



AIR & WASTE MANAGEMENT  
ASSOCIATION

## FINAL PROGRAM



Air & Waste Management Association's

# First International Greenhouse Gas Measurement Symposium

March 22-25, 2009

Hyatt Regency San Francisco Airport

San Francisco, CA

# ABOUT THE CONFERENCE

Reducing greenhouse gas (GHG) emissions to alleviate harmful effects of climate change is one of the greatest challenges of our time. Join the Air & Waste Management Association and industry experts for the First International Greenhouse Gas Measurement Symposium to discuss GHG measurement and monitoring, and technological needs for accurate, local, regional, national, and international monitoring systems! This symposium will provide a forum for participants to begin defining the technical problem of monitoring GHG emissions at multiple spatial scales, and to discuss how to perform these measurements.

## GENERAL INFORMATION

### Registration

Registration will be located in the Grand Peninsula Foyer.

Hours:

Sunday, March 22: 7:30 a.m. - 5:00 p.m.

Monday, March 23: 7:30 a.m. - 7:00 p.m.

Tuesday, March 24: 7:00 a.m. - 5:45 p.m.

Wednesday, March 25: 7:00 a.m. - 12:00 p.m.

### Continuing Education Credit Opportunities

Conference attendees may be eligible for continuing education credit.

For more information, please visit the onsite registration area.

### Conference Co-Chairs

Ram Hashmonay, *ARCADIS*, Brooke Hemming, *U.S. EPA*, Jeff Ryan, *U.S. EPA*, Eben Thoma, *U.S. EPA*

### Presenters' Breakfast

Presenters and Session Chairs will meet for a complimentary continental breakfast on the day of their session involvement to review program details. Presenters should bring their presentations on a CD or memory stick to this meeting. The breakfast will be held at 7:30 a.m. on Monday and at 7:00 a.m. on Tues. and Wed. in the Sandpebble room.

### Conference Proceedings

Conference proceedings will be posted on the A&WMA Web site.

Attendees will be notified by e-mail when the extended abstracts and presentations are available. This is typically two weeks post-conference.

### Attendees' List

A list of attendees will be e-mailed to all participants approximately two weeks post-conference.

### Hotel Information

Hyatt Regency San Francisco Airport

1333 Bayshore Highway, Burlingame, CA 94010

Phone: 650-347-1234 • Fax: 650-347-5948

Any messages and/or faxes should be delivered to the Air & Waste Management Association's registration desk.

This newly updated hotel near San Francisco airport surpasses every standard with a pampering array of amenities and services. Perfectly located on San Francisco Bay - between the excitement of downtown San Francisco and technology corridor of Silicon Valley - you'll enjoy easy access to all the attractions surrounding this luxury SFO hotel. The atrium style hotel offers views of the bay, mountains, or the picturesque atrium foliage. Sample fine wines in a lush 10-story atrium, filled with cascading waterfalls. Take advantage of award-winning business and meeting facilities. A welcoming atmosphere makes this Hyatt San Francisco airport hotel the refreshing choice for every traveler.

### Directions and Transportation

#### From San Francisco International Airport (2 miles):

Take 101 South toward San Jose. Exit Millbrae Ave. Turn left on Millbrae Ave. Turn right at the second stoplight onto Bayshore Hwy. Proceed through 4 stoplights. Hotel is on right hand side.

#### From Oakland Airport (approximately 30 miles) and Points East:

Take I-880 South toward San Jose. Merge onto CA-92 W toward San Mateo Br. Merge onto US-101 N toward San Francisco to the Broadway Exit. Take the Airport Blvd ramp toward Bayshore Blvd, then turn left onto Bayshore Hwy to the hotel.

#### From San Jose Airport (approximately 30 miles) and Points South:

Take 101 North to the Broadway Exit. Take the Airport Blvd ramp toward Bayshore Blvd, then turn left onto Bayshore Hwy to the hotel.

### Parking

The SFO Hyatt Regency offers several parking options for guests:

#### Self Parking:

\$18.00 overnight

\$2.00 for the first hour, \$1.50 for every additional hour

#### Valet Parking:

\$25.00 overnight

\$9.00 up to four hours

\$15.00 four to 10 hours

All rates include in / out privileges. Valet parking is available for vehicles over 6'4". Parking for RVs or trailers is a flat rate of \$36 per night, based upon space availability.

### Transportation To/From San Francisco Airport:

*Complimentary Shuttle:* The shuttle is available every day, 24-hours a day and runs every 10-15 minutes. Take your luggage to the Departures Level, center island, and look for the area marked "Hotel Shuttle." The shuttle is a large bus marked "Hyatt Regency and Marriott." For arrivals from 12:00 a.m. - 4:46 a.m.: shuttles pick up every 30 minutes.

## About the Air & Waste Management Association

A&WMA is a not-for-profit, nonpartisan professional organization that enhances knowledge and expertise by providing a neutral forum for technology exchange, professional development, networking opportunities, public education, and outreach to more than 8,000 environmental professionals in 65 countries. A&WMA also promotes global environmental responsibility and increases the effectiveness of organizations to make critical decisions that benefit society. For more information, please visit [www.awma.org](http://www.awma.org). A&WMA Federal Tax ID # 25-6048614.

# EXHIBITION INFORMATION

Exhibit hours will be Monday, March 23 from 10:00 a.m. – 7:00 p.m. and Tuesday, March 24 from 9:00 a.m. – 4:00 p.m.

An exhibition featuring related products and services complements this conference and will be located in the Grand Peninsula Ballroom D. Exhibitors include:

## **Altech Environment U.S.A.**

2623 Kaneville Court  
Geneva, IL 60134  
630-262-4400  
Fax: 630-262-6220  
www.altechusa.com  
Booth Number: 21  
CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>...Altech Environment U.S.A. has your Greenhouse Gas Monitor! Measure any or all of these gases with the Altech MIR 9000 Multi-gas analyzer. Since its inception in 1989, Altech Environment U.S.A has been a leading supplier of Continuous Emissions Monitoring Systems (CEMS), and is also a supplier of a complete line of gas analyzers for compliance, process and ambient monitoring applications. The proven MIR 9000 offers simplicity of operation, low maintenance and meets the requirements for GHG measurements and reporting.

## **American Ecotech LLC**

100 Elm Street, Factory D  
Warren, RI 02885  
401-247-0100  
Fax: 401-537-9166  
www.AmericanEcotech.com  
Booth Number: 6  
American Ecotech specializes in the design, installation, operation and maintenance of air pollution monitoring instrumentation and systems. In addition to designing and building turn-key air monitoring solutions, American Ecotech partners with other world-class instrument manufacturers from around the world to provide the very highest standard in instrumentation solutions.

## **ARCADIS U.S., Inc.**

4915 Prospectus Drive, Suite F  
Durham, NC 27713  
919-544-4545  
Fax: 919-544-5690  
www.arcadis-us.com  
Booth Number: 2  
ARCADIS is an international company providing consultancy, engineering and management services in infrastructure, environment and buildings, to enhance mobility, sustainability and quality of life. ARCADIS develops, designs, implements, maintains and operates projects for companies and governments. With more than 14,000 employees and more than \$2 billion in gross revenue, the company has an extensive international network that is supported by strong local market positions.

## **AXYS Technologies Inc.**

2045 Mills Road  
Sidney, British Columbia V8L 5X2  
Canada  
250-655-5868  
Fax: 250-655-5856  
www.axystechnologies.com  
www.ghgsentinel.com  
Booth Number: 12  
AXYS Technologies Inc. (AXYS) specializes in the design, manufacturing and deployment of environmental monitoring systems worldwide. The GHG Sentinel™, an AXYS new product development is an automated continuous Greenhouse Gas monitoring system which gathers time series measurements for carbon dioxide, methane and oxygen in water and air.

## **Aztec Signal**

5701 E. Mountain Avenue  
Orange, CA 92867  
714-283-2574  
Fax: 714-283-3574  
www.aztecsignal.com  
Booth Number: 3  
Aztec Signal represents companies whose products are integral in the measurement of Greenhouse Gas emissions. Dekoron Unitherm's heat traced tubing bundles deliver temperature controlled samples for gas analysis. Enerac offers hand-held portable emissions and combustible analyzers.

## **Boreal Laser Inc.**

#13, 51127 Range Road 255  
Spruce Grove, AB T7Y 1A8  
Canada  
780-987-4382  
Fax: 780-987-2418  
www.boreal-laser.com  
Booth Number: 1  
Boreal Laser's portable open path GasFinder2 laser gas detectors are light, battery operated and easy to set up and use. A scanning option enabling automated multiple path monitoring is very useful for quantifying emissions of greenhouse gases and ozone pre-cursors such as CH<sub>4</sub>, CO<sub>2</sub> and NH<sub>3</sub> from area sources.

## **California Analytical Instruments, Inc.**

1312 West Grove Avenue  
Orange, CA 92865  
714-974-5560  
Fax: 714-921-2531  
www.gasanalyzers.com  
Booth Number: 20  
California Analytical Instruments has been providing quality gas analyzers and systems used in Industrial, Environmental, Process and Automotive applications for over 25 years. CAI's goal is to provide innovative, cost effective and reliable solutions. We believe there is no substitute for personal attention to the product requirements and support needs of our customers.

## **C-Lock Technology, Inc.**

525 University Loop, Suite #111  
Rapid City, SD 57701  
605-716-0053  
Fax: 605-343-1916  
www.c-locktech.com  
Booth Number: 14  
C-Lock Technology, Inc. is a company that's core business is quantifying GHG emissions and emission offsets. To date, C-Lock has implemented its solution architecture named GreenCert™ to modules relating to energy production and soil sequestration. GreenCert™ is a multifaceted easy-to-use web based system that is science based at its roots.

## **Gasmet Technologies Inc.**

1410 Taschereau, B-202  
La Prairie, Quebec J5R 4E8  
Canada  
866-685-0050  
Fax: 450-659-4567  
www.gasmet.com  
Booth Number: 13  
Gasmet Technologies is a high-technology company that develops and manufactures the Gasmet™ line of FTIR multi-gas analyzers. In 2008, Gasmet introduced the DX-4030, the world's first truly portable FTIR Gas Analyzer for applications such as industrial hygiene, hospital gas monitoring, first responders and hazmat team toxic gas management. Gasmet product range features both fixed and portable instruments for the measurement of both organic and inorganic compounds.

**Landtec N.A.**

850 S Via Lata, Suite 112  
Colton, CA 92324  
800-821-0496  
Fax: 909-825-0591  
www.landtecnica.com  
Booth Number: 4

LANDTEC is a leading provider of monitoring and measurement systems for renewable energy and Green House Gas (GHG) reduction validation. LANDTEC designs & manufactures instruments, software and products for landfill gas extraction, biogas digesters and other Methane recovery projects.

**LI-COR Biosciences**

4647 Superior Street  
Lincoln, NE 68504  
402-467-3576  
www.licor.com  
Booth Numbers: 8 & 9

LI-COR will demonstrate instrumentation for greenhouse gas research, including the LI-840 and LI-7500 CO<sub>2</sub>/H<sub>2</sub>O analyzers. See the LI-8100 Automated Soil CO<sub>2</sub> Flux System, featuring interchangeable chambers for measurements of soil CO<sub>2</sub> flux, and the newly announced LI-7700 Open Path CH<sub>4</sub> Analyzer, for making true in situ measurements of CH<sub>4</sub> by eddy covariance.

**Los Gatos Research**

67 East Evelyn Avenue, Suite 3  
Mountain View, CA 94041  
650-965-7772  
Fax: 650-965-7074  
www.LGRinc.com  
Booth Number: 15

LGR produces portable gas analyzers that provide measurements of concentrations and isotope ratios with unsurpassed accuracy, precision, selectivity, speed and sensitivity. In addition, LGR instruments have reported measurements on seven continents, thousands of meters underwater, and in the stratosphere, and offer: ultra-high precision and accuracy, rugged, compact design, low power requirements (100-150 watts), fast concentration measurements (20 Hz), fast isotope ratio measurements (1 Hz), and its economical (\$30k-\$50k).

**Magee Scientific Company**

2020 Stuart Street  
Berkeley, CA 94703  
510-845-2801  
Fax: 510-845-7137  
www.mageescientific.com  
Booth Number: 11

Magee Scientific provides continuous, real-time instruments to measure Aerosol Black Carbon using Aethalometer® technology. The instruments can be used in atmospheric studies, ambient air quality assessments, occupational hygiene, and emissions monitoring.

**National Oceanic & Atmospheric Administration (NOAA)**

OAR, 1315 East West Highway  
Silver Spring, MD 20910  
301-713-2458  
Fax: 301-713-0163  
www.research.noaa.gov  
Booth Number: 7

NOAA is a federal agency that enriches life through science. NOAA's weather forecasts, climate research and monitoring, fisheries management, and support for marine commerce enhance the nation's economy. NOAA's scientists conduct cutting-edge research to provide citizens and decision makers with the reliable information they need about our changing environment.

**NovaWave Technologies**

900 Island Drive, Suite 101  
Redwood City, CA 94065  
650-610-0956  
Fax: 650-610-0986  
www.novawavetech.com  
Booth Number: 10

NovaWave will be exhibiting several soon-to-be-released sensor prototypes based on our unique middle infrared laser technology. These sensors provide the sensitive and selective detection of greenhouse gases, pollutants, and industrial gases.

**PICARRO, Inc.**

480 Oakmead Parkway  
Sunnyvale, CA 94085  
408-962-3900  
Fax: 408-962-3200  
www.picarro.com  
Booth Number: 17

Picarro produces the world's highest performance and easiest to use gas analyzers. This incredibly rare combination of attributes enables our customers to make the highest quality measurements both in the modern lab and in the most remote locations imaginable.

**Signature Science, LLC**

8329 North Mopac Expressway  
Austin, Texas 78759  
512-533-2000  
Fax: 512-533-2060  
www.signaturescience.com  
Booth Number: 18

Signature Science is a science and engineering services company, providing technical services in applied science, quality assurance, field testing and analytical methods development, sampling system design, training, and operations support. We offer technical staff with expertise in Statistics, Chemistry, Sampling Equipment Design and Construction, Micro- and Molecular Biology, Radiochemistry, and Engineering.

**Spectra Gases, Inc.**

3434 Route 22 West  
Branchburg, NJ 08876  
908-252-9300  
Fax: 908-252-0811  
www.spectragases.com  
Booth Number: 5

Spectra Gases is the pre-eminent supplier of calibration gas standards for the environmental market. Criteria pollutant standards encompass all US EPA Protocol gases including mercury; SCR/SNCR standards including NH<sub>3</sub>, NO, and NO<sub>2</sub>; and incinerator standards including HCl and THC. In addition to being the official supplier of the US EPA's PAMS standard, Spectra's ambient standards include single and multi component mixes ranging from the low ppb to ppm levels. Spectra also supplies high quality equipment for gas delivery systems.

**The Avogadro Group, LLC**

2825 Verne Roberts Circle  
Antioch, CA 94509  
877-602-1023  
Fax: 925-680-4416  
www.avogadrogroupp.com  
Booth Number: 19

The Avogadro Group (Avogadro) is a source testing and consulting firm that focuses on combustion and process-generated air pollution emissions, emission measurement, emission control devices and CEM systems. Avogadro specializes in the measurement of ultra-low concentration emissions of air toxic contaminants and criteria pollutants.

**Thermo Scientific**

27 Forge Parkway  
Franklin, MA 02038  
508-520-0430  
Fax: 508-520-1460  
www.thermo.com/aqi  
Booth Number: 16

Thermo Scientific (A Thermo Fisher Scientific Brand) has offered air quality products and services since 1970. We are committed to being the global leader in environmental monitoring applications where our market, knowledge, customer intimacy, application expertise, and instrument technology help our customers succeed in protecting people and the environment.

# SYMPOSIUM SPONSORS

## Silver Sponsors



Infrastructure, environment, buildings

**ARCADIS** is an international company providing consultancy, engineering and management services in infrastructure, environment and buildings, to enhance mobility, sustainability and quality of life. ARCADIS develops, designs, implements, maintains and operates projects for companies and governments. With more than 14,000 employees and more than \$2 billion in gross revenue, the company has an extensive international network that is supported by strong local market positions.



**Boreal Laser** is the leading manufacturer of laser gas monitors for the primary greenhouse gases, CO<sub>2</sub> and CH<sub>4</sub>. The open path GasFinder2 is portable and easy to set up and use. A scanning option enables automated multiple path monitoring for determining emission fluxes from area sources. GasFinderFC is a stack laser analyzer for temporary or permanent monitoring of stack GHG emissions. GasFinderAB is a vehicle mounted laser gas detector used for rapid surveying of fugitive GHG emissions from large area sources. All GasFinder configurations share the common laser benefits of gas specificity, high sensitivity and fast response.



**Los Gatos Research** produces portable gas analyzers that provide measurements of gas concentrations and isotope ratios in the field with unsurpassed accuracy, precision, selectivity, speed and sensitivity. Based on LGR's patented cavity-enhanced laser absorption technology, these high-performance, yet easy to use, analyzers offer measurement solutions for the most demanding scientific, industrial and engineering applications. LGR instruments, which have reported measurements on seven continents, thousands of meters underwater, and in the stratosphere, offer:

- ultra-high precision and accuracy
- rugged, compact design
- low power requirements (100-150 watts)
- fast concentration measurements (up to 20 Hz)
- fast isotope ratio measurements (up to 1 Hz)
- economical (price range from \$30k-\$50k)

Please see [www.LGRinc.com](http://www.LGRinc.com) for further information.

## Bronze Sponsors



Engineered for life

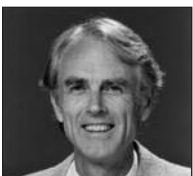
Airborne Natural Gas Emission Lidar (ANGEL) Services from ITT provides a flexible and comprehensive service for detecting, locating and quantifying methane emissions. We find emissions that can be impractical or impossible to detect using traditional survey methods. ANGEL Services can detect both natural emission sources, such as coalbed methane seeps, and man-made sources, such as natural gas pipelines and industrial facilities. Additionally, we can quantify emission flow rates and pin-point emission sources with precise GIS data. With ANGEL Services, industry and government can gauge the positive impacts and reduced carbon footprint from activities that reduce methane emissions while simultaneously giving rise to carbon-credit trading opportunities.

## PICARRO

Based on Wavelength-Scanned Cavity Ring Down Spectroscopy (WS-CRDS), our analyzers offer unprecedented sensitivity, selectivity and stability, all in an elegantly simple, turnkey design. Offering months or years of calibration-free operation, and a 10-minute set up, this incredibly rare combination of attributes enables our customers to take the highest quality data both in the modern lab and in the most remote locations imaginable. From greenhouse gases to stable isotope analyses - it simply doesn't get any better or easier.

# PLENARY SPEAKERS

Monday, March 23, 2009 -  
Plenary Session 1



Pieter Tans



Josh Margolis

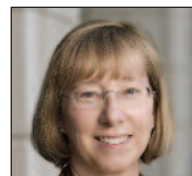


Guido Franco



Ray Weiss

Tuesday, March 24, 2009 -  
Plenary Session 2



Sally Benson



Alex Cuclis



James Butler

# FINAL AGENDA

## Sunday, March 22, 2009

- 7:30 a.m. – 5:00 p.m. **Course and Conference Registration**  
(Grand Peninsula Foyer)
- 8:00 a.m. – 5:00 p.m. **Professional Development Course: "AIR-130: Emission Measurement Techniques for Greenhouse Gases (GHGs) from Area and Fugitive Sources" [ticket required; refer to registration form for fee]**

## Monday, March 23, 2009

- 7:30 a.m.–7:00 p.m. **Conference Registration**  
(Grand Peninsula Foyer)
- 7:30–8:30 a.m. **Presenters' Breakfast** (Sandpebble)
- 7:30–8:30 a.m. **Coffee Service** (Grand Peninsula Foyer)
- 8:30–9:00 a.m. **Opening Remarks and Meeting Purpose**  
(Grand Peninsula EF)
- Plenary Session 1** (Grand Peninsula EF)
- 9:00–9:30 a.m. **How Can an Atmospheric Observing System Provide Objective Information on Emissions and Removals of Greenhouse Gases?**  
Pieter Tans, *Senior Scientist, Earth System Research Laboratory, National Oceanic and Atmospheric Administration (NOAA)*
- 9:30–10:00 a.m. **Developing an Effective Carbon Offset Strategy**  
Josh Margolis, *CEO, CantorCO<sub>2</sub>e*
- 10:00–10:30 a.m. **A Long Quest Towards Improved GHG Inventories**  
Guido Franco, *Technical Lead for Climate Change Research, Public Interest Energy Research, California Energy Commission*
- 10:30–11:00 a.m. **Refreshment Break, Exhibit Viewing, & Poster Session** (Grand Peninsula D)
- 11:00–11:30 a.m. **Quantifying Emissions Inventories from Atmospheric Measurements: Making "Bottom-Up" and "Top Down" Agree**  
Ray Weiss, *Distinguished Professor of Geochemistry, Scripps Institution of Oceanography, University of California, San Diego*
- 11:30 a.m.–12:00 p.m. **Question and Answer**
- 12:00–1:00 p.m. **Luncheon** (Regency AB)
- 1:00–1:20 p.m. **Abstract #52**  
**California's Efforts to Improve its Greenhouse Gas Emissions Inventory**  
Ying-Kuang Hsu, *California Air Resources Board*
- 1:20–1:40 p.m. **Abstract #28**  
**Barriers and Data Limitations Impede Program Participation and Assessment of EPA Voluntary Greenhouse Gas Programs**  
Kalpana Ramakrishnan, *U.S. Environmental Protection Agency, Office of the Inspector General*

1:40–2:00 p.m.

**Abstract #42**  
**A Daily Fire Greenhouse Gas Emission Inventory for the United States and Comparison with other Inventories**  
Sean Raffuse, *Sonoma Technology, Inc.*

2:00–2:20 p.m.

**Abstract #26**  
**The Plains CO<sub>2</sub> Reduction (PCOR) Partnership: Phase II and III Activities**  
Steve Smith, *Energy & Environmental Research Center, University of North Dakota*

2:20–2:40 p.m.

**Abstract #51**  
**Regional-scale Atmospheric Measurements of CO<sub>2</sub> Sources and Sinks**  
Ken Davis, *The Pennsylvania State University*

2:40–3:00 p.m.

**Abstract #83**  
**The California Climate Action Registry's Emission Reduction Project Accounting Framework**  
Derek Markolf, *The California Climate Action Registry*

3:00–3:30 p.m.

**Refreshment Break, Exhibit Viewing, & Poster Session** (Grand Peninsula D)

3:30–3:50 p.m.

**Abstract #67**  
**Field Intercomparison of Methods to Measure Fugitive Methane Emissions on Landfills**  
Antoine Babilotte, *Veolia Environment Research & Development*

3:50–4:10 p.m.

**Abstract #57**  
**How Reliable Are GHG Combustion Emission Factors?**  
Scott Evans, *Clean Air Engineering*

4:10–4:30 p.m.

**Abstract #55**  
**Assessment of GHG Emissions from Industrial Facilities and Environmental Remediation Systems**  
Ann Rosecrance, *Conestoga-Rovers & Associates*

4:30–4:50 p.m.

**Abstract #92**  
**Measurement of Methane Emissions from Petrochemical Industry Using OTM-10**  
Ram Hashmonay, *ARCADIS*

4:50–5:10 p.m.

**Abstract #58**  
**Techniques for Surface Gas Monitoring at Onshore CO<sub>2</sub> Storage Sites**  
John Selby, *Boreal Laser*

5:10–5:45 p.m.

**Discussion**  
Led by Andy Miller, *U.S. EPA*

5:45–7:00 p.m.

**Reception, Exhibit Viewing, & Poster Session** (Grand Peninsula D)

# FINAL AGENDA

**Tuesday, March 24, 2009**

- 7:00 a.m.-5:45 p.m. **Conference Registration**  
(Grand Peninsula Foyer)
- 7:00-8:00 a.m. **Presenters' Breakfast** (Sandpebble)
- 7:00-8:00 a.m. **Coffee Service** (Grand Peninsula EF)
- 8:00-8:15 a.m. **Opening Remarks** (Grand Peninsula EF)
- Plenary Session 2**  
(Grand Peninsula EF)
- 8:15-8:45 a.m. **Monitoring Requirements, Methods, and Strategies for Detecting Carbon Dioxide Leakage from Geological Sequestration Reservoirs**  
Sally Benson, *Director, Global Climate and Energy Project, Stanford University*
- 8:45-9:15 a.m. **If You're Not Measuring You're Just Guessing: Auditing GHG Emissions**  
Alex Cuclis, *Houston Advanced Research Center*
- 9:15-9:45 a.m. **Moving Forward: Challenges, Opportunities, and Optimism**  
James Butler, *Director, Global Monitoring Division, NOAA Earth System Research Laboratory*
- 9:45-10:15 a.m. **Refreshment Break, Exhibit Viewing, & Poster Session** (Grand Peninsula D)
- Session 3: Agricultural GHG Emission Measurements**  
[concurrent with Session 4] (Grand Peninsula E)  
**Chair:** Rich Grant, *Department of Agronomy, Purdue University*
- 10:15-10:35 a.m. **Abstract #1**  
**Agricultural GHG Emissions Quantification: Measure or Model?**  
Karen Updegraff, *C-Lock Technology*
- 10:35-10:55 a.m. **Abstract #19**  
**Methane Emissions from Midwestern Dairy and Turkey Production Barns**  
Larry Jacobson, *University of Minnesota*
- 10:55-11:15 a.m. **Abstract #69**  
**Up-scaling Methods of Greenhouse Gas Fluxes Between the Soil and the Atmosphere Using a Measuring Tunnel as well as Open-path Measurement Techniques for the Flux-gradient Method**  
Klaus Schäfer, *Institute for Meteorology and Climate Research (IMK-IFU)*
- 11:15-11:35 a.m. **Abstract #87**  
**CO<sub>2</sub> Exchange of a Cropped, Drained Organic Soil**  
Richard Grant, *Department of Agronomy, Purdue University*
- 11:35-11:55 a.m. **Abstract #86**  
**Comparison of Micrometeorological Methods Using Open-path Optical Instruments for Measuring Methane Gas Emission from Agricultural Sites**  
Kyoung Ro, *USDA-ARS Coastal Plains Soil, Water & Plants Research Center*
- 11:55 a.m.-12:05 p.m. **Session Chair Summary**
- 12:05-1:00 p.m. **Luncheon** (Regency AB)

**Session 4: Measurements in Support of GHG Trading**

[concurrent with Session 3] (Grand Peninsula F)

- Chair:** John Bosch, *Retired from U.S. EPA*
- 10:15-10:35 a.m. **Abstract #34**  
**Isotopic Constraints on Carbon Trading**  
Bruno Marino, *Planetary Emissions Management, Inc.*
- 10:35-10:55 a.m. **Abstract #11**  
**A Voluntary Carbon Standard Methodology to Accurately Quantify Carbon Offsets from Avoided Deforestation Projects in Tropical Regions**  
Steve De Gryze, *Terra Global Capital*
- 10:55-11:15 a.m. **Abstract #12**  
**Development of a Methodology to Estimate Carbon Credits for GHG Emissions from the Processing of Biosolids Generated by Waste Water Treatment**  
Kenneth Noll, *Illinois Institute of Technology*
- 11:15-11:35 a.m. **Abstract #84**  
**Facility Wide Carbon Dioxide Tracking for Emissions Trading - An Integrated Continuous Parameter Monitoring and Predictive Emissions Monitoring Solution**  
Brian Swanson, *CMC Solutions*
- 11:35-11:55 a.m. **Abstract #10**  
**Carbon Markets - What Do Quantitative Differences Mean?**  
Patrick Wood, *AgRefresh*
- 11:55 a.m.-12:05 p.m. **Session Chair Summary**
- 12:05-1:00 p.m. **Luncheon** (Regency AB)

# FINAL AGENDA

## Session 5: Landfill GHG Emission Measurements

[concurrent with Session 6] (Grand Peninsula E)

**Chair:** Eben Thoma, *U.S. EPA*

**Co-Chair:** Ying-Kuang Hsu, *California Air Resources Board*

- 1:00–1:20 p.m.      **Abstract #89**  
**Estimates of Methane Emissions from Three California Landfills using Two Measurement Approaches**  
Roger Green, *Waste Management, Inc.*
- 1:20–1:40 p.m.      **Abstract #47**  
**An Acetylene Tracer-Based Approach to Measuring Methane Emissions Using Wavelength-Scanned Cavity Ring-Down Spectroscopy**  
Sze Tan, *Picarro, Inc.*
- 1:40–2:00 p.m.      **Abstract #99**  
**Challenges in Quantifying Methane Emissions and Mapping Spatial Variability at a Danish Landfill**  
Charlotte Scheutz, *Technical University of Denmark*
- 2:00–2:20 p.m.      **Abstract #54**  
**Challenges Associated with Greenhouse Gas Measurement and Monitoring for Landfill Gas Projects**  
Ann Rosecrance, *Conestoga-Rovers & Associates*
- 2:20–2:40 p.m.      **Abstract #59**  
**Quantitative Landfill CH<sub>4</sub> Emissions Monitoring with Laser Detectors**  
John Selby, *Boreal Laser*
- 2:40–3:00 p.m.      **Abstract #93**  
**A New Method for Measuring Area Source Emissions Using Surface Scanning Optical Remote Sensing**  
Ram Hashmonay, *ARCADIS*
- 3:00–3:10 p.m.      **Session Chair Summary**
- 3:10–3:40 p.m.      **Refreshment Break, Exhibit Viewing, & Poster Session** (Grand Peninsula D)

## Session 6: GHG Measurements to Support Policy

[concurrent with Session 5] (Grand Peninsula F)

**Chair:** Colm Sweeney, *NOAA/ESRL*

- 1:00–1:20 p.m.      **Abstract #6**  
**High Resolution Fossil Fuel CO Inventory for the US as Produced by the Vulcan Project: Methods, Results, and Evaluation**  
Kevin Robert Gurney, *Purdue University*
- 1:20–1:40 p.m.      **Abstract #74**  
**Assessing Reduction Strategies through Modeling: The Need for Data**  
Dawn Chianese, *ENVIRON International Corporation*
- 1:40–2:00 p.m.      **Abstract #41**  
**Integrated Greenhouse Gas Management Modeling**  
Robert Larkin, *AECOM Environment*
- 2:00–2:20 p.m.      **Abstract #63**  
**Evaluation of Greenhouse Gas Emissions and Reduction Strategies Related to Waste Management by Local Government**  
Rebecca Rosen, *ICF Jones & Stokes, an ICF International Company*
- 2:20–2:40 p.m.      **Abstract #76**  
**The NOAA/ESRL Carbon Cycle Aircraft Program: How Aircraft Measurements Can Be Used to Monitor Greenhouse Gas Emissions**  
Colm Sweeney, *NOAA/ESRL*
- 2:40–3:00 p.m.      **Abstract #101**  
**NIST Capabilities in Ensuring the Accuracy and Quality of our Nation's GHG Inventory**  
James Whetstone, *National Institute of Standards and Technology*
- 3:00–3:10 p.m.      **Session Chair Summary**
- 3:10–3:40 p.m.      **Refreshment Break, Exhibit Viewing, & Poster Session** (Grand Peninsula D)

# FINAL AGENDA

## Session 7: GHG Measurements of Reservoirs and Wastewater Treatment Facilities

[concurrent with Session 8] (Grand Peninsula E)

Chair: Eric Crosson, *Picarro, Inc.*

- 3:40–4:00 p.m.      **Abstract #13**  
The UNESCO/IHA Measurement Specification Guidance for Evaluating the GHG Status of Freshwater Reservoirs: A New Tool to Evaluate the Impact of Freshwater Reservoirs on Natural GHG Emissions  
Joel Goldenfum, *International Hydropower Association*
- 4:00–4:20 p.m.      **Abstract #36**  
Adaptation of a Methodology for Sampling GHGs from Wastewater Treatment Systems in Colombia  
Juan Silva, *UNESCO-IHE Institute*
- 4:20–4:40 p.m.      **Abstract #72**  
Measurement of Fugitive Methane and Nitrous Oxide Emissions from a Wastewater Treatment Plant using Optical Remote Sensing  
Mark Modrak, *ARCADIS U.S., Inc.*
- 4:40–5:00 p.m.      **Abstract #78**  
Measurement of Isotopic CO<sub>2</sub> in Dissolved Inorganic Carbons of Various Water Samples using Wavelength-Scanned Cavity Ring-Down Spectrophotometer  
Nabil Saad, *Picarro, Inc.*
- 5:00–5:20 p.m.      **Abstract #85**  
Use of Automated Systems to Measure Greenhouse Gas Emissions from Reservoirs  
Julie Bastien, *Environnement Illimité Inc.*
- 5:20–5:30 p.m.      **Session Chair Summary**

## Session 8: Measurements for the Monitoring and Verification of CO<sub>2</sub> Sequestration

[concurrent with Session 7] (Grand Peninsula F)

Chair: Jennifer Lewicki, *Lawrence Berkeley National Laboratory*

- 3:40–4:00 p.m.      **Abstract #71**  
Measurement of Isotopic CO<sub>2</sub> in Dissolved Organic Carbons of Various Water Samples using Wavelength-Scanned Cavity Ring-Down Spectrophotometer  
Nabil Saad, *Picarro, Inc.*
- 4:00–4:20 p.m.      **Abstract #45**  
Quantifying CO<sub>2</sub> Sequestration Capture Efficiency with Open Path Tunable Laser Based Gas Detection  
Chris Parker, *Boreal Laser Inc.*
- 4:20–4:40 p.m.      **Abstract #2**  
A Method to Estimate Carbon Sequestration from Excavated Refuse Samples  
Morton Barlaz, *North Carolina State University*
- 4:40–5:00 p.m.      **Abstract #60**  
Continuous, in-situ Isotopic CO<sub>2</sub> Measurements of Soil Respiration Using a WS-CRDS-based Analyzer  
Dave Risk, *St. Francis Xavier University*
- 5:00–5:20 p.m.      **Abstract #73**  
Remote Continuous Monitoring of High Soil-CO<sub>2</sub> Fluxes: A Multi-channel Auto-dilution System  
Jonathan Barr, *Pacific Northwest National Laboratory*
- 5:20–5:40 p.m.      **Abstract #94**  
Application of Partial Pressure CO<sub>2</sub> Sensor Technology to Terrestrial Carbon Sequestration Field Monitoring  
Donald Salmond, *Battelle Memorial Institute*
- 5:40–5:50 p.m.      **Session Chair Summary**

# FINAL AGENDA

Wednesday, March 25, 2009

- 7:00 a.m.–12:00 p.m. **Conference Registration**  
(Grand Peninsula Foyer)
- 7:00–8:00 a.m. **Presenters' Breakfast** (Sandpebble)
- 7:00–8:00 a.m. **Coffee Service** (Grand Peninsula Foyer)
- Session 9: Industrial GHG Measurement Techniques**  
[concurrent with Session 10] (Grand Peninsula E)  
**Chair:** Curtis Laush, *Industrial Monitor and Control Corporation (IMACC)*
- 8:00–8:20 a.m. **Abstract #33**  
**High Performance Analyzers for Measurements of Greenhouse Gases**  
Douglas Baer, *Los Gatos Research*
- 8:20–8:40 a.m. **Abstract #16**  
**On-Line Measurement Technology for Greenhouse Gases**  
Bruce Herman, *ABB Inc.*
- 8:40–9:00 a.m. **Abstract #22**  
**Monitoring of Nitrous Oxide and Perfluorocarbon Emissions with FTIR**  
Jim Cornish, *Gasmet Technologies Inc.*
- 9:00–9:20 a.m. **Abstract #44**  
**Validation and Quantification of GHG Emissions from Industrial Sources**  
John Selby, *Boreal Laser Inc.*
- 9:20–9:30 a.m. **Session Chair Summary**
- 9:30–9:50 a.m. **Refreshment Break** (Grand Peninsula Foyer)

**Session 10: Measurements and Approaches to Improve Emission Factors**

- [concurrent with Session 9] (Grand Peninsula F)  
**Chair:** Jeff Ryan, *U.S. EPA*
- 8:00–8:20 a.m. **Abstract #96**  
**Inferring High-GWP Emissions from the Los Angeles Urban Area by Association with Common Air Pollutant Species**  
Richard (Tony) VanCuren, *California Air Resources Board*
- 8:20–8:40 a.m. **Abstract #37**  
**Stable Isotopes as a Tool for Tracking Greenhouse Gas Sources and Sinks**  
James White, *Institute of Arctic and Alpine Research, University of Colorado*
- 8:40–9:00 a.m. **Abstract #43**  
**Methane Emission Factor Improvements for Natural Gas Industry Sources**  
David Allen, *Center for Energy and Environmental Resources, University of Texas*
- 9:00–9:20 a.m. **Abstract #82**  
**State of the Art Emission Factors for Energy from Waste Industry**  
Brian Bahor, *Covanta Energy Corporation*
- 9:20–9:30 a.m. **Session Chair Summary**
- 9:30–9:50 a.m. **Refreshment Break** (Grand Peninsula Foyer)

# FINAL AGENDA

## Session 11: GHG Measurements Applied to the Magnesium Industry

[concurrent with Session 12] (Grand Peninsula E)

**Chair:** Curtis Laush, *Industrial Monitor and Control Corporation (IMACC)*

- 9:50–10:10 a.m.**      **Abstract #98**  
**Climate Change and Magnesium Production and Processing**  
Jeremy Scharfenberg, *U.S. EPA*
- 10:10–10:30 a.m.**      **Abstract #75**  
**SF6 Degradation in Magnesium Processing: Development of an FTIR Measurement Protocol and Test Results for Highly Diluted Systems**  
Curtis Laush, *Industrial Monitor and Control Corporation (IMACC)*
- 10:30–10:50 a.m.**      **Abstract #91**  
**An Alternative Method for Measuring GHG Emissions at Magnesium Industry Using Open Path FTIR**  
Ram Hashmonay, *ARCADIS*
- 10:50–11:10 a.m.**      **Abstract #95**  
**Emission Measurements from Magnesium Die Casting for SF6 Degradation Determination**  
Steve Hall, *URS Corporation*
- 11:10–11:20 a.m.**      **Session Chair Summary**
- 11:20–11:40 a.m.**      **Refreshment Break** (Grand Peninsula Foyer)
- 11:40–12:20 p.m.**      **Closing Synthesis** (Grand Peninsula EF)

## Session 12: Measurements and Approaches to Improve Emission Factors (cont.)

[concurrent with Session 11] (Grand Peninsula F)

**Chair:** Jeff Ryan, *U.S. EPA*

- 9:50–10:10 a.m.**      **Abstract #64**  
**Methodology to Measure Real-time Greenhouse Gas (GHG) Emissions from Industrial Processes and Determine the Associated GHG Emission Factors**  
Brian Mader, *3M Company*
- 10:10–10:30 a.m.**      **Abstract #3**  
**Use of Steam Flow Method for Estimating GHG Emissions from Heterogeneous Solid Fuels**  
Howard Balentine, *AECOM Environment*
- 10:30–10:50 a.m.**      **Abstract #38**  
**System and Method for Automated Collection and Reporting of Greenhouse Gas Emission Reductions**  
Jay Castino, *GHG, Ltd.*
- 10:50–11:10 a.m.**      **Abstract #81**  
**Determination of the Biomass Content of GHG Emissions with ASTM D6866**  
Mauricio Larenas, *Beta Analytic Limited*
- 11:10–11:20 a.m.**      **Session Chair Summary**
- 11:20–11:40 a.m.**      **Refreshment Break** (Grand Peninsula Foyer)
- 11:40–12:20 p.m.**      **Closing Synthesis** (Grand Peninsula EF)

# FINAL AGENDA

Posters on Display Monday, March 23 – Tuesday, March 24  
in Grand Peninsula D

**Abstract #5**

**Proposed Indicator for Carbon Emissions**

Isabella Loureiro, *Petrobras*

**Abstract #15**

**Techniques for the Measurements of Certain Greenhouse Gases in the Environment**

Frank Duckett, *Thermo Fisher Scientific*

**Abstract #18**

**Climate Change Impacts of Nitrous Oxide Emissions from Wastewater Treatment Operations and Effluent Discharges**

Susan Lorenz, *Weston Solutions, Inc.*

**Abstract #20**

**Greenhouse Gas Estimation in Environmental Remediation**

James Allen, *Geosyntec Consultants*

**Abstract #25**

**Zama Acid Gas EOR: CO<sub>2</sub> Sequestration and Monitoring Project**

Steven Smith, *Energy & Environmental Research Center, University of North Dakota*

**Abstract #29**

**The World Needs a Ruler: Life with Carbon on the Balance Sheet**

Jon Wuebben, *Enviance, Inc.*

**Abstract #30**

**Development and Traceability of Gaseous Standards for Green House Gas Trading Markets**

Stephen Mandel, *Spectra Gases Inc.*

**Abstract #31**

**Use of Open-Path FTIR to Measure Greenhouse Gases**

Robert Kagann, *ARCADIS G&M*

**Abstract #40**

**Greenhouse Gas Emission Estimates from a Municipal Wastewater Treatment Plant: Natural Gas and Anaerobic Digester Biogas Combustion Case Study**

Steven Law, *AECOM*

**Abstract #46**

**Aerosol Black Carbon – Globally the #2 Greenhouse ‘Gas’**

Anthony Hansen, *Magee Scientific Inc.*

**Abstract #56**

**Climate Change Management Guide: Key Terminology, Regulatory Drivers and Voluntary Initiatives in the U.S. and Canada, and GHG Emissions Reduction Strategies**

Ann Rosecrance, *Conestoga-Rovers & Associates*

**Abstract #68**

**Estimation of Green House Gas Emissions from a Municipality**

Bruce Egan, *Egan Environmental Inc.*

**Abstract #79**

**C-Lock Technology, Inc. GHG Measurement Methodology**

Robert Zimmerman, *C-Lock Technology, Inc.*

**Abstract #90**

**Requirements for a Global Greenhouse Gas Information System**

Riley Duren, *Jet Propulsion Laboratory, California Institute of Technology, NASA*

**Abstract #100**

**Surface Monitoring Technology for Carbon Capture and Storage Projects**

Rod Madsen, *LI-COR Biosciences*

