

SPE/IADC Virtual International Drilling Conference and Exhibition

8–12 March 2021

Virtual Conference and Exhibition

go.spe.org/2021drilling

Conference Preview

Discover a new online experience and advance your drilling expertise!





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Dear Colleague,

The SPE/IADC Virtual International Drilling Conference and Exhibition is one of the key annual industry events. It is renowned for excellent technical content and covers a variety of subjects. The conference is a great opportunity for us as an industry to get together, share learnings, increase our competence and collaborate to develop new and innovative solutions to improve safety, efficiency and to reduce emissions.

For the first time ever, the SPE/IADC International Drilling Conference and Exhibition will be carried out as a digital event. We would of course have preferred the opportunity to physically meet, engage and network with colleagues across the industry, and to welcome you to the beautiful surroundings of Stavanger.

That part will have to be postponed until 2023, when we hope we will be able to allow for a physical conference in Stavanger. Now we adapt, like the rest of the society, to what essentially is the industry's most important objective; to always stay safe.

During the Covid-19 pandemic we have proven our ability as an industry to uphold safe and efficient operations even though our working environment has been turned upside down. Doing so it's worth reflecting over some positives.

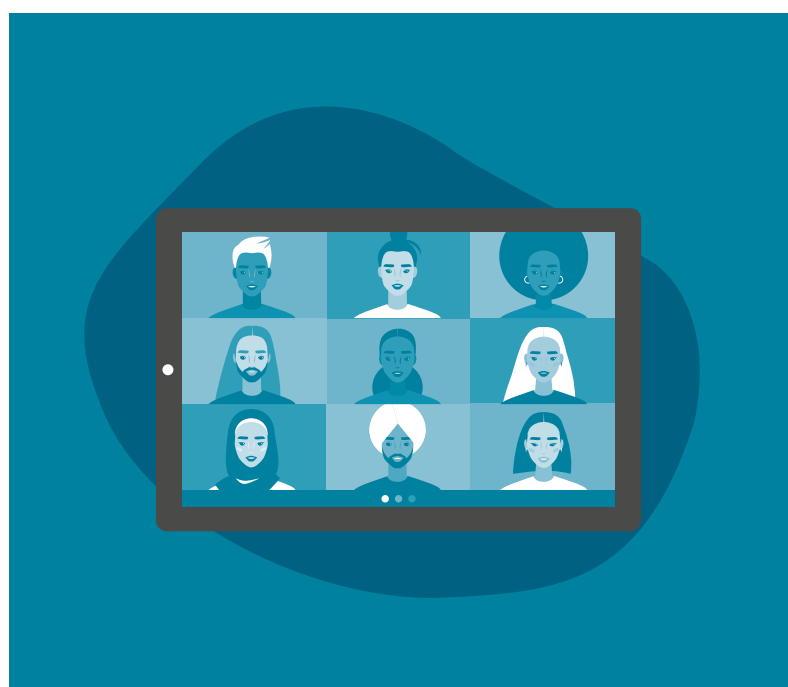
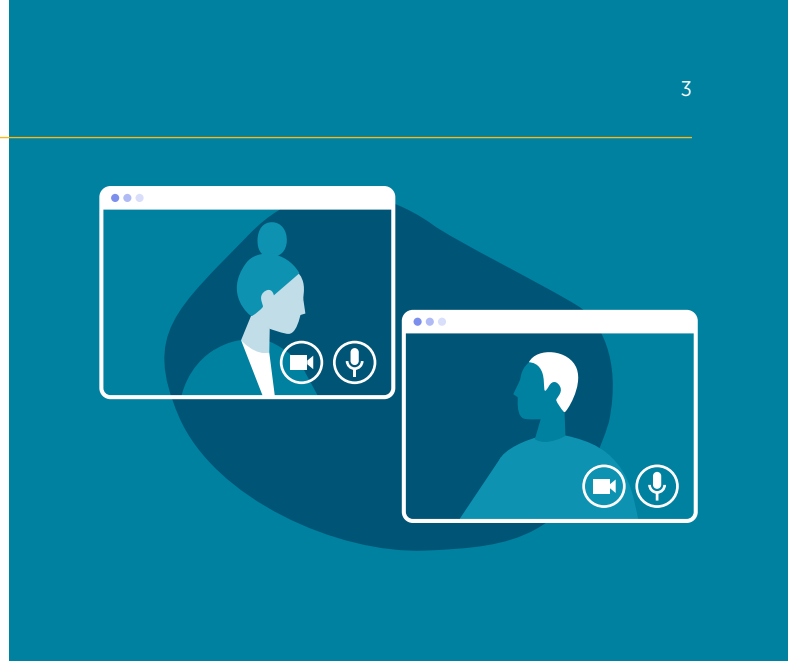
We have seen a rapid implementation of new ways of working, where new communication technologies have enabled us to share learnings and experiences across companies and geographies. It has also made arenas like these more accessible by removing the requirement to travel, and to set aside a full work week away from other obligations and not least our families.

The pandemic also highlights the importance to succeed with many of the technology developments our industry is working on, and which are also part of the conference agenda. We are advancing within digitalisation, automated drilling and moving toward running more drilling and well activities from onshore operations centres.

These advancements are steps not only to increase safety and efficiency, but also reducing CO2 emissions and improving the environmental footprint of our industry.

I encourage you to use this conference as an arena for inspiration, to share learnings and increase competence. I look forward to discussing how we can turn the current and future challenges into opportunities for the drilling and well industry.

Erik G. Kirkemo
SVP, Drilling & Well
Equinor ASA, Conference Chair



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About the Conference

The SPE/IADC Virtual International Drilling Conference and Exhibition is a unique experience where leaders and innovators can discover, network and advance the scientific understanding of drilling in oil and gas exploration and production.

This virtual event is dedicated to the drilling community and brings unrivalled technical content highlighting the latest news, trends, innovations and technical solutions affecting the sector.

90% RATED THE TECHNICAL PAPERS AND CONFERENCE CONTENT FAVOURABLY

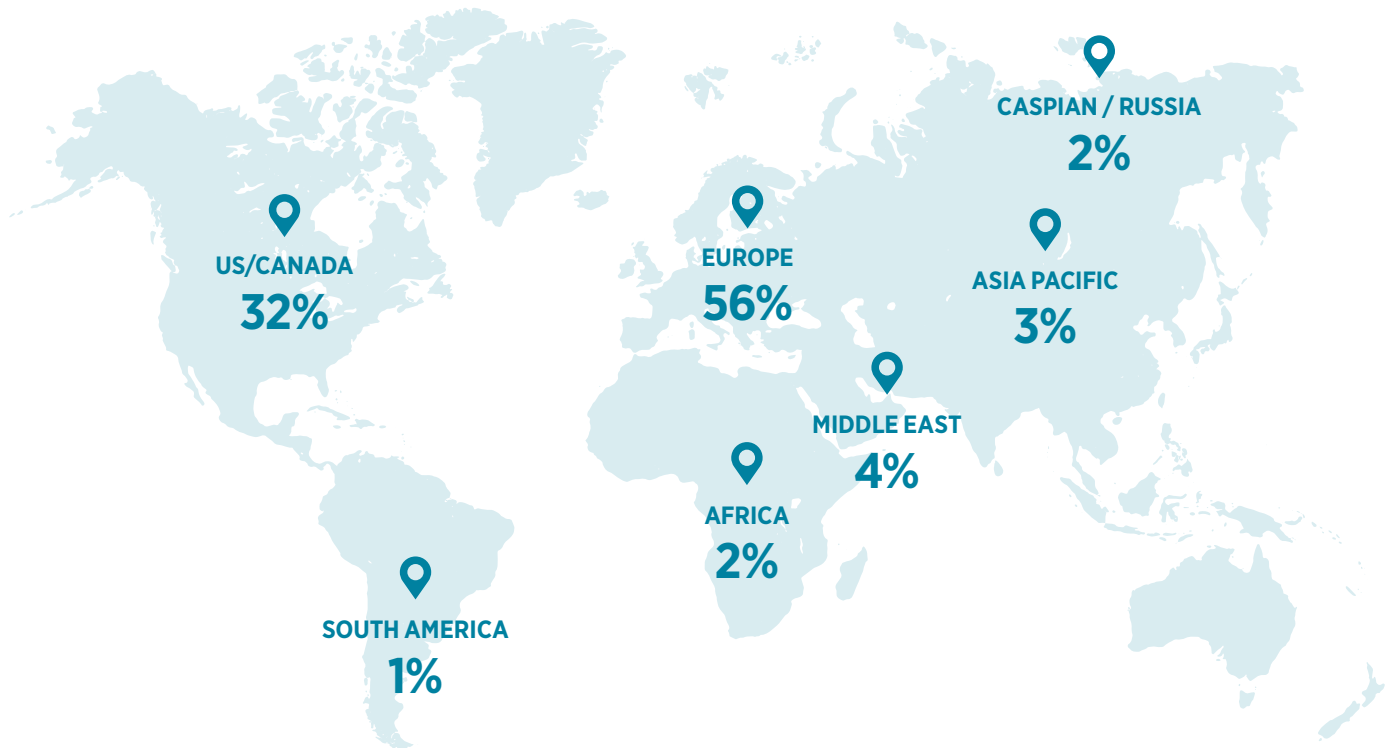
86% RATED THE NETWORKING FAVOURABLY

85% OF ATTENDEES RATED THE EXHIBITION FAVOURABLY

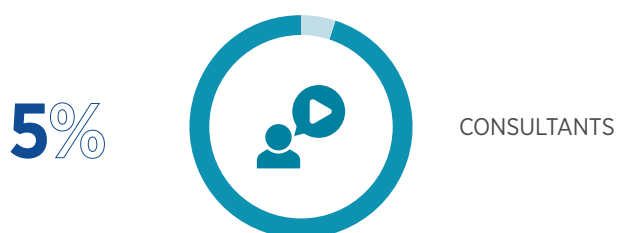
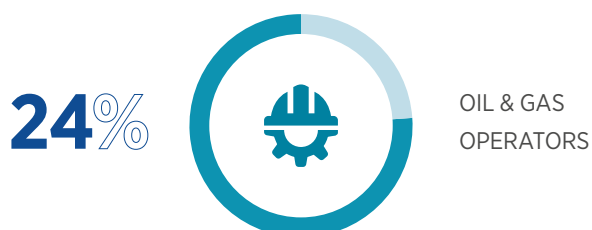
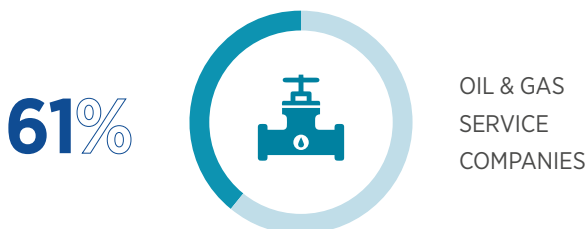
82% WOULD RECOMMEND THE CONFERENCE TO THEIR PEERS

Who Attends

Geographical Breakdown from the 2019 SPE/IADC International Drilling Conference and Exhibition



Organisation Type



Registration is Now Open

Advance, expand and develop your drilling expertise across five days at the leading drilling event.

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Diversity Session Sponsors



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Committee

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Kimberly McHugh, **Chevron**

David Reid, **NOV**

Lina Serpa, **BP**

Lee Womble, **Schlumberger**

Oonagh Werngren, **Independent**

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Øystein Arild, **University of Stavanger**

Pradeepkumar Ashok, **University of Texas**

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Matthew Brodie, **Nobel Drilling**

Igor Brucher, **Transocean**

Crispin Chatar, **Schlumberger**

Iain Cooper, **SeekOps Inc.**

Blaine Dow, **Schlumberger**

Michael Dykalski, **BOS Solutions**

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Otto Santos, **Louisiana State University**

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Håkon Skjelvik, **Tomax**

Junichi Sugiura, **Scout Downhole**

Diego Tellez,

Occidental Oil & Gas Corporation

John Thorogood,

Drilling Global Consultant LLP

Christopher Trzeciak, **Neptune Energy**

Khaydar Valiullin, **ECO**

Goof Zijderveld, **GustoMSC BV**



Society of Petroleum Engineers

About the Society of Petroleum Engineers

The Society of Petroleum Engineers (SPE) is a not-for-profit professional association whose more than 140,600 members in 144 countries are engaged in oil and gas exploration and production. SPE is a key resource for technical knowledge providing opportunities to exchange information at in-person and online events and training courses, publications, and other resources at www.spe.org.



About the International Association of Drilling Contractors

The International Association of Drilling Contractors (IADC) is dedicated to enhancing the interests of oil and gas and geothermal drilling contractors worldwide. IADC's contract drilling members own most of the world's land and offshore drilling units and drill the vast majority of the wells that produce the planet's oil and gas. IADC's membership also includes oil and gas producers, and manufacturers and suppliers of oilfield equipment and services. Founded in 1940, IADC strives to secure responsible standards, practices, legislation and regulations that provide for safe, efficient and environmentally sound global drilling operation.

Schedule of Events (GMT) (as of 8 February 2021)

	Keynote/Plenary/ Special Events	Technical Session 1	Technical Session 2	Technical Session 3
Monday 8 March				
13:00 - 15:00	DSATS/IADC ART Symposium Session: How to Automate at Scale in the Current and Societal Environment?			
15:00 - 16:00	DSATS/IADC ART Symposium Breakout Sessions with Panellists and Event Committee			
15:00 - 16:30	Diversity, Equality & Inclusion Session			
Tuesday 9 March				
12:00- 12:30	Keynote Address: Arne Sigve Nylund, Executive Vice President Technology, Projects and Drilling (TPD), Equinor			
13:30 - 15:30		01T: Case Studies – Deepwater & Subsea	02T: Geothermal, Nuclear Waste & Carbon Sequestration	03T: Completions
16:00 - 17:00		04T: Drilling Automation	05T: Understanding Stick Slip and Torsional Dynamics	06T: Zonal Isolation: Annular Barriers
Wednesday 10 March				
12:00 - 13:30		07T: Project Execution and Employee Wellbeing	08T: Drilling Vibration Modelling and Simulation	09T: Drilling Vibration Modelling and Simulation
14:00 - 15:30	Plenary Session			
16:00 - 17:30		10T: Digital Drilling	11T: Well Control and Well Integrity	12T: Zonal Isolation: Case Studies
Thursday 11 March				
12:00 - 13:30		13T: Deep Learning Applications	14T: Directional Drilling - Wellbore Positioning I	15T: Drilling and Completion Fluids
14:00 - 15:30		16T: Drilling Data Classification Challenges	17T: Directional Drilling - Wellbore Positioning II	18T: MPD
16:00 - 17:30		19T: Computer Vision Systems and Data Analytics	20T: Directional Drilling I	21T: Zonal Isolation Casings
Friday 12 March				
12:00 - 13:30		22T: Novel Drilling Optimization Techniques	23T: Directional Drilling II	24T: Tubulars
14:00 - 15:30		25T: Hydraulics Modelling Challenges	26T: Innovative Technologies	27T: Wired Drill Pipe
16:00 - 17:30		28T: Zonal Isolation: Shale Barrier	29T: Drilling Fluids Automatic Measurement & Monitoring	



SPE DSATS/IADC Art Symposium: How to Automate at Scale in the Current Industry and Societal Environment?

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Baker Hughes 

Monday, 8 March 2021 | 1300 – 1600 GMT

These are times of almost unprecedented crisis for both the E&P industry and for society as a whole. Automation technology holds out the promise of increased efficiency and reduced cost, but its rate of uptake is far from rapid. The CAPEX constrained environment increases scrutiny on every dollar spent by operators, service companies and drilling contractors alike. Can we demonstrate convincing return on investment in automation technology? Can we show clear OPEX reduction through automation facilitated remote operations? Can we challenge the premise of capital investment being essential for technology progression and show CAPEX-free development and adoption are viable, situationally appropriate concepts?

The Symposium will explore these closely linked issues through a combination of keynote presentations and panel discussion. There will be specific focus on addressing the proposed questions from the perspective of North Sea experience, as well as the current pandemic and the E&P industry's downturn.

Updates on DSATS, IADC ART, and the Drillbotics competition will bring the formal element of the Symposium to a close. Following a short break, attendees will be able to meet panellists, Symposium organisers, and other attendees in breakout rooms and to ask questions and continue discussions in smaller, less formal groups.



Business Intelligence Perspective & Industry Outlook

Fredrik Ellekjær, Partner, **Rystad Energy**
1300 - 1315 | Keynote Address

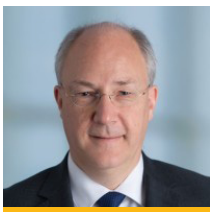


Broad ADC Adoption, an Operator Perspective

Bjørn Rudshaug, Strategic Project Manager
Automatic Drilling Control, **Equinor**
1315 - 1330 | Keynote Address

Live Panel

1330 - 1445



Sven Krueger,
Global Drilling
Services Technology
Leader,
Baker Hughes



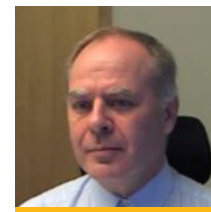
Kai Å. Kostøl,
Snr. Performance
Engineer,
MHWirth



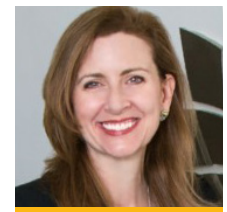
Trevor Burgess,
Managing Director,
Limerock



Johan Kverneland,
Lead R&D Wells,
Total



Rune Kvål, Director
Of Operations,
Transocean



Moderated by
President,
Michael Edwards
**Edwards Energy
Innovation
Consultancy LLC**

Virtual Conference and Exhibition

SPE DSATS/IADC Art Symposium: How to Automate at Scale in the Current Industry and Societal Environment?

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Baker Hughes 

Monday, 8 March 2021 | 1300 - 1600 GMT

SPE DSATS, Drillbotics & IADC ART

1445 - 1500 | Annual Update

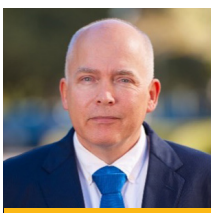
Breakout Sessions with Panelists & Event Committee

1500 - 1600 | Networking

About

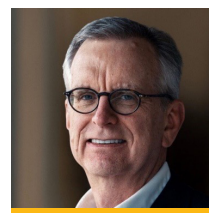
The SPE's Drilling Systems Automation Technical Section (DSATS) mission is to accelerate the development and implementation of systems automation in the well construction industry by supporting initiatives which communicate the technology, recommend best practices, standardize nomenclature and help define the value of drilling systems automation. These initiatives include workshops, forums, lectures, and technical and white papers, among others, and DSATS actively encourages participation of automation experts from outside the drilling industry.

The mission of the IADC Advanced Rig Technology (ART) Committee is to improve safety and efficiency through sound operating procedures, design of automated systems and standardizing automation. Amongst other things, the committee works to develop operational guidelines, assess pros and cons of advanced drilling technology and develop new definitions.



IADC Advanced Rig Technology Committee (ART) Chair

Robert van Kuilenburg,
Noble Services Company LLC



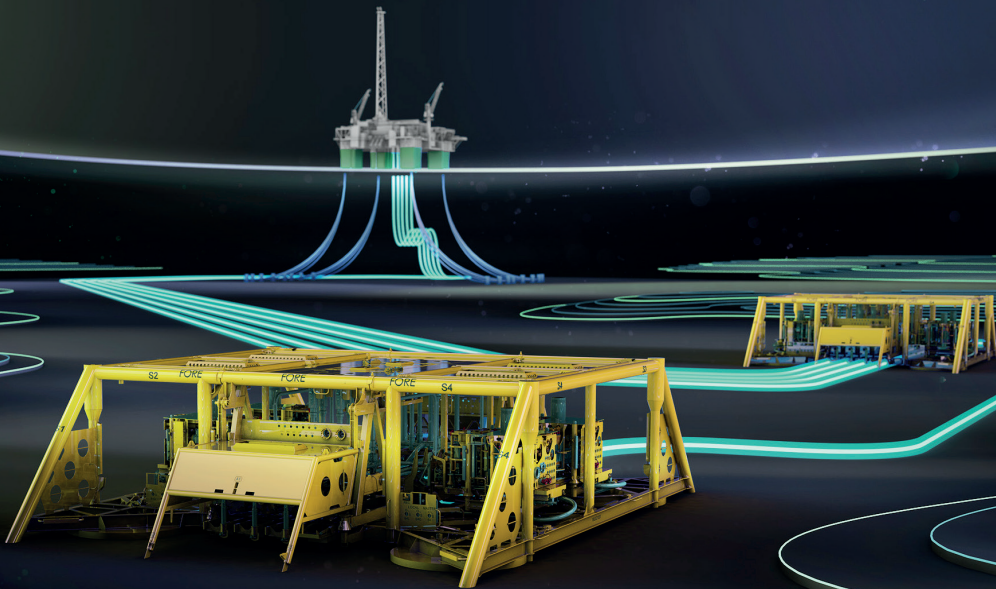
SPE Drilling Systems Automation Technical Section (DSATS) Chair

Mark Anderson,
Anderson and Spilman LLC



NOVA

- Two templates tied back to Gjøa
- Three oil producers
- Three water injectors
- Drilling campaign ongoing
- Planned production start in 2022



wintershall dea

Diversity, Equity & Inclusion Session

Sponsored by:



Monday, 8 March 2021

1500 – 1630 GMT

After the most unexpected and extraordinary year, where both as an industry and individuals we have been fighting for survival due to the Global Pandemic, the Drilling and Wells Community considers the impacts on Diversity, Equity and Inclusion and takes expert advice on how we can all make a difference!

Committee Co-Chairs:

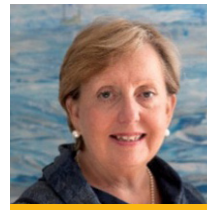


Bente Elin Eliassen Lillemo,
Equinor

Bente Elin Eliassen Lillemo is currently working as Leader Safety and Sustainability for Mobile Drilling Units in Equinor. She has a Master

Degree from 1993 within Petroleum Technology from the University of Stavanger. She started her career in Baker Hughes as an offshore Logging Engineer and after a few years she took on the position as a Directional Driller; she became the first female Directional Driller in Norway; maybe in the world. After 11 years in offshore positions she started in Statoil/Equinor in 2004 as a Drilling Engineer. Since 2007 she has held different leading positions within D&W, both in the discipline ladder and as a line manager in operations. She has mainly worked with innovative improvement projects and initiatives within remote drilling operations, digitalization, business performance, working processes and lean. She has a passion for improving the way we work in order to improve safety results and increase performance.

Bente is recognised as an engaged and hands on leader with high focus on the people.



Oonagh Werngren MBE,
Independent

Oonagh is a former President of the Petroleum Exploration Society of Great Britain and Non- Executive Director. In the course of her career,

she held senior leadership positions around the globe for BP, GDF SUEZ and Oil & Gas UK.

Oonagh was awarded an MBE in the 2011 Queen's Birthday Honours List, for services to the oil and gas industry. She is co-author of "The Oil Industry's Best Kept Secret" the free, online book, inspiring women in their careers. She also still maintains a strong interest in career development through mentoring and public speaking.

Diversity, Equity & Inclusion Session

Sponsored by:



Monday, 8 March 2021 1500 - 1630 GMT

Opening Remarks

1500 GMT

Special D,E & I themed video from Chevron followed by a special presentation from Gretchen Haskins, HeliOffshore and the Flight Safety Foundation. 1505 GMT



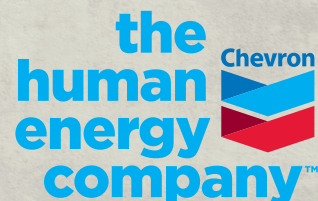
Gretchen Haskins, **HeliOffshore**

Gretchen is a leader in safety performance improvement in the aviation industry and an internationally recognised expert in human factors. She's served in the US Air Force, been advisor to NATO, flown, designed and tested aircraft, and dedicated her career to initiatives that support human performance on the frontline. Previously, she was group director of safety for UK Air Traffic Control company NATS and group safety director of the UK Civil Aviation Authority, before becoming chief executive officer of global helicopter industry association HeliOffshore. Currently, she is a board director for HeliOffshore and the Flight Safety Foundation.

ACHIEVEMENT IS BUILT ON PARTNERSHIP.

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Diversity, Equity & Inclusion Session

Sponsored by:



Special D,E & I themed video from NOV followed by a special presentation from Lucy Cooper, Accenture.

1530 GMT



Lucy Cooper, **Accenture**

Lucy leads Innovation across Europe for Accenture. This includes representing innovation on our European Management Committee and Global Leadership Council and being

the Europe Innovation Lead for Accenture's Industry X business.

She supports client innovation services teams around Europe, oversees our Hubs and Centers and engages with clients in finding value in their business using new ways of working, counter-cultural leadership practices, scaled experimentation, product and service build and innovation-led consulting. Lucy works alongside our Growth and Strategy teams and consulting practices to ensure a collaborative approach to investment and shared success with our clients and teams.

Lucy is an experienced facilitator of C-suites and Boards and an expert in the growth playbook corporate's need to undertake. Additionally, she writes often, is a seasoned panellist, speaker and moderator, including leading stages at TEDx, Cannes Lions and other notable events. Lucy is a mentor and advisor to female founders and organisations on a wide-range of topics from generational diversity in leadership to business building and governance.

Special D,E & I themed video from Equinor followed by a special presentation from Valerie Wark, Valerie Wark Associates

1600 GMT



Valerie Wark,
Valerie Wark Associates

Valerie is an Independent Consultant and an Associate of Ashridge Business School, Ernst & Young and Korn Ferry.

Valerie coaches individuals at Board level, Directors and High Potentials. Her qualifications and experience as a CEO, a Non-Executive and as an Executive Coach and Leadership tutor, enable her to relate to clients in terms of both their business and psychological needs. She is widely known for innovative programme design and executive coaching that delivers results.

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Valerie coaches individuals at Board level, Directors and High Potentials. Her qualifications and experience as a CEO, a Non-Executive and as an Executive Coach and Leadership tutor, enable her to relate to clients in terms of both their business and psychological needs. She is widely known for innovative programme design and executive coaching that delivers results.

Increasingly, she works with organisations to review and design strategic learning and development activities that will support the organisation and individuals in achieving their desired outcomes.

She regularly transfers learning from the arts and sports e.g., The England Cricket and Rugby teams. Valerie has an interest in the development of women as leaders and has four years action research experience around the representation and development of women at Board Level. As an author she wrote Leadership PQ – How political intelligence sets successful leaders apart. An insight into what are the worlds most influential leaders are doing that sets them apart in their ability to contribute to a better future for all.

Open Debate and Audience Q&A

1625

Close

1645

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Keynote Session

Tuesday, 9 March 2021

1200 - 1230 GMT



Arne Sigve Nylund

Executive Vice President Technology, Projects and Drilling (TPD), **Equinor**

Arne Sigve Nylund is the Executive Vice President for Technology, Projects and Drilling in Equinor since 1 January 2021. Previously he was the Executive Vice President for Development & Production Norway (DPN) which is a position he held from January 2014. Prior to that he was Senior Vice President for Marketing, Processing and Renewable Energy (MPR) at Statoil ASA. Arne Sigve joined Statoil in 1987 with the transfer of the operatorship of Statfjord from Mobil. He has a background from a range of operational and leadership positions. He served as platform manager at Gullfaks, operations manager at Statfjord and Senior Vice President for Statfjord operations and Operations West in DPN.

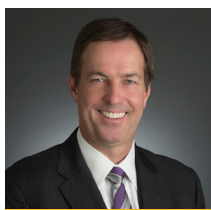
Arne Sigve has a BSc in engineering from the Stavanger Technical College in 1981, BSc in operations management from the University of Stavanger in 1988 and a business economist degree from the Norwegian School of Economics in 1989.

Photo Credit: Ole Jørgen Bratland. Copyright Equinor

Plenary Session: How do we Turn the Current Challenges into Opportunities for our Industry?

Wednesday, 10 March 2021

1400 - 1530 GMT



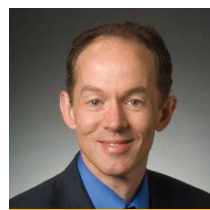
Bruce Niemeyer,
Vice President,
Strategy and
Sustainability
Chevron



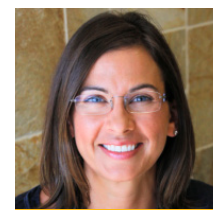
John Lindsay,
President and CEO
Helmerich & Payne



Hinda Gharbi,
Executive Vice
President - Services
& Equipment
Schlumberger



Paul Hodgins,
Chief Medical Officer
ConocoPhillips



Moderated by
Barbara Lasley,
Sr. Well Delivery
Manager
GoM - BP

Technical Programme (as of 8 February 2021)

Tuesday, 9 March 2021

1330 - 1530 GMT

01 Case Studies - Deepwater and Subsea

Session Chairpersons: Danielle Fuselier, Baker Hughes; Govert Zijderveld, GustoMSC BV

Time	Paper #	Presentation
1330	204018	Successful Installations and Predictable Performance of Solid Expandable Drilling Liner in Greater Ekofisk Field, Offshore North Sea E.A. Fitnawan, B. Holien, H. Nevøy, ConocoPhillips
1400	204023	Determination of Dynamic Limits for Rig Heave and Running Speed Based on Drilling Parameters, Well Data and Completion Tool Limitations - Case Studies D. Gorski, M. Kvernland, Heavelock Solutions; K.N. Hals, M. Blaafat, A/S Norske Shell; J. Ladenhauf, OMV (Norge) AS; O.M. Aamo, S. Sangesland, Norwegian University of Science and Technology (NTNU)
1430	204096	Top-hole Technology Overcomes Challenging Sand-based Seabed Conditions and Enables Record Drilling Performance in an Offshore Exploration Well C. Cardenas, H.E. Hansen, S. Hanssen, H. Blikra, Repsol Norge AS; W. Mathis, O.K. Holen, Neodrill A/S; A. Kort, Y. Zhang, Norwegian Geotechnical Institute
1500	204021	Probability-Derived Risk-Model: Lowers Costs Through Reduction in Backup Tool Requirements, Improves Return on Capital Employed for the Contractor, and Reduces Scope 1 CO2 Emissions S. Johannesen, T. Lagarigue, Baker Hughes Limited; G. Shearer, K. Owen, G. Wood, W. Hendry, Shell UK Limited

Alternate

204087	Disconnect Tool Successfully and Efficiently Cements Electromagnetic Gauge Assembly in Place to Provide Key Reservoir Data A. Dimcea, I.A. Massie, Halliburton; S. French, D. Smith, Energean
204066	A Way to Reduce the Uncertainties, Optimize and Reduce Time During the Multistage Cut and Retrieve Operations for Surface Plug Placement M. Volkov, TGT Oil & Gas Services; M. Evans, G. Haggart, TAQA Bratani Ltd.; R. Gaifutdinov, B. Beagrie, TGT Oil and Gas Services



Technical Programme (as of 8 February 2021)

02 Geothermal, Nuclear Waste and Carbon Sequestration

Session Chairpersons: Marc Bird, **Baker Hughes**; Diego Tellez, **Oxy Oil & Gas Corp**

This session comprehends three emerging fields in the well construction industry: geothermal, nuclear waste and carbon sequestration wells. The presenters will discuss how synergies with oil and gas processes and technologies are helping these emerging fields become economically viable. The audience will learn how design and material enhancements are dramatically improving geothermal well construction and what technology gaps still need to be overcome in this field. The session will also introduce a conceptual design to use wellbores to dispose of radioactive waste; and lastly, this session will discuss technical and regulatory challenges associated with the design and execution of carbon dioxide sequestration wells.

Presentation

1330 204097

Constructing Deep Closed-loop Geothermal Wells for Globally Scalable Energy Production by Leveraging Oil and Gas ERD And HPHT Well Construction Expertise

E. van Oort, D. Chen, P. Ashok, A. Fallah, The University of Texas at Austin

1400 204121

Oil and Gas Drill Bit Technology and Drilling Application Engineering Saves 77 Drilling Days on the World's Deepest Engineered Geothermal Systems (EGS) Wells

J. Cardoe, G. Nygaard, C.W. Lane, Baker Hughes; T. Saarno, St1 Deep Heat; M. Bird, Baker Hughes

1430 204117

Borehole Disposal of Nuclear Waste

H. Kristiansen, Norwegian Nuclear Decommissioning; B.S. Aadnøy, University of Stavanger

1500 204012

Real Time Geosteering Integrated Services. A Key Issue in Maximizing Geothermal Exposure and Minimizing Drilling and Completion Risks. A Paris Basin Case Study

P. Ungemach, M. Antics, GPC Instrumentation Process (GPC IP); D. Di Tommaso, Weatherford; F. Casali, Geolog Surface Logging

03 Completions

Session Chairpersons: Michael Dykalski, **BOS Solutions**; Tom Rune Koloy, **NOV Completion & Production Solutions**

This session will present various novel completion techniques and methods for liners and open-hole operations. New and successful cleanup techniques of open-hole horizontal and multilateral wells will be presented. As well as the developments, installation method improvements and successful case studies of complex liners.

Presentation

1330 204095

The Successful Development, Validation, and First Use of an Innovative Zinc-free, High-density Completion Fluid for Deepwater

S.A. Helmy, J.K. Guy-Caffey, L.J. Detiveaux, TETRA Technologies, Inc.; S.C. Zeilinger, M.D. Barry, C.A. Corbell, ExxonMobil Upstream Integrated Solutions

1400 204073

Ensuring Success of Complex Liner Deployment Over Complete Field Development Campaign

L. Brillaud, F. Couliou, Helmerich & Payne; K.D. Mathisen, T. Koloy, NOV Completion; C. Lacaze, E. Balou, M. Bledou, G. Delabrousse-Mayoux, P. Drevillon, Total

1430 204127

Improve Installations of Liners and Lower Completions with Real-Time Downhole Data

K.D. Mathisen, T. Sorheim, V. Keerthivasan, NOV Completion; S.J. Pink, NOV Wellbore Technologies; D.A. Young, NOV Completion

1500 204042

Reservoir Drilling, Completion and Breaker Fluid Qualification for Direct Injection Wells on the Johan Castberg Field - A Multi-disciplinary Study to Secure Injectivity

C. Eliasson, O. Braadland, H. Kaarigstad, A.M. Mathisen, Z. Ibragimova, Equinor ASA; B. Salmelid, Halliburton

Technical Programme (as of 8 February 2021)

Tuesday, 9 March 2021

1600 - 1730 GMT

04 Drilling Automation

Session Chairpersons: Riaz Israel, **BP America Inc**; John Thorogood, **Drilling Global Consultant LLP**

As automated drilling has moved into the mainstream, the degree of sophistication of the accompanying models in support of its implementation continues to grow. This session provides an insight into some of these new capabilities, including technologies deployed on the edge that integrate multiple drilling models and systems that combine 3D visualization of the drilling process with machine learning applications. The challenge of achieving a safe transition from automatic to manual control when an abnormal condition is encountered is a critical issue in the design of automated systems and a technical approach on how to achieve this is discussed here for the first time.

Time	Paper #	Presentation
1530	204064	A Hybrid Test Environment for Verification of Drilling Automation Systems J. Gravdal, NORCE; D. Sui, University of Stavanger; A. Nagy, National Oilwell Varco / University of Stavanger; N. Saadallah, R. Ewald, NORCE
1600	204074	Drilling Advisory for Automatic Drilling Control K. Lahlou, S. Oedegaard, M. Svendsen, eDrilling; T. Weltzin, Equinor; K. Bjørkevoll, Sintef; B. Rudshaug, Equinor
1630	204114	A Technical Approach to Safe Mode Management for a Smooth Transition from Automatic to Manual Drilling E. Cayeux, R. Mihai, L. Carlsen, NORCE; M. Ørevik, K. Birgisson, National Oilwell Varco; R. Bergerud, SEKAL

05 Understanding Stick Slip and Torsional Dynamics

Session Chairpersons: Graham Mensa-Wilmot, **XCIDRILL Technology**; Junichi Sugiura, **Sanvean Technologies**

Stick slip and unwanted torsional dynamics continue to cause damage to drill bits, mud motors, and other downhole tools. Significant non-productive time can be prevented through proper understanding, early recognition and mitigation of such torsional dynamics and stick slip. This session presents the latest advances in sensor technologies, modelling and control techniques that help us achieve this goal.

Time	Paper #	Presentation
1530	204032	Measurement of Mud-Motor Back-drive Dysfunction, Associated Risks and Benefits of Real-time Detection and Mitigation Measures J. Sugiura, S. Jones, Sanvean Technologies
1600	204112	Setting a New Standard: PDC Bits Equipped With Compact Vibration Recorders Monitor Entire Run and Reveal Stick-slip Mitigation System Dysfunction and Downhole Motor Under Performance G. Pelfrene, B. Cuillier, Varel Energy Solutions; D. Ezzeddine, A. Dourfaye, Consultant; D. Dimov, G. Gallego, C. Roccas, A. Mangeny, S. Reboul, Varel Energy Solutions
1630	204025	Buoyancy Force on a Plain or Perforated Portion of a Pipe E. Cayeux, S. Stokka, Norwegian Research Centre



Technical Programme (as of 8 February 2021)

06 Zonal Isolation: Annular Barriers

Session Chairpersons: Iain Cooper, **SeekOps Inc.**; Jim McNicol, **Archer**

Cracking under Pressure: This short session addresses non-cementitious isolation technologies, evaluation techniques to 'see' the robustness of annular seals and the quality of casing in the annulus, and comparisons between inferred and actually measured cement properties to give confidence in behind-casing integrity characterization.

Time	Paper #	Presentation
1530	204077	Game Changing Cementless Annular Isolation Improving Economical Returns in Deep Water Wells M. Bledou, D.P. CAILLON, B. Groschaus, G. Viger, H. Singh, Total; J. Bagal, M. Hallaire, G. Onadeko, P. Hazel, R.R. Vasquez, M. Wallach, M.L. Fürstnow, Welltec
1600	204015	A Comparison of the Measured Properties Of Annular Cement with Ultrasonic Cement Evaluation Logs D. Gardner, NORCE Norwegian Research Centre AS; H.J. Skadsem, NORCE Norwegian Research Centre AS, University of Stavanger; K. Beltrán-Jiménez, NORCE Norwegian Research Centre AS; A. Govil, G.A. Obando Palacio, Schlumberger; L.P. Delabroy, Aker BP ASA
1630	204119	Analysis Behind Casing to Assess Zonal Isolation and Casing Deterioration in a High Pressure Exploratory Well - ABC to Z of Well Integrity Barrier Evaluation H. Ahmed, Pakistan Petroleum Limited; M.R. Khan, A. Bari, Schlumberger; K. Rashid, S.D. Ali, Pakistan Petroleum Limited; S. Dhawan, Wellperform ApS; T. Zubair, U. Anjum, N.S. Sookram, Schlumberger

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Technical Programme (as of 8 February 2021)

Wednesday, 10 March 2021

1200 - 1330 GMT

07 Project Execution and Employee Wellbeing

Session Chairpersons: Pradeepkumar Ashok, **University of Texas at Austin**; Adrian Ledroz, **Gyrodata Inc.**

There is a growing pressure on oil and gas companies to not only deliver financially but also to reflect the investor's human values. In this session, we will look at case studies that showcase project management that prioritizes employee wellbeing, as well as how planning and collaboration using new digital technologies and strategies make a positive impact on the overall drilling process.

Time	Paper #	Presentation
1200	204050	A Novel Use of Digital Technologies for More Effective Multi-Party Well Planning and Execution M.R. Isbell, Hess Corporation; M.R. Manocha, Nabors Corporate Services; B.R. Mangold, Halliburton Landmark; M. Laing, Halliburton Energy Services; S.G. Boone, P. Annaiyappa, Nabors Corporate Services
1230	204036	Improving Employee Wellbeing Through a Five-phase Psychological Model to Reduce Risk and Improve Performance S. Seaton, T. Jelley, D. Carthy, Sodexo
1300	204033	Well Design for Subsea Exploration Drilling in Shallow Formations of Barents Sea M. Stanislawek, Equinor ASA
Alternate		
	204134	Enabling Technologies Help Drilling an Extreme ERD Well on Brage Field, North Sea S. Hussain, M.S. Dahroug, B. Mikalsen, K.H. Christensen, D.N. Nketah, Schlumberger; L.C. Monterrosa, K&M Technology Group; M. Van Aerssen, F. Angell-Olsen, M. Midttun, R. Rouxinol, N. Henriksen, Wintershall DEA; G.M. Ritchie, SPE
	204090	Analysis and Evaluation of Problematic Hazard Elements in Drilling Through Collapse Features, A Case From Challenging Drilling in Persian Gulf E. Salehi, Dana Energy Company, Geophysical Services; V. Daneshkhah, Dana Energy Company, Drilling Operations; B. Hosseini Shoar, Dana Energy Company, Geophysical Services

Technical Programme (as of 8 February 2021)

08 Drilling Vibration Modelling and Simulation

Session Chairpersons: Graham Mensa-Wilmot, **XCIDRILL Technology**; Junichi Sugiura, **Sanvean Technologies**

This session highlights how advanced drilling-dynamics models and high-quality data can be applied to understand and overcome typical oilfield drilling challenges. The topics include an intelligent digital twin for surface-to-downhole drilling dynamics, a new model for positive displacement motor and the investigation of induced axial-vibration on MSE, ROP and drilling dynamics.

Time	Paper #	Presentation
1200	204022	IMoDD: Intelligent Mapping of Downhole Dynamics K.S. Sims, J.A. Bomidi, W.A. Moss Jr, T.A. Wilson, Baker Hughes
1230	204024	Experimental Investigation of Induced Low Frequency Axial Vibration on Drilling Response of a PDC Bit A.S. Trivedi, University of Calgary; M. Mostofi, Curtin University; R.J. Shor, University of Calgary
1300	204071	Improving Surface Oscillation Tools Performance Using Time-domain Dynamics and Torque and Drag Models M. Mahjoub, N. Dao, K. Nguyen, S. Badri, M. Summersgill, S. Menand, Helmerich & Payne

09 Zonal Isolation: Chemistry and Blends

Session Chairpersons: Iain Cooper, **SeekOps Inc.**; Michael Dykalski, **BOS Solutions**

This short session addresses new technologies for ensuring more robust and predictable isolation techniques in a range of downhole environmental conditions, encompassing the use of novel materials to increase the efficiency of cement systems where no spacer is deployed, through the use of a novel spacer system that conditions the borehole, prevents losses and formation damage ensuring successful primary cementing, and finally the design, deployment and evaluation of cement systems for extreme environments, to mitigate the effects of acid gas.

Time	Paper #	Presentation
1200	204058	Novel Surfactant for Spacer-less Cementing Compatible with Non Aqueous Fluids J.K. Wee, P. Gomes, S. Huang, E. Therond, A.H. Dieker, Bp; D.J. Daulton, A. Doan, M.G. Kellum, C. Perez, Baker Hughes
1230	204014	Wellbore Stabilizing Technology Enhances Cementing Efforts in the North Sea A. Bottiglieri, M. Jaskiewicz, Baker Hughes; D.S. Kulakofsky, Impact Fluid Solutions; A. Ilnicka, Equinor
1300	204103	Evaluation of New Innovative Cement Blend for Enhanced CO₂ and H₂S Resistance G. Lende, Halliburton AS; J.A. Clausen, A.J. Kvassnes, ReStone AS



Technical Programme (as of 8 February 2021)

Wednesday, 10 March 2021

1600 - 1730 GMT

10 Digital Drilling

Session Chairpersons: Riaz Israel, **BP America Inc**; Assaad Mohanna, **National Oilwell Varco**

The digitalization of all aspects of drilling is happening at a mind-boggling pace. This session explores some of the latest advancements in this space including one company's journey of leveraging multiple sources of historical data to create a new tool for offset well analysis and planning. We then look at a novel approach to real time management of hole cleaning using a probabilistic approach. Finally with digital twins become more prevalent in drilling, we look at a new approach to doing so, incorporated into an earth model.

Time	Paper #	Presentation
1600	204051	An Introduction of Drilling Data Space A.I. Merciu, H. Kjörholt, Equinor ASA
1630	204125	A Probabilistic Belief System to Track the Cleanliness of a Hole in Real-time P. Ashok, J. D' Angelo, D. Ramos, M. Yi, Intellicess Inc.; T.S. Thetford, Apache Corp; N.T. Younk, Montana Tech; S. Bohlander, M.P. Shahri, M. Behounek, Apache Corp
1700	204069	Integrated Real-time Simulation In An Earth Model - Automating Drilling and Driving Efficiency P.J. Arévalo, O. Hummes, M.J. Forshaw, Baker Hughes

11 Well Control and Well Integrity

Session Chairpersons: Arne Lyngholm, **Equinor ASA**; Otto Santos, **Louisiana State University**

This session explores the impacts and the importance of preventing well control and well integrity accidents in our industry. Two papers focus on the improvement of planning and execution of drilling and well operations, risk management, implementation of safety management systems and regulation regarding well safety as consequences of two major blowouts. The other paper shows how a major oil company manages its operational risks applying a model that has its pillars on three lines of defense.

Time	Paper #	Presentation
1600	204132	Self-verification Programme - a Success Story of Major Accident Risk Management Via Bowtie Barrier Model R. Bulgachev, M. Cromarty, L. Milburn, K. Davies, bp
1630	204013	The Snorre A 2004 Blowout and Its Impact on Drilling and Well Operations Today C.H. van der Zwaag, T. Paulsen, Equinor ASA
1700	204056	Ten Years After the Deepwater Horizon Accident: Regulatory Reforms and the Implementation of Safety and Environmental Management Systems in the United States M. Nieves-Zárate, University of Groningen



Technical Programme (as of 8 February 2021)

12 Zonal Isolation: Case Studies

Session Chairpersons: Iain Cooper, **SeekOps Inc.**; Jim McNicol, **Archer**

Reality in Practice: This session comprehensively addresses a range of techniques used while planning, executing and evaluating well construction. The session encompasses validation of circulating temperature models; the use of downhole measurements to improve understanding of the pore-pressure - frac gradient window; and post-execution validation of cement bond quality, and finally, the use of experience-based learning to plan, address and mitigate shallow water flows.

Time	Paper #	Presentation
1600	204104	Large-Scale Field Validation and Practical Application of a Multi-well Thermal Interaction Model for Temperature Simulation A.R. McSpadden, R. Trevisan, Altus Well Experts Inc.; S.A. Stene, A. Vonheim, ConocoPhillips Norway
1630	204047	The Value of Integrated Downhole Passive Acoustic Monitoring During an Extended Leak Off Test to Prove Formation Integrity. A Case Study M. Volkov, TGT Oil & Gas Services; H. Björk, Equinor; N. Kudryavaia, TGT Oilfield services; S. Strøm, J. Andrews, H. Björk, Equinor
1700	204040	Identifying Formation Creep - Ultrasonic Bond Logging Field Examples Validated by Full-scale Reference Barrier Cell Experiments A. Govil, Schlumberger; H. Nevøy, L. Hovda, ConocoPhillips; G.A. Obando Palacio, Schlumberger; G.C. Kjeldaas, ConocoPhillips

Thursday, 11 March 2021

1200 - 1300 GMT

13 Deep Learning Applications

Session Chairpersons: Crispin Chatar, **Schlumberger**; Harald Nevoey, **ConocoPhillips Norge**

Deep learning applications attempt to teach computers to do what comes naturally to humans; to learn by example. This session will show great examples of how this technique can be applied to optimise well delivery by enhanced real time drilling process management and automation.

Time	Paper #	Presentation
1200	204093	Real-time Classification of Drilled Lithology From Drilling Data Using Deep Learning With Online Calibration M.L. Arno, NTNU; J. Godhavn, Equinor AS; O.M. Aamo, NTNU
1230	204105	Training an Automated Directional Drilling Agent with Deep Reinforcement Learning in a Simulated Environment Y. Yu, W. Chen, Q. Liu, M. Chau, V. Vesselinov, R.J. Meehan, Schlumberger



Technical Programme (as of 8 February 2021)

14 Directional Drilling - Wellbore Positioning I

Session Chairpersons: Martyn Greensmith, **Independent**; Adrian Ledroz, **Gyrodatta Inc.**

Wellbore placement involves the engineering, technology, and know-how required to geometrically position the different types of wells in the reservoir while avoiding existing wells and geohazards. As a fundamental component of the directional drilling discipline, wellbore placement technologies and techniques have vastly advanced over the last decade and continue to evolve at a very rapid speed. This exciting session will cover new developments related to collision avoidance and its impact on risk, new technology disrupting the current practices of wellbore placement as well as new computational techniques.

Presentation

1200 204049

How Close is Too Close? Saving “Undrillable” Slots Through Top-hole Jetting and Drilling in Al-Shaheen Field, Offshore Qatar

O. Couso, A. Bilal, North Oil Company;
A. Sikal, F. Momot, PathControl; M. Cullen, F. Bejaoui,
A. El Abid, A. Aleshin, Schlumberger

1230 204038

Quantifying Global and Random Uncertainties in High Resolution Global Geomagnetic Field Models Used for Directional Drilling

C.D. Beggan, S. Macmillan, W.J. Brown,
British Geological Survey; S.J. Grindrod,
Copsegrove Developments Ltd.

1300 204027

Some Technical and Economic Consequences of Directional Drilling and Surveying Progress and Success

S.J. Sawaryn, Consultant; R. Lowdon, Schlumberger;
J.L. Thorogood, Drilling Global Consultant LLP

15 Drilling and Completion Fluids

Session Chairpersons: Michael Dykalski, **BOS Solutions**; Junichi Sugiura, **Sanvean Technologies**.

This session highlights a novel approach to drilling and completion fluids. The topics include a successful clean-up fluid selection, pressure-loss estimation technique and lost-circulation control technology.

Presentation

1200 204091

Systematic Selection of Drill-in and Completion Fluids for Development of the Dvalin HT Gas Field - Part II: Successful Clean-up Validates Experimental Qualification Approach

O. Czuprat, Wintershall Dea Technology Service Center GmbH & Co. KG; K. Eriksen, D. Clinch, Halliburton AS; P. Byrski, G. Gibbons, N. Hughes, T. Øian, R. Ritschel, J. Storhaug, Wintershall Dea Norge AS

1230 204061

A Study on the Impact of Rheological Measurement Technique on Pressure Loss Estimation Uncertainty

F. Iversen, NORCE; J. Brevik, K. Taugbøl, Equinor

1300 204062

Successful Application of a Reinforced Composite Mat Pill Technology for Lost Circulation Control in the Norwegian Continental Shelf

J.A. Barreiro, J.S. Knowles, C.R. Johnson, I.D. Gordon,
Schlumberger; L.K. Gjerde, Aker BP ASA

Alternate

204030

Development Field First - Directionally Drilling Through Challenging Muderong Shale and Highly Depleted Reservoir Sand with HPWBM

T.J. Lambert, S. MJ, C. Clark, Woodside Energy Limited

204109

Innovative Drilling Fluid Technology Conquered Tough Geomechanics Offshore Mexico

R. Reyna, V. Parra, D. Volbre, R. Ballinas,
Grupo R; R. Maldonado, J. Rockwood, Impact Fluid Solutions



Technical Programme (as of 8 February 2021)

Thursday, 11 March 2021

1400 - 1530 GMT

16 Drilling Data Classification Challenges

Session Chairpersons: Blaine Dow, **Schlumberger**;
Olawale Oredolapo, **Baker Hughes Drilling Services**.

The session is focused on unique analytics approaches to more efficiently understand, interpret and react to drilling data. A method of log interpretation using machine learning is applied to ultrasonic logs for cement bond analysis. Drilling dysfunction is addressed in two separate methods: shocks and vibration data analysis using techniques applied in the medical industry, and a separate approach applying time-series data augmentation.

Presentation

1400 204078

Autonomous Interpretation Methods of Ultrasonic Data Through Machine Learning Facilitates Novel and Reliable Casing Annulus Characterization

R.S. Kalyanaraman, Former Schlumberger; X. Chen, Schlumberger; P. Wu, Former Schlumberger; K. Constable, Equinor; A. Govil, A. Abubakar, Schlumberger

1430 204098

A Medical Inspired Framework to Classify Downhole Shocks Waveforms While Drilling

J. Matheus, M. Ignova, D. Amaya, Schlumberger

1500 204063

Time-series Data Augmentation Techniques for Improving Automated Drilling Dysfunction Classifiers

M. Yi, D. Ramos, P. Ashok, Intellicess Inc.; T.S. Thetford, S. Bohlander, M. Behounek, Apache Corp.

17 Directional Drilling - Wellbore Positioning II

Session Chairpersons: Martyn Greensmith, **Independent**;
Adrian Ledroz, **Gyrodatta Inc.**

Wellbore placement involves the engineering, technology, and know-how required to geometrically position the different

types of wells in the reservoir while avoiding existing wells and geohazards. As a fundamental component of the directional drilling discipline, wellbore placement technologies and techniques have vastly advanced over the last decade and continue to evolve at a very rapid speed. This exciting session will cover new developments related to collision avoidance and its impact on risk, new technology disrupting the current practices of wellbore placement as well as new computational techniques.

Presentation

1400 204133

Systematic Decisions Under Uncertainty: An Experiment Towards Better Geosteering Operations

S. Alyaev, A. Holsaeter, NORCE; R.B. Bratvold, University of Stavanger; S. Ivanova, M. Bendiksen, Bendiksen Invest og Konsult

1430 204111

A Generalised Solution to the Point to Target Problem Using the Minimum Curvature Method

S.J. Sawaryn, Consultant

1500 204100

Description of a High-profit Combination of Low-cost Real-time Survey Management Practices Used to Optimize Reservoir Landing in an Unfamiliar Deep-offshore Geological Environment

F. Momot, J. Comte, PathControl; C. Lacaze, TOTAL SE; A. Sikal, PathControl; E. Balou, TOTAL EP Congo; D. Reynaud, PathControl; M. Bledou, S. Shabanov, TOTAL SE

Alternate

204026

Measurement-while-drilling (MWD) Error Model Validation - Does the Model Reflect Reality?

D. Gutierrez, C. Hanak, Superior QC

204118

Multi-trajectory Hydraulic Model for More Accurate Geosteering Constraints

S. Alyaev, B. Daireaux, NORCE Norwegian Research Centre AS



Technical Programme (as of 8 February 2021)

18 MPD

Session Chairpersons: Isabel Poletzky, **Pruitt**;
Steve Rosenberg, **Consultant**

As MPD moves to increasingly more complex environments, we face escalating challenges in MPD and riser equipment design. This session addresses lessons learned from the deployment of a next generation sealing device; a rotating control devices sealing element customized for ultra-deepwater, and fiber optic technology for detection and investigation of gas-in-riser phenomenon.

Presentation

1400 204110

Lessons Learned Using a Next Generation Active Sealing Device for Deepwater MPD Operations

A.D. Johnson, S. Sundaramoorthy, K. Ameen,
J. Nichols, A. MacGregor, J. Fraczek, AFGlobal Corp

1430 204092

Rotating Control Device Sealing Element Customization for Ultra-deepwater Gulf of Mexico

B. Dow, Schlumberger; D. Pazziuagan, K. Vaczi, C. Chima,
Chevron; J. Guidry, C.H. Kamps, F. Gallo, J. Ham,
S. Likki, Schlumberger

1500 204115

Use of Fiber Optic Information to Detect And Investigate the Gas-in-riser Phenomenon

O.L. Santos, W.C. Williams, J. Sharma, M.A. Almeida,
M.K. Kunju, C.E. Taylor, Louisiana State University

Alternate

204046

Using Continuous Circulation in Geothermal Wells to Improve Drilling Performance and Reduce NPT Related to Wellbore Stability

S.W. Petrie, R. Doll, Advanced Drilling Technologies
(ADRILLTECH) FZE

19 Computer Vision Systems and Data Analytics

Session Chairpersons: Blaine Dow, **Schlumberger**;
Gilles Pelfrene, **Varel Energy Solutions**

The papers and posters presented provide insight into novel technologies in the field of Computer Vision and Data Analytics applied to a variety of issues within drilling operations. The topics include such groundbreaking concepts as computer vision technology to predict rigstate and PDC bit dull grading, statistical methodology to automate geosteering and machine learning engine to interpret cement evaluation logs. Authors are from a wide range of backgrounds, including operators, drilling contractors, service companies and Academia, as well as technology companies outside our industry.

Presentation

1600 204086

Determining Rig State from Computer Vision Analytics

C. Chatar, S. Suresha, Schlumberger; L. Shao, Stanford University;
S. Gupta, I. Roychoudhury, Schlumberger

1630 204124

Drill Bit Failure Forensics Using 2D Bit Images Captured at the Rig Site

P. Ashok, J. Chu, Y. Witt-Doerring, Z. Yan, D. Chen,
E. van Oort, The University of Texas at Austin

1700 204053

Improved Typelog Alignment for Automated Geosteering Using Multi-stage Penalized Optimization

J. Sun, S. Maus, Helmerich & Payne Inc.

Alternate

204057

Better Automatic Interpretation of Cement Evaluation Logs Through Feature Engineering

E.M. Viggen, L. Løvstakken, Norwegian University of Science and Technology; I. Merciu, Equinor; S. Måsåy, Norwegian University of Science and Technology



Technical Programme (as of 8 February 2021)

20 Directional Drilling I

Session Chairpersons: Ashley Johnson, **Schlumberger**; Matthew Rhodes, **BP**

Are we entering an era where it may be possible to directionally drill without the need for conventional MWD and/or Gyroscopic survey systems in the BHA? In this session we hear about how the seismic signal of the drilling BHA has been utilized for anti-collision/well placement purposes and combined with deep-reading resistivity imaging to enhance the lookahead of the bit capability. We also get an update on the automation of directional drilling journey, a process which is rapidly becoming a standard application across the industry.

Time	Paper #	Presentation
1600	204039	High-precision Drill Bit Tracking M. Houbiers, S. Bussat, F. Schopper, F. Hansteen, Equinor ASA
1630	204016	Fully Automated Directional Drilling is Now a Reality - An Example From the Norwegian Continental Shelf J. Heredia, J. Marck, S. Heller, F. Ferreira, Halliburton; A. Linndal, P. Kvandal, AkerBP
1700	204060	Real-time Lookahead Imaging Using the Drill Bit as Seismic Source A.V. Goertz, T. Thiem, E.V. Bergfjord, A. Libak, B. Atkinson, OCTIO AS; S. Bussat, Equinor ASA

21 Zonal Isolation: Casings and Abandonment

Session Chairpersons: Blaine Dow, **Schlumberger**; Rolv Rommetveit, **Independent**

This session addresses new methods for assuring well integrity. Casing integrity is addressed from two perspectives - corrosion management at the cement interface, and collapse analysis at the design phase. Bookending the lifecycle of the well, the third paper analyzes an integrated approach to well abandonment.

Time	Paper #	Presentation
1600	204080	Assessment of Corrosion in the Interface Casing - Cement and Its Effect on the Leakage Potential K. Beltrán-Jiménez, Norwegian Research Centre (NORCE), University of Stavanger (UIS), Federal University of Rio de Janeiro; I. Anwar, University of New Mexico (UNM); K.F. Gebremariam, Arkeologisk museum i Stavanger, Universitetet i Stavanger (UIS); S. Kragset, D.J. Gardner, NORCE Norwegian Research Centre AS (NORCE); H.J. Skadsem, University of Stavanger (UIS); J.C. Stormont, University of New Mexico (UNM)
1630	204116	Integrated Approach for Successful Well Abandonment Under Challenging Well Conditions - A Case Study I. Isgenderov, V. Osayande, S. Nafikova, F.B. Prasetyo, Schlumberger; W.A. van El, Well Engineering Partners
1700	204126	Derivation to Calculate Pipe Collapse Performance Using a Combined Loading Equivalent Grade Accounting for Axial Stress, Internal Pressure, Bending and Torsion J. Besse, Vallourec



Technical Programme (as of 8 February 2021)

Friday, 12 March 2021

1200 - 1330 GMT

22 Novel Drilling Optimization Techniques

Session Chairpersons: Sarah Kern, **Helmerich & Payne Intl Drlg Co**; Gilles Pelfrene, **Varel Energy Solutions**

The papers and posters presented provide insight into novel drilling optimization techniques developed to optimize drilling efficiency, improve ROP, advise drillers and automatic drillers, and better predict PDC wear. Drilling environments span from the analog lab experiments to a virtual drilling simulator, from the Permian Basin to the moon. Authors bring a wide range of experience and perspective from their backgrounds working for exploration and production companies, service providers, technology companies, research institutes, and academia.

Time	Paper #	Presentation
1200	204108	Evaluating Data-driven Techniques to Optimize Drilling on the Moon D.R. Joshi, A.W. Eustes, J. Rostami, C. Dreyer, Colorado School of Mines
1230	204043	From Science to Practice: Improving ROP Using a Cloud-Based Machine-Learning Solution in Real-time Drilling Operations K. Singh, S. Yalamarty, C.A. Cheatham, K. Tran, G. McDonald, Corva AI
1300	204083	Development, Testing and Validation of an Adaptive Drilling Optimization System B. Daireaux, A. Ambrus, L.A. Carlsen, R.G. Mihai, NORCE; K. Gjerstad, Sekal; M. Balov, Equinor
Alternate		
	204031	3D Simulation Workflow for Performance of Sharp and Worn PDC Drill Bits O. Matthews, X. Huang, J.A. Bomidi, Baker Hughes



Technical Programme (as of 8 February 2021)

23 Directional Drilling II

Session Chairpersons: Ashley Johnson, **Schlumberger**; Matthew Rhodes, **BP**

It is well recognised that automation of directional drilling processes drives consistency and frees up our traditional directional driller to monitor and optimize wellbore delivery. Wellbore quality, Non-productive time events and invisible lost time can all be targeted bringing us ever closer to the true technical limit for drilling. In this session we will hear about work to optimize well delivery through automation of the projection to bit process, the provision of a geosteering aid to mitigate against value eroding information loss and how the focus on wellbore quality through a reduction in tortuosity can be impacted by BHA design biases.

Presentation	
1200	204129
When Slick is Not Smooth: Bottom-hole Assembly Selection and Its Impact on Wellbore Quality M. Willerth, B. Dodson, K. McCue, Helmerich & Payne; M. Farrag, Drillsan	
1230	204065
Combining Live Drilling Data Stream With a Cloud Data Analytics Pipeline to Perform Real-time Automated Projections to the Bit D. Cardoso Braga, M. Kamyab, B. Harclerode, Corva; D.R. Joshi, Colorado School of Mines	
1300	204122
Improved Geosteering Information and Data Transfer Using an Automated Computational Framework J.J. D'Angelo, P. Ashok, E. van Oort, University of Texas at Austin	

Alternate	
	204113
Simple but Effective: A Case History Demonstrating Enhanced Performance and Simplified Logistics from New Rotary Steerable M.A. Aburto Perez, A.S. Yadav, S.R. Farley, Weatherford International Ltd.	
	204081
Single Trip Curve-lateral Drilling with High Dogleg RSS J. Tilley, N. Demirer, P. Bond, A. Penman, L. Hamoudi, D. Della Chiesa, Halliburton	

24 Tubulars

Session Chairpersons: Hakon Skjelvik, **Tomax A/S**; Diego Tellez, **Oxy Oil & Gas Corp**

Casing and tubing design plays a critical role in well construction and production operations. Our industry has created a comprehensive and evolving methodology to approach the design of tubulars. This methodology balances the need to improve manufacturing quality, reliability, well integrity requirements, and operational performance necessities versus the need to continue to reduce cost. This session will address a new system to consistently evaluate and purchase tubulars; how to establish a mathematical relationship between tubular design limits and von Mises triaxial theory; and the introduction of a novel triaxial safety factor for threaded connections.

Presentation	
1200	204048
Failure Modes and Root Cause Analyses of Advanced Drill Collar Connections M.H. Du, K. Li, F. Song, H. Li, D.L. Smith, W. Blackman, Schlumberger	
1230	204079
Compatibility Between API Equations and Design Limits Plots for Ellipse and Circle of Plasticity J.M. Romero, J.A. Aasen, University of Stavanger	
1300	204130
New Triaxial Connection Safety Factor for Tubular Design M.A. Goodman, eWellbore LLC	



Technical Programme (as of 8 February 2021)

Friday, 12 March 2021

1400 - 1530 GMT

25 Hydraulics Modelling Challenges

Session Chairpersons: Ashley Johnson, **Schlumberger**; John Thorogood, **Drilling Global Consultant LLP**

While apparently simple, the rig-wellbore hydraulic system involves a complex interaction of many quantities that change continuously with pressure and temperature. Their interactions directly affect our ability to predict standpipe pressure and return flow rate accurately and, in consequence, affect our ability to design and plan the well and analyse conditions while drilling. The session examines how AI, cloud computing and modelling can be utilised to better understand these complex phenomena. Three papers will show how machine learning can be used to unpick the complex interactions and give a more accurate and timely warning of problems before they become critical, how recent developments in enhanced modelling of transient well control are incorporated into a system to aid well planning and analyse operational events and how new modelling methods improve standpipe pressure prediction.

Time	Paper #	Presentation
1400	204035	Detecting Pressure Anomalies While Drilling Using a Machine Learning Hybrid Approach A. Lafond, M. Ringer, F. Le Blay, J. Liu, E.E. Millan, S. Ba, M. Chao, Schlumberger
1430	204089	FWell Control 4.0: Integration of a Transient Model in Automated Well Planning Workflows B. Anfinsen, I. Mosti, W.E. Szemat-Vielma, Schlumberger
1500	204094	Hybrid Physics-based and Data-driven Modeling for Improved Standpipe Pressure Prediction O. Erge, E. van Oort, The University of Texas at Austin
Alternate		
	204101	Risk-controlled Wellbore Stability Criterion Based on Machine Learning Assisted Finite Element Model H.I. AlBahrani, N. Morita, Texas A&M University



Technical Programme (as of 8 February 2021)

26 Innovative Technologies

Session Chairpersons: Konrad Izbinski, **Independent Consultant**; Isabel Poletzky, **Pruitt**

The Innovative Technologies session highlights some of the most recent technological advancements currently being used within the industry. The first paper describes the use of historical surface data to train a machine learning algorithm to predict future mud-motor failures. The next paper discusses the vastly improved mooring disconnect time as observed in over 200 cases. The session finalizes with a case study illustrating how to safely and efficiently install a casing exit system in a difficult application.

Time	Paper #	Presentation
1400	204099	Real-time Prediction of Mud Motor Failure Using Surface Sensor Data Features and Trends T. Lawal, P. Ashok, E. van Oort, The University of Texas at Austin; D. Zheng, M.R. Isbell, Hess Corporation
1430	204017	Increasing Well Efficiencies While Lowering Carbon Emissions Through the Use of a Releasable Mooring System N. Patterson, J. Pasternak, J.T. Shelton, Delmar Systems Inc.; J. Leirvag, Equinor AS
1500	204082	Casing Exit in Expandable Liner Enables Operator to Avoid Redrilling 3,000-ft Hole Sections in Gulf T. Emelander, Weatherford; J. Muesel, C. Carrington, Shell

27 Wired Drill Pipe

Session Chairpersons: Grant Affleck, **British Geological Survey**; Eric Maidla, **Nexen Data Solutions**

The session will present current operating philosophy and background on wired pipe and then its application from an operator's point of view. This will focus on the use of along string measurements to optimise and better manage the drilling process. There will also be a paper focused on the use of a specific along string measurement presented by a service company along with some of modelled benefits derived by deploying this technology.

Time	Paper #	Presentation
1400	204029	Improved Drilling Operations with Wired Drill Pipe and Along-string Measurements - Learnings and Highlights from Multiple North Sea Deployments B. E. Nygård, E. Andreassen, J.A. Carlsen, G.Å. Ulfnes, S. Øksenvåg, R. Stabell, T. Davis, Equinor; T.L. Naterstad, S. Zainoune, E. Vandvik, NOV
1430	204072	A Novel Approach to Drill Stem Selection for Drilling in Sour Fields G. Plessis, A. Muradov, L. Bordet, R. Griffin, L. Hehn, NOV – Grant Prideco
1500	204019	Annular Pressure Management - Benefits From Using Along-string Measurements in Real-time While Tripping E. Vandvik, C. Gomez, NOV; B. Nygård, E. Andreassen, G. Ulfnes, Equinor



Technical Programme (as of 8 February 2021)

Friday, 12 March 2021

1600 - 1700 GMT

28 Zonal Isolation: Shale Barrier

Session Chairpersons: Harald Nevoey, **ConocoPhillips Norge**; Steve Rosenberg, **Consultant**

Long term or 'life of well' zonal isolation is of utmost importance in well design. This session will address implementing shale as a well barrier in new wells and also the investigation of activated shale creep and potential of micro-annulus in the field.

Time	Paper #	Presentation
1600	204075	Implementing a Strategy for Shale as Well Barrier in New Wells T.G. Kristiansen, L.P. Delabroy, Aker BP; G.A. Obando Palacio, T. Winther, Schlumberger; N.A. Aarseth, A. Bauer, K. Hagenes, A. Linndal, P. Tyberø, Aker BP
1630	204088	Activated Shale Creep and Potential Micro-Annulus Investigated in the Field A. Bauer, Aker BP; M. Loizzo, Ridge AS; L.P. Delabroy, T.G. Kristiansen, Aker BP; K. Klepaker, Ridge AS
		Alternate
	204068	Comprehensive Analysis Of Borehole Stability With Temperature, Swelling, And Pore Pressure Change For Layered And Orthotropic Formations T. Kaneshima, Kuraray America Inc; F. Bai, University of Texas; N. Morita, Texas A&M University

29 Drilling Fluids Automatic Measurement and Monitoring

Session Chairpersons: Ashley Johnson, **Schlumberger**; Pradeepkumar Ashok, **University of Texas at Austin**

The drilling fluid is critical in controlling the physical integrity of the well. Failing to properly manage the density and rheology can result in well control issues, wellbore instability or catastrophic losses. Unfortunately monitoring of the fluid is labour intensive and reliant on the skills and expertise of the engineers. In the session we will review two papers. The first looks at changing sporadic testing into continuous surveillance, where the fluid properties of the mud entering and leaving the well are monitored continuously with the results delivered to a surveillance centre for interpretation. The second paper looks at the development of new measurements to automatically monitor the fluid characteristics under conditions of changes to temperature and pressure.

Time	Paper #	Presentation
1600	204041	Automatic Drilling Fluids Monitoring K. Taugbol, Equinor ASA; B. Sola, M.J. Forshaw, A. Fjogstad, Baker Hughes
1630	204084	Automatic Measurement of the Dependence on Pressure and Temperature of the Mass Density of Drilling Fluids E. Cayeux, NORCE



SPE Drilling Engineering Award

The SPE Drilling Engineering award was established in 1984 and recognises outstanding achievement or contributions to the advancement of petroleum engineering in the area of drilling engineering technology. Candidates are nominated by their professional colleagues and selected by committees appointed by the SPE Board of Directors.

The SPE Drilling Engineering Award winner is recognised at the annual SPE/IADC International Drilling Conference and Exhibition and the SPE Annual Technical Conference and Exhibition (ATCE).



Paul Pastusek

Paul Pastusek worked for Baker Hughes for 30 years in Research and Development, Marketing, and Engineering. He started a consulting company in 2008 and joined ExxonMobil in 2009. He is currently a Drilling Mechanics Advisor in the Wells Technical organization at ExxonMobil Upstream Integrated Solutions. Paul has 42 years of experience working on redesign of drilling processes and tools to the economic limit. His areas of expertise are: automation, drill string dynamics, steerable systems, borehole quality, bit applications, cutting mechanics, rig instrumentation and control systems, and failure analysis.

Paul is a member of the Drilling Systems Automation Technical Section, and has been active in the Drilling Study Group, Gulf Coast Section, and the R&D Technical Section. He received the GCS Regional Drilling Engineering award, and has received several Outstanding Instructor awards at ExxonMobil. Paul has a BSME from Texas A&M University and an MBA from the University of Houston. He is a Registered Professional Engineer, holds 42 US patents, and has given numerous talks and written 27 papers on drilling technology.



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- ✓ Engage in our Drilling Forums with like-minded professionals facing the same issues as you
- ✓ Conference Proceedings
- ✓ Live audience polling and surveys

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- ✓ SPE DSATS/IADC Advanced Rig Technology Symposium. Supported by the SPE Drilling Systems Automation Technical Section



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