Nutrient Recovery and Management 2011
Inside and Outside the Fence

January 9-12, 2011
Hilton Miami Downtown
Miami, Florida, USA

*Conference **Workshop** and **Opening General Session** materials available online

Session 1: Advances in Enhanced Biological Phosphorus Removal
Monday, January 10, 2011
1:30pm-5:15pm

1A 1:30pm **Fermentation of Mixed Liqour for Phosphorus Removal**
James Laing Barnard, *Black & Veatch*

1B 1:50pm **The inhibitory effects of Free Nitrous Acid on anaerobic metabolism of PAOs and GAOs**
Liu Ye, *The University of Queensland*

1C 2:10pm **Microbial population in an A2O system operated under different carbon sources**
Luiza Girard Machado, *Federal University of Pará (Brazil)*

TB1 2:30pm **Rapid Increase in Acetate Updake Rate of Glycogen-Accumulating Organisms**
Masafumi Fujita, *Ibaraki University*

2:35pm Discussion

3:00pm Networking Break

1D 3:45pm **Simultaneous Biological Nutrient Removal in a Single-Stage, Low Oxygen Aerobic Reactor**
Jose A Jimenez, *Brown and Caldwell*

1E 4:05pm **Low temperature biological phosphorus removal and partial nitrification in a pilot SBR system**
Qiuyan Yuan, *University of Manitoba*

1F 4:25pm **Enhanced Biological Phosphorus Removal of Low Strength Municipal Sewage at 30 Celsius Using Laboratory-Scale Modified Bardenpho Process**
Cao Yeshi, *Public Utilities Board, Singapore*

TB2 4:45pm TBD

4:50pm Discussion

Session 2: Fate of Organic Nutrogen and Nonreactive Phosphorus
Monday, January 10, 2011
1:30pm-3:00pm

2A	**1:30pm**	**Bioavailability of Dissolved Organic Nitrogen in Wastewater Effluent as Determined by Resin Separation** David L Sedlak, *UC Berkeley*
2B	**1:50pm**	**Experimental and model-based evaluation of the DON and CON fate in biological nutrient removal activated sludge systems** Jacek Makinia,
2C	**2:10pm**	**Molecular variablity in wastewater organic matter and implications for phosphorus removal across a range of treatment technologies** Scott Smith, *Wilfrid Laurier University*
TB1	**2:30pm**	**Florida's Numeric Nutrient Criteria and the Potential Importance of Dissolved Organic Nitrogen** Rosalyn Matthews, *Hazen and Sawyer*
TB2	**2:35pm**	**Analysis of Organic Nitrogen Removal in Municipal Wastewater by Reverse Osmosis** Rion Merlo,

2:40pm Discussion

Session 3: Algae Technology in Nutrient Management
Monday, January 10, 2011
1:30pm-3:00pm

3A	**1:30pm**	**Algae Alchemy: Nutrients to Biofuel - Extracting Value From Wastewater** John Benemann,
3B	**1:50pm**	**Microalgae growth for nutrient recovery from sludge liquor and production of renewable bioenergy** Bjorn Rusten, *Aquateam-Norwegian water technology centre*
3C	**2:10pm**	**Reducing the Nutrient Impacts of Aquaculture Through the Use of an Algal Photobioreactor Production System** Sarina J Ergas, *University of South Florida*
TB1	**2:30pm**	**A STELLA Model for Integrated Algal Biofuel Production and Wastewater Treatment** Ivy Cormier, *University of South Florida*
TB2	**2:35pm**	**Removal of Nitrogen (NH3/NH4+) from Wastewater by Chlorella vulgaris** Joo-Youp Lee, *University of Cincinnati*

2:40pm Discussion

Session 4: Operation to Achieve Low Nitrogen and Phosphorus Concentrations: Unique Challenges
Monday, January 10, 2011
3:45pm-5:15pm

4A 3:45pm **WEF/WERF Cooperative Study of Nutrient Removal Plants: Achievable Technology Performance Statistics for Low Effluent Limits**
Denny S. Parker, *Brown and Caldwell*

4B 4:05pm **Optimizing Moving Bed Biofilm Reactor (MBBR) and Biologically Active Filter (BAF) Design and Operation for Nitrogen and Phosphorus Removal**
Joshua P. Boltz, *CH2M HILL*

4C 4:25pm **N&P Removal from RO Brine – A "New" LOT Operations Challenge**
Mark Thomas Steichen,

TB1 4:45pm **Pilot-Scale MBR and RO Process for COD, Nitrogen and Phosphorus Removals of Mixed Domestic - Industrial Wastewater at 30 Celsius in Singapore**
Cao Yeshi, *Public Utilities Board, Singapore*

TB2 4:50pm **Can we operate Deep Bed Denitrification Filters with limited phosphorus?**
Dilli R Neupane, *AECOM*

4:55pm Discussion

Session 5: Watershed Modeling
Monday, January 10, 2011
3:45pm-5:15pm

5A 3:45pm Identification of sensitive locations to control nutrient pollution in a watershed
Aabha Sargaonkar,

5B 4:05pm The use of a sewers-WWTPs-river integrated model allows the efficient minimization of ammonia peaks and oxygen dips in a river
Lorenzo Benedetti,

5C 4:25pm Selecting Appropriate Centralized and Decentralized Treatment Options for the Management of Nutrients in the Chesapeake Bay – A Case Study for Anne Arundel County, MD
Brian Marengo,

TB1 4:45pm TBD

TB2 4:50pm TBD

4:55pm Discussion

Session 6: Phosphorus Recovery
Tuesday, January 11, 2011
8:30am-10:00am

6A	**8:30am**	**Phosphorus recovery from wastewater – State of the art and future potential** Christian Sartorius, *Fraunhofer ISI* **Perspectives on Nitrogen and Phosphorus Recovery from Wastewater: The State of the Industry** Christine Debarbadillo, *Black & Veatch*
6B	**8:50am**	**Phosphorus and Aluminium Recovery from Sewage Sludge Ash by a novel two Step wet chemical Elution Process (SESAL-Phos – Recovery Process)** Sebastian Petzet, *Technische Universität Darmstadt*
6C	**9:10am**	**Phosphate Fertilizers from Sewage Sludge Ash - Design of an Industrial Manufacturing Plant** Ludwig Hermann, *ASH DEC Umwelt AG*
TB1	**9:30am**	**TBD**
TB2	**9:35am**	**TBD**
9:40am		**Discussion**

Session 7: External Carbon Sources - Optimization and Modeling
Tuesday, January 11, 2011
8:30am-12:00pm

7A 8:30am **Recycling Nitrates to Headworks for Multiple Benefits in a Fixed Film Plant**
John Bratby, *Brown and Caldwell*

7B 8:50am **Operations of four (4) newly build denitrification plants in the Florida Keys: Little Venice, Coco Plum, Area 4 and Key Largo WWTP's.**
Erica Lynn Latker,

7C 9:10am **Usage of Glycerol for Denitrification in High Rate Activated Sludge Processes: Benefits and Limitations**
D Katehis, *CH2M Hill*

TB1 9:30am **Faster SDNRs with Prolonged Glycerin Addition, Carbon Storing Bugs, the Enemy (Dissolved Oxygen), and Other Things Encountered While Piloting Supplemental Carbon at Several BNR Plants**
Katya Bilyk,

9:35am Discussion

10:00am Networking Break

7D 10:45am **Successful Application of an Alternative Carbon Source to Denitrification Filters: Full Scale Implementation at the 50 MGD Littleton - Englewood Advanced Wastewater Treatment Plant**
Samuel Augustine Ledwell, *Environmental Operating Solutions, Inc.*
Observations on the Performance and Modeling of Glycerin-fed Denitrification Filters
Katya Bilyk, *Hazen and Sawyer*

7E 11:05am **Modeling external carbon addition in combined N-P activated sludge systems with an extension of the IWA Activated Sludge Models**
Jacek Makinia, *Gdansk University of Technology*

7F 11:25am **Modelling the use of External Carbon Substrate for Denitrification by Generalists and Specialists**
Ahmed Omari,

TB2 11:45am **A distillery by-product as an external carbon source for enhancing denitrification in mainstream and sidestream treatment processes**
Jacek Makinia, *Gdansk University of Technology*

11:55am Discussion

Session 8: Sustainability Considerations
Tuesday, January 11, 2011
8:30am-12:15pm

8A 8:30am **Comparative Analysis of Parallel IFAS and ASP Reactors: Oxygen Transfer and Uptake, Nutrient Removal, Carbon and Energy Footprint**
Diego Rosso, *University of California, Irvine*

8B 8:50am **Impacts of Post Aerobic Digestion on the Design of Nutrient Removal Facilities**
Bruce R Johnson, *CH2M HILL*

8C 9:10am **Oh Where, Oh Where Has My Carbon Gone? How Do I Get It Back?**
Kenneth Brischke, *MWH Global*

TB1 9:30am **Model-Based Optimization of Controller Settings at the WWTP of Oostende: Trade-Off Between N Removal and Energy Savings**
Lorenzo Benedetti,

9:35am Discussion

10:00am Networking Break

8D 10:45am **Technologies Available to Meet Numeric Nutrient Criteria and their Associated Economic and Environmental Impacts**
Joyeeta Banerjee, *Hazen and Sawyer*

8E 11:05am **Life Cycle Assessment of the Relative Benefits of Meeting Ultra-Low Nutrient Limits at WWTPs**
Andrew R Shaw, *Black & Veatch*

8F 11:25am **Finding the Balance Between Wastewater Treatment Nutrient Removal and Sustainability, Considering Capital and Operating Costs, Energy, Air and Water Quality, and More**
Michael Wayne Falk, *HDR Engineering*

TB2 11:45am TBD

11:50am Discussion

Session 9: Phosphorus Recovery Through Struvite Precipitation
Tuesday, January 11, 2011
10:45am-12:15pm

9A 10:45am **Prevention of Struvite Scaling in Digesters combined with Phosphorus Removal and Recovery - The FIX-Phos Process**
Sebastian Petzet, *Technische Universität Darmstadt*

9B 11:05am **Phosphorus Recovery From Anaerobic Digester Supernatant by Struvite [MAP (Mg.NH4.PO4.6H2O)] Crystallization: Modeling of a Fluidized Bed Reactor Incorporating Thermodynamics, Kinetics and Reactor Hydrodynamics**
Md. Saifur Rahaman, *Yale University*

9C 11:25am **Effect of Micropollutants in Wastewater on Recovered Struvite**
Demet Antakyali, *Universitaet Stuttgart*

TB1 11:45am **Development of a Process Controller for the Operation of a Struvite Crystallization Process**
Kazi Parvez Fattah, *Associated Engineering Ltd.*

TB2 11:50am **Sustainable Phosphorus Recovery From Anaerobically Digested Dairy Manure**
Wendong Tao, *SUNY College of Environmental Science and Forestry*

11:55am Discussion

Session 10: Nutrient Recovery from Effluents
Tuesday, January 11, 2011
1:30pm-3:00pm

10A 1:30pm **A comparative study of the recovery of ammonium from clinoptilolite exhausted with conventional domestic wastewater and with source separated human urine**
Bilsen Beler Baykal, *Istanbul Technical University*

10B 1:50pm **Removal and Recovery of Phosphorus and Potassium from Human Urine by Precipitation of Magnesium Potassium Phosphate**
Kangning Xu, *Tsinghua University*

10C 2:10pm **Phosphorus Recovery with New Ultra-Low Adsorption Process**
James D Fitzpatrick, *Black & Veatch Corporation*

TB1 2:30pm **Biological Induced Phosphorus Precipitation in Aerobic Granular Sludge for Wastewater Treatment**
Angela MANAS, *LISBP/LGC/INSA toulouse*

TB2 2:35pm **Use of Gas-permeable Membranes for the Removal and Recovery of Ammonia from High Strength Livestock Wastewater**
Matias Vanotti, *USDA-ARS*

2:40pm Discussion

Session 11: Optimization of Nitrogen and Phosphorus Removal Processes
Tuesday, January 11, 2011
1:30pm-5:15pm

11A 1:30pm **Not Your Daddy's Wastewater Treatment Plant – The Johns Creek Environmental Campus**
Peter Frank Schuler, *Brown and Caldwell*

11B 1:50pm **Process Modeling And Full Scale Rerate Pilot Testing Results In Innovative BNR Step Feed Process**
Ron James Latimer, *Hazen and Sawyer*

11C 2:10pm **Design and Commissioning of Calgary's New State-of-the-Art Biological Nutrient Removal WWTP**
Barry Rabinowitz, *CH2M HILL Canada Limited*

TB1 2:30pm **Influence of Aeration on Nitrogen Removal in a Biological Packed Bed Reactor for Residuals Removal**
Antonio Albuquerque, *University of Beira Interior*

2:35pm Discussion

3:00pm Networking Break

11D 3:34pm **Ballasted Biological Process Achieves Low Nitrogen and Phosphorus without Tertiary Filtration**
Steven E Woodard, *Cambridge Water Technology*

11E 4:05pm **Bioaugmentation with ammonia oxidizing bacteria (AOB) selected in an alternating bioreactor**
Giulio Munz, *University of Florence*

11F 4:25pm **Combining flocs and granular sludge: An alternative strategy for nitrogen removal?**
Ahlem FILALI,

TB2 4:45pm **The Suffield (Ct) Recipe For Impressive Nitrogen Removal: 2.0 Mg/L Total-N**
Grant Weaver,

4:50pm Discussion

Session 12: Greenhouse Gas Emissions: Balancing Water Quality and Sustainability
Tuesday, January 11, 2011
1:30pm-5:15pm

12A 1:30pm **TBD**
Invite

12B 1:50pm **A Comparison Of Partial And Full Nitrification Processes: Microbial Ecology, Biokinetics And Nitrous Oxide Production**
Kartik Chandran,

12C 2:10pm **Contrastive N2O emissions from partial nitritation and anammox at an industrial WWTP**
Siegfried Elias Vlaeminck,

TB1 2:30pm **Investigation of Nitrous Oxide Emission with Different Carbon Sources in a Simultaneous Nitrogen and Phosphorous Removal System**
Ingwei W LO, *University of British Columbia*

2:35pm **Discussion**

3:00pm Networking Break

12D 3:45pm **Modelling nitrous and nitric oxide emissions by autotrophic ammonium oxidizing bacteria**
Kris E. Mampaey, *Ghent University*

12E 4:05pm **N2o Emissions: Impact Of Process Configuration And Diurnal Loading Patterns**
Dwight Houweling, *EnviroSim Associates Ltd.*

12F 4:25pm **Nitrous Oxide Emissions from Deammonification Processes Determined in Lab-scale Experiments**
Yvonne Schneider, *Leibniz University of Hanover*

TB2 4:45pm **The IWA Greenhouse Gas Task Group Perspective on the Use of Water Quality and Process Models for Sustainable Wastewater Management**
Jose Porro, *Malcolm Pirnie*

4:50pm **Discussion**

Session 13: Nutrient Recovery Cost and Full-Scale Perspectives
Tuesday, January 11, 2011
3:45pm-5:15pm

13A 3:45pm **Increasing Revenue While Reducing Nuisance Struvite Precipitation: Pilot Scale Testing of the WASSTRIP Process**
Peter J Schauer,

13B 4:05pm **Full scale phosphate recovery: process control affecting pellet growth and struvite purity**
Wim HM Moerman, *NuReSys*

13C 4:25pm **Results of the first year's operation of North America's First Full Scale Nutrient Recovery Facility**
Rob Baur, *Clean Water Services*

TB1 4:45pm **Economic Evaluation of Phosphorus Recovery Processes**
Kaoru Kato, *Japan Institute of Wastewater Engineering Technology*

TB2 4:50pm **Phosphorus Recovery Potential in Anaerobic Digestion Residues**
Goksel N Demirer, *METU*

4:55pm Discussion

Session 14: Focused Discussion: Phosphorus Removal to Very Low Levels
Wednesday, January 12, 2011
8:30am-12:00pm

14A 8:30am **Chemically mediated phosphorus removal: testing of aluminum and surface complexation mechanism**
Scott Smith, *Wilfrid Laurier University*

14B 8:50am **Phosphorus Fractionation in Various Tertiary Effluents- Insights into and Implications for Advanced Phosphorus Removal**
April Gu, *Northeastern University*

14C 9:10am **Application of a Factorial Design to Study Chemically Mediated Phosphorus Removal**
Scott Smith, *Wilfrid Laurier University*

14D 9:30am **Development of Full-scale Sizing Criteria from Tertiary Pilot Testing Results to Achieve Ultra-low Phosphorus Limits at Innisfil, Ontario**
Christine Debarbadillo, *Black & Veatch*

9:50am Networking Break

14E 10:15am **West Camden STP Advanced System Design Achieves Total Phosphorus less than 0.04 mg/L**
Bruce R Johnson, *CH2M HILL*

14F 10:35am **Comparison of filtration techniques for advanced phosphorus removal**
Sigrid Marika Scherrenberg, *Delft University of Technology*

TB1 10:55am **Reliability of Low P Technologies in the Real World – First Results from a Two-Year Demonstration Program**
Mario Benisch, *HDR*

TB2 11:00am **PILOT TESTING OF A HIGH EFFICIENCY ADSORBENT SYSTEM FOR PHOSPHORUS REMOVAL AND RECOVERY FROM MUNICHIPAL WASTEWATER SECONDARY EFFLUENT**
Koji Tsuji, *Japan Sewage Works Agency*

11:05am Discussion

Session 15: Focused Discussion: Advances in Deammonification Processes
Wednesday, January 12, 2011
8:30am-12:00pm

15A 8:30am **Approaching energy-positive sewage treatment: OLAND removes nitrogen from low-strength wastewater**
Siegfried Elias Vlaeminck,

15B 8:50am **Implementation Of A Full-Scale Anammox-Based Facility To Treat Anaerobic Digestin Sidestreams At The Alexandria Sanitary Authority Advanced Wastewater Treatment Facility**
Glen T Daigger, *CH2M HILL*

15C 9:10am **Impact of Thermal Hydrolysis Solids Pretreatment on Sidestream Treatment Process Selection at the DCWASA Blue Plains AWTP**
Bryce A Figdore,

15D 9:30am **Influence of aeration conditions on nitrogen removal rate in one stage partial nitritation/anammox process**
Jingjing Yang, *Royal Institute of Technology (KTH)*

9:50am Networking Break

15E 10:15am **1-stage Deammonification MBBR process for reject water sidestream treatment: investigation of start-up strategy and carriers design**
Romain Lemaire, *Anjou Recherche*

15F 10:35am **Swedish experience with deammonification process in biofilm system**
Jozef Trela, *Royal Institute of Technology (KTH)*

TB1 10:55am **Full scale robust ANAMMOX performance and design**
Wiebe Ruurd Abma, *Paques BV*

TB2 11:00am **High-rate nitrogen removal by the Anammox process with a sufficient inorganic carbon source**
Yang Jiachun, *Graduate School of Science and Technology*

11:05am Discussion

Session 19: Focused Discussion: Natural Systems for Nutrient Removal
Wednesday, January 12, 2011
8:30am-12:00pm

16A 8:30am **The Possible Contribution of Suspension Feeding Bivalves to Nutrient Remediation in Eutrophied Coastal Waters**
Roger Newell, *Horn Point Laboratory*

16B 8:50am **Mussel power – using bivalves as biofilters to combat coastal eutrophication?**
Wera Leujak, *Federal Environment Agency*

16C 9:10am **Algal Turf Scrubber**
TBD

16D 9:30am **Treatment Wetlands for TMDL and Numeric Nutrient Criteria Compliance: Technology Advantages and Constraints**
James S Bays, *CH2MHILL*

9:50am Networking Break

16E 10:15am **Cattail farming for water quality: Harvesting cattails for nutrient removal and phosphorous recovery in the watershed**
Richard Grosshans, *International Institute for Sustainable Development*

16F 10:35am **Hybrid Wetlands**
TBD

TB1 10:55am **Removal of Groundwater Derived Nitrate across Five Black Needlerush (Juncus roemerianus) Marsh Restoration Designs**
Eric L Sparks, *Dauphin Island Sea Lab*

TB2 11:00am **Periphyton Stormwater Treatment Areas**
TBD