The Association for Environmental Health and Sciences (AEHS) Foundation is proud to announce

Conference Directors:
Paul Kostecki, Ph.D. and
Edward J. Calabrese, Ph.D., University of Massachusetts, Amherst, MA

The 30th Annual International Conference on

Soil, Water, Energy, and Air

and the AEHS Foundation Semi-Annual Meeting

March 16-19, 2020
DoubleTree Mission Valley, San Diego, California

Register before March 2nd and SAVE! Registration form inside.

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This March will mark the thirtieth gathering of environmental professionals to the Annual International Conference on Soil, Water, Energy, and Air. For the past twenty-nine years, this conference has helped to bring the environmental science community closer together by providing a forum to facilitate the exchange of information in regard to technological advances, new scientific achievements, and the effectiveness of standing environmental regulation programs.

Attracting 500 - 600 participants annually, the conference is highly successful and internationally known, focusing on important and timely environmental issues related to soil, water, energy, and air. Attendees are drawn from a variety of professions including state and federal regulatory agencies, environmental engineering and consulting firms, petroleum and chemical industries, military, and academia.

The 2020 conference promises to be an exciting opportunity for environmental professionals who are concerned with developing creative, cost-effective assessments and solutions that can withstand the demands of regulatory requirements.

WHO SHOULD ATTEND

- Environmental science educators and students
- Federal, state, county, and municipal officials responsible for the development and implementation of environmental regulatory programs
- Agencies and organizations responsive to issues arising from contaminated soils, sediments, water, and air
- Consultants providing environmental contaminant assessment, advice, and guidance
- Attorneys concerned with client environmental contaminant issues
- Environmental scientists, engineers, managers, and consultants
- Analytical laboratory staff specializing in environmental contamination
- Real estate, insurance, and banking representatives

WHY YOU SHOULD ATTEND

The Thirtieth Annual International Conference on Soil, Water, Energy, and Air offers attendees an opportunity to exchange findings, ideas, and recommendations in a professional setting. The strong and diverse technical program has been developed to meet the changing needs of the environmental field.

Platform and poster sessions feature research, case studies, and the presentation of new programs. Equipment demonstrations augment the exhibition hall and bring applied technology to attendees. Focused workshops provide attendees with practical and comprehensive information for immediate application.

SOCIAL PROGRAM

To facilitate networking and the enjoyment of all conference participants, we provide several social opportunities. The 2020 conference will include a wine and cheese welcome reception on Tuesday, a networking social on Wednesday evening, and food and beverage receptions accompanying the afternoon poster presentations on both Tuesday and Wednesday.

WHERE DO OUR ATTENDEES COME FROM?
CONFERENCE ATTENDEE PROFILE

Attendees include representatives from state and federal agencies, military, industry (including railroad, petroleum, transportation, and utilities), environmental engineering, consulting, and academia.

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413-549-5170 P  413-549-0579 F
brenna@aehsfoundation.org
CONFERENCE at a GLANCE

CONFERENCE FORMAT: Monday is WORKSHOPS only. Conference SESSIONS start Tuesday morning and run through Thursday at noon. Platform sessions and workshops may run concurrently. Please check the schedule closely. This is a preliminary program and is subject to change.

Monday, March 16, 2020 (Monday is workshops only)
Registration: 10:00am – 5:00pm

Workshops
Workshop 1 1:00pm – 4:00pm, Environmental Forensics: Emerging Challenges and Solutions
Workshop 2 1:00pm – 5:00pm, Per- and Polyfluoroalkyl Substances (PFAS): Beyond the Basics
Workshop 3 1:00pm – 5:00pm, California’s Environmental Challenges: What Do We Do with Large Operating Facilities
Workshop 4 1:00pm – 5:00pm, Effective Application of Multiple ITRC Guidance Documents to Hydrocarbon Sites

Tuesday, March 17, 2020
Registration: 7:30am – 7:00pm
Exhibit Hall Hours: 9:00am – 7:00pm
Breaks: 10:00am and 3:00pm (30 min)

Morning Platform Sessions/Workshop, 8:30/8:50/9:00am – 12:00pm
Session 1: Site Investigation
Session 2: Regulatory Programs and Policies
Session 3: PFAS Remedial Strategies
Workshop 5 8:30am – 12:00pm, Why You Should Monitor Indoor Radon, Differential Temperature, and Pressure During Chlorinated Vapor Intrusion Assessments

LUNCH
12:00pm – 1:30pm
Speaker: Charles J. Newell, Ph.D., P.E., Vice President/Environmental Engineer, GSI Environmental Inc., Houston, TX
Waves of Problems to Solve: A Long-Term Perspective of the Remediation Field

WELCOME RECEPTION
WINE AND CHEESE SOCIAL
5:00pm – 7:00pm
Free to all registered conference attendees

Afternoon Platform Sessions/Workshop, 1:30pm – 5:00/5:30pm
Session 4a: Sustainable Practices and Partnerships to Ensure a Cleaner and Greener Environment
Session 4b: Horizontal Well Systems – Principles and Practices
Session 5: Environmental Forensics
Session 6: Current Regulatory Status and Risk Assessment Considerations for PFAS
Workshop 5 Continued 1:30pm – 5:00pm, Why You Should Monitor Indoor Radon...

SURF Membership Meeting (open to all), 3:00pm – 5:00pm
Poster Presentations & Social, 3:00pm – 6:00pm
Welcome Reception
Evening Workshops
Workshop 6 6:30pm – 9:30pm, Environmental Forensics: Applications and Advances in Fingerprinting...
Workshop 7 6:30pm – 8:30pm, PFAS 360 – Analytical Challenges and Risk Assessment Update

Wednesday, March 18, 2020
Registration: 7:30am – 7:00pm
Exhibit Hall Hours: 9:00am – 7:00pm
Breaks: 10:00am and 3:00pm (30 min)

Morning Platform Sessions, 8:30am – 12:00pm
Session 7a: Green and Sustainable Remediation: Principles in Action
Session 7b: Green and Sustainable Remediation: Using the Metrics
Session 8: Remediation I
Session 9a: PFAS Analytical Approaches and Challenges
Session 9b: PFAS in Our Environment: Food, Packaging, and Wastewater
Session 10: Vapor Intrusion I
Lunch

Afternoon Platform Sessions, 1:30pm – 4:30/5:30pm
Session 11: 1,4-Dioxane
Session 12: Remediation II
Session 13a: PFAS Assessment and Remediation
Session 13b: Findings of a PFAS Experts Symposium
Session 14: Vapor Intrusion II
Poster Presentations & Social, 3:00pm – 6:00pm

Evening Social

Evening Workshop
Workshop 8 6:30pm – 9:30pm, A Workshop on using the ITRC Guidance Document: Practical Implementation of Advanced Site Characterization Tools
Workshop 9 6:30pm – 8:30pm, Fundamentals of Horizontal Well Systems and Modeling Tools

Thursday, March 19, 2020
Registration: 7:30am – 12:00pm
Exhibit Hall Hours: 9:00am – 12:00pm
Break: 10:00am (30 min)

Morning Platform Sessions, 8:30am – 12:00pm
Session 15a: Natural Source Zone Depletion
Session 15b: In-Situ Thermal Remediation (ISTR)
Session 16: Innovative Remedial Technologies
Session 17: Vapor Intrusion III
Session 18: Innovative Soil, Groundwater, and Sediment Cleanup Technology Solutions

DRAWING - Enter to win a free registration to one of our next two conferences!
Entry and drawing will take place during each of the Thursday morning sessions.
WINNERS IN EVERY SESSION!
Must be present to win. Several second place winners will receive free 2020 AEHS Foundation Membership!
Drawings will take place at the conclusion of each session.
MONDAY AFTERNOON

March 16, 2020

All workshops are FREE to municipal, state, and federal personnel registered for the conference. Use discount code REG-MSF.
Pre-registration is required. If you are registering as “workshop only” and are not registering for the conference, the workshop fee applies.

**Workshop 1** 1:00pm – 4:00pm

Environmental Forensics: Emerging Challenges and Solutions

- Ioana G. Petrisor, Ph.D., ToxStrategies, Mission Viejo, CA
- Jeffrey L. Caufield, Caufield & James LLP, San Diego, CA
- Nick Bubhe, Mission Environmental, San Diego, CA
- Massimiliano Lega, University of Napoli Parthenope, Napoli, Italy

Environmental Forensics focuses on re-construction of past contamination events in order to establish the source(s) and age of environmental contaminants and to allocate between responsible parties.

This workshop will present a series of challenging situations involving the emerging use of forensic techniques for routine site investigations, uncovering illegal contamination and remediation, as well as the use of appropriate fingerprinting methods to distinguish between sources of emerging contaminants such as per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The focus will be on how to develop appropriate strategies and provide defensible and cost-effective solutions from both scientific and legal perspectives.

The participants will learn the principles and how to practically use a variety of fingerprinting techniques from basic chemical fingerprinting to state-of-the-art techniques such as isotopic, mineralogical, and tree-ring fingerprinting, along with aerial imaging using drones and infrared sensors. Case study examples will be provided to illustrate the use of these fingerprinting approaches in routine site investigations, as well as for emerging PFAS and 1,4-dioxane contaminants, in order to build appropriate strategies revealing what caused contamination and how to effectively deal with it. An overview of PFAS and 1,4-dioxane basic properties and environmental behavior will also be included. Ultimately, the goal of the workshop is to provide a forum for sharing the knowledge and strategic ideas to tackle complex emerging environmental and legal cases.

**Workshop 2** 1:00pm – 5:00pm

Per- and Polyfluoroalkyl Substances (PFAS): Beyond the Basics

- Elizabeth Denly, ASQ CMQ/OE, TRC, Lowell, MA
- Amy Wilson, PhD, PE, TRC, Concord, CA
- Jenny Phillips, DABT, TRC, Fort Collins, CO
- Karin Greenacre, PE, TRC, Rancho Cordova, CA
- Erica Kalve, PG, Regional Water Quality Control Board, Oakland, CA
- Michael Eberle, TRC, Philadelphia, PA

This workshop is designed to give owners, site managers, attorneys, regulators, and environmental scientists and engineers a practical, in-depth understanding of environmental sites, and strategies to manage them in an uncertain regulatory and legal environment. Previous workshops on PFAS have focused on providing a general overview of these chemicals, including naming conventions, sources and potentially-affected sites, sampling concerns, unique chemistry, fate & transport, and general toxicity information. This workshop is designed to go to the next level with an assumption that the PFAS basics are already understood. There will be a brief 15-minute introduction to review some of the basics but we will look beyond the PFAS basics, focusing on hands-on site experience and original research, exploring such topics as:

- **Sampling Challenges:** Minimizing cross-contamination in a parts-per-trillion world. The results of a study performed by TRC and Alpha Analytical will be presented, showing the different PFAS constituents that can be transferred from common sampling materials, and the relative concentrations of these PFAS in the materials. Field methods that minimize sampling bias will also be discussed.

- **Toxicity:** The studies behind the numbers. An update and comparison of the recent studies on PFAS toxicity will be provided. The differences in the derivation of PFAS standards among various US states will be discussed.

- **PFAS in Air:** Status of and challenges regarding sampling and analysis of PFAS in source emissions and ambient air.

- **Foams, Forensics, and Source Identification:** Manufacturing methods and the evolution of AFFF chemistry will be discussed, along with current regulatory efforts to manage the use of certain foams. Concepts and examples of the use of PFAS chemical signatures to identify sources including manufacturing, AFFF, and secondary and waste sources will be demonstrated using both site data and information from the literature.

- **Case Studies:** Case studies will be presented highlighting stormwater source characterization and isolation from discharged waters as well as low mass groundwater source identification, characterization, and the implementation of MNA as an effective remedial option.

- **Regulatory Perspectives:** A representative from the Regional Water Quality Control Board will provide their perspective on where regulations and requirements are headed for California.

The workshop will conclude with an open discussion and sharing of ideas and experiences.

**Workshop 3** 1:00pm – 5:00pm

California’s Environmental Challenges: What Do We Do with Large Operating Facilities

Chair: Ravi Arulanantham, Geosyntec Consultants, Oakland, CA
Co-Chair: Yue Rong, Cal-EPA/LA RWQCB, Los Angeles, CA
Panelists: TBA

California has hundreds of large facilities that have been in operation for many decades (refineries, bulk terminals, tank farms, foundries, factories etc.) which are vital for the state’s continuing economy. Most of these are operating properties that contain significant amounts of persistent contaminants and have soil/groundwater impacts on-site and off-site above clean up levels. These facilities are typically in urban areas and are integral to the economic engines of the community and State. Despite years of characterization and remediation, contaminants remain above levels needed for closure. The technical and economic means to restore these sites may not exist. However, for many of these sites, there may be little or no imminent risk to humans or the environment. How to clean and continue to manage these sites in a manner that does not pose a threat to current and future public health, environment and water resources presents a real challenge into the future. This workshop will explore the risks these sites pose, the technical and economic feasibility of cleaning or reducing mass at these sites, the time frame to reach acceptable levels, the greenhouse gas emissions to reach such levels, existing regulatory frameworks, and finally balancing all the above interconnected factors and getting community acceptance. Panel members will focus on their experiences in answering the challenges and some approaches to continue managing these operating sites in California.
MONDAY AFTERNOON

Workshop 4  1:00pm – 5:00pm
Effective Application of Multiple ITRC Guidance Documents to Hydrocarbon Sites

Matthew Lahvis, Shell Project and Technology, Houston, TX
Andrew Kirkman, BP, Naperville, IL
Eric Nichols, Substrata, Newfields, NH
Diana Y. Marquez, Burns & McDonnell, Kansas City, MO
Ross Steenson, San Francisco Bay Regional Water Quality Control Board, Oakland, CA
Laura Trozzolo, TRC, Fort Collins, CO

Course Objective: Provide real-world case examples of technical elements identified in each of ITRC’s petroleum-related guidance documents [TPH Risk, LNAPL, Petroleum Vapor Intrusion (PVI)], giving course attendees a quick, high-level review and understanding of how to support improved risk-based decision making by implementing the ITRC documents in an integrated manner when assessing and managing hydrocarbon release sites.

Course Description: Hydrocarbon-impacted sites are subject to regulations and guidance directed at a variety of concerns, including petroleum vapor intrusion, total petroleum hydrocarbons in soil, and LNAPL. These regulations do not always acknowledge the interrelated nature of these concerns. ITRC has worked over the past five years to provide guidance related to each concern; however, practical integration of the concepts in each of the three guidance documents is necessary to provide a comprehensive evaluation at most petroleum hydrocarbon sites.

This 4-hour course provides a high-level review of concepts presented in hydrocarbon-related ITRC documents. The course invites audience participation in navigating case study examples of typical scenarios encountered at hydrocarbon sites addressing:

- concepts of maximum extent practicable, LNAPL transmissivity, and NSZD to manage TPH risks.
- risk assessment/management at former hydrocarbon sites undergoing redevelopment/land use change.
- developing a comprehensive conceptual site model (CSM) to satisfy elements of all three ITRC guidance documents.

Real-world examples will illustrate how two or more of ITRC’s documents intersect in providing guidance and representing actual questions/concerns from regulators and practitioners. When all three ITRC documents are considered together, they can provide a beneficial roadmap to guide practitioners through successful assessment and identifying closure pathways for their own projects.

STUDENT POSTER COMPETITION

We are proud to announce the 16th Annual Student Poster Competition at the AEHS Foundation West Coast Conference, sponsored by Arcadis. At least one $1000.00 prize and two $500.00 prizes will be awarded to the best student poster presentations. Winners will be contacted Tuesday evening (see registration desk for posting) and will be acknowledged at a special event Wednesday evening.

Must be entered prior to the conference in order to compete. Open to all full- and part-time students (post-docs excluded). See aehsfoundation.org for full details and previous winners.

AEHS FOUNDATION SCHOLARSHIPS

The Charlena M. Seymour Scholarship
Established in 2014 to recognize women pursuing an advanced degree in the fields of Public and Environmental Health. This award is made annually at the beginning of the Fall semester to individuals who embody qualities that best exemplify Dr. Seymour’s life. These qualities include a dedication to high academic and professional standards, a vision of effective leadership, helping and mentoring associates, colleagues, and friends, and a consideration for all humanity.

The David F. Ludwig Memorial Student Travel Scholarship
Established in 2017 in memory of dear friend and respected colleague, Dr. David Ludwig. This annual scholarship is designed to assist students pursuing research in Ecology and Ecological Sciences with travel to conferences or research related expenses. Dr. Ludwig’s passion for science, travel, education, and exploration is the inspiration for this award.

For qualifications, application instructions, and deadlines, please visit the website. Donations toward these scholarships are currently being accepted. For further information, to donate, or to apply for a scholarship, please visit the website at www.aehsfoundation.org/scholarship
Session 1: 9:00am – 12:00pm
Site Investigation
Session Chair: Cristin Bruce, Shell Global Solutions, Houston, TX

9:00 Finding the Needle in the Haystack – Post-Remediation High Resolution Site Characterization
Maile Gee, Santa Ana Regional Water Quality Control Board, Riverside, CA

9:30 Sediment to Water Column Nexus – Bioaccumulation Study of Organochlorines in San Diego Bay, California
Ashley Parks, Southern California Coastal Water Research Project (SCCWRP), Costa Mesa, CA

10:00 BREAK

10:30 Drones/UA: Providing Rapid Innovative Leaps in Environmental Remediation Strategies
Dan Bouchicchio, Groundwater & Environmental Services, Inc., Exton, PA

11:00 Impacts of Urban Stormwater-Associated Polycyclic Aromatic Hydrocarbons on Receiving Sediment
Dimittos Athanasiou, Exponent, Inc., Bellevue, WA

11:30 From MGP to Rail – A Brownfields Story
Lizanne Simmons, Kleinfelder, Temecula, CA

Session 2: 8:30am – 12:00pm
Regulatory Programs and Policies
Session Chair: Nick Amini, Santa Ana Regional Water Quality Control Board, Riverside, CA

8:30 EPA’s Revised Cost-Benefit Policy: What Does It Really Mean at Sediment Sites?
Norman Dupont, Ring Bender LLP, Costa Mesa, CA

9:00 Challenges of Managing Complex Sites and People – A Regulatory Perspective
Alan Kuoch, Regional Water Quality Control Board, Riverside, CA

9:30 Cleanup Challenges of a Small Site Located Within a Large Regional Plume – A Regulatory Perspective
Kayla Kawamura, Regional Water Quality Control Board, Riverside, CA

10:00 BREAK

10:30 Balancing Societal Demands and Long-Term Liability: The Changing Landscape of Environmental Regulations and Corporate Governance
Roy Thun, GHD, Santa Clarita, CA

11:00 Cooperative Interagency Approach to Address Flammability Concerns and Odor Complaints in a Los Angeles County Neighborhood Built on Former Oil and Gas Leases
Christine De Rosa, Los Angeles County Department of Public Health, Los Angeles, CA

11:30 An Adaptive Approach to Integrating RCRA Corrective Action with Facility Demolition
Diana Marquez, Burns & McDonnell Engineering Company, Inc., Kansas City, MO

Session 3: 8:50am – 12:00pm
PFAS Remedial Strategies
Session Chair: Avram Frankel, Integral Consulting Inc., San Francisco, CA

8:50 Introduction: PFAS Remedial Strategies
Avram Frankel, Integral Consulting Inc., San Francisco, CA

9:00 Sustainable PFAS Resin Technology Applied at Multiple Locations for Military Base Aquifer Remediation
Steve Woodard, ECT2, Portland, ME

Adam Redding, Calgon Carbon, Moon Township, PA

10:00 BREAK

10:30 In Situ PFAS Sequestration – Plume Management Strategies Using Colloidal Activated Carbon
Kristin Thoresen, REGENESIS, San Clemente, CA

11:00 Thermal Remediation of PFAS Contamination
Brett Trowbridge, TRS Group, Longview, WA

11:30 Drinking Water Treatment and PFAS – The Katherine, Australia Community Experience
Skefos Tsoukalis, Power and Water Corporation, Winnellie, NT, Australia

Workshop 5: 8:30am – 5:00pm
Why You Should Monitor Indoor Radon, Differential Temperature, and Pressure During Chlorinated Vapor Intrusion Assessments
Henry Schuver, US EPA, Washington, DC
John Zimmerman, US EPA ORD, Durham, NC
Chris Lutes, Jacobs, Cary, NC
Chase Holton, Geosyntec, Denver, CO
Loren Lund, Jacobs, Shelley, ID
Donna Caldwell, NAVFAC, Norfolk VA
Robert Truesdale, RTI International, Durham, NC

While chlorinated vapor intrusion (CVI) is a complex and challenging-to-assess phenomenon largely due to the apparently endless number of hard-to-identify, measure, and predict factors influencing the resulting variable indoor air concentrations; the in-depth study of a few readily-measurable/available Indicators and Tracers (I&T) has shown some impressive correlations with indoor CVOC concentrations due to CVI in the buildings studied to-date. Documentation of I&T measurements can significantly increase the quantitative confidence in the probability of measuring the exposure levels of most concern (e.g., RmE or 95UCL) to that well above the random probability of typical individual sample efforts (~5%).

Foremost among the I&T metrics is radon (Rn) which is a wide-spread naturally-occurring tracer of soil gas intrusion, mixing and retention in indoor air. The evidence and conceptual understanding indicates that the indoor concentration of Rn incorporates the effects of indicators such as temperature (a potential CVI driver), as well as pressure changes (including barometric, wind speed, and building operations) and integrates their effects across both space and time; More specifically indoor Rn levels integrates their actual effects on soil gas intrusion and indoor air concentrations, in the specific building and under the conditions being investigated. While outdoor temperatures and pressures are readily available from nearby weather station records, the changes in indoor levels of radon, temperature and pressure can be measured continuously with relatively inexpensive meters.

This workshop will review new evidence for I&T that have shown correlations with indoor CVOC concentrations in data-rich studies of many buildings (including those with complex preferential pathways) and report the evidence from new building types and climate zones. Presentations will include the results of a study of the antecedent I&T-levels leading up to indoor CVOC concentrations above the 95th percentile for these buildings, as well as an introduction to technology for automated I&T triggered-sampling methods and discussions on selecting I&T trigger-rules for automated sampling. The workshop will also present and discuss I&T Fact Sheets to assist regulators (& other stakeholders) collecting and/or reviewing I&T evidence supporting CVI investigations. Additionally, there will be a report on the use of I&T to address spatial variability (i.e., to prioritize among buildings over the source area). Finally, the workshop will hold a panel/open discussion further exploring the conclusions of our previous workshop, with the question: Does the I&T evidence we have now support a general recommendation to “Document the indoor radon, differential temperature and pressure levels at least at the time of CVOC sampling, and surrounding baseline periods for comparison, to allow and improve future understanding and interpretations of the buildings’ intrusion levels at the time of CVOC sampling?”
Tuesday Afternoon: Waves of Problems to Solve: A Long-Term Perspective of the Remediation Field

Charles J. Newell, Ph.D., P.E., Vice President/Environmental Engineer, GSI Environmental Inc., Houston, TX

The remediation field has evolved considerably since it began about 40 years ago, with paradigm shifts sparked by scientific breakthroughs and hard-fought experience superimposed over the emergence of new contaminants every few years. The result has yielded new conceptual site models, waves of innovation, stronger remediation technologies, and more credible management strategies. This talk will attempt to take the key lessons learned in the remediation field since the first pump and treat sites in the 1980s and apply them to our field’s newest, most difficult challenge: management of PFAS in the subsurface.
The following posters will be presented on Tuesday:

**Urban Forest Ecosystem Risk Assessment in Louisiana using i-Tree Eco Model**
Kamran Abdollahi, Southern University, Baton Rouge, LA

**Simplified Relation Between the Maximum Evaporation Rate Through the Vadoze Zone and the Depth to the Water Table for Sandy Soils**
Mohammad Al-Suwaiyan, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

**The Salinas Valley Integrated Hydrologic Model: Supporting Projects and Programs in a Highly Operated Basin**
Matthew Baillie, Wood Environment and Infrastructure Solutions, Oakland, CA

**Terpenes Detection and Sampling in Air, by Combining Traditional Technologies and New Real Time Monitoring by Using PTR-MS**
Harry Behzadi, RJLee Group, Monroeville, PA

**PFAS: A New Emerging Contaminant and Its Impact on Indoor Air Quality**
Harry Behzadi, RJLee Group, Monroeville, PA

**Evaluation of Oil Spillage Remediation in Ogoniland: A Strategy for Sustainable Environmental Management, Niger Delta**
Ime Ben, Glasgow Caledonian University, Glasgow, Scotland, United Kingdom

**Benefits of Automated, High-Resolution Fluid Interface Data Collection for LNAPL Sites**
Daniel Buckley, AECOM, Long Beach, CA

**Challenges and Considerations for Conducting Remedial Investigations for Per- and Polychlorinated Substances (PFAS) and Evaluating Risk of Non-Drinking-Water Exposures**
Gina Calderone, Tetra Tech, Oakland, CA

**Synthesis of Ni: Co Bimetallic Cathode Electro catalyst, Supported by Al2O3-GO for Higher ORR in MFC**
Amit Chaturvedi, Indian Institute of Technology Roorkee, Roorkee, India

**The Occurrence and Implication of Antimicrobial-Resistant Agents in Aquatic Environments**
Susana Cheetham, Hohai University, Nanjing, China

**Glucose-Based Water Soluble Carbon Quantum Dots (G-b-CQDs or G-b-C-Dots): Synthesis, Photoluminescence (PL) Properties and Future Applications**
Francis Duku, University of Strathclyde, Department of Environmental Engineering, Glasgow, Scotland, United Kingdom

**Organoclay-based Removal of Lamotrigine from Water**
Andrea Guhl, TU Bergakademie Freiberg, Freiberg, Germany

**Controlled Pressure Method for Vapor Intrusion Pathway Assessment: Protocol Development and Demonstration**
Yuming Guo, Arizona State University, Tempe, AZ

**Post ERD Injection Site Dynamics: Long-term Trends at a VOC Contaminated Site in Monterey, CA**
Andrew Halmstad, Integral Consulting Inc., Portland, OR

**Efficiency of Constructed Wetlands For Nutrient Removal**
Mason Jarvis, University of Portland, Portland, OR

**Comparing ISCO Effectiveness with and without Pneumatic Enhancement at a Site in San Diego County**
Adair Johnson, Orion Environmental, Long Beach, CA

**Chemical Dechlorination of Atrazine Using a Magnesium/Palladium Bimetallic System**
Sandrine Jurado, University of New Haven, West Haven, CT

**Removal of Pyrethroids Through Biosynthesized TiO2-Nanoparticles**
Parminder Kaur, Indian Institute of Technology Roorkee, Roorkee, India

**Thermodynamic Prediction for Gas Hydrate Formation in Porous Media**
Shadman Hasan Khan, Indian Institute of Technology Roorkee, Roorkee, India

**Numerical Simulation of Gas Production from Hydrates by Depressurization Method**
Anupama Kumari, Indian Institute of Technology Roorkee, Roorkee, India

**A Field Comparison of Biogeochemically Enhanced, Biological and Chemical Reduction for Treatment of Chlorinated Organics**
Daniel Leigh, PeroxyChem, Walnut Creek, CA

**Personnel Optimization: Substituting Technology for Staffing on Long-Term O&M Projects**
Kevin Lienau, Groundwater & Environmental Services, Inc., Eagan, MN

**Application of H2O2/Na2S2O8 Activated by mZVI to Enhance Degradation of HCHs and DDX in Groundwater from Former Organochlorine Pesticides Manufacturing Plant**
Jun Lu, Hefei University of Technology, Signal Hill, CA

**Global Research Trends in Health Effects of Volatile Organic Compounds During the Last 16 Years: A Bibliometric Analysis**
Jun Lu, Hefei University of Technology, Signal Hill, CA

**Design Considerations for the Mitigation of Vapor Intrusion**
Gary Milne, Trinity Source Group, Santa Cruz, CA

**Applying Conceptual Site Models to Utilize Social Science Methodologies for Stakeholder Engagement**
Rosalie O'Brien, Colorado School of Mines, Golden, CO

**Wave Effect on Tandem Buoyant Jets in the Marine Environment**
Ebenezer Otoo, Hohai University, Nanjing City, China

**Case Study – Moving Beyond Carbon for More Effective Removal of PFAS**
Jim Perlow, Emerging Compound Treatment Technologies, San Diego, CA

**Closing the PFAS Mass Balance in Sediments and Tissues: The TOP Assay**
Eric Redman, Eurofins TestAmerica, West Sacramento, CA

**Optimizing In Situ Remediation Amendments Using Innovative Surfactant System Formulations and Pharmaceutical Techniques**
John Sankey, True Blue Technologies, Inc., Vancouver, BC, Canada

**Propitious PFAS Remediation: CTA-Organoclay**
Paul Scapan, TU Bergakademie Freiberg, Freiberg, Germany

**Horizontal Biosparging for Expedited Remediation of Jet Fuel at DOD Sites**
Mike Sequino, Directional Technologies, Inc., Wallingford, CT

**Synthesis of Magnesium Nanocomposites for the Treatment of Chromium Containing Wastewater**
Bharti Verma, Indian Institute of Technology Roorkee, Roorkee, India

**Hydrothermal Liquefaction of Water Hyacinth for the Generation of Biofuels**
Priyanka Yadav, Chemical Department, IIT Roorkee, Roorkee, India
Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Evaluate Who was Responsible for a Spill or Release of Organic Contaminants into the Environment

Paul Philp, University of Oklahoma, Norman, OK

The concept of environmental forensics has evolved significantly over the years. Basically it is concerned with establishing the relationship between a contaminant in the environment and its suspected source(s), or point of release. Such contaminants can cover a wide range of individual compounds or mixtures of compounds. They may be volatile compounds, such as benzene or chlorinated solvents, or complex crude oils, refined products, or complex mixtures of aromatic compounds. They may be present as free product, dissolved in water, adsorbed on soil particles, or present in the vapor phase. A wide variety of techniques exist to characterize and establish their potential relationship with possible sources or points of release. The standard EPA methods, that many are familiar with, are of little use in forensic studies since those methods are directed towards monitoring concentration data for specific contaminants of interest rather than determining the source or point of release.

Forensic investigations typically use a tiered approach in terms of fingerprinting tools. Preliminary characterization is undertaken by gas chromatography (GC) followed by more detailed analyses using gas chromatography-mass spectrometry (GCMS). The fingerprints, or chromatograms, obtained in this manner often provide enough information to determine relationships between contaminant and possible release points. However, there are also many cases where the resulting GC and GCMS data are ambiguous and possibly misleading. In such cases, it is possible to go to a more specialized tier of analyses and utilize the stable isotope composition of individual contaminants. This is particularly valuable for single component contaminants, such as MTBE, BTEX, or PCE, where GC and GCMS are of virtually no use for correlation or source differentiation.

Early applications of stable isotopes to environmental problems were limited to carbon and hydrogen isotopes but chlorine isotopes can now be measured routinely for most of the common chlorinated groundwater contaminants. This introduces the possibility of a 3D isotope approach for both source correlations and attenuation studies. Stable isotopes, including Cl, are well suited for use in the rapidly emerging area of vapor intrusion studies to differentiate indoor sources of contaminants vs. subsurface contaminants. Br and S isotopes of individual compounds can now be determined using GC coupled with ICP MS.

While most of environmental studies have been concerned with stable isotopes, there are a small number of studies using 14C for certain applications. These studies are limited due to the half-life of 14C, but interesting applications related to biofuels and distinguishing brominated compounds biosynthesized by marine organisms from those in fire retardants have been published and will be discussed.

The use of the various fingerprinting techniques for monitoring attenuation at sites undergoing remediation will be discussed. The combined use of the stable isotopes, GC, and GCMS, can be extremely valuable tools for monitoring remediation as well as determination of the onset of natural attenuation.

Finally the potential for using the forensic approach to evaluate the origin and fate of emerging contaminants such as PFAS components will be discussed along with limitations for certain compounds.
**Session 7a: 8:30am – 10:00am**  
**Green and Sustainable Remediation: Principles in Action**  
**Session Chair:** Matthew Ambrusch, Langan, Parsippany, NJ  
**9:00** Using Horizontal Wells to Mitigate Risk at Sites with Access Issues  
Erik Piat, ENRx, Inc., Dallas, TX  
**9:15** Using GeoTracker to Evaluate Risk Management Strategies for TPhd, TPhg, Benzene, and MTBE  
Kirk O'Reilly, Exponent, Inc., Bellevue, WA  
**9:30** In-Situ Removal of PFASs with Catalyzed Ultrafine Bubble Ozone and Recirculating Well  
William Kerfoot, Kerfoot Technologies, Inc., Mashpee, MA  
**9:45** Multiple Oxidant Soil Mixing/Injection to Position Site Closure  
Todd Hallhan, Antea Group, West Des Moines, IA  
**10:00** Use of Innovative In-Situ Remediation Strategies to Achieve Cleanup of a Complex Site  
Gary Cronk, JAG Consulting Group, Inc., Santa Ana, CA

**Session Chair:** Thomas Mohr, PG, CHG, Mohr HydroGeoScience LLC, Santa Clara, CA  
1,4-Dioxane has been described as “the emerging contaminant that keeps on emerging”. The 2013-2015 Unregulated Contaminant Monitoring Requirements sampling program detected 1,4-dioxane in 21% of 4,884 water systems tested, with the EPA Health Advisory Level, 0.35 μg/L, exceeded in 8.9% of water systems. Its surprisingly frequent detection in surface water has fostered watershed-scale investigations of 1,4-dioxane sources. Contaminated wells have prompted expensive well-head treatment, without clarity on which potentially responsible party should compensate water utilities for their treatment costs.

This presentation will profile the national occurrence of 1,4-dioxane in drinking water and groundwater cleanup sites, the nature of 1,4-dioxane’s occurrence in comparison to the solvents with which it is commonly associated, and non-solvent origins for 1,4-dioxane in groundwater and surface water. The forensic and legal challenges to identify responsible parties will be outlined, with a few examples to illustrate tools and opportunities to sort out the cost allocation question. Examples of wellhead treatment costs will be presented, as well as projections of total costs utilities may expect to incur when addressing 1,4-dioxane contamination.
**Session 11:** 1:30pm – 4:30pm

**1,4-Dioxane**

**Session Chair:** Caitlin Bell, Arcadis, Seattle, WA

1:30 Use Enhanced Soil Vapor Extraction to Remediate 1,4-Dioxane Contaminated Soil: Laboratory Testing and Modeling
Yuanming Guo, Arizona State University, Tempe, AZ

2:00 1,4-Dioxane Treatment in Groundwater to Achieve Drinking Water Goals Using a Synthetic Sorbent Media, Yuma, Arizona
Shuangshuang Xie, Wood. Plc, San Diego, CA

2:30 Treating 1,4-Dioxane with Activated Potassium Persulfate
Brant Smith, PeroxyChem, Philadelphia, PA

3:00 BREAK

3:30 Bioremediation Options for 1,4-Dioxane
Sandra Dworatzek, SIREM, Guelph, ON, Canada

**Session 12:** 1:30pm – 5:00pm

**Remediation II**

**Session Chair:** Tom Szocinski, Land Science, San Clemente, CA

1:30 Effect of Analytical Approaches on Reported PFAS Source Concentrations in Complex Matrices
Amy Wilson, TRC, Concord, CA

2:00 Hydrocarbon Treatability Study of Antarctica Soil with Fenton’s Reagent
Jay Clausen, USACE ERDC-CRREL, Hanover, NH

2:30 Environmental Chemistry and Treatment Methods for Lead and Zinc in Soil and Groundwater
Alan Seech, PeroxyChem, Corona Del Mar, CA

3:00 BREAK

3:30 Optimization and Performance of ZVI Amendments for In-Situ Chemical and Biological Reduction
Gary Birk, Tersus Environmental, Wake Forest, NC

4:00 In-Situ Bio-Air Sparging (ISBAS), San Francisco Bay Area Site
Mario Stremad, Stantec, Walnut Creek, CA

4:30 Full Scale Remediation of TCE in a Low Permeability Aquifer Using Sulfidated Colloidal ZVI
John Freim, REGENESIS, San Clemente, CA

**Session 13a:** 1:30pm – 3:00pm

**PFAS Assessment and Remediation**

**Session Chair:** Sam Williams, Geosyntec, San Diego, CA

1:30 Design, Installation, Startup and Operation of a Mobile PFAS Removal System for Investigation-Derived Waste
Andrea Sepulveda, Emerging Compound Treatment Technologies, San Diego, CA

2:00 Treatment of Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Soil and Water
John Sankey, True Blue Technologies, Inc., Vancouver, BC, Canada

2:30 PFAS and Electroplating in Ohio: They’re Here; Now What?
Jeff Hullinger, SME, Westerville, OH

**Session 13b:** 3:30pm – 5:30pm

**Findings of a PFAS Experts Symposium on Regulatory Policy, Toxicology, Transport/Fate, and Remediation for Per- and Polyfluoroalkyl Substances**

**Session Chair:** Stephen Koenigsberg, EN Rx, Irvine, CA

Overview
John Cherry, G360, University of Guelph, Guelph, ON, Canada

Regulatory and Policy Issues
Chuck Newell, GSI, Houston, TX

Chemistry and Analytics
Elizabeth Denly, TRC, Lowell, MA

Toxicology and Risk
Bill DiGuiseppi, Jacobs, Englewood, CO

Transport and Fate
Angus McGrath, Stantec, Walnut Creek, CA and Rick Wice, Battelle, Pittsburgh, PA

Existing Remediation Technologies and Research
Dan Bryant, Woodard and Curran, East Windsor, NJ and Bill DiGuiseppi, Jacobs, Englewood, CO

Closing Remarks
John Cherry, G360, University of Guelph, Guelph, ON, Canada

**Session 14:** 1:30pm – 4:30pm

**Vapor Intrusion II**

**Session Chair:** Todd Ririe, BP America (retired), Chino Hills, CA

1:30 Comparison of Real-Time TCE Measurement Methods for VI Studies
Marty Hale, AECOM, Austin, TX

2:00 Is VI Modeling Dead? A Data-Rich Approach to Risk-Based Remediation Goals for Vapor Intrusion
Pujeeta Chowdhary, Wood Environment and Infrastructure Solutions, Austin, TX

2:30 Sub-Slab to Indoor Air Attenuation Factors Determined from Radon Data
Suzie Nawikas, H&P Mobile Geochemistry, Carlsbad, CA

3:00 BREAK

3:30 A Regulatory Perspective on Vapor Intrusion Mitigation Systems
Jonathan Sanders, Alameda County Department of Environmental Health, Alameda, CA

4:00 Overcoming Shortcomings of Traditional Vapor Intrusion Sampling Approaches via Continuous Monitoring
Blayne Hartman, Hartman Environmental Geoscience, Solana Beach, CA

**EVENING SOCIAL**

Hors d’oeuvres and Open Bar (limited) 5:00 pm – 7:00 pm
Free to all registered conference attendees
The following posters will be presented on Wednesday:

**Concentrations of Poly- and Per-Fluoroalkyl Substances (PFAS)**
Lansana Coulibaly, Wood. Ptc, San Diego, CA

**A Novel Bioelectrochemical Barrier for Treating a Benzene Plume**
Song Jin, Advanced Environmental Technologies, Fort Collins, CO

**Real-time In Situ Monitoring of Groundwater Bioactivity by a Novel Bioelectrochemical Tool**
Song Jin, Advanced Environmental Technologies, Fort Collins, CO

**Installing a Prototype Horizontal Reactive Media Treatment (HRX®) Well**
Michael Lubrecht, Ellington DTD, Bellefonte, PA

**Carbon Tetrachloride Source Area Remediation Using an Activated Carbon Based Amendment**
Mike Mazzarese, AST Environmental, Inc., Golden, CO

**Use of Mass Flux in Site Management**
Christopher Mulry, Groundwater & Environmental Services, Inc., Edenton, NC

**Management and Treatment of Wastewater Contaminated with High Fast-Forwording Redevelopment of Brownfields Using Barriers Systems**
Rebecca Oliver, Geosynect Consultants, San Diego, CA

**25 Years After RCRA: Has It Improved Site Cleanups?**
Kanen Patel-Coleman, Burns & McDonnell Engineering Company, Inc., Los Angeles, CA

**Emerging and Re-Emerging Contaminants – Considerations of Risk Intensity**
Jenny Phillips, TRC, Fort Collins, CO

**Treatability Study to Evaluate Deep Soil Mixing for Treatment of a Complex Mixture of Chemicals in Soil**
Donald Pope, GHD, Niagara Falls, NY

**Zero-Valent Iron Nanoparticles (nZVI) for In-situ Groundwater Remediation**
Patrick Randall, Hapure Technologies, Inc., Hillsborough, NJ

**Sustainable Practices and Partnerships to Ensure a Cleaner and Greener Environment**
Phillip Reagin, ecoSPEARS, Decatur, GA

**A Case Study on Case Closure: Vapor Intrusion from an Off-Source Plume**
Jackson Reeder, Wood Environment and Infrastructure Solutions, Oakland, CA

**NAPL Mobility in Sediments: Characterizing NAPL Migration Potential Using a Jackson Reeder, Wood Environment and Infrastructure Solutions, Oakland, CA**

**Synthetic Media as a Sustainable Treatment Solution for PFAS**
Marilyn Sinnett, Emerging Compound Treatment Technologies, San Diego, CA

**Multiple Applications of Extended Release of Low Solubility Potassium Persulfate: Field Case Studies**
Brant Smith, PeroxyChem, Philadelphia, PA

**Combining In Situ Stabilization and Solidification (ISS) and In Situ Chemical Oxidation (ISCO)**
Brant Smith, PeroxyChem, Philadelphia, PA

**Innovative Metalized Film Vapor Barrier Mitigation – MonoShield**
Tom Szczoinski, Land Science, San Clemente, CA

**Importance of Using Time-Averaged Temperature Data for Biodegradation Estimation at Petroleum Sites**
Bryan Tallant, Envirosolve, Inc., Fullerton, CA

**Considerations and the Essential Aspect for Sustainable Energy Recovery from Rice Husks**
Masafumi Tateda, Toyama Prefectural University, Imizu, Japan

**Bench-Scale Studies for PFAS-Impacted Waters**
Ryan Thomas, GHD, Niagara Falls, NY

**Eliminating Risk of PFAS Contamination: Low Cost In Situ Remediation with Colloidal Activated Carbon**
Kristen Thoresen, RENEGIS, San Clemente, CA

**Latest Developments in TCE Short-Term Indoor Air Standards**
Laura Trozzolo, TRC, Fort Collins, CO

**Why the Rush? Evaluating California’s Six Hour Tedlar Hold Time**
Madeline Voloshin, Jones Environmental, Inc., Santa Fe Springs, CA

**The Evaporation Effect on Gasoline Composition Using Detailed Hydrocarbon Analysis and GC/MSD**
Chi-Wei Wang, CPC Corporation, Taiwan, Miaoli, Taiwan

**The Estimation of the Octane Rating of Fresh and Evaporated Gasoline by Detailed Hydrocarbon Analysis**
Chi-Wei Wang, CPC Corporation, Taiwan, Miaoli, Taiwan

**Dry Cleaner Forensics: Challenges and Approaches**
Bjorn Wespestad, Roux Associates, Oakland, CA

**Methods of Chemical Control in Potable Reuse – Variation in State Approaches**
Erica Wolski, Woodard & Curran, Inc., San Diego, CA

**In Situ Reductive Dechlorination and Biogeochemical Transformation of Chlorinated Esters**
Chi-Wei Wang, CPC Corporation, Taiwan, Miaoli, Taiwan

**The Fate and Transport of Produced Water Released into Vadose Zone**
Shuangshuang Xie, Wood. Ptc, San Diego, CA

**Workshop 8 6:30pm – 9:30pm**
A Workshop on using the ITRC Guidance Document: Practical Implementation of Advanced Site Characterization Tools
Jim Finegan, Kleinfelder, Riverside, CA
Maile Gee, Santa Ana Water Quality Control Board, Riverside, CA
Liz Simmons, Kleinfelder, Temecula, CA
Alex Ward, Virginia Department of Environmental Quality, Woodbridge, VA
Ed Winner, Kentucky Department of Environmental Protection, Frankfort, KY

**Workshop 9 6:30pm – 8:30pm**
Fundamentals of Horizontal Well Systems and Modeling Tools
Erik Piatt, EN Rx, Inc., Dallas, TX
Richard Laton, Ph.D., California State University Fullerton, Fullerton, CA

The concept of horizontal wells and their deployment, while not a particularly recent development, has been impacted by inevitable evolutionary processes. Now there is a new paradigm surrounding this technology in certain applications. This Workshop will illuminate the rethinking of applications and the resultant economic advantages. Simply put, it many cases, it has become easier to deploy horizontal systems with respect to drilling costs and conventional site-mediated limitations ("access issues"). Consequently, we are in a new era of bringing horizontal well technology to more active use, for both assessment and remediation, but there are other factors in play.

The concept of a conventional horizontal well has been somewhat monolithic and simplistic, recognizing there was really no way it could have begun otherwise, however; when we look at various designations, new possibilities arise. To reduce it to one simple advance in the technology, we can now “break up the system”: In other words, the use of a single horizontal well installation has given way to the concept of using segmented, nested well systems along the same transect and also miniaturizing and bundling the process to dramatically reduce costs. In essence this is taking a traditional nested, segmented well system and turning it ninety degrees to the horizontal plane. As we will review in this workshop, this creates new options in project design, surgical precision and integrity of the data sets that are collected and then, as needed, present advantages in reagent delivery.

A core contribution of this workshop, other than to review the history and value of horizontal well systems (including case studies), is to quantify the savings inherent in replacing an array of vertical wells with horizontal well systems. We will present a model that considers various variables and the specific nature of what a vertical well is across a variety of configurations. This Model uses equations derived from the literature, to determine the estimated number of vertical wells needed to replace a single horizontal well across a given capture area and a specific hydrogeological regime. A simplified approach to determining the ratio of horizontal wells to that of vertical wells is to look at the capture area of each. As implied, this has been addressed before with modeling and complex equations (Forouzarfar, Reynolds, & Li, 2012; Losonsky & Beljin, 1992; Sawyer & Lisahal-Dulan, 1998). A simpler and more “user-friendly” approach uses basic equations to approximate the number of vertical wells required to provide the same capture area as a single horizontal well and calculate any potential concomitant economic savings using Monte Carlo cost distribution techniques.
Session 15a: 8:30am – 10:00am
Natural Source Zone Depletion
Session Chair: Rick Ahlers, Arcadis, San Diego, CA
8:30 Natural Source Zone Depletion Estimation with Multiple Permeable Zones and Confined LNAPL
Lisa Reyenga, GEI Consultants, Denver, CO
9:00 A Framework for Implementing Natural Source Zone Depletion at Petroleum Release Sites
Matthew Lahvis, Shell, Shell, Spring, TX
9:30 Monitored Natural Attenuation of a Deep Aquifer System Impacted by LNAPL
Jim Finegan, Kleinfelder, Riverside, CA
10:00 BREAK

Session 15b: 10:30am – 12:00pm
In-Situ Thermal Remediation (ISTR)
Session Chair: Rick Ahlers, Arcadis, San Diego, CA
10:30 Successful DNAPL Removal in Fractured Granitic Bedrock
Erik Pearson, Ramboll, Irvine, CA
11:00 Low-Temperature Thermal Remediation and Use of Reactivity Demand Models
Jonah Munholland, Arcadis, San Diego, CA
11:30 Residual Soil Vapor Challenges Following In-Situ Thermal Conductive Heating at a Commercial Site
Darren Croteau, Terraphase Engineering, Irvine, CA
10:00 BREAK

Session 16: 8:30am – 12:00pm
Innovative Remedial Technologies
Session Chair: Ryan Wymore, CDM Smith, Denver, CO
8:30 Angled Injection to Mitigate PCE Intrusion into a Stream at a Federal Superfund Site
Mike Mazzarese, AST Environmental, Inc., Golden, CO
9:00 Zero Valent Iron Remediation Design with Reactivity and Demand Models
Patrick Randall, Hepure Technologies, Inc., Hillsborough, NJ
9:30 Industrial Remediation using Enhanced Soil Vapor Extraction
Charlie O’Neill, HDR, Folsom, CA
10:00 BREAK
10:30 Complete Mass Flux Reduction 400 Feet Downgradient of PCE Source by Biogeochemical Rdechlorination
James Studer, InfraSUR LLC, Albuquerque, NM
11:00 In Situ Bioelectrochemically-Enhanced Biodegradation of MTBE and Benzene in Groundwater at a Former Fuel Station
Song Jin, Advanced Environmental Technologies, Fort Collins, CO
11:30 Isolated Sub-Slab Depressurization – An “Active” Alternative with Long-Term Advantages
Deepa Gandhi, EKI Environment & Water, Burlington, CA

Session 17: 8:30am – 12:00pm
Vapor Intrusion III
Session Chair: Liz Miesner, Ramboll, San Francisco, CA
8:30 Analysis of Spatial and Temporal Relationships in Empirical Attenuation Factors
Steve Luis, Ramboll, Irvine, CA
9:00 Lessons Learned from Optimization of Existing SSDS at a Mid-Atlantic Military Installation
Catherine Coffey, Arcadis, Richmond, VA
9:30 Passive Sampling for Soil Gas and Vapor Intrusion Investigations: Realizing the Cost and Performance Benefits of this Maturing Technology
Hester Groenevelt, Geosyntec Consultants, Guelph, ON, Canada
10:00 BREAK
10:30 Using Thoron and Radon to Locate Vapor Entry Points and Choose Indoor Air Sample Locations
Anthony Miller, Gannett Fleming, Madison, WI
11:00 The Importance of Sanitary Sewers as the Expected Preferential Pathway in Vapor Intrusion Evaluations
Craig Cox, Cox-Colvin & Associates, Inc., Plain City, OH
11:30 Simulating the Migration of Petroleum Hydrocarbons via Common Preferential Vapor Intrusion Pathways
Emma Hong Luo, Chevron Energy Technology Company, Houston, TX

Session 18: 8:30am – 12:00pm
Innovative Soil, Groundwater, and Sediment Cleanup Technology Solutions
Session Chair: Richard Cartwright, Cartwright Environmental, East Amherst, NY
8:30 Impacts of Site Characteristics on Anaerobic Bioremediation Efficiency for Chlorinated Solvents
Richard Raymond and Michael Lee, Terra Systems, Inc., Claymont, DE
9:00 Use of Direct Push HRSC in Remedial Design and QA/QC
Eric Garcia, CONETEC, Rancho Cordova, CA
9:30 Managing Environmental Data from the Field to the Map
Dave Rich, Geotech Computer Systems, Centennial, CO
10:00 BREAK
10:30 Innovative Applications of Surfactants for Successful Combined Remedy Remediation
Paul Dombrowski, ISOTEC Remediation Technologies, Lawrenceville, NJ
11:00 Advanced Facultative Hydrocarbon Remediation
Robert Barrett, United Remediation Technologies, Pittsburgh, PA
11:30 Addressing Contaminated Ground Water to Surface Water Discharge: Application of In-Situ Permeable Reactive Barriers (PRB) to Limit Migration of PFAS
John Collins, AquaBlok, Ltd., Toledo, OH; Richard Stewart, Ziltek Pty Ltd, Thebarton, South Australia, Australia; John Hull, AquaBlok, Ltd., Swanton, OH

DRAWING
Stay and win a free registration to one of our next two conferences!
Entry and drawing will take place during each of the Thursday morning sessions.
WINNERS IN EVERY SESSION!
Must be present to win. Second place winners will receive free 2020 AEHS Foundation Membership – members receive reduced registration to the October conference!
Drawings will take place at the conclusion of each session.
REGISTRATION INFORMATION
Advance and on-site registration includes admission to all platform sessions, poster sessions, the exhibit area, welcome reception, socials, and coffee breaks. Workshops and lunches are NOT included in the full registration fee, but may be purchased separately on the conference registration form. The conference registration form is included in this program and is also available on-line at aehsfoundation.org

Full payment must accompany pre-registration. Non-compliance will result in a $25.00 processing fee for any resulting billings. Phone-in registrations will not be accepted.

PURCHASE ORDERS
Purchase orders will be accepted from institutions and agencies during pre-registration only. Payment in full must be received in our office by March 2, 2020.

CANCELLATIONS
Cancellations received in writing by March 2, 2020 can receive a refund minus a $50.00 processing fee. NO REFUNDS WILL BE ISSUED FOR CANCELLATIONS AFTER MARCH 2, 2020. You may substitute a conferee rather than cancel the registration entirely.

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Sponsors and supporters are eligible for complimentary registrations, according to respective guidelines (sent via email to main contact). Employees of sponsoring and supporting organizations may register at the reduced rate of $395. You must clearly indicate on your registration form which sponsoring or supporting organization you are affiliated with in order to qualify for the reduced rate.

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Employees of any State, County, Regional, Municipal, or Federal agency qualify for a registration rate of $95.00 - however you MUST PRE-REGISTER in order to receive this special rate. In addition, all workshops are free to all government personnel (registration is required, use discount code REG-MSF).

WORKSHOPS
Workshops are not included in the conference registration fee and must be purchased separately on the registration form. Early registration is encouraged as space is limited and materials must be prepared in advance. Please check the workshop schedule carefully when selecting workshops - same day workshops may run simultaneously.

POSTER SESSIONS
Posters may be viewed in the designated areas throughout the day on Tuesday, March 17th and Wednesday, March 18th. Authors will be available for individual discussion at their posters from 3:00-6:00 pm, on their assigned day (see schedule). Light hors d’oeuvres will accompany the poster sessions.

EXHIBIT INFORMATION
An exhibition of relevant technologies and services will be in the exhibition hall on Tuesday, March 17th and Wednesday, March 18th from 9:00 am - 7:00 pm and on Thursday, March 19th from 9:00 am – 12:00 pm. A limited number of booths are available. See our website (aehsfoundation.org) or call 413-549-5170 for exhibitor information

LOCATION AND TRAVEL INFORMATION
The conference will be held at the DoubleTree by Hilton San Diego Mission Valley in San Diego, CA, just 8 miles from San Diego International Airport (SAN). Delight in a world of sight-seeing pleasures - miles of white-sand, sunny beaches, charming Old Town, the Gaslamp District, the San Diego Zoo, Sea World, Wild Animal Park, U.S. Navy facilities, and SDCCU Stadium (formerly Qualcomm Stadium).

The hotel does not provide a shuttle, however, many ground transportation options are available directly from the airport. A shared shuttle van is approximately $15.00 per person. Reservations are not necessary - simply cross the street upon exiting baggage claim at the airport. Shuttles are available for hire near the taxis and other ground transportation (supershuttle.com).

PARKING
On-site self-parking is available at the DoubleTree for the special “AEHS Rate” of $5.00 for day use parking (self-park) and $15.00 for overnight parking (self-park). Overnight parking will be automatically billed to guests at the $15.00 rate during check-in at the front desk. Day use parking tickets will need to be validated at the AEHS Registration desk in order to receive the discounted $5.00 rate.

ACCOMMODATION INFORMATION
The DoubleTree by Hilton San Diego Mission Valley is just steps from the San Diego trolley. The hotel is attached by foot bridge to Hazard Shopping Center (shops and restaurants) and is walking distance to the renowned Fashion Valley Mall. Boasting the largest guest rooms in Mission Valley, guests will enjoy 400 sq. ft of space along with sound proof double pane windows. After a busy day, unwind with a swim in the hotel’s indoor or outdoor swimming pool, work out in the fitness center, or savor a meal with friends in the award-winning Windows Cafe or Lounge 72 Degrees. All guests receive a warm welcome with DoubleTree’s signature chocolate chip cookies.

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7450 Hazard Center Drive
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Phone: 619-297-5466
SanDiegoMissionValley.DoubleTree.com

Check In: 3:00 pm / Check Out: 12:00 pm

Conference Coordinator: Brenna Lockwood, AEHS Foundation, 413-549-5170, brenna@aehsfoundation.org

Special Conference Rate:
Single/Double ($195) per night, if reserved by February 21, 2020. Attendees are responsible for their own hotel arrangements. Please note the cut-off date of February 21st. Group rate is first come, first serve and is not guaranteed. Room block may fill prior to cut-off date.

Reservations may be made by calling the DoubleTree and requesting the group rate for AEHS Foundation (use group code “EHS”) or by visiting the AEHS Foundation website for the special DoubleTree online reservation link aehsfoundation.org

Shoulder Dates: The group rate is available 3 days prior to, as well as 3 days after the conference dates, based on availability.
REGISTRATION DEEDLINE IS MARCH 2, 2020 TO AVOID LATE FEE / Online Registration is available at www.AEHSFoundation.org

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Regular Conference Registration ................................................................. $695/$745 after March 2nd
AEHS Member ......................................................................................... $495/$545 after March 2nd
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Workshop Only Fee, workshop only ....................................................... add $100 see below

WORKSHOP FEES (please check schedule closely – workshops run concurrently)
Workshops are $110 for conference registrants and $210 for workshop only registrants.

Monday, March 16, 2020
1. Environmental Forensics: Emerging Challenges and Solutions 1:00pm – 4:00pm .................................................. $110/$210
2. Per- and Polyfluoroalkyl Substances (PFAS): Beyond the Basics 1:00pm – 5:00pm .................................................. $110/$210
3. California’s Environmental Challenges: What Do We Do with Large Operating Facilities 1:00pm – 5:00pm ........ $110/$210
4. Effective Application of Multiple ITRC Guidance Documents to Hydrocarbon Sites 1:00pm – 5:00pm ................. $110/$210

Tuesday, March 17, 2020
5. Why You Should Monitor Indoor Radon, Differential Temperature, and Pressure During Chlorinated Vapor Intrusion Assessments 8:30am – 5:00pm ....................................................................... $110/$210
6. Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Evaluate Who was Responsible for a Spill or Release of Organic Contaminants into the Environment 6:30pm – 9:30pm .................................................. $110/$210
7. PFAS 360 – Analytical Challenges and Risk Assessment Update 6:30pm – 8:30pm .................................................. $110/$210

Wednesday, March 18, 2020
8. A Workshop on using the ITRC Guidance Document: Practical Implementation of Advanced Site Characterization Tools 6:30pm – 9:30pm .................................................. $110/$210
9. Fundamentals of Horizontal Well Systems and Modeling Tools 6:30pm – 8:30pm .................................................. $110/$210

WORKSHOPS ARE FREE TO MUNICIPAL, STATE, AND FEDERAL PERSONNEL REGISTERED FOR THE CONFERENCE. CHECK THE WORKSHOP YOU ARE INTERESTED IN TO RESERVE YOUR SPACE.

IF YOU ARE REGISTERING AS “WORKSHOP ONLY” AND ARE NOT REGISTERING FOR THE CONFERENCE, THE WORKSHOP FEE APPLIES.

CEU CREDITS ADMINISTRATIVE CHARGE ................................................................. $50 each
Please check the type of CEU you would like to receive ($50.00 each): ☐ Certificate of Attendance ☐ CA REHS

LUNCH
Lunch, Tuesday, March 17, 2020 (includes luncheon presentation) ................................................................. $35.00
Lunch, Wednesday, March 18, 2020 (includes luncheon presentation) ................................................................. $35.00

TOTAL CONFERENCE FEES ..........................................................................................................................

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The AEHS Foundation attributes the success of this conference, in large part, to a very dedicated and hard working Scientific Advisory Board (SAB). The SAB evaluates abstract submissions, recommends invited papers and presenters, advises with regard to session topics, and serves as conference ambassadors. The SAB is crucial to the conference development. Care is taken to create a board that represents philosophical, scientific, regulatory, and geographical balance.

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