

2009 International Conference on Nutrient Recovery from Wastewater Streams
Westin Bayshore, Vancouver, BC, Canada
May 10-13, 2009

Preliminary Conference Schedule

(as of May 12, 2009 and is subject to change)

Sunday, May 10, 2009

19:00-21:00 Welcome Reception

Monday, May 11, 2009

08:30-10:30 Conference Opening and Welcome Address

10:30-11:00 Coffee Break

11:00-12:00 Keynote Address: Elimination of Eutrophication through Resource Recovery
Dr. James Barnard (Black & Veatch, Kansas City, MO, USA)

12:00-13:00 Buffet lunch (included)

13:00-15:00 Parallel Sessions 1

Session 1A: Global perspectives on nutrient use and recovery

13:00-13:30 Preferred future phosphorus scenarios: A framework for meeting long-term phosphorus needs for global food demand
*Dana Cordell**, *Tina-Schmid-Neset**, *Stuart White[^]*, *Jan-Olof Drangert** (*Department of Water and Environmental Studies, Linköping University, Linköping, Sweden; [^]Institute for Sustainable Futures, University of Technology Sydney, Sydney, Australia)

13:30-14:00 Impact of supply and demand on the price development of phosphate (fertilizer)
*Jana von Horn**, *Christian Sartorius (Fraunhofer Institute Systems and Innovation Research, Karlsruhe, Germany)*

14:00-14:30 Wastewater treatment and the green revolution
*Paul M.Sutton**, *A. Paul Togna[^]*, *O.J. Schraa[#]* (*P.M. Sutton & Associates, Inc, Enfield, NH, USA; [^]Basin Water, Lawrenceville, NJ, USA; [#]Hydromantis, Inc., Cambridge, ON, Canada)

14:30-15:00 A brief history of phosphorus use and abuse – from the philosophers's stone to nutrient recovery and re-use
*Ken I. Ashley**, *D.S. Mavinic*; *Fred Koch (Fish and Wildlife Branch, Ministry of Environment; Department of Civil Engineering, University of British Columbia, Vancouver, BC, Canada)*

Session 1B: Struvite chemistry and recovery – 1

13:00-13:30 A review of struvite nucleation studies
Phil Schneider, *S.C. Galbraith (School of Engineering, James Cook University, Townsville, Australia)*

- 13:30-14:00 A quantitative method analyzing the content of struvite in phosphate-based precipitates
*Xiaodi Hao**, *C.C. Wang**, *L. Lan** *M.C.M. van Loosdrecht^* (*The R & D Centre of Sustainable Environmental Biotechnology, Beijing University of Civil Engineering and Architecture, Beijing, P.R. of China; ^Dept. of Biochemical Engineering, Delft University of Technology, Delft, The Netherlands)
- 14:00-14:30 Phosphorus removal from an industrial wastewater by struvite crystallization into an airlift reactor
*A Sanchez**, *Sonia Barros^*, *Ramon Mendez**, *Juan Garrido** (*Chemical Engineering Department School of Engineering, University of Santiago de Compostela, Santiago de Compostela, Spain; ^3R Ingeniería Ambiental, Santiago de Compostela, Spain)

Session 1C: Modelling nutrient recovery

- 13:00-13:30 Quantifying phosphorus recovery potentials by fullscale process analysis and modelling
M. Beier, *R. Pikula*, *V. Spering*, *K.-H. Rosenwinkel* (Institute for Water Quality and Waste Management (ISAH), Leibniz University of Hanover, Hanover, Germany)
- 13:30-14:00 Validation of a comprehensive chemical equilibrium model for predicting struvite precipitation
*Sachin Gadekar**, *Pratap Pullammanappallil**, *Amir Varshovi^* (*Department of Agricultural and Biological Engineering University of Florida, Gainesville, FL, USA; ^GreenTechnologies, LLC, Gainesville, FL, USA)
- 14:00-14:30 A thermochemical approach for struvite precipitation modelling from wastewater
*Mary Hanhoun**, *Catherine Azzaro-Pantel*^#*; *Béatrice Biscans*^*; *Michèle Frèche\$^#*; *Ludovic Montastruc*^#*; *Luc Pibouleau*^#*; *Serge Domenech^#* (*Université de Toulouse, INP, UPS, LGC (Laboratoire de Génie Chimique, Toulouse, France); ^CNRS, LGC, Toulouse, France; #ENSIACET INPT, Toulouse, France; \$Université de Toulouse, Toulouse, France; INP, UPS, CNRS – CIRIMAT, Toulouse, France)
- 14:30-15:00 Numerical investigations of the hydrodynamics of the UBC MAP fluidized bed crystallizer
*Md. Saifur Rahaman**, *D.S. Mavinic**, *A.T. Briton^*, *M. Zhang^*; *K.P. Fattah**; *F.A. Koch** (*Environmental Engineering Group, Department of Civil Engineering, University of British Columbia (UBC), Vancouver, BC, Canada; ^Ostara Nutrient Recovery Technologies Inc., Vancouver, BC, Canada)

15:00-15:30 Coffee Break

15:30-17:00 Parallel Session 2

Session 2A: Economics of phosphorus recovery

- 15:30-16:00 About the economy of phosphorus recovery
Thomas Dockhorn (Institute of Sanitary and Environmental Engineering, Braunschweig, Germany)
- 16:00-16:30 Different strategies for recovering phosphorus: technologies and costs
David Montag, *K. Gethke*, *J. Pinnekamp* (Institute of Environmental Engineering, RWTH Aachen University, Aachen, Germany)
- 16:30-17:00 Social and Economic Feasibility of Struvite Recovery from Urine at the Community Level in Nepal
Elizabeth Tilley, *B. Gantenbein*, *R. Khadka*, *C. Zurbrugg*, *K. Udert* (Eawag, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland)

Session 2B: Struvite chemistry and recovery – 2

- 15:30-16:00 Induced struvite precipitation in an airlift reactor for phosphorus recovery
*Daniel Stumpf**, *B Heinzmann^*, *R-J Schwarz^*, *R Gnirss^*, *M Kraume** (*Berlin Institute of Technology, Berlin, Germany; ^Department of Research and Development, Berlin Water, Berlin, Germany)
- 16:00-16:30 Pilot testing and economic evaluation of struvite recovery from dewatering centrate at HRSD's Nansmond WWTP
*Ahren Britton**, *Ram Prasad\$,* *Bill Balzer^*, *Laurissa Cubbage#* (*Ostara Nutrient Recovery Technologies Inc., Vancouver, BC, Canada; \$Old Dominion University, Norfolk, VA, USA; ^Hampton Roads Sanitation District, Suffolk, VA, USA; #Hazen and Sawyer, Raleigh, NC, USA)
- 16:30-17:00 Standardizing the struvite solubility product for field trial optimization
A.L. Forrest, *Kazi Parvez Fattah*, *D.S. Mavinic*, *F. Koch* (Department of Civil Engineering, UBC, Vancouver, BC, Canada)

Session 2C: Utilization of recovered nutrients – 1

- 15:30-16:00 Plant availability of P fertilizers recycled from sewage sludge and meat-and-bone meal in field and pot experiments
R. Cabeza Pérez, *B. Steingrobe*, *W. Römer*, *N. Claassen* (Department of Crop Sciences – Plant Nutrition, Georg-August-University, Göttingen, Göttingen, Germany)
- 16:00-16:30 Ecological testing of products from phosphorus recovery processes – first results
*Karlheinz Weinfurtner**, *Stefan A Gath^*, *Werner Kordel**, *Christine Waida^* (*Fraunhoferinstitute for Molecular Biology and Applied Ecology, Schmallenberg, Germany; ^Institute of Landscape Ecology and Resources Management, University of Giessen, Giessen, Germany)
- 17:00 Free Evening to explore Vancouver and network

Tuesday, May 12, 2009

- 08:30-10:00 Parallel Session 3

Session 3A: Agricultural nutrient recovery – 1

- 08:30-09:00 Strategy for separation of manure P through flocculation
*Maibritt Hjorth**, *Morten Lykkegaard Christensen^* (*Department of Agricultural Engineering, Aarhus University, Tjele, Denmark; ^Department of Biotechnology, Chemistry and Environmental Engineering, Aalborg University, Aalborg, Denmark)
- 09:00-09:30 Full-scale test of a fluidized-bed struvite crystallizer for phosphorus reduction in dairy lagoon water
*Keith E. Bowers**, *Tianxi Zhang^*, *Joseph H. Harrison#* (*Multiform Harvest Inc., Seattle, WA, USA; ^Washington State University, Pullman, WA, USA; # Washington State University, Puyallup, WA, USA)
- 09:30-10:00 Phosphate removal in agro-industry: full-scale and pilot-scale operational considerations of struvite crystallisation
*Wim Moerman**, *M Carballa\$,* *A Vandekerckhove^*, *D Derycke#*, *W Verstraete\$* (*Akwadok, Deerlijk, Belgium; ^Clarebout Potatoes, Nieuwkerke, Belgium; #Biotim, Willebroek, Belgium; \$LabMet Compure Links, Gent Belgium)

Session 3B: Struvite chemistry and recovery – 3

- 08:30-09:00 Development of a process control system for online monitoring and control of a struvite crystallization process
Kazi Parvez Fattah, D.S. Mavinic, M.S. Rahaman, F. Koch (Department of Civil Engineering, UBC, Vancouver, BC, Canada)
- 08:30-09:00 Increasing cost efficiency of struvite precipitation by using alternative precipitants and P-remobilization from sewage sludge
Timur Esemey, Wiebke Rand, Thomas Dockhorn, Norbert Dichtl (Institute of Sanitary and Environmental Engineering, Technische Universität, Braunschweig, Germany)
- 09:30-10:00 Temperature dependence of electrical conductivity and its relationship with ionic strength for Struvite Precipitation System
Md. Iqbal Hossain Bhuiyan, Donald S. Mavinic^ (*Sperling Hansen Associates, North Vancouver, BC, Canada; ^Environmental Engineering Group, Department of Civil Engineering, University of British Columbia (UBC), Vancouver, BC, Canada)*

Session 3C: Phosphorus recovery from WWTPs – 1

- 08:30-09:00 Phosphorus removal and recovery from sewage sludge as calcium phosphate by addition of calcium silicate hydrate compounds (CSH)
Sebastian Petzet, Peter Cornel (TU-Darmstadt, Institut WAR, Darmstadt, Germany)
- 09:00-09:30 Phosphate removal from wastewater using a regenerable adsorption media
Paul Sylvester, T. Moller (Solmetex, Northborough, MA, USA)
- 10:00-10:30 Coffee Break
- 10:30-12:00 Parallel Sessions 4

Session 4A: Agricultural nutrient recovery – 2

- 10:30-11:00 Field application methods for the liquid fraction of separated animal slurry in growing cereal crops
Tavs Nyord (Institute of Agricultural Engineering, University of Aarhus, Tjele, Denmark)
- 11:00-11:30 Research on nutrient removal and recovery from swine wastewater in China
Yong-hui Song, Peng Yuan, Guang-lei Qiu, Jian-feng Peng, Xiao-yu Cui, Ping Zeng (Chinese Research Academy of Environmental Sciences, Beijing, China)
- 11:30-12:00 Chemical recycling of phosphorus from piggery wastewater
Marie-Line Daumer, F. Béline*, S.A. Parsons^ (*Cemagref, Rennes, France; ^Centre of Water Sciences, Cranfield, UK)*

Session 4B: Struvite chemistry and recovery – 4

- 10:30-11:00 Struvite harvesting to reduce ammonia and phosphorus recycle
Rob Baur, Ahren Britton^; Ram Prasad# (*Clean Water Services, Tigard, OR, USA; ^Ostara Nutrient Recovery Technologies Inc., Vancouver, BC, Canada; #Old Dominion University, Norfolk, VA, USA)*

- 11:00-11:30 The application of process systems engineering to the development of struvite recovery systems
Phil Schneider, Md. I. Ali (School of Engineering, James Cook University, Townsville, Australia)
- 11:30-12:00 Membrane EBPR for Phosphorus Removal and Recovery using a Sidestream Flow System: Preliminary Assessment
H. Srinivas, F. A. Koch^, A. Monti# D. S. Mavinic^, E. Hall^ (*Levelton Consultants Ltd., Richmond, BC, Canada; ^Department of Civil Engineering, University of British Columbia, Vancouver, BC, Canada; #GE Water and Process Technologies, Oakville, ON, Canada)*

Session 4C: Phosphorus recovery from WWTPs – 2

- 10:30-11:00 Phosphorus recovery from eluated sewage sludge ashes by nanofiltration by nanofiltration
Claudia Niewersch, S. Petzet^, J. Henkel^, T. Wintgens*, T. Melin*, P. Cornel^ (*Department of Chemical Engineering, RWTH-Aachen, Aachen, Germany; ^Institute WAR, TU Darmstadt, Darmstadt, Germany)*
- 11:00-11:30 P-recovery from sewage sludge ash – technology transfer from prototype to industrial manufacturing facilities
Louis Hermann (ASH DEC Umwelt AG, Wien, Austria)
- 11:30-12:00 Phosphorus recovery by thermochemical treatment of sewage sludge ash – Results of the European FP6-project SUSAN
Christian Adam, C Vogel*, S Wellendorf*, J Schick^, S Kratz^, E Schnug^ (*Federal Institute for Materials Research and Testing, Berlin, Germany; ^Julius Kuehn Institute, Braunschweig, Germany)*
- 12:00-13:00 Lunch on Own
- 13:00-15:00 Parallel Sessions 5

Session 5A: Agricultural nutrient recovery – 3

- 13:00-13:30 Remediation of phosphorus from animal slurry
AM Thygesen, E Skou, O Werneberg, S.G. Sommer (University of Southern Denmark (SDU), Faculty of Engineering, Institute of Chemical Engineering, Biotechnology and Environmental Engineering, Odense, Denmark)
- 13:30-14:00 Affecting corn processing nutrients using membrane separation and biological extraction and conversion
Kent Rausch, R.L. Belyea^, L.M. Raskin#, V. Singh*, D.B. Johnston\$, T.E. Clevenger^, M.E. Tumbleson*, E.F. Morgenroth* (*University of Illinois at Urbana-Champaign, Urbana, IL, USA; ^University of Missouri, Columbia, MO, USA; #University of Michigan, Lansing, MI, USA; \$Eastern Regional Research Center, ARS, USDA, Wyndmoor, PA, USA)*
- 14:00-14:30 Technology for recovery of phosphorus from animal wastewater through calcium phosphate precipitation
Matias B. Vanotti, Ariel A. Szogi (United States Department of Agriculture, ARS, Coastal Plains Research Center, Florence, SC, USA)

Session 5B: Struvite chemistry and recovery – 5

13:00-13:30 Determining the operational conditions required for homogeneous struvite precipitation from belt press supernatant
*Beni Lew**, *Mario Kummel[^]*, *Chaim Sheindorf[#]*, *Somaya Phalah^{\$}*, *Menachem Rebhum^{\$}*, *Ori Lahav^{\$}*
(*Agriculture Research Organization, Bet Dagan, Israel; [^]Mekorot Israel Water Co, Tel-Aviv, Israel.; [#]Shenkar College, Ramat Gan, Israel; ^{\$}Technion, Haifa, Israel)

13:30-14:00 Involvement of filamentous bacteria in the phosphorus recovery cycle
*Jan Suschka**, *E Kowalskii**, *K Grubel[^]* (*Institute of Environmental Engineering, Polish Academy of Sciences, Zabrze, Poland; University of Bielsko-Biala, Bielsko-Biala, Poland)

14:00-14:30 Carbon and struvite recovery from centrate at a Biological Nutrient Removal Plant
*Bonita Dirk**, *A Gibb**, *H Kelly**, *F Koch[^]*, *DS Mavinic[^]* (*Dayton & Knight Ltd., North Vancouver, BC, Canada; [^]University of British Columbia, Vancouver, BC, Canada)

Session 5C: Phosphorus recovery from WWTPs – 3

13:00-13:30 Recovery of phosphorus from sewage sludge incineration ash by combined bioleaching and bioaccumulation
*Jennifer Zimmermann**, *Wolfgang Dott* (RWTH University Institute of Hygiene and Environmental Health, Aachen, Germany)

13:30-14:00 Energy efficient nutrient recovery from household wastewater using struvite precipitation and zeolite adsorption techniques. A pilot plant study in Sweden
*Zsofia Ganrot**, *Jan Broberg[^]*, *Stefan Byden** (*Melica Environmental Consulting, Goteborg, Sweden; [^]Split Vision Development AB, Angelholm, Sweden)

14:00-14:30 Crystallisation of calcium phosphate from sewage: Efficiency of batch mode technology and quality of the generated products
*Anke Ehbrecht**, *D Patzig**, *S Schönauer[^]*, *M Schwotzer[^]*, *R Schuhmann** (*University of Karlsruhe, Center of Competence for Material Moisture (CMM), Karlsruhe, Germany; [^]Forschungszentrum Karlsruhe, Institute of Technical Chemistry (ITC-WGT), Division of Water Technology and Geotechnology, Karlsruhe, Germany)

15:00-15:30 Coffee Break

15:30-17:30 Parallel Sessions 6

Session 6A: Agricultural nutrient recycling – 4

15:30-16:00 Effect of osmotic pressure and substrate resistance on transmembrane flux during the concentration of pretreated swine manure with reverse osmosis membranes
*Lucie, Masse**, *D.I. Massé**, *Y. Pellerin[^]* (*Agriculture and Agri-Food Canada, Sherbrooke, QC, Canada; [^]A. Pellerin et fils Ltée, ST-Adrien-de-Ham, QC, Canada)

16:00-16:30 Process to recover phosphate from meat and bone meal with utilisation of waste heat
*Christian Kabbe**, *Wolfgang Jakob[^]* (*Federal Environmental Agency, Berlin, Germany ; [^]VTS Koop Schiefer GmbH & Co. KG, Unterloquitz, Germany)

16:30-17:00 P and N in solids from manure separation: Separation efficiency and particle size distribution
*Karin Jorgensen**, *Maibritt Hjorth[^]*, *Jakob Magid** (*Department of Agriculture and Ecology, Faculty of Life Sciences, University of Copenhagen, Frederiksberg, Denmark; [^] Department of Agricultural Engineering, Faculty of Agricultural Sciences, University of Aarhus, Horsens, Denmark)

17:00-17:30 Treating solid dairy manure by using the microwave-enhanced advanced oxidation process
AA Kenge, *PH Liao*, *Victor Lo* (Department of Civil Engineering, University of British Columbia, Vancouver, BC, Canada)

Session 6B: Nutrient recovery processes

- 15:30-16:00 Profitable recovery of phosphorus from sewage sludge and meat&bone Meal by the Mephrec Process – a new means of thermal sludge and ash treatment
Klaus Scheidig, Michael Schaaf, Joachim Mallon (ingitec GmbH, Leipzig, Germany)
- 16:00-16:30 Empirical evaluation of nutrient recovery using Seaborne technology at the Wastewater treatment plant Gifhorn
Linh-Con Phan, D Weichgrebe*, I Urban*, KH Rosenwinkel*, L Gunther^, T Dockhorn^, N Dichtl^, J Muller#, N Bayerle\$ (*Institute for Waste Quality and Waste Management (ISAH), Hannover, Germany; ^Institute of Sanitary and Environmental Engineering, Technical University of Braunschweig, Braunschweig, Germany; #PFI Consulting Engineers, Hannover, Germany; \$Abwasser- und Strassenreinigungsbetrieb Stadt Gifhorn, Gifhorn, Germany)*
- 16:30-17:00 Sewage treatment to remove ammonium ions by struvite precipitation
Sergey Lobanov (Department of Chemical Engineering, Perm State Technical University, Perm, Russia)

Session 6C: Phosphorus recovery from WWTPs – 4

- 15:30-16:00 Full-scale plant test using sewage sludge ash as raw material for phosphorus production
Willem Schipper, Leon Korving^ (*Thermphos International, Vlissingen, The Netherlands; ^N.V. Slibverwerking Noord-Brabant, Moerdijk, The Netherlands)*
- 16:00-16:30 Phosphorous recovery and nitrogen removal from wastewater using BiolronTech process
Volodymyr Ivanov, C.H. Guo*, Shengli Kuang*, Viktor Stabnikov^ (*School of Civil and Environmental Engineering, Nanyang Technological University, Singapore, Singapore; ^Institute of Municipal Activity, National Aviation University, Kiev, Ukraine)*
- 16:30-17:00 Phosphorus speciation of sewage sludge ashes and potential for fertilizer production
Simone Nanzer, Markus Janousch^; Thomas Huthwelker^; Urs Eggenberger#; Ludwig Hermann\$; Astrid Oberson*; Emmanuel Frossard* (*Institute of Plant Sciences, ETH Zurich, Zurich, Switzerland; ^Swiss Light Source, Paul Scherrer Institute, Villigen, Switzerland; #Institute of Geological Sciences, University of Bern, Bern, Switzerland; \$ASH DEC Umwelt AG, Vienna, Austria)*
- 19:00-22:00 Evening Dinner Harbour Boat Cruise
(optional/user pay/first come/first served basis)

Wednesday, May 13, 2009

- 08:30-10:00 Parallel Sessions 7

Session 7A: Nutrient Miscellaneous Topics

- 08:30-09:00 Savings from integration of centrate ammonia reduction with BNR operation: simulation of single-sludge and two-sludge plant operation
Morton Orentlicher, Alexander Fassbender*, Gary Grey^ (*ThermoEnergy Corporation, Little Rock, AR, USA; ^HydroQual, Inc, ^Mahwah, NJ, USA)*
- 09:00-09:30 The use of phosphorus-saturated ochre as a fertiliser
Stephen Carr, K.E. Dobbie*^, K.V. Heal*, K.A. Smith* (*The University of Edinburgh, Edinburgh, Scotland, UK; ^SEPA, Edinburgh, UK)*

09:30-10:00 Volatile fatty acid (VFA) and nutrient recovery from biomass fermentation
Qiuyan Yuan, Francesco Zurzolo, Jan Oleszkiewicz (Department of Civil Engineering, University of Manitoba, Winnipeg, MB, Canada)

Session 7C: Nutrient recovery chemistry – 1

08:30-09:00 Phosphate adsorption from sewage sludge filtrate using Zinc-Aluminium layered double hydroxides
*Xiang Cheng**, *Xinrui Huang**, *Xingzu Wang**, *Bingqing Zhao[^]*, *Aiyan Chen**, *Dezhi Sun*[#]* (*School of Municipal & Environmental Engineering, Harbin Institute of Technology, Harbin, P.R. China; [^]Research Center for Eco-Environmental Science, Chinese Academy of Sciences, Beijing, P.R. China; [#]College of Environmental Science & Engineering, Beijing Forestry University, Beijing, P.R. China)

09:00-09:30 Phosphorus recovery from sewage sludge ash: possibilities and limitations of wet chemical technologies
*Christian Schaum**, *Peter Cornel[^]*, *Norbert Jardin[#]* (*Dr. Born – Dr. Ermel GmbH, Achim, Germany; [^]Technische Universität Darmstadt, Institut WAR, Darmstadt, Germany; [#]Ruhrverband, Essen, Germany)

10:00-10:30 Coffee Break

10:30-12:30 Parallel Sessions 8

Session 8A: Utilization of recovered nutrients – 2

10:30-11:00 Urine reuse as fertilizer for bamboo plantations
J.E. Ndzang, *R. Otterpohl (Institute of Wastewater and Water Protection of the Hamburg University of Technology, Hamburg, Germany)*

11:00-11:30 Nutrient supplementation of aquatic ecosystems in British Columbia: The state of the art in the Pacific Northwest
John G. Stockner (University of British Columbia - Fisheries Centre & Eco-Logic Ltd. West Vancouver, BC, Canada)

11:30-12:00 The role of recovered struvite (magnesium ammonium phosphate) in trout and salmon population conservation
*Greg Wilson**, *S. Reddenkopp[^]*, *P. Slaney[#]*, *C.J. Wightman[§]* (*Environmental Stewardship Division, BC Ministry of Environment, Surrey, BC, Canada; [^]Georgia Basin Steelhead Recovery Program, BC Conservation Foundation, Surrey, BC, Canada; [#]PSlaney Aquatic Science Ltd., Coquitlam, BC, Canada; [§]Salmon and Trout Restoration, BC Ministry of Environment, Nanaimo, BC, Canada)

12:00-12:30 Assessing the suitability of struvite as a source of P for potato production
*John P. Hammond**, *Martin R. Broadley[^]*, *Philip J. White[#]* (*Warwick HRI, University of Warwick, Wellesbourne, UK; [^]Plant Sciences Division, School of Biosciences, University of Nottingham, Loughborough, UK; [#]Scottish Crop Research Institute, Invergowrie, Invergowrie, UK)

Session 8B: Nitrogen removal and recovery

10:30-11:00 Ammonium absorption in reject water using vermiculite
*Nina Akerback**, *Sten Engblom**, *Kenneth Sahlén[^]* (*Novia University of Applied Sciences, Vasa, Finland; [^]Swedish University of Agricultural Sciences, Umea, Sweden)

- 11:00-11:30 Alternating anoxic-aerobic process for nitrogen recovery from wastewater in a biofilm reactor
*Mohamed F. Hamoda**, *Rashid A. Bin-Fahad*[^] (*Dept. of Environmental Technology Management, CFW, Kuwait University, Safat, Kuwait; [^]Ministry of Environment and Water Resources, Federal Government, Dubai, U.A.E.)
- 11:30-12:00 Air stripping of ammonia from anaerobic digestate
Frank Waeger, *Thomas Wirthensohn*, *Alberto Corcoba*, *Werner Fuchs* (University of Natural Resources and Applied Life Sciences, Vienna, Dept. for Agrobiotechnology, IFA-Tulln, Institute for Environmental Biotechnology, Tulln, Austria)
- Session 8C: Nutrient recovery chemistry – 2**
- 10:30-11:00 Phosphorus recovery from saturated alum sludge used as a low-cost P-adsorbent
Xiaohong Zhao, *Y.Q. Zhao* (Centre for Water Resources Research, School of Architecture, Landscape and Civil Engineering, University College Dublin, Dublin, Ireland)
- 11:00-11:30 Phosphorus cycling by using biomass ashes
Bettina Eichler-Loebermann, *Silvia Bachmann* (Institute of Land Use, Faculty of Agricultural and Environmental Science, University of Rostock, Rostock, Germany)
- 12:30-13:30 Buffet lunch (included)
- 13:30-15:30 Plenary Session and Expert Panel Discussion and Q&A session:
Panel members tba
- 15:30-18:00 Poster Session Wine and Cheese
- 18:00 Free Evening

Thursday, May 14, 2009

Morning and Afternoon: Local and Out of Town [Technical Tours](#)

(Various prices)

1. Fraser Valley stream channels and reservoir fertilization
2. Lulu Island WWTP R&D struvite recovery set-up
3. Portland, Oregon (USA) full scale Ostara struvite recovery (overnight, and possible Visa required)
4. Edmonton, Alberta (Canada) Goldbar full scale Ostara struvite recovery

POSTER LISTING

A novel waste sludge operation to minimize uncontrolled phosphorus precipitation and maximize the phosphorus recovery: a case study in Tarragona, Spain

R. Barat[^], M. Abella[#], P. Castilla[#], J. Ferrer[^], Aurora Seco^{} (*Dpto. Ingeniería Química, Universidad de Valencia, Valencia, Spain; [^]Dpto. Ingeniería Hidráulica y Medio Ambiente. Universidad Politécnica de Valencia, Valencia, Spain; [#]Departamento de depuración. Empresa municipal mixta de aguas de Tarragona (EMATSA), Tarragona, Spain)*

Assessment of the global amount and recovery potential of Phosphorus in waste

Weicheng Li, Sven G. Sommer (Department of Chemical Engineering, Biotechnology and Environmental Technology, University of Southern Denmark, Campusvej, Denmark)

Nutrient enrichment of south coast B.C. rivers as a fish habitat restoration tool

Kevin Pellett (BC Conservation Foundation, Nanaimo, BC, Canada)

Membrane Capacitive Deionization for Nutrient Recovery from Urine

P. Kuntke^{^}, H. Bruning^{*}, S.J. Metz[^], G. Zeeman^{*}, C.J.N. Buisman^{*^} (*Wageningen University, Sub-department of Environmental Technology, Wageningen, The Netherlands; [^]Wetsus, centre of excellence for sustainable water technology, Leeuwarden, The Netherlands)*

Nutrient supplementation of aquatic ecosystems in British Columbia: The state of the art in the Pacific Northwest

John G. Stockner (University of British Columbia - Fisheries Centre & Eco-Logic Ltd., West Vancouver, BC, Canada)

Phosphorus recovery in EBPR systems by struvite crystallization

N. Marti^{}, L. Pastor[^], A. Bouzas^{*}, J. Ferrer[^], Aurora Seco^{*} (*Dpto. Ingeniería Química. Universidad de Valencia, Valencia, Spain; [^]Instituto de Ingeniería del Agua y Medio Ambiente (IIAMA). Universidad Politécnica de Valencia, Valencia, Spain)*

Struvite control techniques in an enhanced biological phosphorus removal plant.

Rob Baur (Clean Water Services, Tigard, OR, USA)

Study of uncontrolled precipitation problems in Tarragona WWTP (Spain)

R. Barat[^], M. Abella[#], J. Roig[#], J. Ferrer[^], Aurora Seco^{} (*Dpto. Ingeniería Química, Universidad de Valencia, Valencia, Spain; [^]Dpto. Ingeniería Hidráulica y Medio Ambiente. Universidad Politécnica de Valencia, Valencia, Spain; [#]Departamento de depuración. Empresa municipal mixta de aguas de Tarragona (EMATSA), Tarragona, Spain)*

Treating solid dairy manure by using the microwave-enhanced advanced oxidation process

Victor Lo, AA Kenge, PH Liao (Department of Civil Engineering, University of British Columbia, Vancouver, BC, Canada)