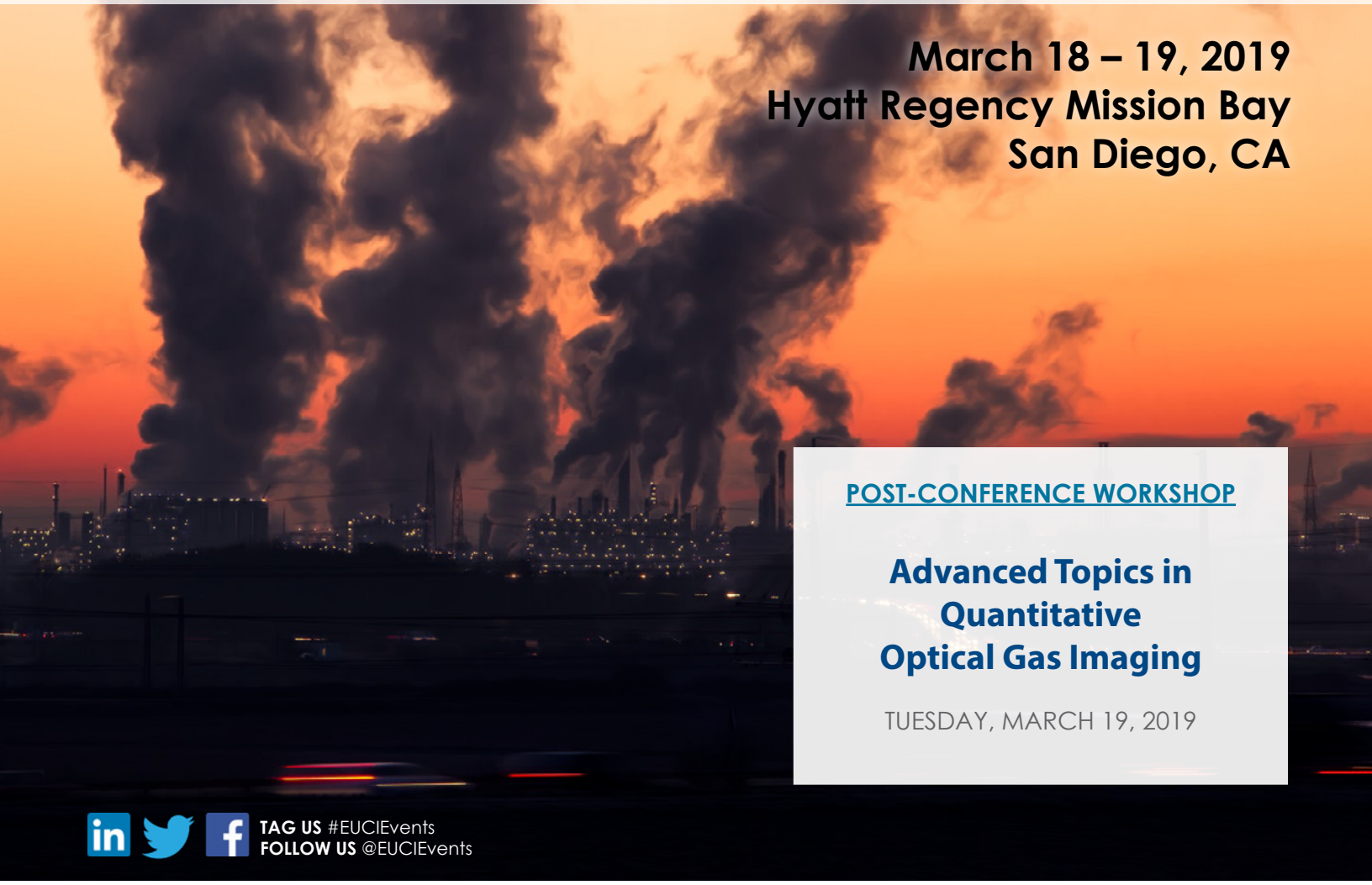
EUCI
CONFERENCE

STAKEHOLDER SYMPOSIUM ON MITIGATING METHANE EMISSIONS

Technology, Regulations, Measurement and Mitigation Best Practices



March 18 – 19, 2019
Hyatt Regency Mission Bay
San Diego, CA

POST-CONFERENCE WORKSHOP

Advanced Topics in Quantitative Optical Gas Imaging

TUESDAY, MARCH 19, 2019

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AUTHORIZED IACET PROVIDER

EUCI is authorized by IACET to offer 1.0 CEUs for this conference and 0.4 CEUs for the workshop

OVERVIEW

The natural gas industry is embracing new methodologies in managing methane emissions as more and more gas utilities are realizing dollar and social value in reducing their organization's environmental footprint. However, there is still a need for further improvement in preventive measures that natural gas utilities can implement. Since timely leak detection is the most important factor in addressing methane emissions, the natural gas industry and its regulators are currently reassessing the traditional leak detection and repair programs that have historically been in place to address methane leakage. In addition, new technologies with increased effectiveness and decreased costs are being developed and explored. EUCI's Stakeholder Symposium on Methane Emission Mitigation will bring together industry leaders to share latest regulatory and policy developments in reducing methane emissions and present delegates with an in-depth analysis on leak quantification and best practices in leak detection and management.

LEARNING OUTCOMES

- Review methane emissions regulation and policy updates
- Assess benefits of stakeholder collaboration in emissions management
- Discover results achieved to date by leading natural gas utilities on their pilot technology implementation programs
- Analyze cost-effective methods implemented to repair larger leaks that account for most of methane emissions
- Evaluate potential risks when choosing leak detection methods and technologies
- Benchmark your current methane leak prevention measures against the industry's best-in-class practices

> ***"Condensed, effective network and technology forum."***
>
> Environmental Engineer, Altech

> ***"This Symposium was exactly at the level of content I need for continuing my assignment in methane emissions reduction."***
>
> Senior Utilities Engineer, CPUC

AGENDA

MONDAY, MARCH 18, 2019

8:00 – 8:30 am **Registration & Continental Breakfast**

8:30 – 8:45 am **Opening Remarks by Chairperson**
Daniel Zimmerle, Senior Research Associate, Colorado State University

8:45 – 9:30 am **California Air Resources Board Methane Emissions Standards for Crude Oil and Natural Gas Facilities**
In this presentation, the speaker will present the recent developments of CARB's oil & gas methane regulation; summarize the requirements and impacts of the regulation; and briefly discuss the regulation's future plans.
Floyd Vergara, Division Chief, Industrial Strategies Division, CARB

9:30 – 10:15 am **Recent Changes in CPUC's Required Methane Emission Mitigation Plans**
California's Public Utility Commission has established methane leak policies for gas pipeline operators in response to Senate Bill 1371. CPUC Decision D.17-16-015 has established requirements for leak reporting and leak abatement best practices. CPUC Staff evaluates how well the gas companies are adopting best practices by review of formal Compliance Plans, filed every two years. This presentation will focus on the first round of Compliance Plans, filed in March 2018.
Fred Hanes, Senior Utilities Engineer, CPUC

10:15 – 10:45 am **Networking Break**

10:45 – 11:30 am **Understanding Methane Emissions in the Natural Gas Value Chain**
This presentation will provide a current perspective on NETL's life cycle analysis research to characterize regional natural gas differences in methane emissions across the value chain from extraction to delivery to the end user. Insights from NETL's work with the ONE Future (leading natural gas industry consortium focused on methane emission characterization and reduction) coalition and other methane reduction opportunities will be described. Key results will be discussed in the context of U.S. natural gas power production options.
Timothy Skone, Sr. Environmental Engineer, US DOE, National Energy Technology Laboratory

11:30 am – 12:30 pm **STAKEHOLDER PANEL: Industry Initiatives to Manage Methane Emissions**
- 3 years post Aliso Canyon gas leak
- Moving from measurements to mitigation
- Reducing emissions from unregulated sources such as abandoned wells, storage infrastructure, etc.

Panelists:
Floyd Vegara, Division Chief Industrial Strategies Division, CARB
Fred Hanes, Senior Utilities Engineer, CPUC
Francois Rongere, R&D and Innovation Manager – Gas Operations, PG&E
Helen Ayotte, Senior Director, Engineering, Summit Utilities

12:30 – 1:30 pm **Group Luncheon**

AGENDA

MONDAY, MARCH 18, 2019 (CONTINUED)

SHOWCASE: Best Practices in Mitigating Methane Emissions

1:30 – 2:15 pm

SoCalGas' Mitigation Technologies
In support of California's goal to reduce methane emissions 40% by 2030, SoCalGas has performed several research projects to evaluate technologies for their ability to cost effectively reduce natural gas emissions from SoCalGas and SDG&E systems. This presentation will summarize what we have learned to date and where we are headed in terms of cost-effective implementation strategies for methane emissions reduction.
Ed Newton, Research Manager, Southern California Gas Company
Shaena Walker, Methane Emissions Reduction Program Manager, Southern California Gas Company

2:15 – 3:00 pm

PG&E Update on Prioritization of Natural Gas Distribution System Leaks usin Advanced Mobile Methane Sensing Technology
The presentation will describe the new method proposed by PG&E to prioritize the detection and repair of larger leaks using advance mobile methane sensing technology. It will show how substantial abatement can be realized rapidly and cost effectively by repairing the small number of larger leaks that account for most of methane emissions. Calculation method and validation pilot will also be discussed.
Francois Rongere, R&D and Innovation Manager – Gas Operations, PG&E

3:00 – 3:30 pm **Networking Break**

3:30 – 4:15 pm

Optical Path Laser Spectroscopy Methane Survey
This case study will explore a cutting-edge technology added to Equinor's suite of methane detection and repair measures for USA shale gas operations. This has been used to establish methane baselines through detection and quantification of methane emissions from multiple sources. The methane sensor is mounted on a drone which enables assessment of individual leaks from specific equipment types as well as total emissions from an entire facility.
Donald Evans, Leader Sustainability Climate and Environment, Equinor

4:15 – 5:00 pm

Consumers Energy Methane Reduction Task Force
In 2017, Consumers Energy committed to Clean Energy Goals for electric generation, aligning with our foundation of People, Planet & Prosperity. Initial emission reduction goals were set for 2018 and beyond for both the electric and gas side of the business; however, a large majority of those reductions are associated with the electric side (retirement of coal plants). Our commitment to the planet, combined with our customers, communities and investors, who are demanding more clean energy, clearly indicates that more work needs to be done with reducing fugitive methane associated with our natural gas delivery. As a result, Consumers Energy initiated a Methane Reduction Task Force to identify opportunities to reduce methane emissions. In collaboration with our 10-year Gas Delivery Plan, the task force will vet opportunities for methane reduction and recommend a meaningful reduction target and appropriate metrics.
Amy Kapuga, Senior Engineer II, Consumers Energy

AGENDA

TUESDAY, MARCH 19, 2019

8:00 – 8:30 am **Continental Breakfast**

8:30 – 8:45 am **Opening Remarks by Chairperson**

SHOWCASE: Emerging Technologies for Methane Detection

8:45 – 9:30 am **Multi-Facility Methane Leak Detection with a Long-Distance Frequency Comb Laser System**
Over the span of four years, a team from the University of Colorado and the National Institute of Standards and Technology has transitioned Nobel-prize-winning frequency comb laser technology from a complex laboratory device to an automated, regional-scale methane leak detection system. The system is now deployed and monitoring real oil and gas infrastructure, and the team has formed LongPath Technologies, Inc. to commercialize the system for the oil and gas industry. We will discuss the technology and discuss results from field deployments.
Greg Rieker, Assistant Professor, Colorado State University

9:30 – 10:15 am **DOE/ARPA-E's Monitor Program - Next Generation Technologies to Detect, Locate and Quantify Natural Gas Emissions**
The Monitor Program funded the development of high risk, high reward emerging technologies which would allow the detection, localization and quantification of natural gas emissions. A central part of the program was the construction of a Colorado test site to allow the direct testing of the effectiveness of these technologies through standardized, controlled, blind releases of natural gas. Key learnings, technology advances and equivalency testing protocols developed during the program will be presented.
Dr. Joseph King, Program Director, ARPA-e, Department of Energy

10:15 – 10:45 am **Networking Break**

10:45 – 11:30 am **Cost-Effective Mitigation Techniques**
There is growing appreciation for both the climate impact of methane emissions from the oil and gas supply chain as well as the enormous opportunity for cost effective mitigation of these emissions. We now have a much stronger understanding of the level of emissions. At 2.3% for the US natural gas supply chain average it is considerably higher than US EPA inventories suggest and almost doubles the 20-year climate impact of utilizing natural gas. The difference in empirically-derived and calculated emissions is the product of bias in bottom-up inventories largely resulting from the under reported role of abnormal operating conditions and super emitters. The pattern of emissions varies across geographies, both upstream and downstream, and if taken out of context can easily generate spurious emission rates, both higher and lower than the national data supports. We know enough about patterns of emissions with the natural gas supply chain to support major cost-effective mitigation efforts.
Steven Hamburg, Chief Scientist, EDF

11:30 am – 12:15 pm **Automated Methane Fugitive Emissions Detection using Artificial Intelligence and Optical Gas Imagers**
This presentation discusses the recent work, funded by the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL), which is focused on the development of the Smart Methane Leak Detection (SLED/M) system, which uses commercial off-the-shelf (COTS) optical gas imagers and expands on the limitations of OGIs by applying machine learning techniques to autonomously and reliably detect "fingerprints" of fugitive methane emissions. SLED/M advances the state-of-the-art in that it focuses on three key critical criteria for effective methane emission mitigation: (1) autonomy (no need for a human to be in the loop), (2) high reliability (low false alarm rates), and (3) real-time performance.
Maria Araujo, Manager R&D, High Reliability Systems, Southwest Research Institute

AGENDA

POST-CONFERENCE WORKSHOP

Advanced Topics in Quantitative Optical Gas Imaging

TUESDAY, MARCH 19, 2019

12:30 – 1:00 pm **Workshop Registration**

1:00 – 5:00 pm **Workshop Timing**

OVERVIEW

This workshop examines advanced topics related to quantitative optical gas imaging. Optical gas imaging (OGI) has been used as part of Leak Detection and Repair (LDAR) programs for many years as a qualitative technology. Recent advancements have enabled quantitative OGI (QOGI) methods to measure emission rates, transforming OGI from a qualitative technology to a quantitative technology. This workshop will discuss the technical basis for QOGI methods. It will also present recent studies examining the accuracy and applications for QOGI methods. Comparisons will be made to other quantitative methods (such as US EPA Method 21) in the context of an LDAR program. In addition, a thorough discussion of OGI detection limits will be examined with implications for both LDAR programs and emission inventories.

LEARNING OUTCOMES

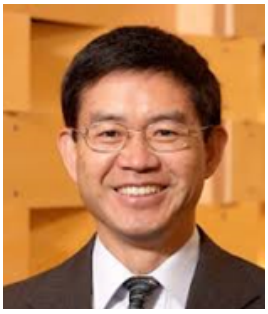
- Review the latest theories on OGI and its detection limits
- Discuss theories and practical applications of QOGI as a tool for methane leak detection and quantification
- Relate OGI and QOGI advantages and limitations to methane emission inventories and emission mitigation

WORKSHOP AGENDA

TUESDAY, MARCH 19, 2019

- Review optical gas imaging (OGI) fundamentals
- Introduce Quantitative OGI (QOGI) methods
- Compare QOGI to Method 21 and high flow sampler
- Review QOGI performance and applications
- Examine OGI detection limits in context of LDAR and emission inventories

WORKSHOP INSTRUCTORS



Yousheng Zeng

CEO, Providence Photonics

Yousheng Zeng received his Ph.D. degree in Environmental Engineering in 1990 from the University of Illinois at Urbana-Champaign. He is an author/co-author of 21 peer-reviewed journal articles and an inventor/co-inventor of 15 patents or pending patents, primarily in the field of optical gas imaging. Dr. Zeng served on three committees/panels under the U.S. EPA Science Advisory Board. He is the CEO of Providence Photonics.

Jon Morris

Chief Technology Officer, Providence Photonics

Jon Morris currently serves as the Chief Technology Officer for Providence Photonics. In this role, Mr. Morris oversees the development of optical gas imaging products for the industrial applications. He holds degrees in Computer Science and Electrical Engineering from Louisiana State University and has been working in the field of optical gas imaging for more than a decade.

INSTRUCTIONAL METHODS

Case studies, PowerPoint presentations and group discussion will be used in this event.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the conference to be eligible for continuing education credit.

IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for this conference and 0.4 CEUs for the workshop.

EVENT LOCATION

A room block has been reserved at the Hyatt Regency Mission Bay1441 Quivira Rd. San Diego, CA 92109, for the nights of March 17-19, 2019. Room rates are US $189 plus applicable tax. Call **1-619-221-4841** for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is February 25, 2019 but as there are a limited number of rooms available at this rate, the room block may close sooner. ***Please make your reservations early.***

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this conference may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

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PLEASE SELECT

○ **BUNDLE PRICE: STAKEHOLDER SYMPOSIUM ON MITIGATING METHANE EMISSIONS CONFERENCE AND POST-CONFERENCE WORKSHOP:** MARCH 18 – 19, 2019: US $1795
EARLY BIRD on or before MARCH 1, 2019: US $1595

○ **STAKEHOLDER SYMPOSIUM ON MITIGATING METHANE EMISSIONS CONFERENCE ONLY**
MARCH 18 – 19, 2019: US $1395
EARLY BIRD on or before MARCH 1, 2019: US $1195

○ **POST-CONFERENCE WORKSHOP ONLY**
TUESDAY, MARCH 19, 2019: US $595
EARLY BIRD on or before MARCH 1, 2019: US $495

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name | Job Title

Company

What name do you prefer on your name badge?

Address

City | State/Province | Zip/Postal Code | Country

Phone | Email

List any dietary or accessibility needs here

CREDIT CARD INFORMATION

Name on Card

Account Number

Exp. Date | Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

Billing Address

Billing City | Billing State

Billing Zip Code/Postal Code

OR Enclosed is a check for $ _____ to cover _____ registrations.

Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before February 15, 2019 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of conference cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 303-770-8800.
EUCI reserves the right to alter this program without prior notice.