

# Technical Programme

## Tuesday 6<sup>th</sup> June

17:00 – 18:00 Early Registration, Hotel Lobby

## Wednesday 7<sup>th</sup> June

08:00 – 08:45 Morning Registration

Proceedings  
page no.

08:50 **Chairman Welcome - Alex Hunt, Woodview Technology Ltd., UK**

09:00 **Opening Keynote Address - “Multiphase Flow Modelling – Past, Present and Future”  
Prof. Chris Lawrence, Schlumberger, Norway**

### SESSION 1: DEPOSITS

**Chair: Dr Tim Lockett, BP, UK**

09:40	<b>Prediction of asphaltene precipitation risk in oil wells using a coupled hydro-thermodynamic model</b> <i>E Al-Safran, Kuwait University, Kuwait</i>	5
10:05	<b>A study of wax deposition in pipeline using thermal hydraulic model</b> <i>Y Zhao, D Limb, Petrofac Engineering &amp; Production Service, West, UK; X Zhu, China University of Petroleum, Beijing, China</i>	23
10:30	<b>Assessing hydrate blockage risk in oil pipelines: deploying a new transient simulation capability</b> <i>B W E Norris, M L Johns, E F May, Z M Aman, University of Western Australia, Australia</i>	39
10:55	<b>Exhibitors Presentation – BHR Group</b>	
11:00	<b>Refreshment Break – Sponsored by</b>	



### SESSION 2: EXPERIMENTAL

**Chair: Dr Eissa Al-Safran, Kuwait University, Middle East**

11:30	<b>Wall shear stress measurements of horizontal two-phase slug flow for high viscosity liquids using constant temperature anemometry</b> <i>L Buitrago, T Kim, E Pereyra, C Sarica, The University of Tulsa, USA</i>	55
11:55	<b>Flow structures in low-inclination stratified oil-water pipe-flows using laser-based diagnostic techniques</b> <i>R Ibarra, O K Matar, C N Markides, Imperial College London, UK</i>	71
12:20	<b>An experimental study of two-phase flow in horizontal and inclined annuli</b> <i>J Nossen, L Liu, O Skjæraasen, M Tutkun, J E Amundsen, H G Sleipnæs, N Popovici, K Hald, M Langsholt, R Ibarra, Institute for Energy Technology (IFE), Norway</i>	87
12:45	<b>Experimental investigation of vertical high-velocity two-phase flows in large-diameter pipes</b> <i>M S Capovilla, P J Waltrich, Louisiana State University, USA; P Cavalcanti de Sousa, Texas A&amp;M University, USA</i>	103
13:10	<b>Exhibitors Presentation – Kongsberg</b>	
13:15	<b>Lunch</b>	

### SESSION 3: DOWNHOLE APPLICATIONS

**Chair: Dr Ruud Henkes, Delft University of Technology, The Netherlands**

14:15	<b>Transient simulations on ESP pump compared to measured data</b> <i>M A H Changoluisa, Schlumberger UK PLC, UK; Z Xu, SWT, Schlumberger, Norway; M Haavelsrud Selberg, X C Billdal, Schlumberger Information Solutions AS, Norway</i>	121
14:40	<b>Multiphase downhole screw assembly (MDA) – A new chapter in conveying hydrocarbons</b> <i>J – U Brandt, J Lewerenz, F Böker, D Müller-Link, ITT Bornemann GmbH, Germany</i>	133
15:05	<b>Unstable well behaviour in gas well liquid loading – stability tests</b> <i>A van Wijhe, S P C Belfroid, TNO, The Netherlands</i>	145
15:30	<b>The use of surfactants for gas well deliquification: a comparison of research projects and developed models</b> <i>J M C van 't Westende, TNO, Heat Transfer and Fluid Dynamics, The Netherlands; R A W M Henkes, Delft University of Technology and Shell Projects and Technology, The Netherlands; A Ajani, M Kelkar, The University of Tulsa, USA</i>	161
15:55	<b>Exhibitors Presentation – Statoil</b>	
16:00	<b>Refreshment Break – Sponsored by</b>	



### SESSION 4: MODEL ENHANCEMENTS

**Chair: Prof. Paolo Andreussi, University of Pisa, Italy**

16:30	<b>Velocity profiles in stratified two-phase flow: Comparison of measurements and model predictions</b> <i>P Andersson, J Henriksson, Schlumberger, SNTC, Norway</i>	185
16:55	<b>Wall transform mechanism in a viscosity stratified turbulent flow</b> <i>S Ahmadi, A Roccon, A Soldati, Università di Udine, Italy and Technische Universität Wien, Austria; F Zonta, Technische Universität Wien, Austria</i>	199
17:20	<b>Assessment and sensitivity analysis of multiphase flow pipeline models against experimental and field data</b> <i>P Dhoorjaty, D Erickson, R Kowta, M Mai, P Parthasarathy, Wood Group, USA</i>	209
17:45	<b>Validation of a multiphase flow simulator using three-phase gas condensate field data</b> <i>N Jauseau, N Zambare, Kongsberg Digital, USA; E Zakarian, J Morgan, Woodside Energy Ltd, Australia</i>	225
18:10	<b>Exhibitors Presentation – Schlumberger</b>	
18:15	<b>Welcome Reception Sponsored by</b>	
19:45	<b>Exhibition room</b>	



## Thursday 8<sup>th</sup> June

09:00 **Opening Keynote Address - “Multiphase Metering – Past, Present and Future”**  
**Dr. Bruno Pinguet, NEL, UK**

### SESSION 5: Åsgard

**Chairs: Dietrich Müller-Link, ITT Bornemann GmbH, Germany & Graham Brook, Fircroft UK**

09:40	<b>Åsgard Subsea Compression – technology overview and operational experience</b> <i>P E Hedne, A Aarvik, M Nordsveen, B H Pettersen, L E Hauge, Statoil, Norway</i>	243
10:05	<b>Åsgard subsea compression inlet cooler – development, qualification and operation of world’s first passive multiphase subsea cooler</b> <i>A Lauvdal, H Alfredsson, Aker Solutions ASA, Norway; A Aarvik, Statoil ASA, Norway</i>	259
10:30	<b>Åsgard subsea compression and predictions of liquid surges</b> <i>G R Setyadi, K Holmås, G G Lunde, K Vannes, A Sengebusch, TechnipFMC, Norway; M Nordsveen, B H Pettersen, Statoil, Norway</i>	275
10:55	<b>Exhibitors Presentation – TMF Consortium</b>	
11:00	<b>Refreshment Break</b>	

## Thursday 8th June - Continued

### SESSION 6: PIPELINES AND RISERS

**Chairs: Terry Wood, INTECSEA, UK & Dr Kristian Holmås, Kongsberg Digital, Norway**

- 11:30 **Advances in modelling hydrodynamic slug flow in production systems** 293  
*T J Lockett, Y Fan, A Ajani, BP Exploration and Production, UK*
- 11:55 **CFD for multiphase flow in vertical risers** 309  
*F Tocci, Politecnico di Milano, Italy; F Bos, Dynaflo Research Group, The Netherlands; R Henkes, Shell Projects & Technology, The Netherlands and Delft University of Technology, The Netherlands*
- 12:20 **Improvement of LedaFlow for churn flow in vertical pipes** 325  
*J Kjølås, A Shmueli, A Morin, SINTEF, Norway; R Belt, Total, France*
- 12:45 **A model for liquid-assisted gas-lift unloading** 345  
*R Coutinho, W Williams, P Waltrich, Louisiana State University, USA; P Mehdizadeh, Production Technology Inc., USA; S Scott, Petroleum ETC, USA*
- 13:10 **Exhibitors Presentation - Ranold**
- 13:15 Lunch**

### SESSION 7: EROSION AND CORROSION

**Chair: Prof. René Oliemans, Multiphase Flow B.V., The Netherlands**

- 14:15 **Minimum sand transportation conditions in multiphase pipelines: an assessment exercise** 363  
*Z Zhou, L Lao, Cranfield University, UK*
- 14:40 **Use of CFD for development of sand erosion control technology** 573  
*P Kane, D Pliszka, T Wood, INTECSEA Worley Parsons Group, UK*
- 15:05 **Improving CO<sub>2</sub> corrosion rate predictions through the use of corrosion assessment and flow modelling – A field case study** 381  
*L Barton, M Forde, A Pinto, I Laing, ROSEN, UK; R Ladwa, ROSEN Group, Switzerland*
- 15:30 **Prolonged gas-condensate pipeline operation below minimum turndown rate** 395  
*E Zakarian, J Morgan, Woodside Energy Ltd, Australia*
- 15:55 **Exhibitors Presentation – Flow Capture**
- 16:00 Refreshment Break**

### SESSION 8: RISK AND UNCERTAINTY

**Chair: Dr Shaun Johnston, Wood Group, UK**

- 16:30 **The use of a low-cost gas-liquid flow meter to monitor severe slugging** 413  
*P Andreussi, University of Pisa, Italy; M Bonizzi, P Ciandri, TEA Sistemi, Italy; S Pedersen, D S Hansen, Aalborg University, Denmark*
- 16:55 **Decision analysis in multiphase flow: uncertainty, risk and application** 425  
*B L Keinath, ExxonMobil URC, USA*
- 17:20 **Exhibitors Presentation - SPE, Applied Multiphase Flow in Pipes and Flow Assurance**
- 17:25 **Chairman's View – "Subsea Processing: Is this the end for multiphase transport systems?"**  
*Alex Hunt, Woodview Technology Ltd., UK*
- 19:30 Conference Dinner at La Mandala Restaurant**

Conference dinner drinks Sponsored by



Dress code: Casual/Business

## Friday 9<sup>th</sup> June

### SESSION 9: SPECIAL REGIONAL FOCUS - TANZANIA REVISITED

**Chairs: Alick Jamieson, Genesis Oil & Gas, UK & Dr Erich Zakarian, Woodside Australia**

09:00	<b>Tanzania gas development – flow assurance challenges</b> <i>H Holm, Statoil ASA, Norway</i>	439
09:25	<b>Pressure drop measurements in low liquid loading three-phase flows</b> <i>J Kjølaas, T E Unander, M Wolden, A Shmueli, SINTEF, Norway; H Holm, Statoil, Norway</i>	455
09:50	<b>Pressure drop in low liquid loading flows – the effect of a thin liquid film on the pipe wall</b> <i>D Biberg, C Lawrence, G Staff, Schlumberger Norway Technology Center, Norway; H Holm, Statoil ASA, Norway</i>	471
10:15	<b>Uncertainty evaluation applied to a model-based Virtual Flow Metering system</b> <i>H Ausen, M Stinessen, D Fønnes, TechnipFMC, Norway; H Holm, Statoil, Norway</i>	485
<b>10:40</b>	<b>Refreshment Break</b>	

### SESSION 10: EMERGING APPLICATIONS

**Chair: Prof. Cem Sarica, The University of Tulsa, USA**

11:10	<b>Development of speed controlled pigging for low pressure pipelines</b> <i>M H W Hendrix, H P IJsseldijk, W-P Breugem, Delft University of Technology, The Netherlands; R A W M Henkes, Delft University of Technology, The Netherlands and Shell Projects &amp; Technology, The Netherlands</i>	501
11:35	<b>Subsea water separation: a state of the art review, future technologies and the development of a compact separator test facility</b> <i>H S Skjefstad, M Stanko, Norwegian University of Science and Technology, Norway</i>	511
12:00	<b>Unequal split of liquid content in parallel flowlines</b> <i>R J Belt, F X Clément, M A Paran, D Larrey, TOTAL France; F Papot, TOTAL Angola; G Lacaille, TOTAL USA</i>	531
12:25	<b>FLNG, a simple way to open Pandora's Box</b> <i>R Malhotra, Wood Group, Australia; I Kopperman, Assured Flow Solutions, UK; T Solanke, Wood Group, UK</i>	551
<b>12:50</b>	<b>Close of Conference</b>	

Best Paper Award Presentation Sponsored by



**13:00 Lunch**



**11<sup>th</sup> North American Conference on Multiphase Technology  
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