

TECHNICAL PROGRAM

ORAL PRESENTATIONS

Monday 21 September 2009

9:00 – 10:00 Welcome Coffee, Grand Ballroom

General Opening Session – Monday 21 September, 2009

St. John's 1 & 2

10:00	12:30	Welcome by Linda Gowman Ph.D., P.Eng.	Guest Speakers: Prof. Don Bursill and Prof. Urs von Gunten
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12:30 – 13:30 Luncheon, Winter Garden

Session A1 – Drinking Water Treatment – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
13:30	13:55	UV in Drinking Water Treatment – Issues for the Next Decade - 2010 to 2020	<u>James P. Malley, Jr.</u>	University of New Hampshire
13:55	14:20	UV System Technology Selection for Metro Vancouver's Coquitlam UV Disinfection Project	<u>Christopher R. Schulz</u> ¹ , <u>Ayman Shawwa</u> ¹ , and <u>Inder Singh</u> ²	¹ CDM Inc., ² Metro Vancouver
14:20	14:45	Metro Vancouver's New 1,200 MLD Coquitlam UV Disinfection Facility	<u>Inder Singh</u>	Metro Vancouver
14:45	15:20	San Francisco Uses a Design-Build Approach to Implement a 315-MGD UV Disinfection Facility	<u>Michael L. Price</u> ¹ , Bijan Ahmadzadeh ² , Matthew Moughamian ¹ , and Jamal Awad ¹	¹ MWH Americas, Inc., ² San Francisco Public Utilities Commission

Session B1 – Component Design – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
13:30	13:55	Disinfection Alternatives and Sustainability: Energy Optimization, Disinfection Efficiency, and Sustainability	<u>Gary L. Hunter</u> ¹ , <u>Ed Kobylinski</u> ¹ , <u>Leonard W. Casson</u> ² , and <u>Ben Freese</u> ¹	¹ Black & Veatch, ² University of Pittsburgh
13:55	14:20	New Medium Pressure Mercury Lamps for AOP/TOC	<u>Alex Voronov</u> , M. Kessler, and R. Dreiskemper	Heraeus Noble light GmbH
14:20	14:45	Comparison Testing of 'Spot' vs. 'Pellet' LPHO UV Lamps	<u>Michael J. Santelli</u> ¹ and <u>James R. Bolton</u> ²	¹ Light Sources, Inc., ² Bolton Photosciences Inc.
14:45	15:20	Renaissance of Medium Pressure Lamps Driven by High Frequency Lamp Driver	Alex Voronov ¹ , <u>Volker Adam</u> ¹ , G. van Eerden ² , and T. Telgenhof ²	¹ Heraeus Noblelight GmbH, ² Nedap Light Controls

Session C1 – Waste Water – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
13:30	13:55	Advanced Disinfection of Secondary Settled Municipal Wastewater by PAA/UV: Hydroxyl Radical Formation and Total Coliforms Inactivation	<u>Lorenzo Liberti</u> ¹ , M. Notarnicola ¹ , S. Sasso ¹ , D. Santoro ² , M. Stefan ² , and J. Eloranta ³	¹ Technical University of Bari, ² Trojan Technologies, Inc., ³ California State University
13:55	14:20	A Practical Case Study for Wastewater UV Disinfection: Evaluation of Quartz Sleeve Mechanical Wiping System Performance & Resultant Fouling Factors	<u>Bruno Ferran</u> , Wei Yang, and Robert Kelly	Infilco Degremont, Inc. - Degremont North American Research & Development Center
14:20	14:45	Microbial Regrowth in Wastewater after UV Disinfection	<u>Zuzana Bohrerova</u> ¹ and <u>Karl G. Linden</u> ²	¹ Ohio State University, ² University of Colorado at Boulder
14:45	15:20	Comparing UV Validation of Waste Water UV Reactors Using USEPA Drinking Water and NWR/AwwaRF Guidance	<u>Harold Wright</u> ¹ , Andrew Salvesson ¹ , and Suzie Sarkis ²	¹ Carollo Engineers, ² Environmental Health Unit, Public Health Branch, Department of Human Services

15:20 – 15:55 Coffee Break, Grand Ballroom

Session A2 – Drinking Water Treatment – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
15:55	16:20	State of the Art of the Production of Harmful Disinfection By-Products: Fact or Fiction	<u>Bram Martijn</u> ¹ , Bram J. van der Veer ² , and Joop C. Kruithof ³	¹ PWN Waterleidingbedrijf, Noord-Holland, ² Evides Water Company, ³ Wetsus Centre for Sustainable Water Technology
16:20	16:45	Comparison of Ozone and UV Disinfection Processes Within the Scope of the Dutch Risk Analysis for Pathogens	<u>Bram J. van der Veer</u> ¹ , P.W.M.H. Smeets ² , and J.C. van Dijk ³	¹ Evides Water Company, ² KWR Watercycle Research Institute, ³ Delft University of Technology
16:45	17:10	Water Purification for Developing Countries, Design and Results	<u>Tonnie Telgenhof Oude Koehorst</u>	NEDAP Light Controls
17:10	17:35	Public Water Works: How Safe is UV Disinfected Drinking Water? Quality Management Once and Now	Regina Sommer ¹ , Alexander Cabaj ² , Georg Hirschmann ³ , Thomas Haider ⁴ and Alexander Kirschner ¹	¹ Medical University Vienna, Hygiene-Institute ² Departement of Medical Physics, Veterinary Medical University Vienna ³ Arsenal Research Vienna ⁴ Medical University Vienna, Institute of Environmental Health

Session B2 – Component Design – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
15:55	16:20	Design of Hydraulically Optimized UV Systems Using CFD	<u>Bas Wols</u> ^{1,2,3} , J.A.M.H. Hofman ^{1,2,3} , E.F. Beerendonk ¹ , W.S.J. Uijtewaai ² , and J.C. van Dijk ²	¹ KWR Watercycle Research Institute ² Delft University of Technology ³ Waternet
16:20	16:45	Comparison Between Radiation Models for CFD Simulations of UV Photoreactors	<u>Azita Soleymani</u> , Domenico Santoro, and Mike Sasges	Trojan Technologies, Inc.
16:45	17:10	CFD Analysis of UV-Disinfection Systems	<u>M. Hunze</u>	FlowConcept GmbH
17:10	17:35	CFD as a Tool to Predict Certification Results (DVGW, ÖVGW, SVGW)	<u>Christoph Dicks</u>	AQUAFIDES UV

Session C2 – Photochemistry – Monday 21 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
15:55	16:20	Determination of the Quantum Yield of the Ferrioxalate and KI/KIO ₃ Actinometers and a Method for the Calibration of Radiometer Detectors	<u>James R. Bolton</u> ¹ , Mihaela I. Stefan ² , Ping-Shine Shaw ³ , and Keith R. Lykke ³	¹ Bolton Photosciences, Inc., ² Trojan Technologies, Inc., ³ National Institute of Standards and Technology (NIST)
16:20	16:45	Kinetics and Quantum Yield Analysis for Vacuum UV (VUV) Photoreactors	<u>Gustavo E. Imoberdorf</u> and Madjid Mohseni	University of British Columbia
16:45	17:10	Characterization of Liquid Foods and Soft Beverages for Ultraviolet Processing	<u>Tatiana Koutchma</u> and Cheryl Defelice	Agriculture and Agri-Food Canada
17:10	17:35	Efficiency Of Surface and Air Disinfection from Bacterial and Fungal Microflora Under the Effect of Continuous and Impulse UV Irradiation	<u>Vladimir I. Sigaev</u> ¹ , A.V.Vorobyov ¹ , A.D.Tolchinsky ¹ , S.G.Shashkovsky ² , S.N.Uspenskaya ¹ , A.N.Varfolomeyev ¹ , I.A.Zhelayev ² , and E.V.Zvyuagina ¹	¹ SFES "Research Centre for Toxicology and Hygienic Regulation of Biopreparations" at FMBA RF ² Bauman Moscow State Technical University

17:35 – 19:30 Welcome Reception, Grand Ballroom

Tuesday 22 September 2009

Session A3 – Advanced Oxidation – Tuesday 22 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
9:00	9:25	Potential for Advanced Oxidation Processes (AOPs) in Disinfection and Simultaneous Emerging Contaminants Removal: a Review	<u>Cosima Sichel</u>	Siemens Water Technologies
9:25	9:50	Efficacy of UV Advanced Oxidation and Direct Photolysis Processes in a Drinking Water Utility with Full-Scale Granular Activated Carbon	<u>Deborah H. Metz</u> ¹ , Maria Meyer ¹ , Ramesh Kashinkunti ¹ and Erwin F. Beerendonk ²	¹ Greater Cincinnati Water Works ² KWR - Watercycle Research Institute
9:50	10:15	UV/H ₂ O ₂ AOP for Water Treatment: Fundamentals and Full-Scale Applications	<u>Mihaela I. Stefan</u> , Alan Royce, Neil Brown and Adam Festger	Trojan Technologies

Session B3 – Certification/Validation – Tuesday 22 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
9:00	9:25	UV Reactor Challenges with a High Resistance Surrogate for Adenovirus Credit	<u>Brian Petri</u> ¹ and Conrad Odegaard ²	¹ Trojan Technologies ² GAP Enviromicrobial Services Ltd.
9:25	9:50	How the UVDGM 2006 Impacts UV Disinfection System Performance	<u>Matthias Boeker</u>	ITT Water & Wastewater, U.S.A.
9:50	10:15	Using Microbial Surrogates for the Wrong Reasons: The Risk in T1 as UV Challenge Microbe for Waste Water	<u>Brian Petri</u> and Wayne Lem	Trojan Technologies

Session C3 – Photochemistry – Tuesday 22 September, 2009

Meeting Room:

Start	End	Title	Authors	Affiliations
9:00	9:25	Effectiveness of Ultraviolet Irradiation in Dechlorination as Influenced by Ultraviolet Transmittance	MP Astuti ¹ , <u>Rongjing Xie</u> ² and MJ Gomez ²	¹ Water Distribution and Network Department ² Centre for Advanced Water Technology Public Utilities Board of Singapore
9:25	9:50	Investigation on the Generation Amount of Nitrite During UV Irradiation Using Medium-Pressure UV Lamps	<u>Nobuhito Yasui</u> ¹ and Naoyuki Kamiko ²	¹ Ritsumeikan University, Department of Integrated Science and Engineering ² Ritsumeikan University, Department of Environmental System Engineering
9:50	10:15	Intensification of Photocatalytic Process for Industrial Wastewater Treatment with a "Solid" UV Reactor	<u>Jiang Yu</u> , Dan Zhang Qiuxin Yang and Dandan Huang	Beijing University of Chemical Technology

10:15 – 10:50 Coffee Break, Grand Ballroom

Session A4 – Advanced Oxidation – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
10:50	11:15	Reduction of Trietazine from Groundwater by UV	<u>Barrie Holden</u> and Angela Richardson	Anglian Water Services, Ltd.
11:15	11:40	Impact of Advanced Pretreatment on the Feasibility of UV/H ₂ O ₂ Treatment for Degradation of Organic Micropollutants	<u>Ashlee Fuller</u> ¹ , Bram Martijn ² , Joop C. Kruithof ³ and James P. Malley, Jr. ¹	¹ University of New Hampshire ² PWN Water Supply Company North Holland ³ Wetsus Centre for Sustainable Water Technology
11:40	12:05	Simultaneous Disinfection and Trace Organic Oxidation: Performance and Cost Comparisons Between Advanced Oxidation Technologies	<u>Jeff Bandy</u> ^{1,2} , Andy Salveson ² and Tavy Wade ²	¹ Duke University ² Carollo Engineers
12:05	12:30	New DBD Lamp Combines the Advantages of the LP and MP UV Lamps for UV/H ₂ O ₂ Oxidation	<u>Léon J.J.M. Janssen</u> ¹ , D.J.H. Harmsen ¹ , E.F. Beerendonk ¹ , D.H. Metz ² , T. Knol ³ , J. Geboers ⁴ , G.F. IJpelaar ^{1,5}	¹ KWR, Watercycle Research Institute ² Greater Cincinnati Water Works ³ Duinwaterbedrijf Zuid-Holland ⁴ Philips Lighting BV ⁵ Royal Haskoning

Session B4 – Certification/Validation – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
10:50	11:15	Biodosimetry of a Full-Scale UV Disinfection System to Achieve Regulatory Approval for Drinking Water Disinfection	<u>Bruno Ferran</u> , Wei Yang and Robert Kelly	Infilco Degremont, Inc.
11:15	11:40	Closing the Gap Between Certification (DVGW, ÖVGW, SVGW) and PSS?	<u>Christoph Dicks</u>	AQUAFIDES UV
11:40	12:05	Impact of Biodosimetry-Based Validation on UV System Design Specifications	<u>Bryan Townsend</u> and Gary Hunter	Black & Veatch
12:05	12:30	Can the Gap be Bridged? – Applying NWRI Test Data to Wastewater UV Designs According to UVDGM 2006	Peer Krueger and <u>Christian Bokermann</u>	ITT WEDECO AG

Session C4 – Photobiology – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
10:50	11:15	Enhanced Effectiveness of Medium-Pressure UV Lamps on Human Adenovirus and its Possible Mechanism	<u>Gwy-Am Shin</u> ¹ , Jung-Keun Lee ¹ and Karl G. Linden ²	¹ University of Washington ² University of Colorado at Boulder
11:15	11:40	UV Reactor Challenges with Adenovirus: A Comparison of Adenovirus and MS2 Inactivation in Low Pressure and Medium Pressure UV Reactors	<u>Brian Petri</u> ¹ , Karl Linden ² and Jeanette Thurston ³	¹ Trojan Technologies ² University of Colorado, Boulder ³ United States Department of Agriculture
11:40	12:05	A Genomic Model for Predicting the Ultraviolet Susceptibility of Viruses and Bacteria	<u>Wladyslaw Jan Kowalski</u>	Immune Building Systems, Inc.
12:05	12:30	Impact of Antecedent Cultivation Conditions on the UV-C Resistance of <i>Escherichia coli</i> and Spores of <i>Bacillus Subtilis</i>	<u>Margarete Bucheli-Witschel</u> , Claudio Bassin, Bernhard Roos and Thomas Egli	Eawag, Swiss Federal Institute of Aquatic Science and Technology

12:30 – 13:30 Luncheon, Winter Garden

Session A5 – Advanced Oxidation – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
13:30	13:55	Selecting Removal Goals for Advanced Oxidation with UV and Hydrogen Peroxide	<u>Jeff Neemann</u> , Bryan Townsend, Bob Hulsey and Gary Hunter	Black & Veatch
13:55	14:20	UV Treatment for the Reduction of Emerging Pesticides in Surface Waters	<u>Barrie Holden</u> ¹ , Ella Lamming ¹ and Alan Royce ²	¹ Anglian Water Services, Ltd. ² Trojan Technologies
14:20	14:45	Genotoxicity Study on UV/H ₂ O ₂ Treated Surface Water Using Comet and SCE Assay	<u>Eric Penders</u> ¹ , Bram J. Martijn ² , Wim Hoogenboezem ¹ and Gerrit M. Alink ³	¹ Het Waterlaboratorium ² PWN Water Supply Company North Holland ³ Wageningen University
14:45	15:10	Formation and Removal of Genotoxic Activity During UV/H ₂ O ₂ -GAC Treatment of Drinking Water	<u>Minne B. Heringa</u> ¹ , D.J.H. Harmsen ¹ , A.A. Reus ² , C.A.M. Krul ² , A.H. Knol ³ , D.H. Metz ⁴ , E.F. Beerendonk ¹ and G.F. Ijpelaar ¹	¹ KWR, Watercycle Research Institute ² TNO Quality of Life ³ Duinwaterbedrijf Zuid-Holland ⁴ Greater Cincinnati Water Works

Session B5 – UV Measurement – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
13:30	13:55	Proposed Method for Measurement of the UV Efficiency of Medium Pressure UV Lamps	<u>James R. Bolton</u> ¹ , Keith Bricher ² , Brad Crawford ² and Brian Altland ²	¹ Bolton Photosciences, Inc. ² Calgon Carbon Corporation
13:55	14:20	Comparison of the Microbicidal Efficiency of Low Pressure and of Medium Pressure Mercury Lamps	<u>Alexander Cabaj</u> ¹ , Regina Sommer ² and Thomas Haider ³	¹ Veterinary University Vienna ² Medical University Vienna ³ Institut für Umwelthygiene Medizinische Universität Wien
14:20	14:45	Method for Measurement of Output of Monochromatic (254 nm) Low Pressure Mercury Lamps, Results of the Intercomparison	<u>Volker Adam</u> , Martin Kessler and Ralf Dreiskemper	Heraeus Noblelight, GmbH
14:45	15:10	Implementation of the European Directive on Optical Radiation Safety Takes Place in May 2010	<u>Fokko P. Wieringa</u> ^{1,2}	¹ TNO Science & Industry ² Scientific Advisory Board of Radtech Europe

Session C5 – Photobiology – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
13:30	13:55	Chlorine and UV Disinfection of Selected Antibiotic-Resistant Strains of <i>Escherichia coli</i>	<u>Michael R. Templeton</u> ¹ , Francine Oddy ¹ , Wing-kit Leung ² and Michael Rogers ¹	¹ Imperial College London ² Centre for Environmental Policy, Imperial College London
13:55	14:20	Activity of Various Catabolic Functions in UV-C Irradiated <i>Escherichia coli</i>	<u>Margarete Bucheli-Witschel</u> , Anna Ehler, Yves Meur and Thomas Egli	Eawag, Swiss Federal Institute of Aquatic Science and Technology
14:20	14:45	Preliminary Study on Whole-Phase Control of Photoreactivation After UV Disinfection	<u>Meiting Guo</u> ¹ , Hongying Hu ² and Jian Chen ²	¹ Tsinghua University ² Fujian Newland EnTech Co., Ltd.
14:45	15:10	The Biological Safety of Model Distribution System Following UV	<u>Sun Wenjun</u> , Liu Wenjun, Cui Lifeng and Zhu Wanpeng	Tsinghua University

15:10 – 15:55 Coffee Break, Grand Ballroom**Session A6 – Water Disinfection Reuse – Tuesday 22 September, 2009****Meeting Room:**

Start	End	Title	Authors	Affiliations
15:55	16:20	Progress and Experiences of Ultraviolet Application to Water Related Treatment Processes in Singapore	<u>Rongjing Xie</u> ¹ , JY Hu ² , M. Koh ³ , E Quek ¹ , SN Xiu ² , YJ Xing ¹ , MJ Gomez ¹ , Y Fu ¹ , AN Pua ¹ and H Seah ¹	¹ Technology and Water Quality Office, Public Utilities Board of Singapore ² National University of Singapore ³ Water Distribution and Network Department, Public Utilities Board of Singapore
16:20	16:45	Approach for Achieving Sustainable Operation of the 2BGD Catskill/Delaware UV Disinfection Facility	<u>Matthew T. Valade</u> ¹ , Steven Farabaugh ¹ , Paul D. Smith ² and Gary Kroll ³	¹ Hazen and Sawyer ² NYC Department of Environmental Protection ³ CDM
16:45	17:10	Practical Considerations of Applying UV Technology for Reuse Water Disinfection	<u>Wayne Lem</u> and Jennifer Muller	Trojan Technologies
17:10	17:35	UV Disinfection for Reuse of Drain Water in Horticulture	<u>Nico Enthoven</u>	Priva B.V.

Session B6 – Biofouling and Regrowth– Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
15:55	16:20	Biofouling Control in Water by UV and AOP Pretreatment	<u>Mamane Hadás</u> ¹ , Lakretz Anat ¹ and Ron Eliora ²	¹ School of Mechanical Engineering, Tel Aviv University ² Life Sciences, Tel Aviv University
16:20	16:45	Combined Aging and Fouling Index Provides Efficient UV System Operation and Maintenance	<u>Mark Heath</u> and Harold Wright	Carollo Engineers, P.C.
16:45	17:10	Effect of Low Pressure UV on the Regrowth Potential of Drinking Water	<u>Peter van der Maas</u> ¹ , Jantinus Bruins ¹ and Dirk van der Woerd ²	¹ Waterlaboratorium Noord ² Waterbedrijf Groningen
17:10	17:35	Disinfection of Biofilm in Tube Lumens with UVC Light Emitting Diodes (LED)	<u>Jimmy Bak</u> ¹ , Søren D. Ladefoged ² , Michael Tvede ² , Tanja Begovic ¹ and Annette Gregersen ²	¹ DTU Fotonik ² Rigshospitalet

Session C6 – Photobiology – Tuesday 22 September, 2009**Meeting Room:**

Start	End	Title	Authors	Affiliations
15:55	16:20	Inhibition of Algae Growth in a Sight Pond with Ultraviolet Irradiation	<u>Meiting Guo</u> ¹ , <u>Hongying Hu</u> ² and Jian Chen ²	¹ Tsinghua University ² Fujian Newland EnTech Co., Ltd.
16:20	16:45	Response of Marine and Fresh Water Algae to UV	Liu Wenjun, <u>Sun Wenjun</u> and Liu Che	Tsinghua University
16:45	17:10	UV Treatment Against Indigenous Microcystis Species and its Potential to Cause Microcystin Release and Change of Aquatic Biota	<u>Hiroshi Sakai</u> ¹ , Kumiko Oguma ¹ , Hiroyuki Katayama ¹ , Shinichiro Ohgaki ¹	University of Tokyo
17:10	17:35	UV as an Ecological Invasion Barrier: UV Inactivation of Myxobolus cerebralis, VHSV, and Marine Phytoplankton	<u>Brian Petri</u> ¹ , Linda Sealey ¹ , Ron Hedrick ² , John Lumsden ³ and Charlie Trick ⁴	¹ Trojan Technologies ² University of California, Davis ³ University of Guelph ⁴ University of Western Ontario

18:30 – 22:00 Banquet, Winter Garden

POSTER PRESENTATIONS

Monday 21 September, 2009

Grand Ballroom, PM Coffee

Start	End	Title	Authors	Affiliations
15:20	15:55	How UV Disinfection Can Help to Address Declining Groundwater Supply	Matthias Boeker	ITT Water & Wastewater, U.S.A.
15:20	15:55	Practical aspects of de-chloramination of public swimming pool water by means of Ultraviolet irradiation	Rob van Esch	Siemens Water Technologies
15:20	15:55	Evaluation and comparison of UV lamps	Norbert Bodenhausen	AQUAFIDES UV

Tuesday 22 September, 2009

Grand Ballroom, AM Coffee

Start	End	Title	Authors	Affiliations
10:15	10:50	Bioassays for Secondary Wastewater UV Systems – Is a Standard possible?	Matthias Boeker	ITT Water & Wastewater, U.S.A.
10:15	10:50	Microwave Powered Ozone Generator – Concept and Initial Test results	Richard Little	JenAct Limited
10:15	10:50	UV Sterilization of Metal Working Fluids	Clayton Sampson	Cyan UV Ltd.
10:15	10:50	The UV Industry “down under” in Oz, warts and all!	Iain F Johnson	Tenix Alliance Pty Ltd