day in the apple orchard. The subjects wore the intervention belt one day and no belt the other day. These measurements were taken for five different postures common to apple harvest work.

Results: Favorable results were seen for the belt condition in the orchard, relative to muscle recruitment, for the lower erector spinae, the muscle for which greatest benefits were seen in the laboratory.

Conclusion: Results in the orchard were similar, but less dramatic than laboratory results. This is likely due to the greater level of physical conditioning among actual harvest workers. This suggests that ergonomic apple bucket benefits will be greatest at the beginning of the season and among less seasoned workers. NIOSH grant 1 R01 OH008153-01.

Poster #9

Pesticide Drift: How Much Is Too Much? How Little Is OK?

Robert Krieger and Helen Vega, Personal Chemical Exposure Program, Department of Entomology, University of California, Riverside, 92521

Advanced drip irrigation of chloropicrin (CP; CCl_3NO_2) reduces pesticide drift during preplant soil fumigation of strawberries. Chemigation near Salinas on October 5, 2005, resulted in CP drift when the fields were accidentally sealed with water containing some residual CP. Fifteen 911 calls requested information or reported eye irritation, shortness of breath, and nausea. Emergency responders were unable to detect CP over treated fields or at residences where illness had been reported. No persons were hospitalized. The episode occurred in a small area over several hours. Ambient CP levels were likely at the sensory threshold (or much more commonly less than that). Intensive follow-up investigation revealed a spectrum of responses reported by persons in proximity to the field and among persons at the same residence. Medical evaluations of the health significance of the episode are lacking. Available investigations are useful to gauge the nature and extent of CP exposure and to guide future exposure mitigation measures.

Drift is an undeniable consequence of the Laws of Conservation of Matter. All pesticide applications are associated with drift if sufficient analytical power is applied. Existing regulations intended to prohibit drift

are archaic. Major reform is past due (perhaps using a food residue risk assessment model). Regulations are unevenly administered. Chemicals like CP with exposure warning odors and sensory effects have become self-incriminating in the present drive for no risk pest management technologies.

Poster #10

Risk of Depression in a Cohort of Older Working Californian Farmers 2004.

Adeyemo, MA, Mitchell, DC Schenker, MB, Department of Public Health Sciences, University of California, Davis.

Background: Male agricultural workers have been reported to have the highest level of depression of all occupational groups.

Objective: To assess the risk of depression in older working Californian farmers.

Methods: The UC Davis Farmer Health Study cohort were asked an 8-item measure to predict depression as part of the 2004 survey. Of the 866 participants, the 623 still actively working were included in this cross-sectional study. Associations between likely depression and environmental or occupational exposures were assessed using SAS 9.1 programming. Univariate associations with depression were assessed using t-tests for continuous variables, and Chi-square tests for categorical. Multivariate associations were assessed using multiple logistic regression.

Results: 4.65% (29 of 623) working farmers, mean age 62.3 years (11.6sd), were at risk for depression. In a multivariate logistic regression model, adjusting for age and gender, depression was significantly associated with all of the following: water damage to the home [OR, 3.91(95% CI 1.40 – 10.89)], hand harvesting [OR, 2.63(1.11 – 6.22)], and BMI [OR, 1.13(1.04 – 1.22)]. Work ability [OR, 0.72(0.59 – 0.88)] and tractor driving [OR, 0.224(0.09 – 0.57)] were protective.

Conclusion: The rate of depression in older working farmers of 4.65% closely mirrors the rate of depression in all older Americans of 5.71% according to the NIMH. Risk of depression in older working farmers is associated with both farm tasks and personal characteristics. Longitudinal studies are needed to tease out what factors lead to depression and which are a result of being depressed.

NIOSH 1U50 OH07550

Poster #11

Encouraging Correct Body Mechanics Among Fruit Warehouse Employees

Pamela Elkind, Pui-Yan Lam, Kathy Pitts, Wendy Holmes and Heather Sawyer, Eastern Washington University, Cheney, Helen Murphy and Maria Negrete, University of Washington, Seattle

Poster Description:

This is an intervention research program. The objective is to consider a certificate of completion to motivate ergonomic behavior as part of a training program for predominantly Spanish speaking workers in fruit warehouses. This training program is being conducted at several fruit warehouses in Eastern Washington. The poster describes the development and implementation of the training program. First, study participants are observed performing activities related to lifting. Second, participants complete a pretest, view the ergonomic video, practice a few exercises, and receive supportive materials. Two weeks later participants complete the posttest and are given another set of ergonomic tasks for observation. The outcomes of the program are evaluated using a mixed method of statistical tabulation of pre-post and experimental data. Study results evaluate the effectiveness of the training program and certificates to encourage ergonomic practices including behavior change. The poster also includes photos related to the training sessions in the warehouse. Funded by: CDC/NIOSH (5 U50 OH007544-04)

Poster #12

Responding to the Needs of the Agricultural Industry of Washington State.

Flor Servin¹, Ofelio Borges¹, ¹ Washington State Department of Agriculture
Worker Protection Standard (WPS) inspections conducted by the Washington State Department of Agriculture (WSDA) reveal that pesticide safety training of workers is often not conducted, and training of pesticide handlers, when conducted, is frequently ineffective and does not meet the WPS training requirements. This is a result of many growers and foreman not understanding their responsibilities under the WPS. To fight this problem, WSDA is seeking to increase WPS knowledge, especially those areas related to training by implementing a comprehensive WPS train-the-trainer (TtT) curriculum. WSDA's TtT program has helped 386 agricultural

employers, foreman, safety officers and others comply with WPS standards and gain tools to conduct effective pesticide safety training. Results of surveys conducted at each workshop will be presented.

The TtT program receives support from Washington State's accident account.

Poster #13

Pacific Northwest Health Professionals Survey on Pesticides and Children

Catherine Karr, MD, PhD, Helen Murphy FNP, MHS, **Michelle Sommargren, PhD**, Gwen Glew MD MPH, Matthew C. Keifer, MD, MPH, Richard A. Fenske PhD, MPH

The Pacific Northwest includes several regions of pesticide-intensive agriculture, and the health risks of pesticides to children have become a focus of scientific inquiry and public health concern. We sought to review the experience, attitudes and needs of regional health care providers on the subject of pesticides and child health. Key informants were identified from settings serving high volumes of farm workers and their families. Although these key informants serve a high-risk group of children, only 50% had any pesticide related health training and only 22% had received child-specific information. 55% affirmed using pesticide information their practice, yet most (61%) were not comfortable responding to patient/client questions. Overall, the informants endorsed that more pesticide information would be useful in their work (92%), particularly information specific to child health. Format preferences for future training varied, with physicians preferring web-based training materials, mid-level clinicians requesting written summaries, and community health workers favoring a conference or workshop format. This key informant survey indicates an important pesticide training gap among health care workers serving children at high risk of pesticide exposure. We are currently creating pesticide curricula tailored to the specific preferences and needs of physicians, mid-level clinicians and community health workers.

Poster #14

Factors Likely to Influence a New York Farmer's Decision to Retrofit

Sorensen JA^{*(a)}, Emmelin M^(b), May J^(a)

^(a)New York Center for Agricultural Medicine and Health, Cooperstown, NY

^(b)Epidemiology and Public Health Sciences, Department of Public Health and Clinical Medicine, Umea University, Umea, Sweden

Background: Tractor overturns have long plagued U.S. farmers, and are of particular concern in the Northeast where 8.4 of every 100,000 agricultural workers are killed in a tractor rollover, compared to rates of 6.1 to 1.9 in other areas of the country (NIOSH, 1998). Despite the frequency of rollover fatalities, New York farmers appear relatively uninterested in retrofitting tractors currently lacking ROPS (about 17% according to a recent NYCAMH survey), even though many of these same farmers felt a ROPS was important (82%) (Sorensen, 2006). To understand the gap between knowledge of risk and lack of interest in retrofitting, a particularly at risk segment of the New York farming community was selected for a qualitative assessment of tractor safety attitudes. Qualitative interviews (in-depth interviews and focus groups) were conducted with small crop and livestock farmers, who accounted for 90% of New York farmers completely lacking ROPS protection. Factors that influence these farmers disposition towards safety and retrofitting were examined.

Study methods: For in-depth interviews, livestock and crop farmers were selected from commodity association lists, contacted by phone and invited to participate. An effort to include farmers of varying ages was made (20-77 years of age), as well as a variety of farm sizes (29-250 head of cattle/112-1000 acres). A total of 20 interviews were conducted and transcripts were double-coded. Themes raised in interviews were evaluated in three focus group discussions. Codes were grouped into categories and core-categories and in an iterative of process of going from codes to text, a theory regarding factors influential to retrofitting was developed.

Study results: Interview and focus group responses indicate that the biggest barriers to retrofitting in the small crop and livestock community include 1) a lack of perception of personal susceptibility 2) financial concerns which make ROPS a low priority (other machinery they'd like more, not cost-effective for an

old or seldom used tractor) 3) lack of time/too many other things to worry about 4) design issues, practicality of ROPS and seatbelts in daily use. Motivators appear to include 1) concern for workers or family using machinery 2) peers 3) visual or daily reminders and 4) a flexible financial assistance program. Application to field practice: The insights gained from interviews and focus groups will be used to inform the development of messages and incentives, which will be released in the farming community in an effort to increase the number of ROPS protected tractors.

Supported by funding from the National Institute for Occupational Safety and Health Cooperative Agreement No. U50 OH007542 - The Northeast Center for Agricultural Health.

Poster #15

Take- Home Pathways Study

Tchong M, Galvin K, Ballew C, Fenske R, Pacific Northwest Agricultural Safety & Health Center, University of Washington

One of the main concerns of agricultural workers is the possibility of exposing their children and families to the pesticides they encounter in the orchards. Agricultural workers may inadvertently bring pesticides residues from their workplace into their homes through their clothes and shoes. This can be considered as a take-home pesticide exposure pathway. The objective of this study was to characterize the take-home pathway and evaluate intervention to minimize the amount of pesticides leaving the workplace.

This study was conducted from 2003-2005 with agricultural workers, pesticide handlers and thinners, from an orchard in WA State. We looked at workplace factors that could contribute to the take-home exposure route for families through interviews with agricultural workers. We collected dust samples from agricultural workers' homes and commute vehicles. The dust samples were analyzed for organophosphorus (OP) pesticide residues. We investigated three workplace based interventions designed to minimize take home pesticides residues.

The first year, 2003, served as the baseline year to determine the pre-intervention pesticide residues levels for three groups: organic orchard workers, pesticide handlers, and thinners. In 2004, we tested out three interventions to minimize take-home exposure for

agricultural workers. In 2005, the study focused on cherry pickers and the intervention selected was the vacuuming of commute vehicles. This intervention had workers vacuumed their vehicles before leaving the workplace. Pesticide residue loads from the home and vehicle were used in the data analysis. The intervention group had lower geometric mean (GM) pesticide loadings than the control group for all three OP pesticides. The azinphosmethyl GM for those who vacuumed at least once during the study was significantly lower ($p=0.03$) than those who did not vacuum their vehicles. More frequent vacuuming of the vehicles resulted in lower GM for most OP pesticide for house and vehicle dust. The vacuuming intervention shows promise in minimizing take-home pathway.

Funding provided by the Agricultural Centers Program of the National Institute of Occupational Safety and Health #5 U50 OH07544-05

Poster #16

In Our Own Voice. Using Social Marketing to Move Research to Practice

Max R. Lum Ed.D MPA.

The National Institute for Occupational Safety and Health (NIOSH) is fully engaged in an effort to maximize the impact of its research, build partnerships and encourage the design of more timely and effective mechanisms to bridge the gap between knowledge and practice. The application of social marketing techniques can be an innovative and opportunistic way to encourage the intervention community on a scale that develops its own momentum and involves the critical partners necessary to effect change and impact. This presentation will feature a brief look at the historical pathway of moving research to practice and where and how these activities can be informed by social entrepreneurs. Case studies involving tractor safety will be highlighted.

Poster #17

Agricultural Hazard and Intervention Effectiveness Research Translated into Practice Through the Community Collaboration for Farmworker Health & Safety

Stacey Viebrock, Lynae Hawkes, John J. May, Northeast Center for Agricultural Health, NYCAMH, Bassett Healthcare, Cooperstown, New York

Background: Previous Northeast Center research has demonstrated that eye irritation is a common agricultural health problem in the Lower Hudson Valley of New York State, and are that ergonomic hazards of blueberry raking in Maine. Research has also shown that injury prevention interventions are more effective and sustainable when developed collaboratively with farmers, farmworker groups and local farm communities.

Objectives: to translate research results regarding specific agricultural hazards in New York and Maine, and results regarding community organizing as an effective intervention method to develop 2 sustainable agricultural health programs.

Methods: Using the Precede/proceed methodology, a community training and organizing program is in its third year in both Maine and New York State. These "intervention development coalitions" have each identified an intervention, and are currently evaluating a pilot implementation. In New York an intervention trial involving 120 participants is in progress to evaluate the effectiveness of conducting eye safety education and distributing safety glasses and saline solution on eye irritation. A coalition member clinician is evaluating the incidence of pterygium among study participants by conducting eye exams of farmworkers.

In Maine, a trial involving 48 participants and eight rake designs is currently underway to understand how different rake designs affect the raker's musculoskeletal symptoms and productivity. End points for this trial include: 1) time to onset of excessive and/or unusual pain; 2) pain intensity; 3) productivity; and 4) worker acceptance of the rake.

Results/Conclusions: results of both of these field evaluations will be presented. The presenter will also discuss process evaluation results from both regions. Undertaken with support from NIEHS grant: 1 R25 OH08144-01.

Poster #18

Air modeling for investigation of community and fieldworker exposure to off-site movement of fumigants: chloropicrin and metam-sodium by-products.

Michael O'Malley, M.D., M.P.H., Terrell Barry, Ph.D.

Between 1992 and 2003 14 episodes of off-site movement of metam-sodium by-products (methyl-isothiocyanate – MITC – and related compounds) were reported in

California, involving 762 symptomatic community residents, emergency responders or field workers. During the same time period 15 episodes were reported involving off-site movement of chloropicrin, involving 244 ill residents, emergency responders, or field workers. Industrial hygiene monitoring, when available, was limited to monitoring halogenated fumigants used in conjunction with chloropicrin. It was seldom possible to evaluate the correlate the occurrence of symptoms and exposure to air-contaminants in any of the reported episodes, despite well a characterized ocular irritation threshold for MITC (800 ppb) and a similar 50-75 ppb threshold for eye irritation following exposure to chloropicrin.

Following the November 13, 1999, metam-sodium episode in Earlimart, case information was obtained from direct interviews, from illness complaints filed with state or county agencies, or from illness reports filed by community physicians for 173 subjects. Although no hygiene data were available from the episode, air concentrations of the by-product methyl isothiocyanate (MITC) during the episode were estimated based upon the Industrial Source Complex Short-Term (ISC3) air dispersion model. This involved estimating fumigant flux, based upon from prior metam-sodium monitoring studies, and data from weather stations in two adjoining communities. California irrigation management information system (CIMIS) weather station data indicated that the November 13th incident corresponded with a temperature inversion at approximately 5:00 p.m. and a shift in the direction of prevailing wind from northwest to southeast. On the edge of Earlimart, 1-hr time weighted average (TWA) MITC concentration estimates ranged from 0.5 to 1 ppm. Of the 173 subjects, 170 had MITC-compatible symptoms, including eye or upper respiratory irritation (77.6%), non-specific systemic symptoms (64.7%), and lower respiratory symptoms (20.0%). 78.2% were exposed within 0.5 miles of the northern edge of the treated field where average 1 hr MITC concentrations exceeded the 800 ppb irritation threshold.

After a July 8, 2002, application of more than 25,000 pounds of metam-sodium near the community of Arvin, California, Residents in a four-block area were interviewed regarding eye and upper respiratory irritation, non-specific systemic symptoms, and lower respiratory complaints. As with the Earlimart episode, no hygiene measurements were available from the day of the incident. The distribution of cases was compared to results of Industrial Source Complex (ISC3) air dispersion

modeling for the metam-sodium byproduct, methyl isothiocyanate (MITC). Two-hundred-fifty-two cases of irritant, non-specific systemic, and respiratory symptoms were associated with the metam-sodium application. These included 178 community residents or visitors and 74 employees of a carrot packing operation located in the affected neighborhood of Arvin. The most severe reported illness occurred in a community visitor with a history of pre-existing pulmonary disease, who was hospitalized for a week with respiratory distress. ISC3 modeling indicated 1-hour MITC concentrations in the affected community ranged from 0.8-1.0 ppm, in the range of the LOEL, with peak concentrations between 2.4 and 3.2 ppm.

Modeling was also used to estimate exposure following an October 3, 2003 application of 100% chloropicrin (80 pounds/acre) to 34 acres of fallow land south of the Kern County community of Lamont. Investigation determined that 165 persons reported symptoms compatible with illness caused by chloropicrin, principally from an apartment complex south of the treated field. ISC3 modeling indicated estimated 1-hour average chloropicrin air concentrations in areas south and west of the field ranged up to 0.20 parts per million (ppm). Peak-to-mean extrapolations indicated that peak concentrations may have briefly exceeded 1 ppm, substantially exceeding experimentally average eye-irritation thresholds experimentally determined in human volunteers.

Comment: Estimated air contaminant concentrations generated by the ISC3 model depend upon available of weather-station data from a site near the location of a given incident and availability of prior air-monitoring studies to estimate expected levels of contaminant flux associated with a given fumigant application method. If such information is available, ISC3 modeling may provide insight into the relationship between air contaminants and illnesses reported following off-site movement of soil fumigants.

Poster #19

Pesticide Drift: How Much Is Too Much? How Little Is OK?

Robert Krieger and Helen Vega, Personal Chemical Exposure Program, Department of Entomology, University of California, Riverside

Advanced drip irrigation of chloropicrin (CP; CCl₃NO₂) reduces pesticide drift during pre-plant soil fumigation of strawberries. Chemigation near Salinas on October

5, 2005, resulted in CP drift when the fields were accidentally sealed with water containing some residual CP. Fifteen 911 calls requested information or reported eye irritation, shortness of breath, and nausea. Emergency responders were unable to detect CP over treated fields or at residences where illness had been reported. No persons were hospitalized. The episode occurred in a small area over several hours. Ambient CP levels were likely at the sensory threshold (or much more commonly less than that). Intensive follow-up investigation revealed a spectrum of responses reported by persons in proximity to the field and among persons at the same residence. Medical evaluations of the health significance of the episode are lacking. Available investigations are useful to gauge the nature and extent of CP exposure and to guide future exposure mitigation measures.

Drift is an undeniable consequence of the Laws of Conservation of Matter. All pesticide applications are associated with drift if sufficient analytical power is applied. Existing regulations intended to prohibit drift are archaic. Major reform is past due (perhaps using a food residue risk assessment model). Regulations are unevenly administered. Chemicals like CP with exposure warning odors and sensory effects have become self-incriminating in the present drive for no risk pest management technologies.

Poster #20

Human Exposure to Surface Pesticide Residues: Dislodgeable Foliar Residues and Pilot Studies to Predict Bioavailability

Yanhong Li, James J. Keenan, Helen Vega and Robert I. Krieger, Dept. of Entomology, Personal Chemical Exposure Program, and Graduate Program in Environmental Toxicology, University of California, Riverside, CA 92521

Contact-transfer of chemical residues from surfaces (TSR) potentially exposes harvesters following crop protection. The Iwata et al. (1977) procedure for determination of dislodgeable foliar residues (DFR) is standard. This method utilizes a weak detergent solution to wash residues from the surface of leaf samples. This chemical process contrasts with the predominantly physical contact-transfer that occurs in the field. We are investigating procedures to measure DFR and physical TSR (Transferable Surface Residue). An Automated Surface Wiper (ASW), intended to test color-fastness of textiles, automatically wipes the leaf surface with an

attachment covered by cotton cloth and foil. Another device for physical surface sampling is the Benchtop Surface Roller (BSR). This machine, intended to make pasta, simulates direct worker contact with treated foliage. A cotton cloth and foil containing leaf samples is used to obtain residue. Urine biomonitoring data will be used to evaluate DFR and TSR data.

Poster #21

Pesticide Spray Drift and Public Health

Gretchen L. Snoey, P.E., Master of Public Administration, Candidate 2006 University of Washington; Richard A. Fenske, PhD. MPH, PNASH University of Washington

It is essential that the health of those living in agricultural communities be protected from adverse effects of pesticide spray drift. The Washington State Department of Agriculture (WSDA), which has jurisdiction over pesticide regulation in Washington State, recently proposed a revision to the General Pesticide Rules (WAC 16-228) that would require prior notification of pesticide applications. The proposed rule requires applicators to give two days written notice before applying some pesticides near schools, hospitals, nursing homes, and state-licensed adult or child day care centers. This presentation will examine the scientific basis of this and similar rules, the burden such rules place on agricultural producers, and pesticide spray drift regulations in California and other states.

Poster #21

Indoor Exposure Potential of Pyrethroid Pesticides Following Fogger or Crack and Crevice Applications by Homeowners

James J. Keenan¹, R. Shane Gold², Gabriele Leng³, Xiaofei Zhang¹, and Robert I. Krieger¹

¹Dept. of Entomology, Personal Chemical Exposure Program, University of California, Riverside, CA 92521

² Brigham Young University-Hawaii, Laie, HI 96762,

³Bayer Industry Services, Leverkusen, Germany

Pyrethroid products are extensively used in residential pest management. Twenty families from 5 states were recruited that planned on using pesticides, in the form of pyrethroid foggers or crack and crevice sprays, to deal with an indoor insect problem. Pyrethroids are used in this study because of their availability to the general public, low to moderate toxicity in mammals, and suitability for urine biomonitoring. This study involved

use of a commercially available crack and crevice spray (Air Devil™ HPX) with 0.1 % cypermethrin and a commercially available indoor fogger (Raid Deep Reach™ Fogger) with 1.7 % cypermethrin active ingredient. Families included 46 children (< 12 years old) the youngest of which was 3 years old at the study time and 54 teens/adults (≥ 12). These families were biomonitoring for at least 8 days. Fogging was performed on day 2 and crack and crevice treatment was performed on day 1, which allowed at least 1 sample that could be used to determine background levels, and at least 6 samples post-application. Total $\mu\text{g}/\text{kg}$ pyrethroid equivalents following crack and crevice treatment were 1.5 ± 1.1 and 0.55 ± 0.21 $\mu\text{g}/\text{kg}$ for children and teens/adults after 8 days, respectively. Total $\mu\text{g}/\text{kg}$ pyrethroid equivalents following fogging were 11 ± 8.3 and 2.6 ± 1.65 for children and teens/adults after 8 days, respectively. After use of indoor foggers exposure was still well above background on day 6 post application while after crack and crevice exposure did not appear to increase above background on any day following application. Back-calculated exposures below known LOAELs and regulatory NOAELs for cypermethrin indicate about a 4-fold greater elimination by children than teens/adults.

PRESENTERS' BIOS

Ofelio Borges

Ofelio Borges is a farmworker education specialist for the Washington State Department of Agriculture's Farmworker Education Program. This program provides classroom courses, "Train the Trainer" workshops for growers and their farm supervisors, and the all-day "Hands-on" training for agricultural employees to learn safe pesticide handling practices. To date, over 18,000 individuals, primarily those from the highest vulnerability group of young, Hispanic males, have been trained to work safely around pesticides and their residues. Mr. Borges has been with the program since 2001 and has become a leader in the Northwest on the Worker Protection Standard and educating Hispanic pesticide handlers on safe practices. Mr. Borges holds the equivalent of an associates degree in human resources administration from the Universidad Autonoma de Mexico. He has worked within the agricultural industry as a safety and health specialist, orchard manager and farmworker and is a dedicated collaborator with industry, extension and researchers.

Zoe Cardoza Clayson, Sc.D.

Dr. Zoe Cardoza Clayson is a Professor in the College of Health and Human Services at San Francisco State University and President of Abundantia Consulting. She received her Doctorate of Science in Health Policy and Management from the Johns Hopkins University School of Hygiene and Public Health. For the past twenty-five years Dr. Cardoza Clayson has been engaged in the public health field conducting evaluations and policy analyses in the areas of health equity, environmental health, social services and community development. She has extensive experience working with low income, multi-ethnic communities as well as with small community organizations, large public agencies, state-wide coalitions, and policymakers. Her current publications include "The Intersection of Culture, Health and Systems in California Latino Communities" and "Unequal Power, Changing Landscapes: Negotiations Between Stakeholders in Latino Communities."

George A. Conway, M.D., M.P.H.

George Conway (CAPT, USPHS) is Director of the NIOSH Agriculture, Forestry, and Fishing Program. Dr. Conway is a medical epidemiologist with a career-long interest in occupational injuries.

He received his M.D. from the University of New Mexico, clinical training in Family and Community Medicine at the University of Wyoming, a Masters of Public Health, and a residency in Public Health, Occupational Medicine, and Preventive Medicine from the University of South Carolina. He is a former Epidemic Intelligence Service Officer, is board-certified in Preventive Medicine and Public Health, and certified by the FAA as an Aviation Medical Examiner. He has participated in a variety of field research and prevention activities in Alaska and multiple developing nations since 1981. He began his collaboration on injury research and prevention with the Centers for Disease Control (CDC) in 1984, publishing his first injury epidemiology paper with the then-embryonic CDC injury program in 1985. From 1988 to 1992, while assigned as a medical epidemiologist for CDC-Atlanta, he served as the HIV/AIDS Consultant to the Indian Health Service and helped to set up surveillance and prevention programs for HIV infection and other infectious diseases for American Indians in the western states and Alaska Natives at health centers throughout Alaska. He has also collaborated on disease and injury surveillance and prevention projects with, and training of, public health officials in Canada, Greenland, Sweden, Finland, Norway, Russia, Iceland, Bangladesh, India, and Taiwan.

Since September, 1992, Dr. Conway has served as Chief of the CDC/NIOSH Alaska Field Station in Anchorage, leading efforts toward injury surveillance and prevention for severe work-related injuries in Alaska and other Circumpolar areas. In addition, from 2000 through 2002, he served as a CDC consultant to the World Health Organization and the Ministry of Health, Government of India, playing an instrumental role in the founding of the Indian National Field Epidemiology Training Program. From 2004 into 2006, Dr. Conway served as Acting Director of the NIOSH Spokane Research Laboratory. In 2005 he was named as co-Manager and in 2006 as

Director of the NIOSH Agriculture, Forestry and Fishing Program. In that role, he oversees a program involving hundreds of NIOSH employees and grantees, with an annual budget of over \$20 million.

Dr. Conway was instrumental in establishing Anchorage as an International Safe Community and the founding of the Alaska Injury Prevention Center. He remains active in international health, as Past President of the International Union for Circumpolar Health and the American Society for Circumpolar Health, and in training occupational medicine and aerospace medical residents and Epidemic Intelligence Service officers. He is the author of over 50 peer-reviewed articles in the scientific literature, many book chapters and scientific monographs, over 40 published abstracts, and editor of four book-length proceedings volumes. He has organized and chaired many international conferences, including the 9th and 10th International Conferences on Circumpolar Health, and the 1st, 2nd and 3rd International Fishing Industry Safety and Health Conferences (IFISH). IFISH3 was held in Tamil Nadu, India in February 2006. He is widely known and cited worldwide for his work in safety in the fishing and aviation industries, and resides in Anchorage, Alaska.

Jennifer Crowe, M.P.H.

Jennifer Crowe works for PNASh (Pacific Northwest Agricultural Safety and Health) Center located at the University of Washington. She received her B.S. in Biology at Marquette University in Milwaukee, Wisconsin and her MPH in Environmental and Occupational Health at the University of Washington. Prior to moving to the University of Washington, she lived in Costa Rica for five years. There her work focused on sustainable development, public health, education, and community based research. Jennifer's work in Washington is centered around community based participatory research (CBPR), Environmental Justice, and health disparities research. She served as a Core member and Project Coordinator of El Proyecto Bienestar (The Well-Being Project), a CBPR project focused on Environmental Justice issues for Hispanic Farmworkers and their families in the Yakima Valley, Washington. She also works with the Idaho Partnership for Hispanic Health (IPHH), a CBPR project focused on prioritizing and lessening health disparities in the state of Idaho. Recently, Jennifer has returned to live in Costa Rica, but she continues her work with El Proyecto Bienestar and IPHH.

Fadi Fathallah, Ph.D.

Fadi Fathallah comes to UC Davis with a joint appointment as assistant professor of bio-mechanical engineering and ergonomics in the Department of Biological and Agricultural Engineering and as a biomechanical engineer in the Agricultural Engineering Experiment Station. He is also a member of the Biomedical Graduate Group at UC Davis.

Fathallah's research focuses on improving safety and productivity in the workplace by applying occupational biomechanics and remediating exposure to environmental hazards. His research interests include the effects of the physical work environment on the musculoskeletal system of agricultural workers, the design of mechanical systems to prevent injury, evaluation of worker exposure to climatic and chemical hazards, and development of strategies to reduce these risks. Through his Agricultural Experiment Station appointment, Fathallah will work with the public and the agricultural community to solve engineering problems related to occupational biomechanics.

Fathallah received his bachelor's degree in industrial engineering from Texas Tech University in 1986, a masters degree in industrial engineering and operations research from Virginia Polytechnic Institute and State University in 1988, and a doctorate in industrial and systems engineering from Ohio State University in 1995. At Ohio State, he investigated the role of spinal motion and workplace factors in work-related low back disorders.

Before joining UC Davis, Fathallah was a senior research associate at the Liberty Mutual Research Center for Safety and Health in Hopkinton, Mass., where he investigated the risk factors involved in exiting commercial vehicles, the implications of using back belts for lifting, and hourly trends in occupational injuries.

Richard Fenske, Ph.D.

Dr. Fenske's work has focused primarily on the evaluation of environmental health risks in special populations, such as children, farm workers, and farm producers. Areas of particular interest include the health risks of pesticide exposures, development of new exposure assessment methods, environmental justice, risk communication, and the role of science in shaping public health policies.

Dr. Fenske currently directs the Pacific Northwest Agricultural Safety and Health Center, one of ten

regional centers in the United States supported by the National Institute for Occupational Safety and Health (NIOSH). The center supports research, education, and outreach activities in the Northwest, including Alaska, Idaho, Oregon, and Washington. Dr. Fenske teaches courses in human exposure assessment, environmental risk analysis, and the management of pesticide health risks. He serves on the U.S. Environmental Protection Agency's Science Advisory Board and its Human Studies Review Board. He is also a member of the NAS/Institute of Medicine Committee on Veterans and Agent Orange.

Kit Galvin, C.I.H., R.O.H.

Kit Galvin is the PNASH Center's Certified Industrial hygienist. Her interests focus on the determinants of exposure and on interventions that minimize the risk to agricultural workers and the community. She received her MS in Environmental Health Sciences from the University of California at Berkeley. Before joining PNASH and the University of Washington, she provided industrial hygiene services for 10 years at an occupational health clinic in Winnipeg, Canada. There she fostered the participation of employers and workers in addressing a wide range workplace health concerns.

Mike Gempler

Mike Gempler is the Executive Director of the Washington Growers League in Yakima, WA. He also administers the Northwest Growers Association, which utilizes the H-2A program for agricultural employers. Mike also serves as Western Vice President of the National Council of Agricultural Employers. He received a BS in agriculture from the Ohio State University and an MS in agricultural economics from the University of Wyoming and is a graduate of the Washington Agriculture and Forestry Leadership Program. He also serves as Treasurer of the Washington State Farmworker Housing Trust, as a member of the Stewardship Committee of The Food Alliance, and as Secretary of the Mt. Adams Foundation, which sponsors the Washington Basic Health Plan for over 18,000 low-income people in Central Washington.

Paul H. Gosselin

On July 1, 2001, the Governor of California appointed Mr. Gosselin to the position of Chief Deputy Director of the Department of Pesticide Regulation (DPR), which is part of the California Environmental Protection Agency. Mr. Gosselin had been Acting Chief Deputy Director since April 1999.

DPR is responsible for regulating, monitoring, and controlling the use of pesticides in California, including evaluating the public health and environmental effects of pesticides. DPR also develops and promotes pest management practices that reduce the problems associated with pesticide use.

In January 1998, Mr. Gosselin became Assistant Director over the Division of Registration and Health Evaluation. The division carries out all pesticide product registration activities, risk assessments, illness evaluations, and work place safety. Mr. Gosselin joined DPR in November 1993 when he was appointed as Assistant Director overseeing the Division of Enforcement, Environmental Monitoring, and Data Management. Division branches included Pesticide Enforcement, Environmental Monitoring and Pest Management, and Information Technology, collectively responsible for the pesticide enforcement activities, pesticide use reporting, licensing program, water monitoring and protection, air programs (including volatile organic compound emission control), and reduced-risk pest management.

Mr. Gosselin earned his Masters of Science degree in chemistry and a Bachelor of Science degree in biochemistry, both from the University of Massachusetts.

From 1989 to 1993, Mr. Gosselin was Director of the Division of Regulatory Services for the Massachusetts Department of Food and Agriculture. In that position, he managed five bureaus, including pesticides, dairy inspection, plant pest control, farm products, and animal health.

Marcy Harrington, M.P.A.

Marcy Harrington is the Manager of the Pacific Northwest Agricultural Safety and Health (PNASH) Center. Ms. Harrington has been with PNASH for 9 years, planning, facilitating operations and communicating PNASH's work. She was a principle contributor to stakeholder engagement projects in Northwest farming, fishing and forestry to develop occupational research agendas and has produced numerous communications materials, workshops, short courses and conferences. Ms. Harrington's special interests include participatory processes, evaluation methods, and research to practice.

R. DeLon Hull, Ph.D.

Dr. Hull is the Associate Director for Research and Technology Transfer at NIOSH. In this capacity, he leads the Research to Practice (r2p) initiative and facilitates and develops partnerships between NIOSH and stakeholders. Research to Practice is an initiative to enhance the relevance and impact of NIOSH funded research and applies to all research conducted or funded by NIOSH. He is also responsible for diversity efforts in NIOSH, research related to economics of safety and health, and the Institutional Review Board.

Dr. Hull joined NIOSH in 1976 and has held a number of scientific and managerial positions throughout the Institute. As a researcher, he developed numerous NIOSH analytical methods for industrial hygiene and biological samples, led the Inhalation Toxicology Program, led the Immunochemistry Research Program and served in several other technical and leadership roles. Prior to his current assignment, Dr. Hull served as the Acting Deputy Director of NIOSH in Washington DC and the Acting Director of NIOSH's field research division which conducts health hazard evaluations; epidemiologic and industrial hygiene research; and hazard, illness and medical surveillance. He was involved in developing the National Occupational Research Agenda, was lead author of the NIOSH Alert on Latex Allergy, and has authored numerous research publications and NIOSH analytical methods. As the Acting Deputy Director of NIOSH immediately before and for the year following 9/11, Dr. Hull was involved in the many response efforts around these events in addition to the anthrax issues in Congress and the Post Offices.

William Krycia, M.P.H., C.I.H.

William J. Krycia is the regional manager for the Department of Industrial Relations—Cal/OSHA Enforcement, Region II, which covers the Central Valley from the Oregon border down to Edwards Air Force Base. Mr. Krycia has been with the Department of Industrial Relations, Division of Occupational Safety and Health, for more than 23 years. In addition to his regional manager duties, he is involved with special projects within Cal/OSHA on blood borne pathogens, tuberculosis, hantavirus, SARS, and indoor air quality. He is chairperson for the division's Field Sanitation and Agricultural Health and Safety Task Force. He is also the Northern California Process Safety Management Team Leader and the division's field coordinator with

the CDAA Worker Safety Circuit Prosecutor Project. Mr. Krycia has a master's degree in public health from the University of Michigan, Ann Arbor, and is a certified industrial hygienist.

William Krycia, DOSH Regional Manager in Sacramento, and lead person for the DOSH Agricultural Safety and Health Inspection Program (ASHIP), noted that the field sanitation standard (Title 8 Section 3457) required provision of water to covered workers and made mention of heat stress prevention. [Section 3457(c)(1)(A) requires provision of potable water that is "suitably cool, and in sufficient amounts, taking into account the air temperature, humidity, and the nature of the work performed, to meet the needs of all employees." Section 3457(c)(4) requires that covered employees be informed of the importance of practices to minimize exposure to hazards in the field including heat, and that they should drink water frequently, especially on hot days.

Eric Lauritzen

Eric Lauritzen is the Monterey County Agricultural Commissioner where he has served since his appointment in 1998. Prior to coming to Monterey County, Lauritzen served as agricultural commissioner in Sonoma County, Deputy Agricultural Commissioner in San Mateo County, and Agricultural Biologist in Alameda County, he has over 25 years experience in public regulatory programs. He graduated from the University of California at Davis with a degree in Plant Science and earned his Master's degree in Public Administration from California State University, Hayward.

Eric serves on the Board of Directors for Monterey County Agricultural Education, he is married, with two sons and lives in Pacific Grove. His interests include travel, golf, gardening, fishing and wine.

Karen M. Lewis

Karen Lewis is an Extension Educator with Washington State University. She received her B.S. in Plant Science and an M.S. in Horticulture from the University of Arizona. Karen's Extension work has focused on labor issues, management and education, pesticide safety education, and orchard systems. Karen is involved with the National Tree Fruit Technology Roadmap, with emphasis in automation and mechanization in tree fruit production and orchard systems. With funding from the Washington State Tree Fruit Research

Commission, Karen's research and outreach efforts are currently focused on replacing orchard ladders with mobile platforms and over the row (OTR) systems and robotics. As a member of an interdisciplinary team, she works specifically on the human-machine interface issues including ergonomics, productivity, efficiency, worker safety and management.

The National Tree Fruit Technology Roadmap is available at <http://www.treefruitresearch.com/technology-roadmap/>

Max R. Lum, Ed.D., M.P.A.

Max Lum is the Associate Director, Office of Health Communication for the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention. In addition, Max is the international program lead for the Institute. Dr Lum began his government career as a White House Fellow assigned to the Executive Office of the President after an unsuccessful tour of duty with the New York Yankees' minor league farm system. Before coming to NIOSH in 1996, Max served as the Director, Division of Health Education at the Agency for Toxic Substances and Disease Registry located in Atlanta Georgia. He received a B.S. from the University of Maryland, a Masters Degree in Public Administration and a Doctorate in Medical Education from the University of Southern California. Dr. Lum has published and lectured widely in the field of risk communication. He has currently adjunct teaching appointments at the Harvard School of Public Health and the George Washington University School of Public Health and Health Policy.

Stephen McCurdy, M.D., M.P.H.

Dr. McCurdy graduated from the UC San Diego School of Medicine and received his MPH degree from the UC Berkeley School of Public Health. He has been a member of the faculty at UC Davis School of Medicine since 1987 and is currently a Professor in the Division of Environmental and Occupational Health in the Department of Public Health Sciences. Since its inception in 1990, Dr. McCurdy has been involved with the Western Center for Agricultural Health and Safety, where he currently heads up the Community Outreach for Research and Education (CORE) component which focuses on engaging the agricultural community and public with Center activities. His research interests include general agricultural health, with a special focus on injury among youth and Hispanic farm workers.

Elizabeth McLoughlin, Sc.D.

Elizabeth McLoughlin has spent her career bridging the chasm between science and practice. She directed UCSF's San Francisco Injury Center for Research and Prevention from 1987-1995, and coordinated the Academic Fellowship Program of the California Wellness Foundation's Violence Prevention Initiative from 1993-2003. She received her doctorate in public health from Johns Hopkins University. She believes that social change happens when good public policy is advocated before legislative and regulatory bodies by a cluster of scientists, activists and survivors all on the same page. She has testified in Sacramento in support of the motorcycle helmet law and the fire-safe cigarette. She is currently writing a book on the 28 year grassroots campaign to change the cigarette to prevent fatal residential fires. She will use the mobilization of the central valley for health care reform to suggest ways to work on safety in agriculture.

Liz McLoughlin has spent a professional career working to bring science to policymaking. For decades, she has worked to increase health & safety through legislative or regulatory change. Being a survivor advocate herself, she believes that the most eloquent advocates for change are those who have suffered the most from the status quo.

John A. Miles, Ph.D., PE (Emeritus)

John Miles received his B.S. and M.S. degrees in Agricultural Engineering from the University of California, Davis, in 1966 and 1967. After earning his Ph.D. in Agricultural Engineering from Cornell University, Ithaca, he joined the U.S. Army, becoming a captain, and was stationed for three years at White Sands Missile Range in New Mexico. From 1973 to 1976, he served as assistant professor of soils, water and engineering at the University of Arizona, Tucson. He joined UC Davis' Department of Biological and Agricultural Engineering in 1976, and retired as a professor in 2005.

His research interests include, the development of equipment and systems for the improved health and safety of agricultural and forest workers (design of ergonomic interventions) is the primary interest area. Past efforts in design have been directed at improving working conditions in forestry, fruit orchards, nurseries and vineyards. While efforts in each area continue, the most recent emphasis is on improving the health and environmental conditions for workers in the vineyard industry. As the primary instructor of the Biological

and Agricultural Engineering Design Courses, Dr. Miles directs student designs over a broad range of topics. He is author or co-author of numerous publications.

Frank M. Mitloehner, Ph.D., Dipl. Agr. Ing.

Frank Mitloehner began responsibilities as an Air Quality Cooperative Extension Specialist in the Department of Animal Science at the University of California, Davis in January 2002. His current research activities are in the area of air emission estimates from dairies and other Agricultural sources and emission mitigation (focus on volatile organic compounds, ammonia, and particulate matter). His extension efforts are largely related to teaching farmers and dairymen air quality related information and assisting them in air quality compliance issues. He assists regulatory agencies in obtaining scientifically sound emission estimates and finding ways to reduce emissions from agricultural operations.

He is principle investigator at the Ag Center project on exposure and health effects on large California dairies. Dr. Mitloehner serves as director for the Agricultural Air Quality Center at UC Davis coordinating research efforts from a faculty group of 30+ faculty members.

Dr. Mitloehner was born in Germany. He received his M.S. degree (Dipl. Agr. Ing) in Agricultural Engineering and Animal Science in 1996 from the University of Leipzig and the University of Goettingen (Germany). He completed his Ph.D. program in Animal Science "Environmental Management of Feedlot Cattle" at Texas Tech University in Lubbock, Texas. Dr. Mitloehner was a Post Doctoral Fellow at the Department of Animal Science at Texas Tech University conducting research related to air quality associated with commercial feedlots in Texas. Frank has international experience working in South Africa, Australia, Paraguay, and China.

Helen Murphy, F.N.P., M.H.S.

Helen Murphy is the Director of Outreach and Education at the Pacific Northwest Agricultural Safety and Health (PNASH) center. Before joining PNASH in 2004 she worked for the United Nations Food and Agriculture Organization in their Integrated Pest Management Program in Asia. She was their field epidemiologist conducting studies on the acute and reproductive effects of pesticide use among West Sumatran women in Indonesia. She went on

to integrate a human health component to the IPM ecological paradigm by adapting the study design for farmers' use. With this she trained IPM farmers throughout Asia to conduct their own studies on pesticide exposure and the acute health effects in their communities as a health education strategy. She received her BS at Stanford in nursing, family nurse practitioner training and Masters in Health Services at UC Davis and was at the University of Hawaii, School of Public Health in the DrPH program. She practiced as a Family Nurse Practitioner for 10 years, thereafter spent 20 years in international public health, primarily in the refugee camps of Thailand, the Philippines and Pakistan, working as an epidemiologist, training specialist and researcher.

Kathleen O'Connor, Ph.D.

Kathleen O'Connor is the Field Study Coordinator of the MICASA Study of the Department of Public Health Sciences at UC Davis (Dr. Marc Schenker, Principal Investigator), coordinating field research activities of the Mendota-based research team. Kathleen received her doctorate in Social Anthropology from Harvard University in 2005, where she wrote on mental health care and alternatives to psychiatric care among the urban poor in Bahia, Brazil. She is currently finishing a book on African Diaspora religious traditions in Bahia, her second book. Kathleen speaks fluent Portuguese, Spanish and French, and holds an MA in Latin American Studies from UCLA and an MM in Jazz Performance from USC. She considers herself the "token" qualitative member of the research team.

Kent E. Pinkerton, Ph.D.

Dr. Kent E. Pinkerton completed his Ph.D. degree in Pathology at Duke University in 1982. He holds joint appointments in the School of Veterinary Medicine as Professor of Anatomy, Physiology and Cell Biology and in the School of Medicine as Professor of Pediatrics at the University of California, Davis.

Dr. Pinkerton's research interests: 1) the health effects of environmental air pollutants to alter lung anatomy and function; 2) the interaction of gases and airborne particles within site specific regions and cell populations of the respiratory system to produce acute and chronic lung injury; and 3) the effects of environmental tobacco smoke and ambient airborne particles on lung growth and development.

Dr. Pinkerton serves as Associate Director for the

Western Center for Agricultural Health and Safety at the University of California, Davis. He also serves as Director of the Center for Health and the Environment and Associate Director of the San Joaquin Valley Health Effects Research Center at UC Davis. This Center has been recently funded by the U.S. Environmental Protection Agency to study the health effects of ambient airborne particles in the Central Valley of California.

Kathy Pitts, M.S.W.

Kathy Pitts is project coordinator for the Center for Farm Health and Safety located in the Sociology and Criminal Justice Department at Eastern Washington University. She received her MSW from Eastern Washington University. She has been project coordinator on six research projects for the Center from 1994 to 2006. The current NIOSH funded grant she is working on is, "An Incentive Intervention Program to Encourage Ergonomic Behavior in Latino Farm Workers." The majority of her work at the Center has focused on developing farm safety interventions for seasonal and migrant farm laborers. During this time she has also been a faculty field advisor and adjunct professor for the School of Social Work. Mrs. Pitts can be contacted at 509-359-7795.

Marc Schenker, M.D., M.P.H.

Dr. Marc Schenker received his M.D. degree from the University of California at San Francisco and his M.P.H. from the Harvard School of Public Health. He is currently Professor and Chairman of the Department of Public Health Sciences at the University of California, Davis. Following training in internal medicine and pulmonary disease, Dr. Schenker directed his efforts toward occupational health, epidemiology and preventive medicine. He has worked for more than 20 years in these fields, addressing a wide range of public health issues. His research has included major studies on respiratory hazards among agricultural workers, diesel exhaust exposure and lung cancer, reproductive and other health hazards in the semiconductor industry. He teaches at the undergraduate, graduate and professional school levels as well as in a wide range of continuing education and professional forums. His teaching includes courses in epidemiology, preventive medicine, public health and international health. He is the International Health Advisor for the UC Davis School of Medicine as well as Director of the UC Western Center for Agricultural Health and Safety and

Director of the Davis component of the Center for Occupational and Environmental Health. Dr. Schenker has published more than 150 scientific manuscripts.

John P. Snider, M.P.H., M.P.A.

John Snider is Community Health Director for Monterey County Health Department. He received his Masters Degree in Public Administration, M.P.A. at San Diego State University, and his Masters Degree in Public Health, M.P.H., at the University of California, Berkeley.

John Snider's experience includes:

- Seven years with San Diego County Public Health
- One year with Texas State Department of Health in Austin
- 22 years with Monterey County Health Department

His current duties include, overall direction of the Departments', Community Health Division that consists of 190 employees and a 21 million dollar budget that provides:

- Children's Medical Services
- Health Promotion Services, including Maternal Child Health Services
- Public Health Nursing Services
- Women, Infants, and Children's Services

John Snider also serves as co-principle investigator for the Steps to a Healthier Salinas Project.

Sabina Swift, Ph.D.

Sabina Swift is a native of the Philippines where her extension experience started. Before she received her PhD in entomology from the University of Hawaii, she assisted vegetable growers in Vietnam and Laos on integrated pest management, where she learned to speak the language. As coordinator of USDA/RMA's risk management training project for Southeast Asian growers in Hawaii, Sabina continues to learn effective outreach to translate/disseminate results of the university's agriculture research to Hawaii's socially disadvantaged clientele, a challenging but rewarding profession.

James Thompson, P.E.

Jim Thompson is an Extension Engineer at UC Davis. He received a B.S. and M.S. degrees from the Agricultural Engineering Department at UC Davis. He has authored more than 250 research and extension reports and publications. His research and extension activities cover post harvest handling of fresh fruits,

vegetables, flowers, dried fruits, tree nuts, and grains; and energy use and conservation in agriculture. Please welcome him today to discuss Robotics and Mechanization in Agriculture: History and Future Trends.

Don Villarejo, Ph.D.

Don Villarejo is Founder and Director Emeritus of the California Institute for Rural Studies (CIRS), a non-profit research center in Davis, and has published widely on policy issues affecting agriculture and rural communities. He has also served as a consultant to numerous public and private agencies, including the California Agricultural Labor Relations Board, International Brotherhood of Teamsters (Locals 601 and 890), United Food and Commercial Workers (Local 1096), and California Rural Legal Assistance. In January 2005, he was awarded the first-ever Advocate for Social Justice Award, the "Justie", by the Ecological Farming Association for his "...long term, significant contributions to improving the well-being of the people who work in food production and agriculture." Most recently, he is co-author with Prof. Marc Schenker of "Policies to Improve the Health and Well-Being of California's Hired Farm Workers," sponsored by the California Program on Access to Care (November 2005).

Jennifer Weber

Jennifer Weber is a pesticide safety field consultant with the Arizona Department of Agriculture's Agricultural Consultation and Training Program. She works directly with growers and agricultural employees to assist them in becoming compliant with the federal Worker Protection Standard and state pesticide laws and regulations. She provides pesticide safety information during site visits and training programs and develops educational resources to further extend pesticide safety information to the agricultural community.

Ms. Weber was a pesticide safety educator for the Statewide Integrated Pest Management Program at UC Davis for about 10 years. In that capacity, she participated in pesticide safety training programs, developed English- and Spanish-language materials, and worked with rural health clinics and social service agencies to provide information about pesticides to clinic staff, farmworkers, and rural families. She also participated in several projects designed to help limited-English speaking farm operators become aware of safe pesticide handling practices.

Prior to working for the University, Ms. Weber was a health and safety specialist with the Farmworker Occupational Safety and Health Education program (FOSHE) in Stockton, California. This program was a collaborative effort of the California Farm Bureau Federation, the University of California Cooperative Extension (UCCE) Service, and the Agricultural Workers' Health Centers. While with FOSHE, she assisted UCCE farm advisors and the UC Small Farms' Center with a project to develop pesticide safety materials and provide educational outreach for Southeast Asian specialty crop growers.

Ms. Weber graduate from California Polytechnic State University in San Luis Obispo with a degree in dairy science. Following graduation, she spent two years working on a livestock health program in Ecuador as a Peace Corps volunteer. Upon completion of her Master's Project focusing on pesticide applicator exam formats and testing strategies, Ms. Weber will receive her M.A. in Multicultural and Bilingual Education from California State University, Sacramento.

Mary Jo Ybarra-Vega, M.S.

Mary Jo Ybarra-Vega is currently the social worker/Migrant Health Coordinator for Quincy Community Health Center in Quincy, WA. She coordinates the Promoters de Salud program, the Guiding Good Choices Program and handles in house consultations/referrals from the staff at the Quincy site for their patients. Mary Jo received her B.A. degree in clinical psychology with a double minor in Spanish and sociology from Gonzaga University. Later she became a Patricia Harris Fellow and earned a Master of Science degree in counseling psychology along with an ESA School Counseling Certificate from Central Washington University. During the Western Migrant Stream Forum this January she had the honor of receiving the Sister Cecilia B. Abhold Award for farmworker health outreach services on behalf of the promotores from her program. Moreover she also recently wrote and received the National Health Service Corp Excellence award on behalf of the providers she has the privilege of working with. She is part of a core of outreach providers who have begun their own Washington State Outreach/Promoters Network. This Network has quickly become an important entity in migrant and farmworker health entities. Mary Jo's passion is community based organizing and social justice through farmworkers and youth.

Michael Yost, Ph.D.

Dr. Michael Yost is a professor and the director of the Industrial Hygiene and Safety program in the Department of Environmental and Occupational Health Sciences at UW. He received his Ph.D. from the University of California at Berkeley in Environmental Health Sciences with a minor in Electrical Engineering, and Biostatistics. He has been at the UW since 1993. Dr. Yost's research focuses on exposure assessment methods, exposure modeling, and novel instrumentation for chemical and aerosol sampling. Professor Yost has developed sampling methods based on Open Path Fourier Transform Infrared (OP-FTIR) spectroscopy for air monitoring, and establishing the Optical Remote Sensing (ORS) lab at the University of Washington. Research in the ORS lab currently involves developing spectroscopic and laser

instruments for rapidly detecting gases and aerosols in the environment. Recently this work resulted in a new US patent (#6542242). A recent research project conducted with Targeted Genetics studied sampling methods and the aerosol properties of a modified adenovirus used to deliver gene therapies. Professor Yost also has worked on controlling submicron particle contamination in clean rooms; he participates in the Semiconductor Industry Association (SEMI) standards committee on surface micro-contamination, and has published papers on measurement of aerosol contamination in semiconductor facilities. Dr. Yost has published more than 70 articles in refereed technical journals, holds seven US patents, and has had major research supported by grants from NIOSH, NIEHS, and US-DOE.

Attendees

Curt Ackerman
Farmer
NEC Guest
One Atwell Road
Cooperstown, NY 13482

Susan B Ackerman
Center Manager
NEC
One Atwell Road
Cooperstown, NY 13482
sackerman@nycamh.com

Mopelola A. Adeyemo
Graduate Student
University of California, Davis
Davis, CA 95616
maadeyemo@ucdavis.edu

Tracey L. Armitage
Assistant Statistician
University of California, Davis
Davis, CA 95616
tlrmitage@ucdavis.edu

Melinda Bigelow
Graduate Student Researcher
University of California, Riverside
Department of Entomology
Riverside, CA 92521
mbige00@student.ucr.edu

Ofelio Borges
Farmworker Education Specialist
Washington State
Department of Agriculture
21 North 1st Avenue, Suite 236
Yakima, WA 98902
oborges@agr.wa.gov

Kristen Borre
Interim Director
NC Agromedicine Institute/East
Carolina University
1157 VOA Site C Rd.
Greenville, NC 27834
borrek@ecu.edu

Melissa Brower
Research Coordinator
NYCAMH
One Atwell Road
Cooperstown, NY 13326
mbrower@nycamh.com

Vicky Buchan
Deputy Director
HiPlains Intermountain Ag Health
& Safety Ctr
154B EHB
Colorado State University
Ft. Collins, CO, 80523
Buchan@cahs.colostate.edu

Michelle Calvo
Graduate Student
University of California, Davis
Davis, CA 95616
michellecalvo@gmail.com

Zoe Cardoza Clayson
Professor, SFSU
President, Abundantia Consulting
575 Market Street, Suite 2475
San Francisco, CA 94105
zoeclay@abundantia.net

Susan Q. Cohen
Senior Writer
University of California, Davis
IPM Education & Publications
Statewide IPM Program
One Shields Ave.
Davis, CA 95616
sqcohen@ucdavis.edu

George A. Conway
Director, NIOSH
Agriculture, Forestry and Fishing
Program
4230 University Drive #310
Anchorage, AK 99508
gconway@cdc.gov

Jennifer L. Crowe
Research Coordinator
CEDs
Apartado 150-4013
Atenas, Alajuela
Costa Rica
jencrowe@u.washington.edu

Elizabeth Noceti DiDio
Education & Outreach
Coordinator
University of California, Davis
Davis, CA 95616
emnoceti@ucdavis.edu

Victor Duraj
Grad Student
Ag Ergonomics Research Ctr.
University of California, Davis
Davis, CA 95616
vduraj@ucdavis.edu

Pamela Elkind
Sociology Professor
Eastern Washington University,
Farm Center
314 Patterson
Cheney, WA 99004
pelkind@mail.ewu.edu

Fabiola Estrada
Life Scientist
EPA Region 9
75 Hawthorne Street (CED-5)
San Francisco, CA 94105
estrada.fabiola@epa.gov

Donna Fairchild
Agricultural Consultant
Arizona Department of Agriculture
1688 W. Adams Street
Phoenix, AZ 85007

Fadi Fathallah
Associate Professor
University of California, Davis
Davis, CA 95616
fathallah@ucdavis.edu

Richard A. Fenske
Professor and Director
PNASH Center
University of Washington
1959 NE Pacific St. F-233
Seattle, WA 98195-7234
rfenske@u.washington.edu

Sandra Freeland
Center Manager
WCAHS
University of California, Davis
Davis, CA 95616
slfreeland@ucdavis.edu

Susan Gabbard
President
JBS International
555 Airport Blvd.
Burlingame, CA 94010
sgabbard@jbsinternational.com

Kit Galvin
Research Industrial Hygienist
Dept Env & Occupational Health
Sciences
University of Washington
Seattle, WA 98195-7234
kgalvin@u.washington.edu

John Garcia
Corporate Safety Manager
Foster's Americas
1000 Pratt Avenue
St. Helena, CA 94574
John.Garcia@am.fostersgroup.com

Mike Gempler
Executive Director
Western Growers League
406 W. Chestnut Avenue
Yakima, WA 98902
mgempler@growersleague.org

Paul Gosselin
Chief Deputy Director
California Dept. of Pesticides
Regulations
Davis, CA 95616
pgosselin@cdpr.ca.gov

Marcy J. Harrington
Manager
PNASH Center
Box 357234
Seattle, WA 98195
marcyw@u.washington.edu

Alberto Hauffen
Senior Public Information
Representative
University of California, Riverside
SBMS
Riverside, CA 92521
alberto.hauffen@ucr.edu

Carl Hawk
ARS USDA
9611 S. Riverbend Ave.
Parlier, CA 93648
chawk@fresno.ars.usda.gov

Tamara E. Hennessy-Burt
Statistician
University of California, Davis
Davis, CA 95616
tehennessy@ucdavis.edu

Edna Hernandez
RN- MSN Student
SFSU
Ednayasmin@yahoo.com

Jonathan Hofmann
PhD Student
University of Washington
432 NE Ravenna Blvd, #403
Seattle, WA 98115
hofmann@u.washington.edu

Stacey Holland
Graphic Designer
PNASH Center
Box 357234
Seattle, WA 98195-7234
sh3@u.washington.edu

Jillian Hopewell
Director of Education
Migrant Clinicians Network
1309 Orchard Way
Chico, CA 95928
jhopewell@migrantclinician.org

R. DeLon Hull
Assoc Director
Research & Technology Transfer
National Institute for Occup. Safety
& Health
4676 Columbia Parkway
Cincinnati, OH 45226
DHull@cdc.gov

Lovell "Tu" S. Jarvis
Associate Dean and Professor
University of California, Davis
College of Ag & Env Sciences
One Shields Avenue
Davis, CA 95616
lsjarvis@ucdavis.edu

Josh Johnson
Assoc. Environ. Research Scientist
Cal EPA/CDPR
1001 I Street
Sacramento, CA 95812
jjohnson@cdpr.ca.gov

Pam Kan-Rice
Assistant Director
News and Information Outreach
1111 Franklin St. 6th floor
Oakland, CA 94607
pamela.kan-rice@ucop.edu

James J. Keenan
Graduate Student Researcher
University of California, Riverside
Dept. of Entomology
Riverside, CA 92521
james.keenan@ucr.edu

Robert Krieger
Extension Toxicologist
University of California, Riverside
Department of Entomology
Riverside, CA 92521
bob.krieger@ucr.edu

William J. Krycia
Regional Director
Cal OSHA
2424 Arden Way, Suite 125
Sacramento, CA 95825
wkrycia@dir.ca.gov

Eric Lauritzen
Ag Commissioner
Monterey County
1428 Abbott Street
Salinas, CA 93901
lauritzene@co.monterey.ca.us

Steven M. LeVene
Consumer Rehabilitation and AI
Specialist
University of California, Davis
One Shields Ave
Bio & Ag Eng
Davis, CA 95616
smlevene@ucdavis.edu

Karen M. Lewis
Extension Educator
Washington State University
PO Box 37 Courthouse/WSU Extension
Ephrata, WA 98823
kmlewis@wsu.edu

Yanhong Li
Graduate Student
University of California, Riverside
Department of Entomology
Riverside, CA 92521
li014@student.ucr.edu

Max R. Lum
Associate Director-Health
Communications
NIOSH
HHH Bldg. 200 Independence
Ave., SW
Washington, DC 20201
Mrl1@cdc.gov

Irina Malkina
AES Specialist
University of California, Irving
Irvine, CA
irina@mail.cert.ucr.edu

Michael Marsh
Staff Attorney
California Rural Legal Assistance, Inc.
3 Williams Road
Salinas, CA 93905
mmarsh@crla.org

Alma Martinez
Associate Producer
Radio Bilingue
Davis, CA 95616
almam@radiobilingue.org

Phyllis McCalla
Conference Consultant
University of California, Davis
Davis, CA 95616

Stephen A. McCurdy
Professor
University of California, Davis
Public Health Sciences
One Shields Ave
Davis, CA 95616
samcurdy@ucdavis.edu

Elizabeth McLoughlin
Trauma Foundation
San Francisco General Hospital
Bldg. 1, Rm 300
San Francisco, CA 94110
emclhall@comcast.net

Emily Meharg
Graduate Student Researcher/CHE
UC Davis
emeharg@ucdavis.edu

John Scott Meschke
Assistant Professor
University of Washington
4225 Roosevelt Way NE
Seattle, WA 98011
jmeschke@u.washington.edu

John Miles
Professor Emeritus
University of California, Davis
Davis, CA 95616
jamiles@ucdavis.edu

Cynthia Miles
University of California, Davis
Davis, CA 95616

Brandon J. Miller
Graduate Student Researcher
University of California, Davis
Davis, CA 95616
bjmiller@ucdavis.edu

Diane C. Mitchell
Project Manager
University of California, Davis
Davis, CA 95616
dcmitchell@ucdavis.edu

Elizabeth Mitloehner
Director of External Grants, UC
Davis
Center for Public Policy, Race,
Ethnicity & Gender
ebmitloehner@ucdavis.edu

Frank M. Mitloehner
Air Quality Extension Specialist
University of California, Davis
Davis, CA. 95616
fmmitloehner@ucdavis.edu

Elizabeth Morgan
Staff Research Scientist
UC Davis
Ednayasmin@yahoo.com

Barbara Morrissey
Toxicologist
WA State Dept of Health
PO Box 4
Olympia, WA 98504
Barbara.Morrissey@doh.wa.gov

Helen Murphy
Outreach Director
PNASH Center
1959 NE Pacific Street, HSB F-233
Seattle, WA 98195
hmurf@u.washington.edu

Glenna A. Nagy
Office Manager
Windward Farming Company
18911 Portola Drive, Suite A
Salinas, CA 93908
gnagy@berry.net

Mai Ngo
Postdoctoral Fellow
University of California, Davis
Davis, CA 95616
maingo@ucdavis.edu

Minhchau T. Nguyen
Student Researcher
University of California, Davis
Davis, CA 95616
nguyenmt@umdnj.edu

Kathleen O'Connor
Project Field Coordinator
Proyecto MICASA
660 Tule Street
Mendota, CA 93640
koconnor@ucdavis.edu

Michael A. O'Malley
Medical Director
University of California, Davis
Employee Health Services
Davis, CA 95616
maomalley@ucdavis.edu

Brian A. Oatman
EH&S Coordinator
University of California, Davis
One Shields Avenue
Davis, CA 95616
baoatman@ucdavis.edu

Kent E. Pinkerton
Professor and Associate Director
WCAHS
University of California, Davis
One Shields Avenue
Davis, CA 95616
kepinkerton@ucdavis.edu

Kathy Pitts
Project Coordinator
Eastern Washington University
Farm Health & Safety Ctr.
314 Patterson
Cheney, WA 99004
kpitts@mail.ewu.edu

Amjad A. Ramahi
2918 Weald Way # 921
Sacramento, CA 95833
ajramahi@hotmail.com

Jaime Ramon
Farmworker Education Specialist
WSDA - Pesticide Management
Division
3102 W. 46th Avenue
Kennewick, WA 99336
jramon@agr.wa.gov

Steven J. Reynolds
Director, High Plains Intermtn. Ctr.
for Ag Health & Safety
154B EHB
Colorado State University
Ft. Collins, CO 80523
sjreynolds@colostate.edu

John Rosecrance
Outreach/Education Core
HiPlains Intermountain Ag Health
& Safety Center
154B EHB
Colorado State University
Ft. Collins, CO 80523
john.rosecrance@colostate.edu

Robin W. Russell
Program Coordinator
PNASH Center
1959 NE Pacific Street, F-233
Seattle, WA 98195
marcyw@u.washington.edu

Sonia Sanchez
Safety Manager
Western Farm Service
1335 W. Main Street
Santa Maria, CA 93454
beautifulwfs@yahoo.com

Marc B. Schenker
Director, WCAHS
PHS, Chair
University of California, Davis
One Shields Avenue
Davis, CA 95616
mbschenker@ucdavis.edu

Robert Schlag
Research Scientist
State Pesticide Epidemiology
1001 I Street
Sacramento, CA 95814
rschlag@oehha.ca.gov

Jay P. Schreider
Primary State Toxicologist
Dept. of Pesticide Regulation
1001 "I" Street, POB 4015
Sacramento, CA 95812
jschreider@cdpr.ca.gov

Flor Servin
Farmworker Education Specialist
WSDA - Pesticide Mgmt.Division
1505 N. Miller Street, Suite 140
Wenatchee, WA 98801-1569
fservin@agr.wa.gov

John Snider
Community Health Chief
Monterey County
Salinas, CA 95616
sniderj@co.monterey.ca.us

Kevin J. Solari
Program Specialist - Worker
Health & Safety Dept. of Pesticide
Regulation
1001 I Street
Sacramento, CA 95814
ksolari@cdpr.ca.gov

Michelle Sommargren
Graduate Student
University of Washington
Seattle, WA 98195
mmbraun@u.washington.edu

Julie Sorensen
Research Coordinator
NY Ag Center
One Atwell Road
Cooperstown, NY 13326
jsorensen@nycamh.com

Kim R. Stackhouse
Graduate Student
University of California, Davis
Davis, CA 95616
krstackhouse@ucdavis.edu

Maria Stoecklin-Marois
Staff Research Associate, PHS
University of California, Davis
mtstoecklin@ucdavis.edu

Richard Sultanov
Conference Assistant/AV Specialist
University of California, Davis
Davis, CA 95616
rsultanov@ucdavis.edu

Sabina Swift
Assistant Specialist
University of Hawaii, Manoa
3190 Maile Way St. John 307
Honolulu, Hawaii 96822
sabina@hawaii.edu

Maria I. Tchong
Research Industrial Hygienist
PNASH Center
UW-DEOHS, Box 357234
Seattle, WA 98195
mitchong@u.washington.edu

Suzanne Teran
Program Coordinator
Labor Occupational Health Program
2223 Fulton Street, 4th Floor
Berkeley, CA 94720
steran@berkeley.edu

James F. Thompson
Cooperative Extension Specialist
University of California, Davis
Davis, CA
jftompson@ucdavis.edu

Kevin Thompson
Reporter
Cal-OSHA Reporter
Petaluma, CA

Ming-Yi Tsai
Doctoral Candidate
University of Washington
5007 Wyandotte St. #2-s
Kansas City, MO 64112
mytsai@u.washington.edu

Brent L. Ulrey, PhD Student
Bio & Ag Engineering
University of California, Davis
Davis, CA 95616
blulrey@ucdavis.edu

Stacey C. Viebrock
Research Assistant
New York Center for Ag Medicine
& Health
One Atwell Road
Cooperstown, NY 13326
sviebrock@nycamh.com

Don Villarejo
Consultant
P.O. Box 381
Davis, CA 95616
donfarm@comcast.net

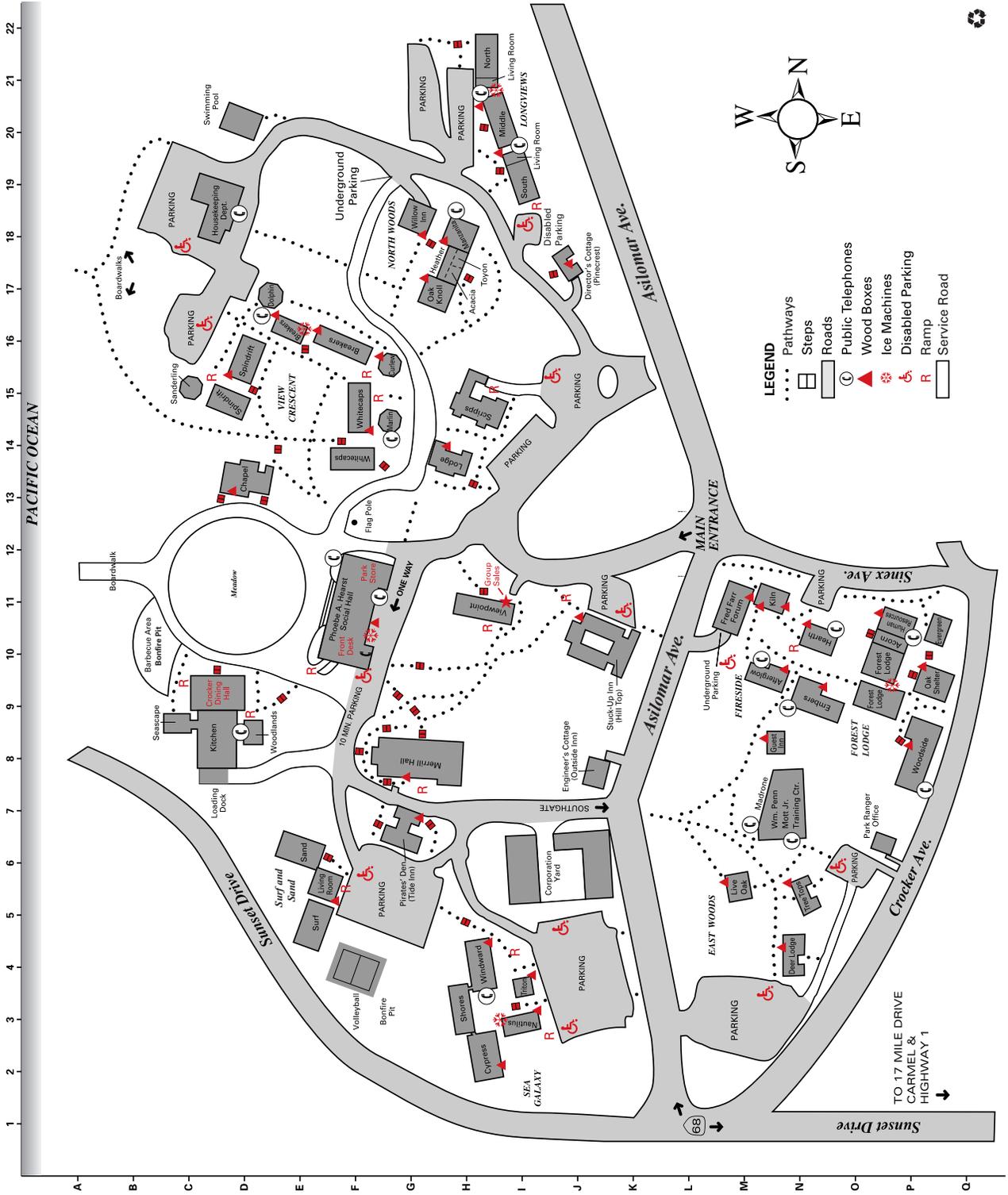
Don Wade
ARS USDA
9611 S. Riverbend Ave.
Parlier, CA 93648
dwade@fresno.ars.usda.gov

Jennifer Weber
Agricultural Consultant
Arizona Department of Agriculture
1688 W. Adams Street
Phoenix, AZ 85007
jweber@azda.gov

Mary Jo Ybarra-Vega
Outreach Specialist
Quincy Community Health Center
1450 1st First Street SW
Quincy, WA 98848
mybarra@mlchc.org

Michael G. Yost
Professor
University of Washington
Department of OEH Sciences
Box 357234
Seattle, WA 98195
airion@u.washington.edu

Yongjing Zhao
Staff Research Associate
University of California, Davis
Davis, CA 95616
yjzhao@ucdavis.edu



FACILITY	ROOM #	MEETING ROOMS	LOC.
Longviews (H-21)			
Longview North	101-110	North Living Room	H-22
Longview Middle	111-120		H-21
Longview South	121-130	South Living Room	I-19
North Woods (G-18)			
Willow Inn	1025-1036	Heather	G-19
Manzanita	1001-1012	Toyon	H-18
Oak Knoll	1013-1024	Acacia	H-17
View Crescent (E-15)			
Whitecaps South	809-820	Marlin	F-14
Whitecaps North	809-820	F-15	F-15
Breakers East	821-832	Curlew	F-16
Breakers West	833-840	Dolphin	E-16
Spindrift South	841-848	Sanderling	D-15
Spindrift North	849-856		D-16
Fireside (O-10)			
Afterglow	1301-1312	Fred Farr Forum	M-9
Heath	1325-1336	Kiln	N-10
Embers	1313-1324		N-9
Guest Inn	901-903		M-8
Forest Lodge (M-10)			
Forest Lodge	1201-1211	Acorn	O-10
	1212-1223	Evergreen	P-11
		Oak Shelter	P-8
Woodside			
Historic Core			
Lodge	201-218		H-14
Scrapps	301-323	Scrapps Meeting Rm	H-15
Stuck-Up Inn (Hilltop)	401-414		K-10
Pirates' Den (Tide Inn)	501-510		G-6
Director's Cottage (Pinecrest)	1401-1403		J-18
Viewpoint		Viewpoint East	I-11
Group Sales Office			I-11
Merrill Hall			G-8
Chapel			D-14
Front Desk & Park Store / Phoebe A. Hearst Social Hall			F-10
Crocker Dining Hall		Crocker, Woodlands & Seascapes	D-9
Engineer's Cottage (Outside Inn)			J-8
Fire Academy Offices			J-8
Sea Galaxy (G-4)			
Sand	605-610	Surf & Sand Room	E-6
Surf	601-604		E-4
Shores	701-708	Triton	H-4
Shores	709-716		H-3
Cypress	717-724	Nautilus	H-2
Eastwoods (M-4)			
Live Oak	1101-1110		M-5
Tree Tops	1111-1120		N-5
Deer Lodge	1121-1130		N-3
William Penn Mott Jr. Training Center			N-7
Madrone			M-7
Activity Locations			
Barbecue Area			C-10
Swimming Pool			D-21
Volleyball Court			F-4
Corporation Yard		Facilities	J-6
Housekeeping			D-19
Woodhaven - Park Ranger Office			O-7