



Preliminary

# AGENDA

*(subject to change) rev. 2016.02.26*

## 26<sup>th</sup> CRC REAL WORLD EMISSIONS WORKSHOP

### *Workshop Organizers*

Dominic DiCicco, Co-Chairman, Ford Motor Company  
Scott Mason, Co-Chairman, Phillips 66 Company  
Megan Beardsley, US Environmental Protection Agency OTAQ  
Kevin Black, Federal Highway Administration  
Susan Collet, Toyota Motor Engineering & Manufacturing, NA  
Jorn Dinh Herner, California Air Resources Board  
Henry Hogo, South Coast Air Quality Management District  
Tao Huai, California Air Resources Board  
Tom Long, US Environmental Protection Agency NRMRL  
Radha Purushothaman, Caterpillar, Inc.  
Shirish Shimpi, Cummins, Inc.  
Chris Tennant, Coordinating Research Council  
Matthew Thornton, National Renewable Energy Laboratory

Hyatt Regency, Newport Beach, California  
March 13-16, 2016



<b>Welcome</b>		<b>Sunday, March 13, 2016</b>		
4:30-6:00 pm		Registration in the Garden Room and Poster Setup in the Plaza Arbor		
6:00-7:00 pm		Welcome Reception in the Garden Room		
<b>DAY ONE</b>		<b>Monday, March 14, 2016</b>		
7:00 AM to 8:00 AM		Registration and Continental Breakfast in the Plaza Arbor Foyer		
8:00 AM to 8:10 AM		<i>Welcome from the Chairs:</i> Dominic DiCicco, Ford Motor Co., and Scott Mason, Phillips 66		
8:10 AM to 9:00 AM		<b>Keynote Speaker:</b> Barry Wallerstein, South Coast Air Quality Mgmt District		
<b>SESSION 1:</b>		<b>Emission Rates and Inventory</b>		
9:00 AM to 9:05 AM		<i>Introduction by Session Leader Henry Hogo, Southcoast Air Quality Management District</i>		
■	9:05 AM to 9:20 AM	WHY SHOULD WE STILL CARE ABOUT LIGHT-DUTY HIGH EMITTING VEHICLES?	Gary Bishop	University of Denver
■	9:20 AM to 9:35 AM	DETAILED CHARACTERIZATION OF CRITERIA POLLUTANT EMISSIONS FROM DEDICATED EGR® LIGHT DUTY VEHICLE	Cary Henry	Southwest Research Institute
■	9:35 AM to 9:45 AM	Introduction to Posters and Student Poster Competition	Chris Tennant	Coordinating Research Council, Inc.
9:45 AM to 10:25 AM		Poster Session in the Plaza Arbor and Demonstrations in the Terrace Room Parking Lot		
■	10:25 AM to 10:40 AM	ASSESSING THE DIFFERENTIAL CONTRIBUTIONS OF AGE AND MILEAGE ON EMISSIONS DETERIORATION	James Warila	U.S. Environmental Protection Agency
■	10:40 AM to 10:55 AM	MOBILE SOURCE INVENTORY TRENDS FOR SELECT CRITERIA POLLUTANTS, AIR TOXICS, AND GREENHOUSE GASES	David Choi	U.S. Environmental Protection Agency
■	10:55 AM to 11:10 AM	VOCATION-SPECIFIC ACTIVITY PATTERNS OF ON-ROAD HEAVY-DUTY DIESEL VEHICLES IN CALIFORNIA	Kanok Boriboonsomsin	University of California Riverside (CE-CERT)
■	11:10 AM to 11:25 AM	THE IMPACT OF THE 2015 VOLKSWAGEN EMISSIONS SCENARIO ON REAL-WORLD EMISSIONS	Nick Molden	Emissions Analytics
■	11:25 AM to 11:40 AM	General Discussion of Session 1		
11:40 AM to 1:00 PM		Lunch in the Amphitheater		
<b>SESSION 2:</b>		<b>Off Road</b>		
1:00 PM to 1:05 PM		<i>Introduction by Session Leader Radha Purushothaman, Caterpillar Inc.</i>		
■	1:05 PM to 1:20 PM	DEVELOPING A MODEL TO QUANTIFY EMISSIONS FROM HEAVY-DUTY CONSTRUCTION EQUIPMENT	Robert Russell	University of California Riverside (CE-CERT)
■	1:20 PM to 1:35 PM	EU DEVELOPMENT OF IN USE EVALUATION METHOD FOR NON-ROAD MOBILE MACHINERY	Jonas Holmberg	Volvo
■	1:35 PM to 1:50 PM	TANKER SHIP HOTELING EMISSIONS	Louis Browning	ICF International
■	1:50 PM to 2:05 PM	17,000 HOUR REAL-WORLD EMISSIONS AND DURABILITY STUDY OF A TIER 3 ENGINE	Yu Jiang	University of California Riverside (CE-CERT)
■	2:05 PM to 2:20 PM	SUMMARY OF BLACK CARBON EMISSIONS	Kent Johnson	University of California Riverside (CE-CERT)
■	2:20 PM to 2:35 PM	EXHAUST AND EVAPORATIVE EMISSIONS ASSESSMENT FOR GREEN AND RED STICKER OFF-HIGHWAY MOTORCYCLES	Sherry Zhang	California Air Resources Board
■	2:35 PM to 2:50 PM	General Discussion of Session 2		

*All sessions take place in Plaza Ballroom unless otherwise noted.*

2:50 PM to 3:10 PM	Poster Session in the Plaza Arbor and Demonstrations in the Terrace Room Parking Lot		
<b>SESSION 3:</b>	<b>Particle Emissions: Real World Measurements</b>		
3:10 PM to 3:15 PM	<i>Introduction by Session Leader Tao Huai, California Air Resources Board</i>		
■ 3:15 PM to 3:30 PM	HEAVY-DUTY TRUCK NUMBER CONCENTRATIONS MEASURED USING THE ON-ROAD HEAVY-DUTY VEHICLE EMISSIONS MONITORING SYSTEM (OHMS)	Molly Haugen	University of Denver
■ 3:30 PM to 3:45 PM	CHARACTERIZATION OF CHEMICAL COMPOSITION OF PARTICULATE MATTER FROM MODERN HEAVY-DUTY VEHICLES UNDER REAL-WORLD DRIVING CONDITIONS	Jeremy Smith	California Air Resources Board
■ 3:45 PM to 4:00 PM	PARTICLE EMISSIONS DURING ENGINE START-UP (CRANKING)	Imad Khalek	Southwest Research Institute
■ 4:00 PM to 4:15 PM	FIELD EVALUATIONS OF DPF CONDITION USING NUMBER CONCENTRATION OF SOLID PARTICLES IN TWO LATIN AMERICAN CITIES	Aaron Avenido	TSI Inc.
■ 4:15 PM to 4:30 PM	PARTICULATE EMISSIONS FROM LIGHT-DUTY VEHICLES OPERATING AT LOW AND HIGH SPEEDS REPRESENTATIVE FOR CALIFORNIA HIGHWAYS	Patrick Roth	University of California Riverside (CE-CERT)
■ 4:30 PM to 4:45 PM	EVALUATION OF PARTICULATE MATTER FROM LOW-GHG INTERNAL COMBUSTION ENGINES	Shiyen Chen	California Air Resources Board
■ 4:45 PM to 5:00 PM	MASS BALANCE AND EMISSIONS FROM BOTH ACTIVE AND PASSIVE REGENERATIONS OF HEAVY DUTY DIESEL PARTICULATE FILTERS	Chris Ruehl	California Air Resources Board
■ 5:00 PM to 5:15 PM	General Discussion of Session 3		
5:15 PM	<b>END OF DAY</b>		
5:50 PM	Board buses for Dinner onboard Endless Dreams (last bus leaves at 6:10 PM)		
<b>DAY TWO</b>	<b>Tuesday, March 15, 2016</b>		
7:30 AM to 8:00 AM	Registration and Continental Breakfast in the Plaza Arbor Foyer		
<b>SESSION 4:</b>	<b>Particle Emissions: Measurement Techniques</b>		
8:00 AM to 8:05 AM	<i>Introduction by Session Leader Shirish Shimpi, Cummins, Inc.</i>		
■ 8:05 AM to 8:20 AM	VERY LOW PM MASS MEASUREMENTS: THE CRC E-99-1 PROGRAM	Kent Johnson	University of California Riverside (CE-CERT)
■ 8:20 AM to 8:35 AM	A COMPARISON OF AEROSOL INSTRUMENTS TO REGULATED PM EMISSIONS: EEPS, DMM, AND MSS VERSUS GRAVIMETRIC FILTER AND SOLID PARTICLE NUMBER EMISSIONS FROM GDI AND PFI VEHICLES	Matti Maricq	Ford Motor Company
■ 8:35 AM to 8:50 AM	GRAVIMETRIC PM FILTER HOLDER WITH REAL-TIME PARTICLE CONCENTRATION MEASUREMENT	Ville Niemelä	Dekati Ltd.
■ 8:50 AM to 9:05 AM	ULTRAFINE PARTICLES: HOW SHOULD THEY BE DEFINED AND MEASURED - CHEAPLY?	David Kittleson	University of Minnesota
■ 9:05 AM to 9:20 AM	CHARACTERIZATION AND CALIBRATION OF OBD DIFFUSION-CHARGING PARTICULATE MATTER SENSOR	Marc Besch	West Virginia University
■ 9:20 AM to 9:35 AM	COMPREHENSIVE QUANTITATIVE CHARACTERIZATION OF AMBIENT AND EXHAUST PARTICULATE MATTER ON THE INDIVIDUAL PARTICLE LEVEL	Alla Zelenyuk	Pacific Northwest National Laboratory
■ 9:35 AM to 9:50 AM	USING REAL-TIME INSTRUMENTS TO CHARACTERIZE GASEOUS AND PARTICLE EMISSIONS FROM LOW GHG VEHICLES	Shishan Hu	California Air Resources Board
■ 9:50 AM to 10:05 AM	General Discussion of Session 4		
10:05 AM to 10:35 AM	Poster Session in the Plaza Arbor and Demonstrations in the Terrace Room Parking Lot		

<b>SESSION 5:</b>		<b>Emissions Measurements: Laboratory</b>		
10:35 AM to 10:40 AM		<i>Introduction by Session Leader Matt Thornton of the National Renewable Energy Laboratory</i>		
■	10:40 AM to 10:55 AM	WHY THE DIFFERENCE METHOD FAILS FOR NMHC WHEN CH4 IS HIGH	Barbara Marshik	MKS Instruments, Inc.
■	10:55 AM to 11:10 AM	MEASUREMENT OF SEMI-VOLATILE EXHAUST SPECIES FROM GASOLINE VEHICLES USING RAW PROPORTIONAL SAMPLING	Aron Butler	U.S. Environmental Protection Agency
■	11:10 AM to 11:25 AM	INVESTIGATIONS ON NO2 MEASUREMENT METHODS IN TEST PROCEDURE FOR DIESEL PASSENGER CARS IN THE FRAME OF WLTP DEVELOPMENT	Jacques Lemaire	AEEDA/VERT
■	11:25 AM to 11:40 AM	DEVELOPMENT OF A NEW KIND OF NOx SENSORBASED IB SOLID STATE ELECTROLYTE	Dirk Bleicker	CPK Automotive GmbH & Co.
■	11:40 AM to 11:55 AM	DEVELOPMENT OF REAL WORLD HEAVY-DUTY REFUSE TRUCK DRIVING CYCLES USING MARKOV CHAINS METHOD	Saroj Pradhan	West Virginia University
■	11:55 AM to 12:10 PM	DETERMINATION OF A PRECONDITIONING PROTOCOL TO STABILIZE NOx AND PN EMISSIONS FOR EURO 6 ENGINE CERTIFICATION	Pragalath Thiruvengadam	West Virginia University
■	12:10 PM to 12:25 PM	General Discussion of Session 5		
12:25 PM to 1:55 PM		Lunch in the Amphitheater		
<b>SESSION 6:</b>		<b>Fuel Effects &amp; Efficiency</b>		
1:55 PM to 2:00 PM		<i>Introduction by Session Leader Kevin Black, Federal Highway Administration</i>		
■	2:00 PM to 2:15 PM	IMPACT OF BIODIESEL BLENDING ON GASEOUS AND PARTICULATE EMISSIONS DURING REGENERATION OF DIESEL PARTICULATE FILTER FROM LIGHT-DUTY VEHICLES: RESULTS FROM THE AVFL-17B STUDY	Georgios Karavalakis	University of California Riverside (CE-CERT)
■	2:15 PM to 2:30 PM	FUEL EFFECTS ON GASEOUS AND PARTICULATE EMISSIONS ON SIDI IN-USE VEHICLES	Peter Morgan	Southwest Research Institute
■	2:30 PM to 2:45 PM	COMPARISON OF REAL-WORLD FUEL ECONOMY AND EMISSION RATES TO RATED FUEL ECONOMY AND CERTIFICATION LEVELS	Chris Frey	NC State University
■	2:45 PM to 3:00 PM	EMISSIONS, FUEL ECONOMY AND DUTY CYCLE TESTING AND ANALYSIS OF HYBRID ELECTRIC TRUCKS OPERATING IN CALIFORNIA FLEETS	Matthew Thornton	National Renewable Energy Laboratory
■	3:00 PM to 3:15 PM	COMPARISON OF DIESEL AND CNG IN-USE TRANSIT BUSES: FUEL ECONOMY AND EMISSIONS OF REGULATED POLLUTANTS, AMMONIA, GREENHOUSE GASES	Kwangsam Na	California Air Resources Board
■	3:15 PM to 3:30 PM	REAL-WORLD EVALUATION OF HYBRID ELECTRIC VEHICLES FUEL USE AND GASEOUS EMISSION RATES	Chris Frey	NC State University
■	3:30 PM to 3:45 PM	General Discussion of Session 6		
3:45 PM to 4:05 PM		Poster Session in the Plaza Arbor and Demonstrations in the Terrace Room Parking Lot		

<b>SESSION 7:</b>	Emission Control Measures, I/M, and OBD		
4:05 PM to 4:10 PM	<i>Introduction by Session Leader Susan Collet, Toyota Technical Center NA</i>		
■ 4:10 PM to 4:25 PM	UPDATE ON VEHICLE INSPECTION AND THE REFAIL RATE IN CALIFORNIA'S SMOG CHECK PROGRAM	Frank Di Genova	California Bureau of Automotive Repair
■ 4:25 PM to 4:45 PM	USING REAL-WORLD TELEMATICS DATA TO IMPROVE OUR UNDERSTANDING OF UNITED STATES LIGHT-DUTY FLEET OPERATIONS	Carl Fulper	U.S. Environmental Protection Agency
■ 4:45 PM to 5:00 PM	EFFECT OF DRIVING CONDITIONS ON NOX EMISSIONS FROM HEAVY-DUTY VEHICLES WITH SCR	Gurdas Sandhu	U.S. Environmental Protection Agency
■ 5:00 PM to 5:15 PM	EVALUATING IN-USE SCR PERFORMANCE: EFFECTS OF AGING AND IMPROVEMENTS IN TECHNOLOGY	Chandan Misra	California Air Resources Board
■ 5:15 PM to 5:30 PM	STATUS UPDATE OF LOW NOX ENGINE DEMONSTRATION	Seungju Yoon	California Air Resources Board
■ 5:30 PM to 5:45 PM	DEVELOPMENT OF AMMONIA REDUCTION AFTERTREATMENT SYSTEMS FOR STOICHIOMETRIC NATURAL GAS ENGINES	Saroj Pradhan	West Virginia University
■ 5:45 PM to 6:00 PM	General Discussion of Session 7		
<b>6:00 PM</b>	<b>END OF DAY</b>		
6:00 PM to 7:00 PM	Poster Session and Demonstrations in the Renaissance Foyer and Naples Ballroom		
<b>DAY THREE</b>	<b>Wednesday, March 16, 2016</b>		
7:30 AM to 8:00 AM	Registration and Continental Breakfast in the Plaza Arbor Foyer		
8:00 AM to 8:30 AM	Open discussion - Dominic Diccio and Scott Mason, Co-Chairs		
<b>SESSION 8:</b>	Emissions Modeling		
8:30 AM to 8:35 AM	<i>Introduction by Session Leader Megan Beardsley, US EPA</i>		
■ 8:35 AM to 8:50 AM	IMPACT OF MOVES2014A AND PLANS FOR THE NEXT VERSION OF MOVES	Darrell Sonntag	U.S. Environmental Protection Agency
■ 8:50 AM to 9:05 AM	MODELING EMISSIONS FROM LIGHT-DUTY VEHICLES TRAVELING AT HIGH SPEEDS IN CALIFORNIA	Kanok Boriboonsomsin	University of California Riverside (CE-CERT)
■ 9:05 AM to 9:20 AM	EVALUATION OF REAL-WORLD EMISSIONS OF PLUG-IN HYBRID ELECTRIC VEHICLES	John Karim	California Air Resources Board
■ 9:20 AM to 9:35 AM	UPGRADE OF EMFAC-HK USING REAL-WORLD VEHICLE EMISSIONS DATA AND SURVEY DATA FOR THE HONG KONG FLEET	Carol Wong	Environmental Protection Dept. Hong Kong SAR Government
■ 9:35 AM to 9:50 AM	EVALUATION OF METHODS FOR HONG KONG'S NEW VEHICLE EMISSIONS MODEL	John Koupal	Eastern Research Group
■ 9:50 AM to 10:05 AM	IMPACT OF ETHANOL BLENDS ON EMISSION ESTIMATES	Roger Wayson	Wyle Aerospace
■ 10:05 AM to 10:20 AM	EVALUATION OF THE USEPA MOVES MODEL SENSITIVITY TO ETHANOL FUEL BLENDS: A CASE STUDY IN COOK COUNTY, ILLINOIS	Steffen Mueller	University of Illinois-Chicago
■ 10:20 AM to 10:35 AM	General Discussion of Session 8		
10:35 AM to 10:55 AM	Poster Session and Demonstrations in the Renaissance Foyer and Naples Ballroom		
<b>SESSION 9:</b>	Emission Measurements: In-Field		
10:55 AM to 11:00 AM	<i>Introduction by Session Leader Jorn Herner, California Air Resources Board</i>		
■ 11:00 AM to 11:15 AM	ON-ROAD EVALUATION OF EMISSIONS FROM NEW TECHNOLOGY CONVENTIONAL AND HYBRID TRANSIT BUSES	Andrew Kotz	University of Minnesota
■ 11:15 AM to 11:30 AM	IN-USE NOX EMISSIONS FROM 2010-TECHNOLOGY HEAVY-DUTY DIESEL VEHICLES	Seungju Yoon	California Air Resources Board
■ 11:30 AM to 11:45 AM	IN-USE EMISSIONS FROM CURRENT MODEL YEAR HEAVY-DUTY DIESEL AND NATURAL GAS TRUCKS- EVALUATION OF NTE VS ALTERNATIVE METRICS	Arvind Thiruvengadam	West Virginia University
■ 11:45 AM to 12:00 PM	STUDY OF HEAVY-DUTY VEHICLE EMISSIONS DURING IN-USE COMPLIANCE TESTING	Jesse Tu	California Air Resources Board
12:00 PM to 1:30 PM	Lunch in the Amphitheater		

■	1:30 PM to 1:45 PM	COMPARISON OF GHG, NOX AND FUEL CONSUMPTION OF HEAVY-DUTY HYBRID, NATURAL GAS AND DIESEL TRACTORS	Berk Demirgok	West Virginia University
■	1:45 PM to 2:00 PM	WAYS FORWARD FOR A NEXT GENERATION (SMALLER, LOWER COST, LOWER ENERGY CONSUMPTION) PORTABLE EMISSIONS MEASUREMENT SYSTEM (PEMS)	Karl Ropkins	University of Leeds
■	2:00 PM to 2:15 PM	ARE WE MAKING THE BEST USE OF PEMS DATA? EMISSIONS FACTORS BASED ON AVERAGE SPEED AND VEHICLE SPECIFIC POWER	Adam Boies	University of Cambridge
■	2:15 PM to 2:30 PM	REAL-WORLD TESTING ON LIGHT DUTY VEHICLES USING PEMS IN HONG KONG	Carol Wong	Environmental Protection Dept. Hong Kong SAR Government
■	2:30 PM to 2:45 PM	MEASUREMENT AND MODELING OF COLD START FUEL USE AND EMISSIONS FROM LIGHT DUTY GASOLINE VEHICLES	Chris Frey	NC State University
■	2:45 PM to 3:00 PM	General Discussion of Session 9		
	3:00 PM to 3:10 PM	Break in Plaza Arbor		
	3:10 PM to 3:55 PM	CRC Committee Summaries - TBD		
■		Emissions Committee		
■		STATE OF THE CRC ATMOSPHERIC IMPACTS COMMITTEE – 2016	Susan Collet	Toyota Technical Center NA
■		Real World Group		
	3:55 PM	END OF Workshop		

# Poster Sessions

## Emission Rates and Inventory

SECONDARY ORGANIC AEROSOL FORMING POTENTIAL FROM LIGHT-DUTY GASOLINE DIRECT INJECTION VEHICLES	Diep Vu	University of California Riverside (CE-CERT)
REAL-WORLD EMISSIONS AND FUEL ECONOMY FROM LATEST MODEL GDI AND DIESEL LIGHT-DUTY VEHICLES	Marc Besch	West Virginia University
MEASUREMENT OF LIGHT-ABSORBING CARBONACEOUS COMPOUNDS FROM MODERN LIGHT-DUTY AND HEAVY DUTY VEHICLES	Jeremy Smith	California Air Resources Board
DISCREPANCIES BETWEEN EMISSIONS MEASURED IN URBAN DRIVING AND CERTIFICATION OF HEAVY-DUTY DIESEL ENGINES	Kent Johnson	University of California Riverside (CE-CERT)

## Particle Emissions: Measurement Techniques

A COMPARISON OF SOLID PARTICLE NUMBER AND BLACK CARBON MEASUREMENTS FROM PASSENGER VEHICLE EMISSIONS IN REAL TIME	Erin Shields	California Air Resources Board
IMPACT OF DRIVING CYCLE ON PARTICULATE EMISSIONS FROM GASOLINE-POWERED VEHICLES	Huifang Shao	Afton Chemical Corporation
TOXICOLOGICAL RESPONSE TO PM EMITTED BY VARIOUS LIGHT-DUTY VEHICLE ENGINE TECHNOLOGIES AND FUELS	Chris Ruehl	California Air Resources Board
SIX-SIGMA IMPLICATIONS OF PARTICULATE MASS MEASUREMENTS AT A MILLIGRAM PER MILE	Dan Meyer	AVL Test Systems, Inc.

## Emissions Measurements: Laboratory

EVALUATE SEMI-VOLATILE ORGANIC COMPOUNDS (SVOC) LOSS IN A CONSTANT VOLUME SAMPLER (CVS)	Ao Lin	California Air Resources Board
LABORATORY TESTING OF A CONTINUOUS EMISSIONS MONITOR FOR TRACE LEVEL SULFUR DIOXIDE	Tom Durbin	University of California Riverside (CE-CERT)
REAL-TIME AUTOMATIC GC-MS GAS SAMPLING SYSTEM FOR DETAILED CHARACTERIZATION OF DIESEL ENGINE EMISSIONS	Robert Fanick	Southwest Research Institute
NOVEL SAMPLE SYSTEM FOR COLLECTION OF AIR TOXIC POLLUTANTS FROM THE MODERN LIGHT-DUTY VEHICLES	Svitlana Kroll	Southwest Research Institute

## Fuel Effects & Efficiency

REAL WORLD FUEL QUALITY: QUANTIFICATION OF STANDARD EUROPEAN FUEL VARIABILITY WITH AN ON BOARD MINIATURISED SENSOR AND EVALUATION OF THE IMPACT ON POLLUTANTS EMISSIONS AND CO <sub>2</sub>	Alan Lunati	SP3H
EMISSIONS AND EFFICIENCY FROM A FLEX FUELED LIGHT DUTY VEHICLE AND TRUCK OPERATED WITH E85 AT STANDARD AND COLD TEMPERATURE	Aaron Conde	Environment Canada
THE EFFECT OF GASOLINE AROMATICS ON THE EMISSIONS FROM A FLEET OF PFI AND GDI VEHICLES	Georgios Karavalakis	University of California Riverside (CE-CERT)

## Emission Control Measures, I/M & OBDII

HOW HARD WILL IT BE FOR CAR MANUFACTURERS TO MEET THE NEW EURO6C REGULATIONS?	Nick Molden	Emissions Analytics
CHARACTERISATION AND EVALUATION OF METHANE OXIDATION CATALYSTS FOR DUAL FUEL DIESEL AND NATURAL GAS ENGINES	Donnie Worth	University of Cambridge



EVALUATION OF ASH LOADING IMPACT ON GASOLINE PARTICULATE FILTERS (GPF)	Seungmok Choi	Argonne National Laboratory
CALIFORNIA AIR RESOURCES BOARD'S HEAVY-DUTY DIESEL IN-USE COMPLIANCE PILOT PROGRAM	John O' Cain	California Air Resources Board
<b>Emissions Modeling</b>		
ISSUES WITH MATCH BLENDING TEST FUEL PARAMETERS WHILE INCREASING THE LEVEL OF ETHANOL AND THE RESULTING CONSEQUENCE FOUND IN EPA'S 2014 MOVES MODEL	Steven Vander Griend	ICM Inc.
<b>Emissions Measurements: In-Field</b>		
REAL-WORLD TESTING ON EURO VI HYBRID DOUBLE DECK BUSES USING PEMS IN HONG KONG	Carol Wong	Environmental Protection Dept. Hong Kong SAR Government
PRACTICAL IMPLICATIONS OF DIRECTLY MEASURING WATER IN EXHAUST TO CORRECT FOR WATER DILUTION INSTEAD OF ASSUMING OR MEASURING FUEL COMPOSITION	Andrew Burnette	infoWedge
<b>Student Posters</b>		
EMPRICAL EVALUATION OF FUEL USE AND EMISSION RATES FOR LIGHT DUTY VEHICLES FUELED WITH E85 ETHANOL	Maryam Delavarrafiee	NC State University
IMPACTS OF DIMETHYL CARBONATE BLENDS ON EMISSIONS FROM A HEAVY-DUTY DIESEL ENGINE	Jiacheng Yang	University of California Riverside (CE-CERT)
ALTERNATIVE METRICS FOR SPATIALLY AND TEMPORARILY RESOLVED ON-ROAD PARTICLE MONITORING	Liem Pham	University of California Riverside (CE-CERT)
<b>General</b>		
OZONE ATTAINMENT TRENDS FOR THE SOUTH COAST AIR BASIN: IS ATTAINMENT WITHIN REACH? COULD FURTHER REDUCTIONS IN NOX BE COUNTERPRODUCTIVE? ARE VOC REDUCTIONS THE FORGOTTEN FACTOR?	Rey Agama	NC State University
<b>Demonstrations</b>		
THE SENSITIVITY AND ACCURACY OF EDAR	Allison Kelly	HEAT, LLC.
DEKATI AND PEGASOR INSTRUMENTS FOR PM SAMPLING, CONDITIONING AND ANALYSIS	Tyler Beck	Dekati
NCEM Compact Multi Gas Meter	Mark Monohon	NGK Spark Plugs (USA), Inc.
NPET: TAIL PIPE PARTICLE MEASUREMENTS	Bob Anderson	TSI, Inc.
AVL CONCERTO M.O.V.E. - A SOFTWARE TOOL FOR PEMS EMISSIONS DATA EVALUATION, PROCESSING AND REPORTING	Siegfried Roeck	AVL Test Systems Inc.
Sensors, Inc.	Rob Wilson	Sensors, Inc.
AUTOMATED WEIGHING SYSTEM	Sonny Moore	Measurement Technology Laboratories, LLC.

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