



**4<sup>th</sup> European Conference on Microfluidics**  
10th – 12th December 2014  
Limerick, Ireland

**Wednesday 10 December**  
**Room Ballroom**

**10h00 - 10h30**

**Conference welcome**

**10h30 - 11h15**

**Plenary 1**

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*Chair Person: S. Colin*

**10:30 Multi-Scale Modelling of Micro/Nano Flows**  
D. Lockerby

*11:15 – 11:45: Coffee break*

**11h45 - 13h00**

**Session 1A - Boiling - Phase Change Phenomena**

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*Chair Person: W. Luan*

**11:45 Evaporation, Capillary Invasion and Gas Dissolution in Nanochannels**  
A. Naillon, H. Tarbague, A. Gourbil, S. Geoffroy, M. Prat and P. Joseph

**12:05 Influence of Temperature on the Performance of an Evaporation Driven Micro Pump**  
C. Nie, A. Frijns, R. Mandamparambil and J. Den Toonder

**12:25 Detailed Visualization Techniques of Evaporating Two-Phase Flow and Phase Transition Phenomena in Microchannels**  
S. Maikowske and J. Brandner

**12:45 Evaporation of Water in Microchannel Heat Exchangers for Energy Recovery from Exhaust Gases**  
S. Maikowske, F. Goetz and J. Brandner

**12:50 The Study of Boiling Crisis of Nanofluids on the Microsurface**  
A. Minakov, A. Lobasov, M. Pryazhnikov, A. Seryshev and V. Rudyak

**12:55 Heat Transfer in High Field Magnets**  
F. Debray, C. Trophime and J.-P. Franc

**Wednesday 10 December**  
**Room Barrington**  
**11h45 - 12h50**

**Session 1B - Gas Microflows I**

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*Chair Person: L. Baldas*

**11:45 Molecular Simulation of Water Vapor Outgassing from Silica Nanopores**

J. Kim, A. Frijns, S. Nedea and A. Van Steenhoven

**12:05 Shock Wave Attenuation Study at Micro-Scales**

P. Perrier, J. Giordano and M. Brouillette

**12:25 Semi-Local Friction Factors of Gas Flow in Rectangular Microchannels**

C. Hong, T. Nakamura, Y. Asako and I. Ueno

**12:45 Experimental Investigation of the Laminar-Turbulent Transition in Supersonic Axisymmetric Microjet**

V. Aniskin, S. Mironov, A. Maslov and I. Tsyrlunikov

*13:00 – 14:15: Lunch*

**Wednesday 10 December**  
**Room Ballroom**  
**14h15 - 15h20**

**Session 2A -Thermal Transport in Microfluidics**

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*Chair Persons: D. Maillet, J. Stafford*

- 14:15 Asymmetry and Geometry Effects on the Dynamic Behavior of a Pulsating Heat Pipe**  
G. Gürsel, A. Frijns, E. Homburg and A. Steenhoven
- 14:35 Viscous Dissipation Effect on Heat Transfer in Micro-Channels Filled with Porous Media under Local Thermal Non-Equilibrium Conditions**  
B. Buonomo, O. Manca and G. Lauriat
- 14:55 Lateral Heat Losses in a Flat Minichannel**  
W. Al Hadad, Y. Jannot and D. Maillet
- 15:15 Assessment of Micro Structures on Heat Transfer and Pressure Drop Behavior**  
I. Gerken, J. Brandner and R. Dittmeyer

**Wednesday 10 December**

**Room Barrington**

**14h15 - 15h25**

## **Session 2B - Sensors and Actuators**

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*Chair Persons: W. Hilber, P. Perrier*

- 14:15 Novel Portable Device Based on Microfluidic System for Indoor Air BTEX Monitoring**  
R. Nasreddine, S. Le Calvé, C. Trocquet, V. Person, B. Hanoune, S. Dusanter, C. Serra and J. Brandner
- 14:35 Active Micro Mixer Based on 3D-Printed Sacrificial Kernels**  
S. Zou, W. Luan and J. Brandner
- 14:55 Development of a Micro Opto-fluidic Sensor for Continuous Selective In-Line Monitoring of Electrolytes**  
M. Sharma, A. Frijns, R. Mandamparambil, J. Kooman and D. Smeulders
- 15:15 Numerical and Experimental Characterization of a Micro-Oscillator for Flow Control**  
S. Wang, L. Baldas, S. Colin, N. Mazellier and A. Kourta
- 15:20 Assessment of Probe-to-Specimen Distance Effect in Kidney Stone Treatment with Hydrodynamic Cavitation**  
D. Uzusen, O. Oral, S. Ekici, M. Unel, D. Gozuacik and A. Kosar

*15:30 – 16:00: Coffee break /posters /exhibition*

**Wednesday 10 December**  
**Room Ballroom**  
**16h00 - 17h15**

**Session 3A - Lab on a Chip I**

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*Chair Person: J. Ducree*

- 16:00 Laboratory Unit Operations on Centrifugal Lab-on-a-Disc Cartridges using Dissolvable-Film Enabled Flow Control**  
D. Kinahan, M. Glynn, N. Kilcawley, S. Kearney and J. Ducree
- 16:20 Microfluidic Flow Cytometry Based on Spatially Modulated Excitation with Self-Aligning and Calibration Free Optical Interface for Circulating Tumor Cell Detection**  
S. Quint, L. Schott, J. Wittek, P. Spang, T. Walther and M. Bassler
- 16:40 Blood-Based Point-of-Care Medical Diagnostics Using Microfluidic Dual-Force Magnetophoresis**  
M. Glynn, D. Kirby, R. Burger, D. Kinahan and J. Ducree
- 17:00 Reciprocating, Buoyancy-Driven Radial Pumping on Centrifugal Microfluidic Platforms**  
N. Kilcawley, D. Kinahan, D. Kernan and J. Ducree
- 17:05 The Microfluidic Technology Meets the Lateral Flow Immunochromatographic Technology for Making a Point of Care Device**  
H. Madadi, M. Mohammadi and J. Casals-Terré
- 17:10 Continuous, Stopped-Flow Separation for Integrated Blood Cell Enrichment and Analysis on Centrifugal Microfluidic Platforms**  
D. Kirby, C. O'Connell and J. Ducree

**Wednesday 10 December**  
**Room Barrington**  
**16h00 - 17h10**

**Session 3B - Slug Flow Microfluidics**

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*Chair Person: Z. Silber-Li*

**16:00 Dynamics and Rheology of Droplets in Confined Geometries: a Lattice Boltzmann Study**

M. Sbragaglia, R. Scatamacchia and A. Gupta

**16:20 Experimental Study on the Two-Phase Flow Sensitivity to the Input Flow Rates in a Serpentine Microchannel**

M. Bucolo and S. Gagliano

**16:40 Three-Dimensional Simulation of Droplet Deformation and Break-Up in Simple Shear Flow Using the Lattice Boltzmann Method**

N. Ioannou, H. Liu and Y. Zhang

**17:00 Study on Continuous Emulsification by Using Microstructured Devices**

Y. Li, M. Wengerter, I. Gerken, H. Nieder, S. Scholl and J. Brandner

**17:05 Numerical Simulation of Two-Phase Flow in Mini and Microchannels**

A. Minakov, D. Guzei and V. Rudyak

*19:00 – 23:00: Reception at the University Pavilion*

**Thursday 11 December**  
**Room Ballroom**  
**9h00 - 10h40**

**Session 4A - Nanofluidics**

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Chair Person: A. Frijns

- 9:00 Stability of Superhydrophobic State on Complex Surface via Molecular Dynamics Simulations**  
M. Amabili, A. Giacomello, S. Meloni, M. Chinappi and C. Casciola
- 9:20 Investigation of the Thermal Conductivity of a Water-Copper Nanofluid Confined in a Graphene NanoChannel**  
M. Frank and D. Drikakis
- 9:40 Acoustical Micro- and Nanofluidics: Synthesis, Assembly and other Applications**  
E. Sackmann, L. Ghislain, D. Harris, M. Sonntag, S. Rajeswari, R. Stearns and S. Datwani
- 10:00 Development of a Stand-Alone Hard-Anodization Module for Finely Tuned Nanoporous Membrane Autonomous Fabrication**  
V. Raspal, C. Massard, G. Bouchaud, L. Jouve, Y. Sibaud and K. Awitor
- 10:20 Dynamics of Water Confined in Reverse Micelles**  
T. Kaneko, H. Sakai and I. Ueno

**Thursday 11 December**  
**Room Barrington**  
**9h00 - 10h45**

**Session 4B - Biomicrofluidics I**

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*Chair Person: T. Dalton*

- 9:00 Hydrodynamic Interactions of Deformable Objects in Microfluidic Channels**  
A. Sen, P. Sajeesh and M. Doble
- 9:20 A Microfluidic Device to Study Red Blood Cell Deformability**  
W. El-Nemer, P.A. Ndour, S. Lefevre, H. Tawfik, J. Picot, B. Le Pioufle, P. Buffet, C. Le Van Kim and O. Français
- 9:40 Design Parameters for Deterministic Lateral Displacement Separation Technique in bio-MEMs**  
A. Khater, M.N. Sabry and H. Abdelmeguid
- 10:00 A Microfluidic Device to Determine Dielectric Properties of a Single Cell: a Combined Dielectrophoresis and Electrorotation Technique**  
C.I. Trainito, O. Français and B. Le Pioufle
- 10:20 The Development of a Microfluidic Cell Culture Instrument**  
M. Keays, P. Kiely and T. Dalton
- 10:25 Continuous Sorting and Concentration of Viable and Non-Viable *Cryptosporidium parvum* Ovocysts Using Dielectrophoresis**  
J. McGrath, M. Jimenez and H. Bridle
- 10:30 On-Chip Study of Tissue Related Cancer Complications**  
G. Benazzi, K. McKenzie, N. Pamme, K. Shaw, L. Madden and S. Haswell
- 10:35 Self-powered Efficient Blood Plasma Separator Microfluidic Chip for Multifunctional Blood Analysis**  
H. Madadi, M. Mohammadi and J. Casals-Terré
- 10:40 Reproducing Topography and Roughness of Osteoconductive Materials in a Microfluidic Device for Bone Tissue Engineering**  
B. David, E. Perrin, M. Lazaar, M. Chabanon, B. Le Pioufle and O. Français

*10:45 – 11:15: Coffee break /posters /exhibition*



**Thursday 11 December**

**Room Ballroom**

**11h15 - 12h55**

**Session 5A - Mass Transport in Microfluidics**

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*Chair Person: M. Rossi*

- 11:15 Electrowetting-Induced Mass Transfer Enhancement and Surface Ageing at Drop Scale**  
J. Theisen and L. Davoust
- 11:35 SAW Technology for Microfluidics and Considerations about Efficiency**  
R. Bruenig, A. Winkler, S. Wege and H. Schmidt
- 11:55 Fuss-Free Microfluidic Particle Transportation by Optical Scattering Force**  
M. Motosuke and H. Kotari
- 12:15 Experimental and Numerical Investigations of Ionic Liquid- Aqueous Flows in Small Channels for Europium Recovery**  
Q. Li, D. Tsaoulidis and P. Angeli
- 12:35 Numerical and Experimental Analysis of the Splitting of Water Laminar Flow into a Micro T-Junction**  
G. Puccetti, P. Vocale, S. Eberhardt, B. Pulvirenti, J. Brandner and G.L. Morini
- 12:40 PDMS Membrane with Integrated Nozzle-Diffuser Structure for Peristaltic Pumping of Fluids in Microfluidic Structures**  
W. Hilber, S. Clara and B. Jakoby
- 12:45 Kinetics of Antibody Release from Gelatine Layers for On-Chip Sample Preparation**  
X. Zhang, D. Wasserberg, L.W.M.M. Terstappen and M. Beck
- 12:50 On-Chip Processing of Food and Blood Samples via Acoustophoresis for Pathogen Pre-Concentration and Analysis**  
B. Ngamson, M. Lopez-Martinez, J.-C. Raymond, P. Broyer, P. Patel and N. Pamme

**Thursday 11 December**  
**Room Barrington**  
**11h15 - 12h50**

**Session 5B - Droplets and Digital Microfluidics**

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*Chair Persons: M. Marengo, C. Serra*

**11:15 A Si Based Lab-on-a-Chip for Digital Droplet PCR**

R. Wiederkehr, B. Jones, B. Majeed, F. Colle, W.C. Chen, T. Stakenborg, P. Fiorini, L. Lagae, K. Schimdt and L. Stuyver

**11:35 Polyelectrolyte Coating onto Magnetic Droplets - Towards Continuous Flow Assembly of Drug Delivery Capsules**

A. Al-Orabi, M. Tarn, V. Paunov and N. Pamme

**11:55 Numerical Simulation of the Trapping of a Micro-droplet in a Well of Surface Energy Using the Lattice Boltzmann Method**

H. Liu, J. Li and Y. Zhang

**12:15 Droplet Confinement and Leakage: Causes, Underlying Effects and Amelioration Strategies**

A. Debon, R. Wootton and K. Elvira

**12:35 Micro Droplet Generation, Capturing and Storage in a Multi-Chamber Carrier for Evaluation of Soil Microbial Communities**

M. Kielpinski, K. Bergmann, C. Gärtner, A. Gross, M. Köhler and T. Henkel

**12:40 On-Chip Droplet Polymerisation - Amphiphilic Microgels from Hydrophobic Droplets**

B. Lu, M. Tarn, N. Pamme and T. Georgiou

**12:45 History Dependent Shape of Droplets Pinned to a Substrate. Towards a Predictive Model of Droplet Mobilization in Partially Wetting Microreactors**

M. Musterd, V. Van Steijn, C. Kleijn and M. Kreutzer

*13:00 – 14:15: Lunch*

**Thursday 11 December**

**Room Ballroom**

**14h15 - 15h00**

## **Plenary 2**

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*Chair Person: J. Brandner*

**14:15 Microfluidic Cooling of Photonic Integrated Circuits (PICS)**

N. Jeffers, J. Stafford, K. Nolan, B. Donnelly, R. Enright, J. Punch, A. Waddell, L. Ehrlich, J. O'Connor, A. Sexton, R. Blythman and D. Herson

*15:00 - 15:30: Coffee break /posters /exhibition*

**15h30 - 17h00**

**Room Ballroom**

## **Session 6A - Gas Microflows II**

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*Chair Person: Y. Zhang*

**15:30 Role of Diffusion on Molecular Tagging Velocimetry Technique for Rarefied Gas Flow Analysis**

A. Frezzotti, H. Si Hadj Mohand, C. Barrot and S. Colin

**15:50 Rarefied Gas Flow and Heat Transfer in a Microcavity Heated by a Wall Heat Flux**

G. Tatsios, D. Valougeorgis and S. Stefanov

**16:10 The Structure of the Supersonic Two-Dimensional Microjets**

V. Aniskin, A. Maslov, S. Mironov, I. Tsyrunikov and I. Timofeev

**16:30 Heat Transfer through a Rarefied Polyatomic Gas Confined between Parallel Plates**

C. Tantos, D. Valougeorgis, M. Pannuzzo and A. Frezzotti

**16:50 Oscillatory Couette Flow of Binary Rarefied Gas Mixture**

M.T. Ho, J.-D. Parisse and I. Graur

**16:55 Numerical Investigation of a Novel Knudsen Pump with Two Ratchet Surfaces**

J. Chen, S. Colin, L. Baldas and C. Barrot

**Thursday 11 December**

**Room Barrington**

**15h30 - 17h10**

**Session 6B - Multiphase and Reactive Microflows**

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*Chair Person: P. Watts*

- 15:30 Development of a Micro Reactor for the Isobutane Oxidation as a Multiphase Process**  
T. Willms, H. Kryk, M. Wiezorek and U. Hampel
- 15:50 Lateral Migration of Particles in Square Microchannels at Low Flow Inertia**  
Y. Gao, P. Magaud, L. Baldas, C. Lafforgue-Baldas, M. Abbas, P. Schmitz and S. Colin
- 16:10 Continuous Production of Organic Polymers in Microstructure Reactors: Feasibility and Scale-up**  
J. Bucko and J. Brandner
- 16:30 Supercritical Microfluidics: Phase Equilibria, Chemical Reactivity and Nanostructures Synthesis at High Pressure and Temperature**  
S. Marre, B. Pinho, Y. Roig, E. Ilin, T. Gendrineau, C. Lecoutre, Y. Garrabos and C. Aymonier
- 16:50 The Use of Microfluidics in Developing Continuous Chemical Manufacture**  
P. Watts
- 16:55 Production of Size-Tunable Nanoemulsions in an Elongational Flow Microdevice and its Application to the Synthesis of Multi-Scale Composite Polymeric Microparticles**  
W. Yu, N. Visaveliya, I. Khan, C. Serra, M. Koehler, R. Muller, Y. Holl, M. Bouquey
- 17:00 Fabrication of Complex Polymersomes Using Microfluidic Co-Flow**  
A. Perro, J.-F. Le Meins, S. Lecommandoux and A. Colin
- 17:05 SAMs Vapor deposition technology as a generic functionalization technology for Monitoring Wettability properties in microfluidic devices**  
R. Courson, M. Fouet, A. Naillon, P. Joseph, F. Mesnilgrente, V. Conedera and A.-M. Gue

*17:15: End of day 2 sessions*

*19:00: Social Event at Thomond Park*

**Friday 11 December**  
**Room Ballroom**  
**9h00 - 9h45**

**Plenary 3**

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*Chair Person: G.L. Morini*

**9:00 Electric and Acoustic Boundary Layers in Microfluidics**  
H. Bruus

**9h45 - 11h10**

**Session 7A - Thermal Management of Electronics**

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*Chair Persons: J. Stafford, D. Maillet*

**9:45 Optimisation of Segmented Two-Phase Flow Networks for Fluid and Heat Transport**  
J. Stafford

**10:05 Local Thermo-Hydrodynamics of a Liquid Plug Pulsating inside a Dry Capillary Tube**  
S. Kumar, B. Mehta, A. Bajpai and S. Khandekar

**10:25 Toward a Design of a Micro Pulsating Heat Pipe**  
M. Manzoni, M. Mamei, C. Defalco, L. Araneo, S. Filippeschi and M. Marengo

**10:45 Radial Hierarchical Microfluidic Evaporative Cooling for 3-D Integrated Microprocessors**  
C.L. Ong, S. Paredes, A. Sridhar, B. Michel and T. Brunschweiler

**11:05 "Microworld and Microflows": Initiating School Children to Microfluidics**  
W. Mielczarek, T. Aspray, F. Mallevre, M. Jimenez, J. McGrath, P. Cameron, H. Bridle and M. Kersaudy-Kerhoas

**Friday 12 December**  
**Room Barrington**  
**9h45 - 11h05**

**Session 7B - Lab on a Chip II**

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*Chair Person: R. Ferrigno*

- 9:45 Manipulation of Rare Cells in Microfluidic Devices Using Magnetophoresis and Dielectrophoresis Based on Composite-PDMS**  
J. Marchalot, R. Gelszinnis, A.-L. Deman, M. Faivre, J.-F. Chateaux, C. Rivière, I. Mertani and R. Ferrigno
- 10:05 A Capillary Pump With a Controllable Filling Pattern for Lab on a Chip Applications**  
B. Jones, A. Taher, B. Majeed, P. Fiorini, L. Lagae and P. Peumans
- 10:25 A Microfluidics Tool for High-Throughput, Real-Time Multimodal Imaging of Nanoparticle-Cell Interactions**  
C. Cunha-Matos, O. Millington, A. Wark and M. Zagnoni
- 10:45 Monitoring Endothelial Cell Dysfunction at single Cell level utilizing “Living Photonics” (LiPhos) Concepts**  
D. King, M. Glynn, R. Burger, D. Kurzbuch, S. Kearney and J. Ducree
- 10:50 Noninvasive Tumor Cell Selective Separation: Development of a Microfluidic Platform for the Detection, Monitoring and Insulation**  
A. Martin, M.M. Bou-Ali, I. Gonzalez, V. Acosta, J. Berganzo, M. Tijero, J.L. Soto, A. Castillejo and N. Lopez
- 10:55 Microfluidic “Lab-in-a-Trench” Platform based Sequential Glycan Profiling on the Single Cell Level**  
D. King, T. O’Connell, C. Dixit, B. O’Connor, D. Walls and J. Ducree
- 11:00 Design and Operation of an Experimental Setup for Heterogeneous Catalyzed Gas-Phase Reactions under Rarefied Conditions**  
A. Mikos, T. Bauer, J. Brandner and R. Lange

*11:05 - 11:30: Coffee break /posters /exhibition*

**Friday 11 December**  
**Room Ballroom**  
**11h30 - 13h10**

**Session 8A - Biomicrofluidics II**

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*Chair Person: P. Joseph*

**11:30 Silicon Micropillar Array Chips for Fast DNA and RNA Chromatography**

L. Zhang, P. Fiorini, B. Majeed, L. Lagae and W. De Malsche

**11:50 A Gene Expression Profile for Predicting Metastatic Disease**

C. Hayes, P. Kiely and T. Dalton

**12:10 A Microfluidic Platform for Serial Formation of Droplet-Interface-Bilayers  
for Membrane Protein Studies**

B. Schlicht and M. Zagnoni

**12:30 How Could Microfluidics be Applied for Waterborne Pathogen Detection?**

M. Jimenez, B. Miller, J. McGrath and H. Bridle

**12:50 Multiplexed Isolation of Food-Borne Pathogens via On-Chip Free-Flow  
Magnetophoresis**

B. Ngamson, M. Esfahani, J.-C. Raymond, P. Broyer, P. Patel and N. Pamme

**12:55 Hydrodynamic Models of a Microchannel System with Integrated Nanofilter  
Membranes for Capturing Blood Cells**

G. Mayer, D. Malsch, U. Neugebauer, J. Popp and T. Henkel

**13:00 Exploration of Micro-Focusing Potentialities for Microorganism's Separation**

C. Lafforgue-Baldas, P. Magaud, Y. Gao, L. Leitner, P. Schmitz and L. Baldas

**13:05 Systematic Understanding of Insulin Fibrillation on a Chip**

H.S. Rho and H. Gardeniers

**Friday 12 December**  
**Room Barrington**  
**11h30 - 13h05**

**Session 8B - Electrohydrodynamics and Electrokinetics**

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*Chair Person: J. Casals-Terré*

- 11:30 The Anomalous Ion Selectivity of a Nanoporous PCTE Membrane under External Electric Field**  
Z. Silber-Li, Q. Yu and X. Zheng
- 11:50 The Optimization of the Dielectrophoresis Electrode to Enhance Separation Efficiency by Genetic Algorithm H.-C.**  
H.-C. Shing, C.-H. Gao, S.-C. Lin and C.-T. Lin
- 12:10 Interaction Effects in Multi-Outlet Viscoelastic Contraction Flow**  
S. Drost and J. Westerweel
- 12:30 Flow Development of Polymer Solutions in a Microchannel**  
Z. Li
- 12:50 Viable Cell Trapping via Hydrodynamic and Direct Current Insulator Based Dielectrophoresis (H-DC-iDEP) Effects in a Corrugated Microfluidic Channel**  
M. Mohammadi, H. Madadi, J. Casals-Terré and J. Sellarès
- 12:55 Water Slippage over Nano-Patterned Silane-Coated Surfaces: the Effect of the Pressure**  
D. Gentili, G. Bolognesi, A. Giacomello, M. Chinappi and C. Casciola
- 13:00 Experimental Characterization of the Effect of Dean Vortices on Microfluidic Fuel Cells**  
M. Rossi and C. Kaehler

*13:10: Closing Ceremony and Lunch*