

Program

Exhaled Breath Analysis: From Sensors to Devices and Applications

October 24 - 29, 2010

Il Ciocco Hotel and Conference Center

Castelvecchio Pascoli (LU), Tuscany, Italy

Chair:

Dr. Raed A. Dweik
Cleveland Clinic, USA

Co-Chairs:

Dr. Claire Gmachl

Dr. Gary Hunter

Dr. Cristina Davis



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Antonio Mutti (Italy)

Sunday, 24 October 2010

17:30 – 18:30	Conference Check-in
18:30 – 19:30	Welcome Reception
19:30 – 21:00	Dinner

NOTES

- Meals will be in the Dining Room.
- Social hours will typically be near the posters, unless otherwise announced.
- Audiotaping, videotaping and photography of presentations are prohibited.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Poster Presenters – Posters will remain on view all week. Please hang your poster prior to the first poster session.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the workshop.

Monday, 25 October 2010

07:30 – 08:30 Breakfast

08:30 – 08:40 **Welcome and Conference Overview**

Raed Dweik, Conference Chair

Welcome from ECI

Herman Bieber, Technical Liaison

Session I: Transition from Clinical to Applied Overview

Session Chairs: Anton Amann and Terence Risby

08:40 – 09:20 **THE STATE OF BREATH ANALYSIS: ACHIEVEMENTS AND CHALLENGES**

Raed Dweik, Cleveland Clinic, Cleveland OH, USA

09:20 – 10:00 **RESEARCH FIELDS INVOLVING VOLATILE COMPOUNDS: A TOUR
D'HORIZON**

Anton Amann, Breath Research, Institute of the Austrian Academy of Sciences,
Innsbruck Medical University, Austria

10:00 – 10:30 Coffee break

10:30 – 11:10 **BARRIERS TO OVERCOME FOR TRANSITION OF BREATH TESTS FROM
RESEARCH TO ROUTINE CLINICAL PRACTICE**

Anil S. Modak, Cambridge Isotope Laboratories, Inc., USA

11:10 – 11:50 **REAL TIME BREATH ANALYSIS**

Terence H. Risby, Johns Hopkins University, USA

11:50 – 12:20 **PANEL DISCUSSION: TRANSITION FROM CLINICAL TO APPLIED
OVERVIEW**

12:30 – 13:30 Lunch

13:30 – 16:00 **POSTER VIEWING / *ad hoc* discussions / free time**

16:00 – 16:30 Afternoon coffee break

Session II: Clinical and Human Studies:

Session Chairs: Anna-Carin Olin and Raed Dweik

16:30 – 17:10 **FROM BREATH RESEARCH TO END USER**

Trevor Smith, Bedfont Scientific Ltd., UK

17:10 – 17:30 **SAMPLING OF PARTICLES IN EXHALED AIR – A NEW METHOD TO
MONITOR CHANGES IN RESPIRATORY TRACT LINING FLUID OF THE
DISTAL AIRWAYS**

Anna-Carin Olin, Occupational and Environmental Medicine, University
of Gothenburg, Sweden

17:30 – 17:50 **ANALYSIS OF SPA IN EXHALED PARTICLES**

Anna-Carin Olin, Occupational and Environmental Medicine, University
of Gothenburg, Sweden

Monday, 25 October 2010 (continued)

18:00 – 19:00	PANEL DISCUSSION: CLINICAL AND HUMAN STUDIES
19:30 – 21:00	Dinner
21:00	Poster Session or Social Hour

Tuesday, 26 October 2010

07:30 – 08:30 Breakfast

SESSION III: Clinical Studies and Human Studies

Session Chairs: Michael Epton, Charlene Bayer, and Antonio Mutti

08:30 – 08:50 **DETECTING INFECTION FROM BREATH SAMPLES; FROM ASPERGILLUS TO TUBERCULOSIS**

Michael Epton, Christchurch Hospital, New Zealand

08:50 – 09:10 **TAKING SIFT-MS TO THE BEDSIDE; DEVELOPING A POINT-OF-CARE SELECTED ION FLOW TUBE – MASS SPECTROMETER FOR HUMAN BREATH TESTING**

Michael Epton, Christchurch Hospital, New Zealand

09:10 – 09:40 **BALANCING CLINICIAN'S ENTHUSIASM WITH THE NEED FOR ROBUST VALIDATION IN BREATH ANALYSIS**

Malina K. Storer, Syft Technologies Ltd., New Zealand

09:40 – 10:10 **THE POTENTIAL OF VOLATILE ANALYSES FOR LIVER DISEASE DIAGNOSES**

Norman Ratcliffe, University of the West of England, UK

10:10 – 10:40 Coffee break

10:40 – 11:00 **ANALYSIS OF ACETONE IN EXHALED BREATH USING A SELECTED ION FLOW TUBE-MASS SPECTROMETER SYNCHRONISED WITH A PNEUMOTACHOMETER**

Jack Dummer, Canterbury Respiratory Research Group, Christchurch Hospital, New Zealand

11:00 – 11:40 **PRELIMINARY STUDY ON BREATH ANALYSIS TO MEASURE HYDRATION STAT Clinical and Human Studies US**

Charlene Bayer, Georgia Tech Research Center, USA

11:40 – 12:00 **FROM HIGHLY SOPHISTICATED ANALYTICS TOWARDS POINT OF CARE TESTING – NEW TRENDS FOR APPLICATIONS OF BREATH MARKERS IN INTENSIVE CARE TESTING**

Wolfram Miekisch, University of Rostock, Department of Anaesthesiology and Intensive Care, Germany

12:00 – 12:20 **A TRACER STUDY ON REDISTRIBUTION AND OXIDIZATION OF CARBON MONOXIDE IN HUMAN BODY**

Makoto Sawano, Saitama Medical University, Japan

12:20 – 12:50 **PANEL DISCUSSION: CLINICAL AND HUMAN STUDIES**

13:00 – 14:30 Lunch

14:30 – 16:30 **POSTER VIEWING / *ad hoc* discussions / free time**

Tuesday, 26 October 2010 (continued)

16:30 – 17:00 Afternoon coffee break

SESSION IV: Environmental / Exogenous Compounds

Session Chairs: Joachim Pleil and Terence Risby

17:00 – 17:20 **BREATH GAS ANALYSIS FOR PHARMACO AND TOXICOKINETICS**
Jonathan Beauchamp, Fraunhofer Institute for Process Engineering and
Packaging (IVV), Germany

17:20 – 17:40 **USE OF EXHALED BREATH CONDENSATE ENDPOINTS FOR
EXAMINATION OF BODY MASS INDEX AS A SUSCEPTIBILITY FACTOR TO
DIESEL EXHAUST**
Michael Madden, U.S. Environmental Protection Agency, USA

17:40 – 18:00 **HEAT MAP VISUALIZATION OF COMPLEX BREATH BIOMARKER
MEASUREMENTS FOR ENVIRONMENTAL AND INTELLIGENCE
APPLICATIONS**
Joachim Pleil, U.S. Environmental Protection Agency, USA

18:00 – 18:30 **PANEL DISCUSSION: ENVIRONMENTAL COMPOUNDS**

19:30 – 21:00 Dinner

21:00 – 22:00 Poster Session and Social Hour

Wednesday, 27 October 2010

07:30 – 08:30 Breakfast

SESSION V: Mass Spectrometer and Ion Mobility Mass Spectrometer

Session Chairs: Cristina Davis and Anton Amann

08:30 – 09:10 **MICROSCALE SENSOR COMPONENTS FOR PULMONARY DISEASE MONITORING**

Cristina Davis, University of California, Davis, USA

09:10 – 09:30 **RAPID DETECTION AND CHARACTERIZATION OF BACTERIAL INFECTIONS USING SECONDARY ELECTROSPRAY IONIZATION MASS SPECTROMETRY (SESI-MS)**

Jane E. Hill, University of Vermont, USA

09:30 – 09:50 **IMPROVING DATA PRECISION IN HUMAN BREATH ANALYSIS USING A NOVEL TD-GC/TOFMS ANALYZER THAT INCORPORATES QUANTITATIVE SAMPLE RECOLECTION AND CHEMOMETRIC DATA MINING**

Nicola Watson, Markes International Ltd., UK

09:50 – 10:10 **BREATH ANALYSIS WITH PTR-MS**

Jens Herbig, Ionimed Analytik, Austria

10:10 – 10:40 Coffee break

10:40 – 11:10 **DYNAMIC PROFILES OF VOLATILE ORGANIC COMPOUNDS (VOCs) IN EXHALED BREATH – A MODELING APPROACH**

Julian King, Austrian Academy of Sciences

11:10 – 11:30 **BREATHSPEC®: A SENSITIVE AND SELECTIVE ANALYTICAL TOOL FOR EXHALED VOLATILE ORGANIC COMPOUNDS**

Thomas Wortelmann, GAS mbH

11:30 – 12:40 **PANEL DISCUSSION: MASS SPECTROMETRY BASED TECHNIQUES**

12:45 Optional Excursion – Pick up boxed lunches and meet at front gates to board bus; Lunch in dining room for all others

18:00 Return from excursion

18:00 Afternoon coffee

19:30 – 21:00 Dinner

21:00 Poster Session and Social Hour

Thursday, 28 October 2010

07:30 – 08:30 Breakfast

Session VI: Sensors and Optical Based Breath Monitoring
Session Chairs: Prabir Dutta and Gary Hunter

08:30 – 09:10 **STATUS REPORT ON USE OF ELECTROCHEMICAL SENSORS FOR HUMAN HEALTH BRETH MONITORING; APPLICATIONS TO NO SENSING**
Prabir Dutta, The Ohio State University, USA

09:10 – 09:30 **REALIZING NEW TECHNOLOGIES FOR IR SPECTROSCOPIC ANALYSIS OF BREATH**
Miles J. Weida, Daylight Solutions, Inc., USA

09:30 – 09:50 **DETECTION OF ACETYLENE IN HUMAN BREATH BY CAVITY RING-DOWN SPECTROSCOPY**
Olavi Vaittinen, University of Helsinki, Finland

09:50 – 10:10 **NEEDLETRAPH (NT) – A NEW ANALYTICAL TOOL AS AN INTERFACE BETWEEN PATIENT AND DETECTION**
Phillip Trefz, University Hospital of Rostock (KAI), Germany

10:10 – 10:40 Coffee break

10:40 – 11:20 **THERMALLY STABLE, SILICA DOPED WO_3 FOR SENSING OF ACETONE IN THE HUMAN BREATH**
Marco Righettoni, ETH Zurich, Switzerland

11:20 – 11:40 **CHARACTERIZATION OF CARBON MONOXIDE ABSORBANCE IN MURINE WHOLE BLOOD BY USING A GAS CHROMATOGRAPHY WITH SEMICONDUCTOR DETECTOR**
Noboru Suzuki, TAIYO CO., Ltd., Japan

11:40 – 12:00 **SIMULTANEOUS MEASUREMENT OF SPIROMETRY AND AUSCULTATION USING A THIN-FILM SENSOR**
C. E. Forbes, Feather Sensors, USA

12:10 – 12:30 **CLINICAL STUDY OF MULTIPLE BIOMARKERS IN THE BREATH OF ASTHMA AND COPD PATIENTS USING A FULLY AUTOMATED QUANTUM CASCADE LASER SPECTROMETER**
Joanne H. Shorter, Aerodyne Research, Inc., USA

12:30 – 13:00 **PANEL DISCUSSION: SENSORS AND OPTICAL BASED BREATH MONITORING**

13:00 – 14:30 Lunch

14:30 – 15:00 **POSTER VIEWING** / *ad hoc* discussions / free time

15:00 – 15:30 Afternoon coffee

Thursday, 28 October 2010 (continued)

Session VII: Sensor Arrays and Nanotechnology

Session Chairs: Gary Hunter and Daniel Laskowski

- 15:30 – 16:10 **SMART SENSORS SYSTEMS FOR HUMAN HEALTH BREATH MONITORING APPLICATIONS**
G. W. Hunter, NASA Glenn Research Center, USA
- 16:10 – 16:30 **A NANOMEDICAL ARTIFICIAL OLFACTORY SYSTEM FOR DETECTING VOLATILE BIOMARKERS OF CANCER**
Hossam Haick, Technion – Israel Institute of Technology (Presented by Yoav Broza)
- 16:30 – 16:50 **BREATH ANALYSIS SYSTEM BASED ON PHASE-SHIFTING INTERFEROMETRIC MICROSCOPY (PSIM) READOUT OF MICROCANTILEVER ARRAYS**
Sven Kelling, University of Cambridge, UK
- 16:50 – 17:20 **ELECTROCHEMICAL SENSORS FOR THE DETECTION OF AMMONIA IN BREATH**
Troy Hibbard (Presenter on behalf of Tony Killard), Biomedical Diagnostics - Institute, Dublin City University, Ireland
- 17:20 – 17:30 Stretch Break
- 17:30 – 17:50 **RECENT ADVANCES IN EXHALED BREATH ANALYSIS USING ION MOBILITY SPECTROMETRY**
Chandrasekhara Hariharan, Leibniz- Insitut für Analytische Wissenschaft- ISAS e.V., Dortmund, Germany
- 17:50 – 18:10 **CHEMOSENSOR ARRAYS-BASED BREATH ANALYSIS DEVICES FOR DISEASE MONITORING**
Perena Gouma, SUNY Stony Brook, USA
- 18:10 – 18:30 **ELECTROCHEMICAL SENSORS FOR THE DETECTION OF AMMONIA IN BREATH**
Tony Killard, Dublin City University, Ireland (Presented by Troy Hibbard)
- 18:30 – 18:50 **EXPLOITING THE ODOR SIGNATURE: BIOMARKER DISCOVERY AND SENSOR DESIGN**
Ryan Kramer, Air Force Research Laboratory 711th HPW/RHPCB, USA
- 18:50 – 19:10 **EXHALED BREATH SMELLPRINT IS ALTERED IN PREGNANCY**
Andras Bikov, Semmelweis University, Department of Pulmonology
- 19:10 – 19:30 Free-time
- 20:00 Conference Dinner

Friday, 29 October 2010

07:30 – 08:30 Breakfast

08:30 – 09:00 **PANEL DISCUSSION: SENSOR BASED SYSTEMS**

09:00 – 09:30 **SUMMARY PANEL DISCUSSION**

09:30 – 10:00 Closing Remarks

LIST OF POSTERS

- 1. EXHALED BREATH ANALYSIS OF PATIENTS WITH PULMONARY HYPERTENSION USING SELECTED ION FLOW TUBE MASS SPECTROMETRY (SIFT-MS)**
Kelly Paschke, Cleveland Clinic, USA
- 2. EXHALED BREATH ANALYSIS IN LIVER DISEASE USING SELECTED ION FLOW TUBE MASS SPECTROMETRY (SIFT-MS)**
David Grove, Cleveland Clinic, USA
- 3. CHANGE IN EXHALED NITRIC OXIDE LEVELS AFTER SLEEP IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA CORRELATES WITH OSA SEVERITY**
Ai-Ping Chua, Cleveland Clinic, USA (Presented by Kelly Paschke)
- 4. EFFECT OF INFLUENZA A (H1N1) LIVE ATTENUATED INTRANASAL VACCINATION ON EXHALED NITRIC OXIDE (NO) IN HEALTHY ADULT HEALTHCARE WORKERS**
Alquam Mashir, Cleveland Clinic, USA
- 5. MULTIVARIATE SCREENING OF EXHALED ENDOGENOUS PARTICLES FROM SUBJECTS WITH ASTHMA AND HEALTHY CONTROLS**
Ann-Charlotte Almstrand, University of Gothenburg, Sweden
- 6. MICROFABRICATION OF NASICON BASED NOX SENSOR**
Chung-Chiun Liu, Case Western Reserve University (Presented by Gary Hunter), USA
- 7. CORRELATIONS BETWEEN CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS IN SALIVA AND EXHALED AIR AND THEIR DEPENDENCE ON AGE AND BODY MASS INDEX OF SUBJECTS**
Elena Shnayder, Siberian Branch of Russian Academy of Science, Russia
- 8. A BREATH MARKER FOR THE STATUS OF UREMIA BY PTR-MS**
Ingrid Kohl, Ionimed Analytik GmbH, Austria
- 9. A PRELIMINARY STUDY ON THE INFLUENCE OF AEROBIC EXERCISES ON BREATH ACETONE**
Koichiro Nagamine, Nagoya University, Japan
- 10. CHEMO-RESISTIVE GAS SENSORS FOR EASY DIAGNOSIS OF DIABETES BY BREATH ANALYSIS**
Marco Righettoni, ETH Zurich, Switzerland
- 11. BREATH ANALYSIS FOR EARLY DETECTION IN VENTILATOR ASSOCIATED PNEUMONIA USING GAS CHROMATOGRAPHY TIME-OF-FLIGHT MASS SPECTROMETRY (GC-TOF/MS)**
Maria Basanta, University of Manchester, United Kingdom (UK) (Presented by Stephen Fowler)
- 12. PROFILING OXIDATIVE STRESS MARKERS IN ALLERGIC ASTHMA BY ANALYSIS OF EXHALED BREATH USING COMPREHENSIVE TWO DIMENSIONAL CHROMATOGRAPHY**
Michael Caldeira, Universidade de Aveiro, Portugal
- 13. EFFECT OF DATES SOLUTION ON HALITOSIS**
Nathanael O Salako, Kuwait University, Kuwait
- 14. A NEW PORTABLE BREATH HYDROGEN ANALYZER AND ITS CLINICAL APPLICATION**
Noboru Suzuki, TAIYO CO., Ltd., Japan

15. BREATH ANALYSIS BY SNO₂-BASED GAS SENSOR MICROARRAY: AN EXPLORATIVE STUDY OF SMOKING STATUS RISK

Simonetta Capone, CNR-IMM, Italy

16. BREATHSPEC: SENSITIVE AND SELECTIVE TOOL FOR ANALYSIS OF EXHALED VOLATILE ORGANIC COMPOUNDS

V. Ruzsanyi, G.A.S. Gesellschaft für analytische Sensorsysteme mbH, Germany

17. MONITORING CANCER TREATMENT VIA EXHALED BREATH

Yoav Y Broza, The Technion, Haifa, Israel