# International Conference
# Biofilms 2004: Structure and Activity of Biofilms
### 24-26 October 2004 - Las Vegas, NV, USA

# Conference Program

Sunday, October 24 - 12:00 pm - 7:00 pm Registration (Conference Lobby)
4:00 pm - 7:00 pm Welcome Reception (Terrace Lobby Bar)

Monday, October 25 - 7:00 am - 8:00 am Continental Breakfast (Avalon Ballroom)
8:00 am - 9:15 am Introduction and Plenary Session (Salon Rooms 3-6)
9:40 am - 11:40 am Presentations (Salon Rooms 3-6 and Rooms 1-2)
11:40 am - 1:20 pm Lunch (Avalon Ballroom)
1:20 pm - 5:00 pm Presentations (Salon Rooms 1-2 and Rooms 5-6)
5:30 pm - 7:30 pm Poster Session (Salon Rooms 3-4/Avalon Ballroom)
7:30 pm - 9:30 pm Dinner (Avalon Ballroom)

Tuesday, October 26 - 7:00 am - 8:00 am Continental Breakfast (Avalon Ballroom)
8:00 am - 12:00 pm Presentations (Salon Rooms 1-2 and Rooms 5-6)
12:00 pm - 1:40 pm Lunch (Avalon Ballroom)
1:40 pm - 6:00 pm Presentations (Salon Rooms 1-2 and Rooms 5-6)

# DETAILED SCHEDULE

**October 25, Monday**

7:00 – 8:00 **Breakfast**
(Avalon Ballroom)

| | **INTRODUCTION AND PLENARY SESSIONS**<br>Rooms 3-6 (combined) |
|---|---|
| 8:00-8:05 | Eugene Cloete<br>(IWA Vice President) |
| 8:05-8:10 | Oskar Wanner<br>(Chair IWA Biofilm Processes and Systems Specialist Group) |
| 8:10-8:15 | Zbigniew Lewandowski<br>(Conference chair) |
| 8:15-9:15 | Plenary speaker<br>Perry L. McCarty, Stanford University<br>**Biofilm processes in the remediation of groundwater contamination** |

9:15-9:40 Break

## ORAL PRESENTATIONS
## October 25, Monday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Reactors<br>Session chairman: Bruce Rittmann | P# | Rooms 3-6 (combined)<br>Ecology<br>Session chairman: Eugene Cloete |
|---|---|---|---|---|
| 1 | 9:40-<br>10:00 | **Membrane aerated biofilms – problems in scale up**<br>Michael J. Semmens, John W. Shanahan, and Timothy LaPara<br>Presenter: John W. Shanahan | 1 | **Microautoradiography: recent advances within the studies of the ecophysiology of bacteria in biofilms**<br>P. H. Nielsen and J. L. Nielsen<br>Presenter: P. H. Nielsen |
| 2 | 10:00-<br>10:20 | **High biofilm activity under increased oxygen concentrations in a pressurized biofilter system for removal of easy degradable organic matter**<br>K. F. Janning, S. N. Bak, M. Andersen, G. H. Kristensen<br>Presenter: K. F. Janning | 2 | **Effect of nucleic acid stain Syto 9 on nascent biofilm architecture of *Acinetobacter* sp. BD413**<br>R. GrayMerod, L. Hendrickx, L. N. Mueller, J. B. Xavier, and S. Wuertz<br>Presenter: S. Wuertz |
| 3 | 10:20-<br>10:40 | **Biofilm physical structure, internal diffusivity and tortuosity**<br>L. F. Melo<br>Presenter: L. F. Melo | 3 | **Cellular changes due to biofilm formation – influence of flow regime**<br>M. Simões, M. O. Pereira, M. J. Vieira<br>Presenter: M. Simões |
| 4 | 10:40-<br>11:00 | **The performance of biofiltration on *E. coli* removal from drinking water**<br>Sachie Ogawa, Jin Li and Sandra Mclellan<br>Presenter: Sachie Ogawa | 4 | **Optimization of the fluorescence in situ hybridization (FISH) method for the characterization of colonization processes in intact biofilms developing on carrier material in a laboratory column inoculated with an aquifer enrichment culture**<br>Ioanna Letsiou, Martina Hausner<br>Presenter: Ioanna Letsiou |
| 5 | 11:00-<br>11:20 | **Performance of aerobic consortia immobilized on *Opuntia imbricata* in domestic wastewater treatment**<br>Jesús Rodriguez-Martinez, Leopoldo J. Rios González and Yolanda Garza-Garcia<br>Presenter: Jesús Rodriguez-Martinez | 5 | **Comparison of community structure of sulfate-reducing bacteria and their roles in carbon mineralization in sewer biofilms growing under aerophilic and microaerophilic conditions**<br>Ho-Wai Derek Leung, Tsukasa Ito, Guang-Hao Chen, Yoshimasa Watanabe and Satoshi Okabe<br>Presenter: Ho-Wai Derek Leung |
| 6 | 11:20-<br>11:40 | **Determination of microbial density by characterization of aerobic granule formed in sequencing batch reactor**<br>S. M. Kim, S. H. Kim, T. Rameshwar and I. S. Kim<br>Presenter: S. M. Kim | 6 | **Analysis of nitrifying bacterial community and chemical profile in the sponge media using microelectrode and FISH**<br>T. Rameshwar, S.H.Kim, K. J. Chae, S.M. Kim, S.H. Hyun and I. S. Kim<br>Presenter: T. Rameshwar |

11:40-1:20

**Lunch**
(Avalon Ballroom)

## ORAL PRESENTATIONS
## October 25, Monday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Reactors<br>Session chairman: Luis Melo | P# | Rooms 5-6 (combined)<br>Ecology<br>Session chairman: Stefan Wuertz |
|---|---|---|---|---|
| 1 | 1:20-1:40 | **Biofilms in porous media: Upscaling conservation equations and measurement of microbial distributions via NMR**<br>Brian D. Wood, Fabrice Golfier, Paul Majors, Michel Quintard, Stephen Whitaker<br>Presenter: Brian D. Wood | 1 | **Growth and structure of phototrophic biofilms under controlled light and flow conditions**<br>B. Zippel, T. R. Neu<br>Presenter: T. R. Neu |
| 2 | 1:40-2:00 | **Visualization and characterization of dynamic patterns of flow, growth and activity of *Vibrio fischeri* biofilms growing in porous media**<br>R.R. Sharp, P. Stoodley, M. Adgie and A. Cunningham<br>Presenter: R.R. Sharp | 2 | **The use of the Rotoscope as an online, real-time, non-destructive biofilm monito**r<br>T.E Cloete and M.R Maluleke<br>Presenter: T.E Cloete |
| 3 | 2:00-2:20 | **Effect of hydrodynamic conditions on biofilm oxygen consumption rate in a fixed-bed nitrifying reactor**<br>M. Carrión, J. Alba and F. Thalasso<br>Presenter: M. Carrión | 3 | **Cypris habitat selection facilitated by microbial films influences the vertical distribution of subtidal barnacle *Balanus trigonus***<br>Thiyagarajan V, Lau SCK, Cheung SCK and Qian P-Y<br>Presenter: Thiyagarajan V, |
| 4 | 2:20-2:40 | **Experimental and numerical results of a single submerged attached growth bioreactor (SAGB) for simultaneous oxidation of organics and nitrogen removal**<br>P.B. Pedros, J. Y. Wang, W. K. Dobie, and H. Metghalchi<br>Presenter: P.B. Pedros | 4 | **Effects of shear stress on the secretion of extracellular polymeric substances in biofilms**<br>P. Ramasamy, X. Zhang<br>Presenter: P. Ramasamy |
| 5 | 2:40-3:00 | **Biofilm reactor technology for low temperature anaerobic waste treatment – microbiology and process characteristics**<br>Sharon McHugh, Gavin Collins, Thérèse Mahony and Vincent O'Flaherty<br>Presenter: Vincent O'Flaherty | 5 | **Physiological heterogeneity in biofilm formation ability of a strong adhesive bacterium, *Acinetobacter* sp. Tol 5**<br>Shun'ichi Ishii, Jun Koki, Hisami Watanabe, Yasunori Tanji, Hajime Unno, and Katsutoshi Hori<br>Presenter: Katsutoshi Hori |

3:00-3:40 **Break**
(Avalon Ballroom)

## ORAL PRESENTATIONS
## October 25, Monday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Reactors<br>Session chairman: Christian Picioreanu | P# | Rooms 5-6 (combined)<br>Ecology/ Biofouling<br>Session chairman: Eugene Cloete |
|---|---|---|---|---|
| 1 | 3:40-4:00 | **Total nitrogen removal in an aerobic/anoxic membrane biofilm reactor system**<br>Jennifer Cowman, César Torres, and Bruce E. Rittmann<br>Presenter: Bruce E. Rittmann | 1 | **A polyphasic approach to study the structure, function, and eco-physiological interactions among community members in autotrophic nitrifying biofilms**<br>Satoshi Okabe, Tomonori Kindaichi, Yoshiyuki Nakamura and Tsukasa Ito<br>Presenter: Satoshi Okabe |
| 2 | 4:00-4:20 | **Acetate and ammonium diffusivity in membrane-aerated biofilms: Improving model predictions using experimental results**<br>J. W. Shanahan, A. C. Cole, M. J. Semmens and T. M. LaPara<br>Presenter: T. M. LaPara | 2 | **Distribution of biofilm and active bacteria in district heating systems**<br>B. V. Kjellerup, G. Gudmonsson and P.H. Nielsen<br>Presenter: B. V. Kjellerup |
| 3 | 4:20-4:40 | **Start-up of moving bed biofilm reactors for deammonification – the role of hydraulic retention time, alkalinity and oxygen supply**<br>T. Gaul, S. Märker and S. Kunst<br>Presenter: T. Gaul | 3 | **Effect of cationic surfactants on biofilm removal and mechanical stability**<br>M. Simões, M. O. Pereira, M. J. Vieira<br>Presenter: M. Simões |
| 4 | 4:40-5:00 | **Performance and structure of a nitrifying biofilm at low pH**<br>S. Tarre, M. Beliavski, M. Herzberg, N. Denekamp, A. Gieseke, D. de Beer and M. Green<br>Presenter: S. Tarre | 4 | **Distribution, dynamics and *in situ* ecophysiology of *Crenarchaeota* in anaerobic wastewater treatment granular biofilms**<br>G. Collins, T. Mahony, S. McHugh, A. Gieseke, D. de Beer and V. O'Flaherty<br>Presenter: G. Collins |

5:00-5:30 **Break**

5:30-7:30 **Poster Session**
Avalon Ballroom
Rooms 3-4 (combined)

7:30-9:30 **Dinner**
(Avalon Ballroom)

## October 26, Tuesday

7:00-8:00 **Breakfast**
(Avalon Ballroom)

## ORAL PRESENTATIONS
## October 26, Tuesday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Modeling<br>Session chairman: Oskar Wanner | P# | Rooms 5-6 (combined)<br>Bioremediation<br>Session chairman: Eric Arvin |
|---|---|---|---|---|
| 1 | 8:00-8:20 | **MATHEMATICAL MODELING OF BIOFILMS**<br><br>**Biofilm modeling task group presentations**<br>Oskar Wanner, Herman J. Eberl, Mark C. M. van Loosdrecht, Eberhard Morgenroth, Daniel R. Noguera, Julio Perez, Cristian Picioreanu , Gonzalo E. Pizarro, Bruce E. Rittmann, Alex O. Schwarz<br><br>OVERVIEW ON BIOFILM MODELS<br><br>Models considered, model assumptions<br>Results of benchmark modeling:<br>1. MONOSPECIES BIOFILM<br>2. INFLUENCE OF HYDRODYNAMICS<br>3. MULTISPECIES BIOFILM "DECISION MATRICES"<br><br>MODEL SELECTION PARAMETERS USED FOR BIOFILMS AND FOR ACTIVATED SLUDGE<br><br>SUMMARY AND CONCLUSIONS | 1 | **Competitive metabolism of polycyclic aromatic hydrocarbon (PAH) mixtures in porous media biofilms**<br>S.J. Rodríguez and P.L. Bishop<br>Presenter: S.J. Rodríguez |
| 2 | 8:20-8:40 | | 2 | **Push-pull test evaluation of the in situ aerobic cometabolism of chlorinated ethenes by toluene-utilizing microorganisms**<br>M.F. Azizian, J.D. Istok, and L. Semprini<br>Presenter: L. Semprini |
| 3 | 8:40-9:00 | | 3 | **Biodegradation of polychlorinated biphenyls using biofilm grown with biphenyl as carbon source in fluidized bed reactor**<br>J. Q. Borja, J. L. Auresenia and S. M. Gallardo<br>Presenter: J. Q. Borja |
| 4 | 9:00-9:20 | | 4 | **Biodegradation of polychlorinated biphenyls (PCBs) using acclimatized biofilm grown in easily biodegradable organics**<br>J. Auresenia, D. M. G. Taleon and S. M. Gallardo<br>Presenter: J. Auresenia |
| 5 | 9:20-9:40 | | 5 | **Cadmium transfer and distribution in a multi-species biofilm and the impact on naphthalene removal**<br>P. Jin and P. L. Bishop<br>Presenter: P. Jin |
| 6 | 9:40-10:00 | | 6 | **Immobilizing uranium in sulfate-reducing biofilms**<br>Marsili, E., Beyenal, H., Di Palma, L., Merli, C., Dohnalkova, A., Amonette, J.E., Lewandowski, Z.<br>Presenter: E. Marsili |

10:10:40 **Break**

## ORAL PRESENTATIONS
## October 26, Tuesday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Modeling<br>Session chairman: E. Morgenroth | P# | Rooms 5-6 (combined)<br>Bioremediation<br>Session chairman: Al Cunningham |
|---|---|---|---|---|
| 1 | 10:40-11:00 | **Evaluating heterotrophic growth in a nitrifying biofilm reactor using fluorescence *in situ* hybridization and mathematical modeling**<br>R. Nogueira, D. Elenter, A. Brito, L. F. Melo, M. Wagner and E. Morgenroth<br>Presenter: R. Nogueira | 1 | **Biodegradability and biodegradation kinetics of creosote compounds in a biofilm in a fractured clay flow model**<br>E. Arvin and K. Broholm<br>Presenter: E. Arvin |
| 2 | 11:00-11:20 | **A 3D model of antimicrobial action on biofilms**<br>S. M. Hunt, M. A. Hamilton, and P. S. Stewart<br>Presenter: P. S. Stewart | 2 | ***In situ* dominance and competitive advantage of a phenol-degrading strain in aerobic granules**<br>He-Long Jiang, Joo-Hwa Tay and Stephen Tiong-Lee Tay<br>Presenter: Stephen Tiong-Lee Tay |
| 3 | 11:20-11:40 | **Quantification of detachment forces on biofilm colonies in a rototorque reactor using Computational Fluid Dynamics tools**<br>R. Sudarsan, K. Milferstedt, E. Morgenroth, H. J. Eberl<br>Presenter: R. Sudarsan | 3 | **Short-term and long-term effects of oxygen on biological perchlorate reduction in biofilm reactors**<br>Choi, Y.C., Xi, C., Li, X., Raskin, L., and Morgenroth, E.<br>Presenter: Choi, Y.C |
| 4 | 11:40-12:00 | **Model-based evaluation of oxygen consumption in a partial nitrification-Anammox biofilm process**<br>X.-D. Hao, X.-Q. Cao, C. Picioreanu and M. C. M. van Loosdrecht<br>Presenter: X.-D. Hao | 4 | **Effect of exopolysaccharides on the adsorption of metal ions by *Pseudomonas* sp. CU-1**<br>T.C. Lau, X.A. Wu, H. Chua, P.Y. Qian and P. K. Wong<br>Presenter: P. K. Wong |

12:00-1:40 **Lunch**
(Avalon Ballroom)

## ORAL PRESENTATIONS
## October 26, Tuesday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm Modeling<br>Session chairman: Oskar Wanner | P# | Rooms 5-6 (combined)<br>Biofilm Structure<br>Session chairman: Per Halkjær Nielsen |
|---|---|---|---|---|
| 1 | 1:40-2:00 | **Finite element modeling to expand the UMCCA model to describe biofilm mechanical behavior**<br>C. S. Laspidou, B. E. Rittmann and S. A. Karamanos<br>Presenter: C. S. Laspidou | 1 | **Image Structure Analyzer-2 (ISA-2) for quantifying biofilm structure**<br>Haluk Beyenal, Conrad Donovan, Zbigniew Lewandowski, Gary Harkin<br>Presenter: Haluk Beyenal |
| 2 | 2:00-2:20 | **A mesoscale model for hydrodynamics in biofilms that takes microscopic flow effects into account**<br>V. Th. Nguyen, E. Morgenroth, H.J. Eberl<br>Presenter: H.J. Eberl | 2 | **ConAn a new software for 3-d analysis of biofilm images**<br>T. R. Neu, C. Staudt<br>Presenter: T. R. Neu |
| 3 | 2:20-2:40 | **Comparison of spatial organization in top-down-and membrane-aerated biofilms: a numerical study**<br>A. Bell, Y. Aoi, A. Terada, S. Tsuneda and A. Hirata<br>Presenter: A. Bell | 3 | **Investigation of biofilm structure, flow patterns and detachment with Magnetic Resonance Imaging (MRI)**<br>Bertram Manz, Frank Volke, Daniel Goll, Harald Horn<br>Presenter: Harald Horn |
| 4 | 2:40-3:00 | **3-D Simulations and structural parameters for a continuum biofilm model**<br>E. Alpkvist, N. C. Overgaard and A. Heyden<br>Presenter: E. Alpkvist | 4 | **NMR methods for *in-situ* biofilm metabolism studies: spatial and temporal resolved measurements**<br>Paul D. Majors, Jeffrey S. McLean, James K. Fredrickson, and Robert A. Wind<br>Presenter: Paul D. Majors |

3:00-3:40 **Break**
(Avalon Ballroom)

## ORAL PRESENTATIONS
## October 26, Tuesday

| P# | Start&end | Rooms 1-2 (combined)<br>Biofilm modeling<br>Session chairman: Bruce E. Rittmann | P# | Rooms 5-6 (combined)<br>Biofilm Structure<br>Session chairman: Haluk Beyenal |
|---|---|---|---|---|
| 1 | 3:40-4:00 | **A deterministic continuum model for the formation of EPS in heterogeneous biofilm architectures**<br>H.J. Eberl<br>Presenter: H.J. Eberl | 1 | **Rapid diffusion of fluorescent tracers into biofilms visualized by time lapse microscopy**<br>S. Abdul Rani, B. Pitts, and P. S. Stewart<br>Presenter: S. Abdul Rani |
| 2 | 4:00-4:20 | **Two-dimensional cellular automata model for nitrifying biofilms**<br>Carolina P. García, Gonzalo E. Pizarro, Rolando Moreno and Marcos E. Sepúlveda<br>Presenter: Gonzalo E. Pizarro | 2 | **Physicochemical parameters influencing the formation of biofilms compared in mutant and wild type cells of *Pseudomonas chlororaphis* 06**<br>A. J. Anderson, D. W. Britt, J. Johnson, G. Narasimhan<br>Presenter: G. Narasimhan |
| 3 | 4:20-4:40 | **Simulation of turbulence and dissolved oxygen concentration profiles over biofilm using k-epsilon turbulence model**<br>H. Nagaoka and K. Sanda<br>Presenter: H. Nagaoka | 3 | **Modelling biofilm structure and growth using image metrics based on phase interfacial areas**<br>P. Saripalli, G. Petrie and G. Holtom<br>Presenter: G. Holtom |
| 4 | 4:40-5:00 | **Hierarchical modeling approach for the prediction of effective hydraulic permeability and diffusion coefficient in biofilms**<br>G.E. Kapellos, T.S. Alexiou, S. Pavlou, and A.C. Payatakes<br>Presenter: G.E. Kapellos | 4 | **Abrasion as a major source of macroscale heterogeneity in biofilm development in an annular reactor**<br>K. Milferstedt and E. Morgenroth<br>Presenter: K. Milferstedt |
| 5 | 5:00-5:20 | **Qualitative and quantitative changes in marine biofilms as a function of temperature and salinity in summer and winter**<br>J. M. Y. Chiu, V. Thiyagarajan, M. M. Y. Tsoi, P. Y. Qian<br>Presenter: J. M. Y. Chiu | 5 | **Formation and structure of granulated microbial aggregates used in aerobic wastewater treatment**<br>V. Ivanov, S.T.-L. Tay, Q.-S. Liu, Q.-H. Wang, and J.-H. Tay<br>Presenter: V. Ivanov |
| 6 | 5:20-5:40 | **Correlation between *Desulfovibrio sessile* growth, open circuit potential and hydrogen permeation**<br>M. F. de Romero and I. Araujo<br>Presenter: M. F. de Romero | 6 | **Influence of COD/$NH_4^+$-N ratio on biofilm structure in a suspended carrier biofilm reactor**<br>R. C. Wang, X. H. Wen and Y. Qian<br>Presenter: R. C. Wang |
| 7 | 5:40-6:00 | **Study on the efficiencies of biofilm membrane bioreactor in nitrogen and phosphorus removal**<br>Yingjun Cheng, Hanmin Zhang, Lifen liu, Xingwen Zhang, Fenglin Yang, Kenji Furukawa<br>Presenter: Yingjun Cheng | 7 | |

# POSTER PRESENTATIONS

Monday, October 25 - 5:30 pm - 7:30 pm
Avalon Ballroom
Rooms 3-4 (combined)

**BIOFILM REACTORS**

| | |
|---|---|
| **1** | **Use of a plug-flow biofilm reactor as toxicity indicator for pharmaceutically active compounds and their chlorinated products: naproxen as a chemical model**<br>S. Y. Zhang, G. R. Boyd and D. A. Grimm<br>Presenter: S. Y. Zhang |
| **2** | **Performance benchmarking of the membrane-aerated biofilm reactor: preliminary studies**<br>E. Syron and E. Casey<br>Presenter: E. Casey |
| **3** | **Moving bed biofilm reactor: Biofilm disfunction in nutrients shortage**<br>Pasinetti E., Emondi V.<br>Presenter: Pasinetti E. |
| **4** | **Dynamics of organic carbon and of bacterial populations in a conventional pretreatment train of a reverse osmosis unit experiencing severe biofouling**<br>R. P. Schneider, L. M. Ferreira, P. Binder, E. M. Bejarano, K. P. Góes, E. Slongo, C. R. Machado and G. M. Z. Rosa<br>Presenter: R. P. Schneider |
| **5** | **Pilot studies of a membrane-aerated biofilm reactor for wastewater treatment**<br>M. J. Semmens, J.W. Shanahan, and A. Cole<br>Presenter: J.W. Shanahan |
| **6** | **Start-up and operation of a biologic reactor for the treatment of herbicides**<br>Castro-González, A, Prieto-Jiménez, D, and Merino-Castro, G<br>Presenter: Castro-González, A |
| **7** | **Azo dye decolourisation by air-lift reactor packed with *Opuntia imbricata* used as support to create aerobic biofilm**<br>Sosa-Santillán, G.J., Estrada-Rivera, R., Garza-García, Y. and Rodríguez-Martínez, J.<br>Presenter: Sosa-Santillán, G.J. |
| **8** | **Biofilm characteristics according to different organic loading rates in up-flow Biobead® process implicated as a middle and small size sewage treatment**<br>M H. Kim, D.H. Ju, S. H. Lee and J. O. Ka<br>Presenter: M H. Kim |
| **9** | ***Opuntia imbricata* as support for anaerobic biofilm in an UASB for high nitrate denitrification**<br>J. Rodríguez-Martínez*, Y. Garza-García, G.J. Sosa-Santillán, J.C. Mata-Berlanga and S.Y. Martínez-Amador<br>Presenter: Y. Garza-García |
| **10** | **Interrelation between the biofilm activity for nitrogen removal and the organic support in a trickling filter**<br>M.A. Garzón-Zúñiga, P. Lessard and G. Buelna<br>Presenter: M.A. Garzón-Zúñiga |
| **11** | **Nitrate removal from drinking water via a novel hydrogenotrophic silicone-attached biofilm reactor**<br>Chun-Ming Ho and Jing-Sung Tsai<br>Presenter: Jing-Sung Tsai |
| **12** | **Simultaneous nitrification and denitrification in biofilms of an engineered integrated fixed-film activated sludge (IFAS) System**<br>David Krichten and Curtis McDowell<br>Presenter: David Krichten |

## ECOLOGY

| | |
|---|---|
| **1** | **Extracellular Polymeric Substances (EPS) in biofilms – a different point of view on structure, function and activity**<br>T.R. Neu, J. R. Lawrence<br>Presenter: T.R. Neu |
| **2** | **Microbial community dynamics of particulate biofilm during the anaerobic treatment of synthetic industrial wastewater**<br>Colm Scully, Gavin Collins and Vincent O'Flaherty<br>Presenter: Gavin Collins |
| **3** | **An immunoassay for quantifying nitrification activity in a submerged attached growth biofilter**<br>M. Litman, N. Chiu, P. Pedros, E. Spieck and J. Wang<br>Presenter: M. Litman |
| **4** | **Microbiological and physicochemical characterisation of paper mill biofilms**<br>K.R. Sreekumari, L. Davey, K.T. Leung, H. Schraft, A. Chen, N. Low, L. Truelstrup-Hansen, A. Paulson, and D. Pink<br>Presenter: K.R. Sreekumari |
| **5** | **The difference of autotrophs/ heterotrophs fraction and ions profiles in a fixed biofilm BNR process with different media packing ratio and HRTs for treating municipal wastewater with low COD/$NH_4^+$-N ratio**<br>Mi-Hwa Kim, Tae-Joo Park<br>Presenter: Mi-Hwa Kim |
| **6** | **Pluronics® modify bacterial traits in a pseudomonad**<br>A.J. Anderson, D.W. Britt, H.R. Hall, S. Mann, G. Narasimhan<br>Presenter: G. Narasimhan |
| **7** | **Artifact in viability staining of biofilm bacteria with BacLight**<br>W.M. Davison, R. Xu, and P.S. Stewart<br>Presenter: W.M. Davison |
| **8** | **Changes in CoNS biofilm formation, composition, structure and antimicrobial resistance due to growth in sub-inhibitory concentrations of dicloxacillin**<br>N.Cerca, S. Martins, S. Sillankorva, G. Pier, R. Oliveira, J. Azeredo<br>Presenter: R. Oliveira |
| **9** | **Study of surface characteristics of water-exposed *Helicobacter pylori* and plumbing materials**<br>N. F. Azevedo, A. P. Pacheco, A. R. Pinto, C. W. Keevil and M. J. Vieira<br>Presenter: N. F. Azevedo |
| **10** | **Feasibility of using hyperspectral imaging incorporated into a mobile biofilm unit to detect perturbations in water quality**<br>P.A. Suci, S.L.Cady, P. Gentile, P. Stoodley<br>Presenter: P.A. Suci |
| **11** | ***Escherichia coli* capture from the bulk fluid by an established *Pseudomonas aeruginosa* biofilm in a capillary flow cell**<br>B.J. Klayman, P.S. Stewart, and A.K. Camper<br>Presenter: B.J. Klayman |
| **12** | **Role of AI-2 and quorum sensing in the regulation of *Mycobacterium avium* biofilm formation and maturation**<br>H. Geier and T. E. Ford<br>Presenter: H. Geier |

| | |
|---|---|
| **13** | **Bacterial community analysis of nitrifying biofilm reactors with different loading rates of low C/N ratio wastewater by using FISH and PCR-DGGE**<br>T. H. Lee, Y. O. Kim, S. H. Jeong, S. J. Moon, and T. J. Park<br>Presenter: T. J. Park |
| **14** | **Differences in adhesion and biofilm formation among *Candida albicans* and *Candida dubliniensis***<br>M. Henriques, B. Fontinha, J. Azeredo and R. Oliveira<br>Presenter: M. Henriques |
| **15** | **Microbiological communities in an experimental structure for recovery of water quality in small polluted rivers**<br>Ramírez-Baca, N., Saucedo-Teran, R., Manzanares-Papayanopoulos, L,I., Carrazco-Palafox, J., Nevárez-Moorillón, G.V.<br>Presenter: Nevárez-Moorillón, G.V. |
| **16** | **Determination of biofilm microorganisms in cooling water towers and characterization of their extracellular polysaccharides**<br>N. Ceyhan and G. Ozdemir<br>Presenter: N. Ceyhan |
| **17** | **Quorum-sensing and its influence on biofilm formation**<br>Qi Zhihua, Yu Xin, Yu Ping, Xia Mingfang and Sun Cheng<br>Presenter: Yu Xin |

## BIOFOULING

| | |
|---|---|
| **1** | **Effect of two temperatures on flagellation, initial adhesion and biofilm formation of different *Listeria monocytogenes* strains**<br>M. Chae and H. Schraft<br>Presenter: H. Schraft |
| **2** | **Efficiency of chlorine, chlorine dioxide and UV-C irradiation on biofilm removal and prevention in silicone tubes with running tap water**<br>A. Otte, V. Vacata, M. Exner, J. Gebel<br>Presenter: A. Otte |
| **3** | **Surface characterization of biofilm of *Streptococcus mutans* grown on polyethylene and Beta-titanium**<br>E. S. Najar, A. Leduc, M. Zoughlami, J. Barbeau Y. L. Yahia<br>Presenter: A. Leduc |
| **4** | **Silver doped silane coatings to control microbiologically induced corrosion**<br>M. Y. Wu, K. Suryanarayanan, W. van Ooij, and D. B. Oerther<br>Presenter: D. B. Oerther |
| **5** | **Antimicrobial properties of various biocides against biofilm bacteria isolated from cooling waters of a petrochemical industry**<br>G. Ozdemir, R. Isler, F. Akirmak, T. Cosar, N. Ceyhan<br>Presenter: G. Ozdemir |
| **6** | **Study of antifouling paints by scanning electronic and confocal laser microscopies**<br>Fabienne Faÿ, Isabelle Linossier, Valérie Langlois, Karine Vallée-Réhel, Nathalie Bourgougnon, Philippe Guerin, Dominique Haras<br>Presenter: Fabienne Faÿ |
| **7** | **Biofilm recovery after treatment with an anionic and a cationic surfactant at sublethal concentrations**<br>M. Simões, M. O. Pereira, M. J. Vieira<br>Presenter: M. Simões |

| | |
|---|---|
| **8** | **Comparison of disinfection efficiency of silver compounds and chlorine for bacterial suspensions and biofilms**<br>Jaeeun Kim, Jee Yeon Kim, Jeyong Yoon<br>Presenter: Jaeeun Kim |
| **9** | **Biofilm formation by bacterial contaminants of fuel ethanol production**<br>K. A. Skinner-Nemec and T. D. Leathers<br>Presenter: K. A. Skinner-Nemec |
| **10** | **Quantification of the effect of flowrate on the rates of arrival and permanent attachment to glass of *Pseudomonas aeruginosa***<br>J.D. Boyle and H. Lappin-Scott<br>Presenter: J.D. Boyle |
| **11** | **Development of a flow model system for investigating biofilm formation on polymers in drinking water and its application on PVC-C and PVC-P**<br>C. B. Corfitzen, H.-J. Albrechtsen<br>Presenter: H.-J. Albrechtsen |

## BIOFILM MODELING

| | |
|---|---|
| **1** | **Computer model of persister cell protection mechanism of biofilms against antimicrobial agents**<br>J. D. Chambless and P. S. Stewart<br>Presenter: J. D. Chambless |
| **2** | **An investigation of Dockery-Klapper's biofilm model in the growth- and transport-limited extreme cases**<br>Niels Chr. Overgaard and Erik Alpkvist<br>Presenter: Erik Alpkvist |
| **3** | **Tridimensional simulation of *Pseudomonas fluorescens* biofilm growth with a cellular automata**<br>G. Merino, A. Castro, C. Garbi, M. Martin, R. Alonso-Sanz , L. Casasús<br>Presenter: G. Merino |
| **4** | **Parameter estimation of initial bacterial attachment using a dynamic model**<br>J.A. Harwood, W. Uhl, A. Palinski, A.B. Cunningham, A.K. Camper<br>Presenter: J.A. Harwood |

## BIOREMEDIATION

| | |
|---|---|
| **1** | **Dynamics of aromatic compounds degrading anaerobic microbial groups in a biofilm formed on *Opuntia imbricata***<br>J. A. Morlett Chávez, N. Balagurusamy, K. Gurumurthy, J. Rodriguez Martínez and Y. Garza García<br>Presenter: Nagamani Balagurusamy |
| **2** | **Poly-β-hydroxybutyrate metabolism in a biofilm reactor**<br>C. Alves, R. Nogueira and A. Brito<br>Presenter: R. Nogueira |
| **3** | **Bioremediation of hexavalent chromium from seawater using bagasse biofilm**<br>Kishore K. Krishnani, Xioaguang Meng, I.S.Azad, Reba Mukherjee, Abebayo Ogundipe and Peter Krsko<br>Presenter: Kishore K. Krishnani |

## BIOFILM STRUCTURE

| | |
|---|---|
| **1** | **Murphy's law, protozoa, and biofilm structures**<br>C.Staudt, H. Horn, D.C. Hempel, T.R. Neu<br>Presenter: T.R. Neu |
| **2** | **Image analysis for quantification of statically cultured *S.aureus* biofilms on biomaterial surface**<br>T. Tsurumoto, A. Yonekura, S. Nishimura, K. Adachi, M. Osaki1, Y. Hiragata, H. Shindo<br>Presenter: T. Tsurumoto |
| **3** | **Influence of shear stress on structure of particle supported biofilms - Investigation with confocal laser scanning microscopy (CLSM)**<br>M. Bößmann, S. Hübner, T. R. Neu, H. Horn, D. C. Hempel<br>Presenter: H. Horn |
| **4** | **Relations between minerals and biofilm organic matrix during its formation in river water systems**<br>P. Hiernaux, J.-H. Thomassin and N. Merlet<br>Presenter: P. Hiernaux |
| **5** | **Biofilm activity as determined by fluorescence lifetime imaging (FLIM)**<br>P. Walczysko, U. Kuhlicke, T. R. Neu<br>Presenter: T. R. Neu |
| **6** | **PHLIP: Image bioinformatics for the quantitative analysis of multi-channel confocal laser scanning microscopy data**<br>L. N. Mueller, J. F.C. de Brouwer, J. B. Xavier and J. S. Almeida<br>Presenter: L. N. Mueller |