38th International Conference on Ocean, Offshore and Arctic Engineering
Glasgow, Scotland
June 9–14, 2019
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For queries or support, contact Sharon Giordano: GiordanoS@asme.org
**Saturday, June 8**

**Short Courses**
- Corrosion and Fouling in Marine Environment
- Verification & Validation of Industrial CFD

**Outreach**
- Team Building Exercise
- Welcome Dinner

**Sunday, June 9**

**Short Courses**
- Offshore Wind Turbines: Dynamic Analysis and Marine Operations
- Dynamic and Control Design
- Introduction to Machine Learning and Data-driven Modelling Methods for Engineering Applications

**Welcome Reception**
18:30 – 20:30
Glasgow Science Centre

**Monday, June 10**

**Opening Ceremony and Keynote Plenaries**
08:30 – 10:00
SEC Armadillo

**Welcome and Opening Remarks**
Prof. Attila Incecik, Conference Chair, OMAE 2019
Prof. H. Thirapongkham, Technical Program Chair, OMAE 2019
Prof. Antonio C. Fernandes, ODAE Division Chair

**Keynote Plenary One**
Blue Oceans: Offshore Research for Future Maritime Challenges
Dr. Bas Buchner, President, MARIN

**Keynote Plenary Two**
Advancing a Lower Carbon Future
David Dickson, Vice President, Safety & Operational Risk, Global Operations, BP

**Keynote Panel**
Offshore Digital
Moderator: Xiaozhi (Christina) Wang, PhD, Vice President, Global Marine, American Bureau of Shipping (ABS)
Panelists: Prof. Kjetil Staugset, PhD, Chief Researcher Upstream and Downstream, Technology, Equinor Expert Centre, Equinor ASA
Fredric Dabe, Digital Transformation Director, SBM Offshore

**OMAE 2020 Presentation**
Prof. Manhar Dhanak, Conference Chair, OMAE 2020
Prof. Ron W. Young, Conference Co-Chair, OMAE 2020

**Opening Lunch**
12:00 – 13:30
Hall 5 (SEC)

**Refreshment Break**
10:00 – 10:30
Hall 5 (SEC)

**Keynote Plenaries (Continued)**
10:30 – 12:00 SEC Armadillo

**Concurrent Sessions**
13:30 – 15:00
OT 1-1-2 FPSo and Arctic Structures
SSR 2-1-2 Data Driven Models
MAT 3-1-2 Formulation of the Fracture Parameter
PRS 4-1-1 Flexible Pipes I
OSU 5-1-1 Marine Utilization and Marine Spatial Planning
OE 6-1-2 Floating Body Technology
OE 6-4-1 Marine Control and Automation

**Keynote Plenary Three**
Numerical and Experimental Methods in Hydrodynamics
OT 13-7-1 Small vessel and Related Technology

**Refreshment Break**
15:00 – 15:30
Hall 5 (SEC)

**Concurrent Sessions**
15:30 – 17:30
OT 1-3-2 Design Optimization
SSR 2-2-3 Probabilistic Response Models
SSR 2-2-2 Collision and Crushworthiness II
MAT 3-9-1 Advances in Materials Characterization
PRS 4-1-4 Flexible Pipes IV
PRS 4-2-5 SCR's and SLWPs II
OSU 5-6-1 High Tide and Tsunamis
OE 6-4-2 Marine Operations and Vessel Movements
OE 6-11-1 Autonomous Vehicle Technology
CFD 8-1-2 Surface Waves
OE 9-9-1 Aeroacoustics I
OG 10-3-1 Anchors
PT 11-7-3 Well Drilling Fluid and Hydraulics III
HRT 12-2-1 Multi-Body Hydrodynamics
OT 13-2-1 Numerical Methods

**ASME & IMechE Connect Roundtable**
16:00 – 18:00
Forth Room

**Afternoon Lunch Series**
17:40 – 18:10
Lomond Auditorium
European Research Council – Funding Opportunities (SEC)
for Creative Minds from All Over the World
Dr. Ing. Luiz Alves dos Santos, Scientific Officer, European Research Council

**Afternoon Drinks Reception**
18:15 – 19:15
Hall 5 (SEC)

**Tuesday, June 11**

**Concurrent Sessions**
08:30 – 10:00
OT 1-1-3 Floating Wind Platforms
OT 1-2-2 Mooring System Design and Analysis I
SSR 2-4-1 Fatigue and Fracture Reliability I
SSR 2-3-1 Extreme Loading and Responses I
SSR 2-4-3 Structural Analysis and Optimization I
MAT 3-1-1 Fracture Toughness measurement and Assessment
PRS 4-1-2 Flexible Pipes II
PRS 4-3-2 Installation
OSU 5-2-1 Aquaculture I: Design and Modeling I
OE 6-2-3 Coastal Engineering I
OE 6-4-3 Marine Engineering and Applications I
CFD 8-2-2 Free Surface Modeling
ORE 9-3-1 Wave Energy Converter Control Systems

**Afternoon Lunch**
12:00 – 13:30
Hall 5 (SEC)

**Concurrent Sessions**
13:30 – 15:00
OT 1-1-5 Artificial Intelligence and Advance Analysis
OT 1-2-3 Dynamic Positioning II
SSR 2-4-3 Fatigue and Fracture Reliability II
SSR 2-9-2 Extreme Loading and Responses II
SSR 2-12-3 Structural Analysis and Optimization II
MAT 3-3-2 Performance of Mooring Chains
PRS 4-1-5 Flexible Pipes V
PRS 4-3-1 General Design and Analysis I
OSU 5-4-1 Underwater Vehicle and Technology
OE 6-2-3 Coastal Engineering III
OE 6-4-5 Very Large Floating Structures
CFD 8-2-3 Free Surface Loading and Structure Interaction I
ORE 9-6-1 Optimization and Load Analyses
OG 10-5-1 Bucket Foundations, Suction Caissons and Spudcans
PT 11-6-1 Integrity of Well Barriers II
HRT 12-5-1 Non-Linear Waves and Wave Effects II
OT 13-2-3 Fluid-Induced Motions (FIM)
Wednesday, June 12

Refreshment Break 10:00 – 10:30 Hall 5 (SEC)

Concurrent Sessions 10:30 – 12:00

OT 1-4-2 Numerical Design and Analysis
SSR 2-1-2 Abnormal or Rogue Waves II
SSR 2-11-2 Ultimate Strength II
MAT 3-3-1 Fatigue Assessment and Improvements
PRS 4-1-7 Flexible Pipes VII
PRS 4-3-3 Thermo-Mechanical II
OSU 5-1-3 Hybrid and Complex Use of Floating Systems I
OE 6-3-2 Wave-Body Interactions/CFD
OE 6-5-2 Advanced Marine Hydrodynamics II
OE 6-9-2 Ship Hydromechanics
PAT 7-4-1 Vessels in Ice and Waves
CFD 8-3-2 Code Development and V&V
ORE 9-2-2 Aerodynamic Noise
ORE 9-3-2 Wave Energy: Oscillating Water Column I
PT 11-2-2 Drilling Mechanics Session II
PT 11-15-2 Well Abandonment II - Research and Operational Experiences

OT 13-1-2 Fluid Body Interaction

Lunch 12:00 – 13:30 Hall 5 (SEC)

Concurrent Sessions 13:30 – 15:00

OT 1-3-1 Nonlinear Wave and Wave Effects
SSR 2-2-2 Probabilistic and Spectral Wave Models I
SSR 2-11-3 Ultimate Strength III
MAT 3-11-1 Developments in BS 7910 and other Fitness-for-service Procedures: Session I
PRS 4-2-3 Drilling Riser I
PRS 4-3-3 Mechanics I
OSU 5-1-3 Hybrid and Complex Use of Floating Systems II
OE 6-15-1 Underwater Vehicles Control
OE 6-3-3 Damping and Viscous Effects
OE 6-5-3 Advanced Marine Hydrodynamics III
PAT 7-11-1 Ice Model Tests and Structure-Ice Interactions
CFD 8-1-3 Ship Performance I
ORE 9-4-2 Wave Farms and Alternative Markets
ORE 9-6-1 Thermal, Hybrid and Others: Analysis, Design and Prediction
PT 11-3-1 Drilling Geomechanics
PT 11-5-1 Well Inflow Control and Reservoir Management
OT 13-1-3 Nonlinear Waves I

Refreshment Break 15:00 – 15:30 Hall 5 (SEC)

Concurrent Sessions 15:30 – 17:30

OT 1-3-2 Fluid-Structure Interaction
SSR 2-2-2 Probabilistic and Spectral Wave Models II
SSR 2-6-1 Reliability of Mooring and Riser Systems II
MAT 3-11-2 Developments in BS 7910 and other Fitness-for-service Procedures: Session II
PRS 4-2-4 SGRs and SLWRs I
PRS 4-5-2 Flow Assurance II
OE 6-15-2 Underwater Vehicles Design Technology and Hydrodynamics
OE 6-3-4 Wave-Body Interactions: Special Problems
OE 6-5-4 Advanced Marine Hydrodynamics IV
PAT 7-12-1 Numerical Ice Modeling
CFD 8-1-4 Ship Performance II
CFD 8-4-1 Cylinder VIV
ORE 9-1-2 FWT - Numerical Analysis I
ORE 9-7-1 Driven Design, Operation and Condition Monitoring I
PT 11-4-1 Petroleum Production Systems Design and Operation
PT 11-12-2 Cementing II
OT 13-1-4 Nonlinear Waves II

Afternoon Lecture Series 17:40 – 18:30 Lamond Auditorium

Environmental and Offshore Marine Engineering Researches on Sports Environment, not only Water Wave Engineering, Nonlinear Hydrodynamic Forces and Statistics
Prof. Takeshi Kinoshita, Visiting Professor, Nagasaki Institute of Applied Science

Conference Banquet 19:00 – 24:00 Merchant Square

Thursday, June 13

Outreach Breakfast / Feedback Session 07:30 – 10:00

Concurrent Sessions 08:30 – 10:00

OT 1-1-1 Semi-Submersibles and TLPs
SSR 2-13-1 Risk Analysis and Management I
SSR 2-6-2 Reliability of Mooring and Riser Systems II
MAT 3-2-1 Abstraction and Performance of Clad Pipes
PRS 4-1-1 Umbilicals and Cables I
PRS 4-3-7 Thermo-Mechanical III
OE 6-13-1 Ship Resistance and Wave Loads
OE 6-17-1 Wave loads on structures
OE 6-7-1 Regional Metocean I
CFD 8-1-5 Seakeeping I
CFD 8-4-2 Risers, Juppers and Pipelines
ORE 9-1-5 FWT - Mooring Systems
ORE 9-5-3 Numerical Analysis I
PT 11-1-1 General Petroleum Technology I
PT 11-13-1 LSU Workshop on Riser Gas Management and Well Control
OT 13-3-2 Wave Energy I

Refreshment Break 10:00 – 10:30 Hall 5 (SEC)

Concurrent Sessions 10:30 – 12:00

OT 1-7-1 Wave Loading and Motions in Extreme Seas I
SSR 2-13-2 Risk Analysis and Management II
SSR 2-6-3 Reliability of Mooring and Riser Systems III
MAT 3-5-1 Fatigue Assessment and Improvement
PRS 4-1-1 Umbilicals and Cables II
PRS 4-3-8 Mechanics II
OE 6-13-2 Ship manoeuvrability and Motion
OE 6-17-2 Nonlinear and Breaking Waves
OE 6-7-2 Regional Metocean II
CFD 8-1-6 Seakeeping II
CFD 8-4-3 Interference, Proximity and Geometry Effects
ORE 9-1-8 FWT Hydrodynamics I
ORE 9-1-9 Advanced Control
PT 11-2-2 General Petroleum Technology II
PT 11-10-1 New Materials for Well Construction
OT 13-3-4 Wave Energy II

Technical Session Organizers’ Lunch 12:00 – 13:00 Hall 5 (SEC)

Concurrent Sessions 13:30 – 15:00

OT 1-7-2 Wave Loading and Motions in Extreme Seas II
SSR 2-14-1 Risk Based Maintenance
SSR 2-7-1 Reliability of Renewable Energy Systems
MAT 3-2-2 Analysis and Fatigue Performance of Tubular Joints (John Sharp Honorary Session)
PRS 4-4-1 Subsea Structures I
PRS 4-6-1 Innovative Technologies for Deepwater Low-Cost Production I
OE 6-13-3 Numerical Methods
OE 6-7-3 Metocean Criteria I
CFD 8-4-1 VIV Suppression and Control
ORE 9-4-1 Power Take-offs and Experiments
ORE 9-5-4 Numerical Analysis II
PT 11-3-1 General Petroleum Technology III
PT 11-11-1 Innovations in Drilling, Production and Transport
OT 13-3-3 Ocean Current Energy, OTEC and Related Technology

Refreshment Break 15:00 – 15:30 Hall 5 (SEC)

Concurrent Sessions 15:30 – 17:30

OT 1-4-1 Experimental Design and Analysis
SSR 2-5-1 Reliability of Marine Structures
MAT 3-13-1 Dr. John Sharp Honorary Session
PRS 4-4-2 Subsea Structures II
PRS 4-6-2 Innovative Technologies for Deepwater Low-Cost Production II
OE 6-7-4 Metocean Criteria II
CFD 8-4-2 VIV Theory and CFD&FSI Symposium Workshop
ORE 9-2-6 Hybrid Systems ans Farm Analysis
ORE 9-3-3 Wave Energy: CFD Simulations
PT 11-11-2 Innovations in Drilling, Production and Transport
OT 13-3-1 Wind Energy

Farewell Reception 17:30 – 19:00 Argyll Suite (Crowne Plaza)

Friday, June 14

Technical Tours
• Technical Tour to Advancing Research Centre and Falkirk Wheel
• Technical Tour to Subsea 7 and Falkirk Wheel

Registration
Hall 5 (SEC)
Sunday, June 9 13:00 – 20:00
Monday, June 10 07:00 – 17:30
Tuesday, June 11 08:00 – 17:30
Wednesday, June 12 08:00 – 17:30
Thursday, June 13 08:00 – 17:30

Exhibition
Hall 5 (SEC)
Monday, June 10 08:30 – 19:15
Tuesday, June 11 08:30 – 17:30
Wednesday, June 12 08:30 – 17:30
Thursday, June 13 08:30 – 15:30

Daily Program Handout
An updated daily program handout will be available at the Registration Desk the mornings of Tuesday, Wednesday and Thursday. The handout will incorporate any last-minute program changes and show the time-synchronized order of presentations in each session for that day. You can use this handout as a general reference and to easily plan your personal attendance schedule for the day. The program changes will also be updated on the ASME Crowd Compass App.

Key to Symposium Abbreviations
CFD&FSI CFD & FSI
MAT Materials Technology
OE Ocean Engineering
OG Off shore Geotechnics
ORE Ocean Renewable Energy
OFF Offshore Technology
OSU Ocean Space Utilization
PAS Polar and Arctic Sciences and Technology
PRS Pipelines, Risers, and Subsea Systems
PT Petroleum Technology
SSR Structures, Safety and Reliability
ET Prof. Rodney Eatock Taylor Honoring Symposium on Marine and Offshore Hydrodynamics
TK Prof. Takeshi Kinoshita Honoring Symposium on Offshore Technology

See Detailed Program starting on page xx for concurrent session room locations.

#OMAE2019 | 3
Venue Floor Plans

We are using meeting rooms at the Scottish Event Campus (SEC) and the Crowne Plaza Hotel. There is a walkway/link joining the mezzanine level of the Crowne Plaza Hotel with the upper level of the SEC.

Opening Ceremony [SEC Armadillo]
Exhibits, Refreshment Breaks, Lunches, Registration [Hall 5, SEC]
Concurrent Sessions [Various Rooms, SEC and Crowne Plaza Hotel]
Farewell Reception [Argyll Suite, Ground Level, Crowne Plaza Hotel]

Crowne Plaza Hotel
Crowne Plaza Hotel, Congress Road, Glasgow, G3 8QT
Tel: +44 (0)871 942 9091

Ground Level
Meeting Rooms

Room Location (Alphabetical)
- Armadillo SEC-Armadillo
- Alsh 1 SEC-Ground
- Alsh 2 SEC-Ground
- Argyll Suite Crowne Plaza-Ground
- Barra Crowne Plaza-Mezzanine
- Boisdale 1 SEC-Ground
- Boisdale 2 SEC-Ground
- Carron 1 SEC-Upper
- Carron 2 SEC-Upper
- Castle 1 Crowne Plaza-Ground
- Castle 2 Crowne Plaza-Ground
- Castle 3 Crowne Plaza-Ground
- Dochart 1 SEC-Upper
- Dochart 2 SEC-Upper
- Etive SEC-Ground
- Fyne SEC-Ground
- Hall 5 SEC-Ground
- Jura Crowne Plaza-Mezzanine
- Lomond Auditorium SEC-Ground/Upper
- M2 SEC-Upper
- M3 SEC-Upper
- M4 SEC-Upper
- Shuna Crowne Plaza-Mezzanine
- Staffa Crowne Plaza-Mezzanine

Mezzanine Level
Meeting Rooms

Link to SEC Upper Level

Ground Level
Meeting Rooms

- Castle III
- Castle II
- Castle I
- Conservatory
- Argyll Suite
- Argyll Foyer
- Main Function Room Entrance
- Bar
- Stairs/lift to Mezzanine
- Stairs to Reception
- Staffa
- Shuna
- Jura
- Barra
- Executive Boardroom
- Stairs/lift to Ground Floor
Welcome from the Conference Chair

Professor Atilla Incecik

It is my great privilege and honour to welcome you all to the 38th International Conference on Ocean, Offshore and Arctic Engineering (OMAE) in Glasgow, Scotland, from 9 – 14 June 2019.

I am delighted that OMAE 2019 is being hosted by our Department of Naval Architecture, Ocean and Marine Engineering at the University of Strathclyde in Glasgow, Scotland. Established in 1883, and built on Glasgow’s rich heritage of naval architecture and shipbuilding, we are one of the oldest Naval Architecture departments in the world. The Department of Naval Architecture, Ocean and Marine Engineering is part of the largest Faculty of Engineering in Scotland, and our University is home to over 22,000 students. Glasgow houses the second highest number of ship management companies after London, and has the largest shipyard in the UK, cementing the fact that Glasgow remains the hub of the UK’s shipbuilding industry.

Over 900 papers have been accepted for the conference, organised around 13 symposia which will take place during the week. Monday’s Opening Ceremonies will feature welcome speeches from the University of Strathclyde and the City of Glasgow, along with Keynote Presentations from industry. The conference features three afternoon lectures, including a presentation from the European Research Council on the ERC research funding programme. On Tuesday and Wednesday afternoon, we are pleased that our two conference honourees, Professor Rodney Eatock Taylor and Professor Takeshi Kinoshita, will be giving afternoon plenary lectures. Technical tours on Friday include visits to Subsea7 in Glasgow, the University of Strathclyde’s Advanced Forming Research Centre and the Falkirk Wheel.

We have an exciting social programme organised for you including the Conference Banquet which will take place in Glasgow’s Merchant City, one of Glasgow’s oldest quarters dating back to the 1750s. Throughout the conference we will have a truly Scottish theme, introducing you to Scottish food and culture, giving you a real taste of Scotland which you are sure to remember!

Glasgow was this year named in the top ten of Time Out’s best cities in the world for 2019, and has previously been named as one of the world’s top ten must see cities by various publications including Rough Guides and the Telegraph. National Geographic named Glasgow as one of its ‘Best of the World’ destinations and we were also voted ‘Friendliest City in the World’ in Rough Guide 2016 – something I am sure you will agree with after your stay here!

Finally, the Conference could not be a success without the dedication and the hard work of many people. In particular I would like to recognize our Technical Programme Chair, Professor Krish Thiagarajan Sharman, our Local Organising Committee, Mrs Annabel Anderson (Marketing and Events Coordinator of the Faculty of Engineering at the University of Strathclyde), the many symposia and topic organisers, session chairs and reviewers, authors of papers and conference participants, our sponsors and exhibitors, ASME and Sea to Sky Meeting and Association Management staff, and our Volunteers, who will be around all week in the blue shirts to guide and assist you! Thank you all most sincerely.

I wish you all a very productive conference, and a most enjoyable stay in Glasgow.

—Professor Atilla Incecik
Conference Chair, OMAE 2019
Professor of Offshore Engineering
Associate Principal and Executive Dean of the Faculty of Engineering
University of Strathclyde, Scotland, UK
Welcome from the Technical Program Chair

Professor Krish
Thiagarajan Sharman

It is a great pleasure for me to address you this year as the Technical Program Chair for this year’s Ocean Offshore and Arctic Engineering Conference in the city of Glasgow, a city with deep and rich maritime traditions. Most of us attend the OMAE conference every year to delve into the depths of science, technology and engineering as displayed by the technical program. So it was with a sense of trepidation and respect that I took on the role of TPC for 2019.

Our program this year has exceeded our expectations with a large number of submissions. From the 1060 submitted abstracts, 916 technical papers and 38 presentations were accepted for the conference. Over the years, the technical program committee has continually focused on improving quality of the papers, which implied keeping an eye on the rejection rate. This year, the paper rejection rate is close to 6% of the draft papers that were submitted. You will be able to see improvements in quality as you enjoy the technical sessions. Another aspect we have been working on is to increase the number of technical presentations, which are accompanied by only an abstract. This gives opportunities for our colleagues from industry to present material that they may otherwise not be able to share with others. In consideration of this, please be sensitive about taking pictures of presentations during the sessions without permission from the speaker.

Apart from our regular symposia, this year we are proud to honor two exceptional individuals whose contributions to the fields of offshore engineering and marine hydrodynamics has been legendary. Professor Rodney Eatock-Taylor has a long history of working on complex problems in wave mechanics and offshore platform dynamics. Professor Takeshi Kinoshita has done pioneering work on many aspects of ocean science and offshore engineering. We will hear from them about their life journeys through two afternoon lectures on Tuesday and Wednesday.

My role as this year’s TPC would have been daunting if it were not for the tremendous support from all the symposium coordinators, topic and session organizers. I particularly want to acknowledge the support of Dr. Charles Smith, who handled the Ocean Renewable Energy Symposium while I was focused on the TPC role. Working with Professors Atilla Incecik and Antonio Fernandes, the LOC and Executive Committee has been a pleasure. The support given by Stacey Cooper at ASME and the Sea to Sky team has been invaluable.

I hope you will have a great time at OMAE 2019, and I look forward to seeing you again at future OMAE conferences.

—Professor Krish Thiagarajan Sharman

Technical Program Chair, OMAE 2019
Endowed Chair in Renewable Energy and Professor
Department of Mechanical and Industrial Engineering
University of Massachusetts Amherst, USA
Welcome to the Ocean, Offshore and Arctic Engineering Conference (OMAE), hosted by the American Society of Mechanical Engineers (ASME). This is the 38th edition of the conference, which is held annually around the world. **International** is one word. The OOAE Division volunteers and ASME staff (Houston and New York) come together each year with truly democratic rules to host this conference, seeking sustainable and safe use of ocean resources.

OMAE is an unusual conference for several reasons. It combines Academia with Industry to adapt scientific achievements into practical applications, leading to tangible technological successes. Industry has an obligation to make it feasible and safe. Academia has an obligation to verify the science. This is a wonderful play well represented in OMAE conferences. **Art** is another word. OMAE and its volunteers organize comprehensive Symposia, which organize sessions where one can enjoy professional presentations and discussions that lead to networking in the corridors and in the social events.

Starting last July, I had the honor to assume the mandate as Chair of the Executive Committee of the OOAE/ASME division. To put my journey to Chair into perspective, I remember my first OMAE conference in 1985 in Dallas, where I bought a Stetson cowboy hat. The next conference was in Florence, 1996, where I listened to a Bach recital in a medieval church. By then I was convinced, and I have attended every OMAE conference since then 23 years in a row. This includes two conferences I helped organize with my friend Segen Farid Estefen, in 2001 and 2012. I have numerous cities and destinations to reminisce about, without forgetting the approximately 80 papers I have co-authored and presented so far. I strongly recommend participation in OMAE to my students and younger colleagues.

Through my OMAE experiences I have made many friends from all over the world, making me feel that I indeed belong to an international network that makes me a better professional. I profit from this and I can create and provide opportunities in this very stable, very productive community that has contributed to mankind’s well-being through quality engineering and sustainable technological achievements. **Rewarding** is the final word. Welcome to Glasgow!

—Professor Antonio C. Fernandes
OOAE Executive Division Chair
Head Ocean Engineering Program of COPPE/UFRJ LOC (Laboratório de Ondas e Correntes – Waves and Currents Laboratory), Coordinator LabOceano,
Director for International Affairs
Welcome from the Lord Provost of Glasgow

Eva Bolander

I’m delighted to welcome the 38th International Conference on Ocean, Offshore and Arctic Engineering to Glasgow. Delegates, this is a city with a long and rich seafaring history as well as an unrivalled reputation for world-class shipbuilding and engineering. The term ‘Clyde-built’ synonymous across the globe, with quality and safety. A tradition I’m proud to say, continues for Glasgow remains the home of the UK’s largest shipyard BAE Systems. While nearby Rosyth boasts the largest engineering dockyard facilities. Both sites involved in delivering the Royal Navy’s latest aircraft carriers – built by highly skilled workers BAE Systems Shipyards and assembled by equally accomplished workers at Babcock in Rosyth.

Meanwhile, your conference host, the University of Strathclyde is a leading provider of teaching and research in marine technology. Its Department of Naval Architecture, Ocean and Marine Engineering one of the world’s oldest - established back in 1883. Its enviable status enabling it to forge strong and meaningful links with maritime, offshore and renewable industries across the UK and worldwide.

The Department also has a winning team of postgraduate researchers and academic staff, the largest in Europe, committed to diverse, useful and innovative research, education and knowledge exchange.

It’s an institution that is also home to the UK’s largest engineering faculty with the capability to attract some of the finest minds to teach and learn.

The decision by the UK government to locate the Renewable Energy Catapult Centre on the university campus also emphasising Strathclyde’s significant research capability.

You’ll be aware, that Glasgow is also a major renewables hub. With some of the United Kingdom’s largest offshore renewable companies choosing to locate here. Making it an obvious destination for conferences like yours.

I’m thrilled to have this opportunity to welcome the conference back to Glasgow and I’m sure you’ll have a great experience and an enjoyable stay. This is a city famed for its friendliness and hospitality. Recently ranked the 8th best city in the world by Time Out readers. It was also judged - by the same Time Out readers - as the most improved city in the world! That’s something we’re incredibly proud of.

This forward-thinking, progressive and international city owes its status to the skills and expertise of its citizens. They’re our greatest asset and consistently demonstrate that ‘People Make Glasgow’.

Friends, I’m confident you’ll enjoy your stay here and leave Glasgow with fond memories.

—Councillor Eva Bolander
Lord Provost of Glasgow
Glasgow City Map

1. **Scottish Event Campus** [SEC] (Conference Venue)
   Exhibition Way, Glasgow, G3 8YW

2. **Crowne Plaza Hotel** (Breakout Session Rooms, Farewell Reception)
   Congress Road, Glasgow, G3 8QT

3. **Glasgow Science Centre** (Welcome Reception)
   50 Pacific Quay, Glasgow, G51 1EA

4. **Merchant Square** (Conference Banquet)
   Candleriggs Street, Glasgow

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Award Winners

The Subrata Chakrabarti Young Professional Award

Dalila Gomes, for her outstanding presentation and paper OMAE2018-77547 “A Transient Flow Model for Investigating Parameters Affecting Kick Behavior in OBM for HPHT Wells and Backpressure MPD Systems”

OMAE 2018 Best Paper Awards

Offshore Technology Symposium, OMAE2018-78315 “Hydrodynamic Coefficients of Simplified Subsea Structures” by Fredrik Mentzoni, Mia Abrahamsen-Prsic and Trygve Kristiansen


Materials Technology Symposium, OMAE2018-78672 “Integrity of Sour Gas Pipeline Despite Local Hard Zones” by Mamdouh M. Salama, Hernan Rincon and Stuart Wilson

Pipelines, Risers, and Subsea Systems Symposium, OMAE2018-78146 “Equivalent Layer Approaches to Predict the Bisymmetric Hydrostatic Collapse Strength of Flexible Pipes” by José Renato M. de Sousa, Marcelo K. Protasio and Luiz V. S. Sagirlo

Ocean Space Utilization Symposium, OMAE2018-77201 “Validation of Applicability of Low Frequency Motion Analysis Theory Using Observation Data of Floating Offshore Substation” by Haruki Yoshimoto, Hisafumi Yoshida and Ken Kamizawa

Ocean Engineering Symposium, OMAE2018-77238 “Semi-Submersible Floater’s VIM Simulation Method for Mooring Line Safety Assessment” by Toshifumi Fujiwara

Polar and Arctic Sciences and Technology Symposium, OMAE2018-78080 “Investigating the Influence of Bridge Officer Experience on Ice Management Effectiveness Using a Marine Simulator Experiment” by Erik Veitch, David Molyneux, Jennifer Smith, and Brian Veitch

CFD & FSI Symposium, OMAE2018-78598 “Validation Exercises for a Free Falling Wedge into Calm Water” by João Muralha, Luís Eça, António Maximiano, and Guilherme Vaz

Ocean Renewable Energy Symposium, OMAE2018-77807 “Using Nonlinear Wave Kinematics to Estimate the Loads on Offshore Wind Turbines in 3-hour Sea States” by Tim Bunnik and Erik-Jan de Ridder

Offshore Geotechnics Symposium, OMAE2018-78128 “Simulating the Response of Untrenched Flowlines due to Iceberg-Flowline-Soil Interaction” by Kenton Pike and Andrew Blundon


Honoring Symposium for Professor Carlos Guedes Soares on Marine Technology and Ocean Engineering, OMAE2018-77672 “Autonomous Ship Navigation under Deep Learning and the Challenges in COLREGs” by L.P. Perera

Honoring Symposium for Professor Bernard Molin on Marine and Offshore Hydrodynamics, OMAE2018-78221 “Hydrodynamic Interactions of the Truncated Porous Vertical Circular Cylinder with Water Waves” by Charaf Ouled Housseine and Sime Malenica
Attendee Information

Registration
The Registration Desk is located in Hall 5, and is open during the following hours:
- Sunday, June 9: 13:00 – 20:00
- Monday, June 10: 07:00 – 17:30
- Tuesday, June 11: 08:00 – 17:30
- Wednesday, June 12: 08:00 – 17:30
- Thursday, June 13: 08:00 – 17:30

Name Badges
In addition to being a means of identification to colleagues, you are required to wear your name badge for admission to conference sessions and events. Room monitors will check name badges before allowing anyone into the session or event. Replacement badges are available at the Registration Desk at a cost of £20 per badge. Attendees who have paid the author/member, non-member or student registration fee are entitled to admission to all conference sessions, daily refreshment breaks, the Welcome Reception, the Exhibition, the four Lunches, the Conference Banquet and the Farewell Reception. These attendees will also receive a conference bag and a program. **Daily Registration:** Attendees who have paid the one-day registration fee qualify for the badge representing the day they have selected to attend. Attendees wearing this badge are entitled to the following on their specified day: admission to conference sessions, refreshment breaks, the Exhibition and food and beverage service. The Conference Banquet is excluded from the daily pass. Daily attendees will also receive a conference bag and a program.

**Accompanying Person:** Guests who have registered as an accompanying person qualify for this badge and are entitled to admission to the Welcome Reception, the Conference Banquet and a special sightseeing tour on Monday.

**Exhibitors:** Exhibit staff have access to the Exhibition and may participate in the Welcome Reception, the four Lunches, the Conference Banquet, and the Farewell Reception. One representative from each exhibiting company is permitted to attend conference sessions.

**Technical Tours and Social Events:** Pre-purchased tickets for technical tours and social events are provided with your name badge.

Author Presentations
If you are a Presenter, please be in the session room 30 minutes prior to the start of the first presentation of your session in order to upload your presentation. You may also upload your presentation any time prior to your talk on the computer in your session room. Screens aspect ratios are 4:3 in Crowne Plaza and 16:9 in SEC session rooms.

Conference Evaluation
Our aim is to deliver a conference that is an enjoyable and educational experience. We rely on your full and honest feedback to improve future conferences. An online survey will be emailed to you following the conference and we appreciate your time and assistance in completing the survey and providing your feedback.

Dietary Requirements
If you advised the Conference Secretariat of your special dietary needs during the registration process, a special meal has been prepared for you. For lunch on Monday, please advise your server of your special requirement. On Tuesday, Wednesday and Thursday, an allergen buffet station will be available where the servers will provide a meal to meet your dietary requirements. Vegetarian meals will be served on the regular buffet stations.

If you did not advise the Conference Secretariat of your special dietary needs during the registration process, advise the staff at the Registration Desk before 18:00 on Sunday, June 9.

First Aid
For medical first aid assistance, please visit the First Aid Room on the main SEC Centre concourse. The nearest hospital is the Queen Elizabeth University Hospital, a ten-minute drive from the Conference venue. Dial 999 or 112 to contact UK emergency services.

Internet
Free Wi-Fi internet is provided by the conference. The network names are “SEC Wi-Fi” and “CrownePlaza”. No password is required.

Lost & Found
Should you lose or misplace an item, please go to the Information and Business Centre, located on the public concourse of the SEC Centre.

Meeting Room Protocol
Every effort will be made to ensure that all sessions start and end on time. Presenters and attendees are asked to work together to achieve this. This may mean having to cut short a valuable discussion; however, conference organizers request your cooperation for the benefit of all attendees. Please turn your cell phone and other noise making devices off or set to silent.

Smoking
Smoking, including the use of e-cigarettes, is not permitted within the Hotel and SEC Centre. Smoking shelters are located on the campus grounds.

ASME Crowd Compass App
Engage with sessions, speakers, and organizations, watch social networking in action, including posting on the in-app feed or sharing outside it. Download the Crowd Compass App from your app store. After installation, search for OMAE and download. Once OMAE is downloaded, you can set up a login. You will then receive a verification email with a code you need to enter in the app. Once you have entered the code in the app, this will grant you access to the event.
Social Events

Welcome Reception
Sunday, June 9, 18:30 – 20:30
Location: Glasgow Science Centre
(50 Pacific Quay, Glasgow)

The Rt Hon The Lord Provost Councillor Eva Bolander is hosting the Welcome / Civic Reception at the Glasgow Science Centre, one of Scotland’s most popular visitor attractions. Enjoy appetizers and drinks while exploring interactive science displays including “Powering the Future” and “Quantum Technologies”!

The Glasgow Science Centre is a five minute walk from the conference venue.

Afternoon Drinks Reception
Monday, June 10, 18:15 – 19:15
Location: Hall 5 (SEC)

Celebrate the first day of the conference with Afternoon Drinks amongst the exhibits.

Conference Banquet
Wednesday, June 12, 19:00 – 24:00
Location: Merchant Square (Candleriggs Street, Glasgow)

Transportation to and from the banquet venue via ScotRail train: Walk 8 minutes to the Exhibition Centre Station located across the street from The SSE Hydro via a covered walkway, and board the ScotRail train to the Argyle Street Station (three stops). Exit the station and walk east for 5 minutes along Argyle Street. Take a left on Brunswick Street and walk for about 3 minutes then right onto Wilson Street for 2 minutes. The destination will be in front of you. Look for directions and a map to Merchant Square in the conference app or refer to the map on page 10.

You will have the option of sampling menus from each of the restaurants and drinks from any of the conveniently located bars. After dinner we’ll put on an old fashioned Ceilidh with great music and dancing to the wee hours!

Lunches
Monday, June 10 to Thursday, June 13
Location: Hall 5 (SEC)

Monday: Opening Lunch (12:00 – 13:30)
Tuesday: Lunch (12:00 – 13:30)
Wednesday: Lunch (12:00 – 13:30)
Thursday: Technical Session Organizers Lunch (12:00 – 13:30)

Lunch is open to all attendees when lunch is included in their fee.

Monday lunch sponsored by Elsevier
Thursday lunch sponsored by Greater Ft. Lauderdale Convention Bureau

Accompanying Persons Program
Monday Tour, June 10
Departure: 08:45
Departure Point: Registration Desk, Hall 5, SEC Centre

The Accompanying Persons Program includes admission to the Welcome Reception, the Conference Banquet and a tour on Monday, June 10 to Loch Lomond including a boat cruise.
Sightseeing Tours

Discounted rates for OMAE 2019 conference attendees and accompanying persons are available for a selection of tours to discover the stunning surroundings of Glasgow and Scotland.

Below is an introduction to the tours available through our partner Rabbie’s Tours. OMAE 2019 attendees and accompanying persons receive a 10% discount on the published rates. A Tour Desk will be available in Hall 5 on Monday, June 10th between 10:00 – 15:30. To apply the discount, please enter the tour discount code OMA1466 during the check out process when booking the tour on www.rabbies.com. The code is valid until June 30, 2019.

Loch Lomond & Whisky Distillery: Half day tour
Combine a famous loch with a world-renowned whisky on this afternoon trip to the Highlands.

Culzean Castle, Burns Country & the Ayrshire Coast: 1 day tour
Discover the landscapes and myths that inspired Scotland’s most famous poet, Robert Burns.

Stirling Castle, Loch Lomond & Whisky: 1 day tour
Journey into the Highlands and the heart of Loch Lomond on this tour from Glasgow.

Oban, Glencoe, Highland Lochs & Castles: 1 day tour
See epic ruined castles, listen to tales of old clan rivalries, and venture through brilliant mountain scenery on this tour to the Scottish Highlands.

Outlander Adventure: 1 day tour
Visit three castles and a well-preserved village on this adventure through the sights and stories of Outlander.

Loch Ness, Glencoe & the Highlands: 1 day tour
Myths, monsters, and mountains: this tour is the best way to see ‘Scotland in a day’.

The Isle of Skye: 3 day tour
Venture through breath-taking landscapes, quaint villages and epic castles on this journey to the ‘Misty Isle’.

Mull & Iona: 3 day tour
Journey to Mull and discover a paradise for wildlife enthusiasts, history addicts, and seafood connoisseurs.

Isle of Arran Adventure: 3 day tour
Explore the beautiful Isle of Arran and Robert Burns Country.
The Department of Naval Architecture, Ocean and Marine Engineering at the University of Strathclyde is one of the premier providers of teaching and research in marine technology. The Department, which is one of the oldest Naval Architecture departments in the world, established in 1883, has strong links with the maritime and offshore industry in the UK and worldwide in research, education and knowledge exchange activities related to marine and offshore hydrodynamics, ship stability and safety, marine and offshore structures, offshore engineering, marine and offshore structures, marine renewable energy, marine engineering and emerging technologies.

Visit the exhibits to discover new products and services from some of the industry’s leading organizations. Coffee and tea will be served amongst the exhibits during Refreshment Breaks.

### Location:
Hall 5, SEC

### Dates & Times:
- Monday, June 10: 08:30 – 19:15
- Tuesday, June 11: 08:30 – 17:30
- Wednesday, June 12: 08:30 – 17:30
- Thursday, June 13: 08:30 – 15:30
OPENING LUNCH SPONSOR

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Elsevier is a world-leading provider of scientific, technical and medical information products and services. The company works in partnership with the global science and health communities to publish more than 2,000 journals, including The Lancet, Cell and Ocean Engineering, Applied Ocean Engineering, Coastal Engineering and Marine Structures.

REFRESHMENT BREAK SPONSORS

TechnipFMC
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TechnipFMC is a global leader in subsea, onshore, offshore, and surface technologies. With our proprietary technologies and production systems, integrated expertise and comprehensive solutions, we are transforming our clients’ projects and unlocking new possibilities for developing their oil and gas resources through innovative technologies and improved efficiencies.

Babcock
www.babcockinternational.com

For more than a century, Babcock, the Aerospace and Defence company, has been trusted to deliver bespoke, highly-skilled engineering services. We help customers in the UK and around the world to improve the capability, reliability and availability of their most critical assets within the four market sectors of Marine, Land, Aviation and Nuclear, underpinned by a deep understanding of technology integration, unique infrastructure and specialist training.

SYMPOSIA SPONSOR

SYMP 9: Ocean Renewable Energy
Principle Power Inc.

MEDIA SUPPORTERS

Journal of Marine Science and Engineering

ON&T

Ship & Offshore

Springer

TRAVEL SPONSOR

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Exhibitors

**DNV GL**
www.dnvgl.com

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. Operating in more than 100 countries, our professionals are dedicated to helping our customers in the maritime, oil & gas, energy and other industries to make the world safer, smarter and greener. DNV GL is the world-leading provider of software for managing risk and improving asset performance in the energy, process and maritime industries. Our solutions support a variety of business critical activities including design and engineering, risk assessment, asset integrity and optimization, QHSE, and ship management.

**Fugro**
www.fugro.com

Fugro provide the people, equipment, expertise and technology that support the exploration, development, production and transportation of our world's natural resources. They can provide the technical data and information required to design, construct and maintain client structures and infrastructure in a safe, reliable and efficient manner.

**Lankhorst**
www.lankhorst-ep.com

Lankhorst provides high quality engineered products for offshore risers and flow lines. With their unique thick-walled plastic production technology, they can supply innovative high performance products to meet the demands of the offshore industry. From piggy-back-blocks and clamps for laying pipelines and vortex-induced-vibration-suppression riser protection, through to bend restrictors, Lankhorst’s precision engineered components deliver outstanding performance in the most demanding subsea environments. Clients can rely on their proven track record having delivered hundreds of projects all over the world, from the most northern platforms to the deepest waters.

**Malin Group**
www.malingroup.com

The Malin Group represents a collection of companies under common ownership that offer a diverse and comprehensive set of services to our clients. Our in house team of naval architects, structural engineers, marine engineers, draughtsmen and project managers have a wealth of practical experience across a broad range of projects, including marine, heavy lift, fabrication and complex transportation projects. Malin are in a unique position where we can offer support for the lifecycle of a project, whether it be at Front-End Engineering Design (FEED) stage, through detailed design, fabrication, delivery and installation.

**Orcina**
www.orcina.com

Orcina is a professional engineering software house specialising in the fields of offshore dynamics, risers, moorings, towed systems and installation procedures. We develop and sell leading edge commercial software packages including OrcaFlex (with VIV analysis), OrcaLay and OrcaBend. We also undertake feasibility and design studies, design audit, and engineering systems analysis.

Our main product is OrcaFlex, the market-leading numerical simulation program for modelling flexible and rigid risers, moorings, cable and pipe lay, pipeline pull-in, towed arrays, installation sequences and many other systems. OrcaFlex provides the best-in-class complete design environment for offshore dynamics.
Siemens

SIEMENS
Ingenuity for life

Siemens Industry Software NV (SISW) helps manufacturers worldwide bring innovative products to market faster and with greater confidence, by offering them a comprehensive solutions portfolio, called Simcenter™ solutions. This uniquely combines test, system simulation, 3D CAE, CFD and design space exploration, as well as engineering services.

By employing Simcenter, major industry players can more effectively design and optimize key performance aspects, while dealing with complexities such as ever-increasing mechatronics, additive manufacturing, and concepts like cloud or the internet of things.

SISW runs a business unit of Siemens Product Lifecycle Management (PLM) Software, part of the broader Siemens Digital Factory division.

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www.supergen-ore.net

Supergen
Offshore Renewable Energy

The Supergen Offshore Renewable Energy (ORE) Hub is an Engineering and Physical Sciences Research Council (EPSRC) funded programme that brings together academic and industrial expertise from across the Offshore Renewable Energy (ORE) sector. The vision of the Hub is to provide research leadership to connect academia, industry, policy and public stakeholders, inspiring innovation and maximising societal value in offshore wind, wave and tidal energy. The Hub is central to the UK ORE community, bringing together shared skills and expertise, transferring fundamental knowledge, and sharing learning and use of resources for inter-disciplinary research, whilst taking a whole systems approach.

TWI
www.twi-global.com

TWI

TWI is a world leading research and technology organisation. Bases in the UK and globally see 800 staff provide technical support in joining and technologies such as material science, structural integrity, NDT, surfacing, electronic packaging and cutting. Services include generic research, contract R&D, technical information, consultancy, standards drafting, training and qualification. TWI offers a single, impartial source of service for joining engineering materials.

TWI is internationally renowned for its multidisciplinary teams that implement established or advanced joining technology solving problems at any stage – from initial design, materials selection, production and quality assurance, through service performance and repair.

Engineering at the University of Strathclyde
www.strath.ac.uk/engineering

The University of Strathclyde is the third largest university in Scotland and our Faculty of Engineering is largest in Scotland, with eight world-class engineering departments.

We have an established record of research excellence evidenced through our expanding research portfolio of over £100 million. Much of our engineering research is done with industry and we work to provide specific business solutions for many engineering sectors.

Our Department of Naval Architecture, Ocean and Marine Engineering has Europe’s largest team of postgraduate researchers and academic staff to sustain the production of useful and innovative research ideas. We work closely with key UK and global industry partners and take part in many diverse research projects and networks funded by the UK government, the marine and offshore industry and the EU.
TECHNICAL PROGRAM
The OMAE 2019 Conference is pleased to dedicate a Special Symposium in honour of Professor Rodney Eatock Taylor. Professor Eatock Taylor has made a significant contribution to the field of Marine and Offshore Hydrodynamics.

Professor Rodney Eatock Taylor (FREng, FRINA, FIMechE) graduated from King’s College, Cambridge (Mechanical Sciences followed by Fine Arts, 1965), and obtained his PhD in Civil Engineering from Stanford University (1968). After two years as a structural engineer with Ove Arup and Partners in London he joined University College London, working on ship structures with Professor R. E. D. Bishop. He became Professor of Ocean Engineering at UCL (1984) and Dean of Engineering (1988-1989). Since then he has been at the University of Oxford as Professor of Mechanical Engineering (now Emeritus), and Head of Engineering Science (1999-2004). His research interests have concerned vibrations of offshore platforms, numerical and analytical hydrodynamics, hydroelasticity of ships and very large floating structures, and marine renewable energy. This work has been published in some 280 journal articles and conference papers.

He was the UK Representative on the Standing Committee of the ISSC (1992-2000). In 2005-06 he was the 28th Weinblum Memorial Lecturer. Elected as a Fellow of the Royal Academy of Engineering in 1990, he was a Vice-President (2004-2007). In 2008 he was made an Honorary Fellow of University College London and an Honorary Professor of Harbin Engineering University. He has been Visiting Professor at Ecole Centrale de Nantes (1983, 1997), the Research Institute for Applied Mechanics (RIAM) of Kyushu University (1997), the National University of Singapore (2009-2015); and Adjunct Professor at the University of Western Australia from 2015.

The OMAE 2019 Conference is pleased to dedicate a Special Symposium in honor of Professor Takeshi Kinoshita. Professor Kinoshita has made a significant contribution to the field of Offshore Technology.

Professor Kinoshita graduated from the department of Naval Architecture of the University of Tokyo with BSc, MSc and PhD.

After his appointments as a lecturer and associate professor in the Department of Naval Architecture at the National Yokohama University Professor Kinoshita was appointed as an associate professor, the Institute of Industrial Science, the University of Tokyo and promoted to a full professor at the same institute.

Professor Kinoshita was seconded to the Japan Society of Promotion of Science as its London Office Director.

After his retirement from the University of Tokyo Professor Kinoshita was appointed as a professor in the Department of Oceanic Architecture, Nihon University.

Professor Kinoshita was the President Nagasaki Institute of Applied Science and is now a visiting Professor at Nagasaki Institute of Applied Science.

Professor Kinoshita received the Appreciation Award, ASME OOAЕ Division in 2007, and ASME Best Paper Award, ASME OOAЕ Division in 2010, ASME.
Afternoon Lecture Series

Monday, June 10
17:40 – 18:10
Location: Lomond Auditorium

European Research Council – Funding Opportunities for Creative Minds from all over the World
Dr.-Ing. Luiz Alves dos Santos, Scientific Officer, European Research Council

A presentation about the ERC's mission – to encourage and support the highest quality frontier research in Europe through competitive funding, its funding schemes and opportunities, the evaluation process, and sources of relevant information. Particular remarks would be on the investigator-driven approach of the Work Programme (no thematic specific calls) and on the openness of the programme to non-EU nationals.

L. Santos is a scientific officer at the European Research Council assigned to the management of programmes and projects in the areas of research addressed by the Product and Processes Engineering panel. His technical background is in mechanical engineering and computer sciences, with work experience in the private sector, academia, and public organizations.

Tuesday, June 11
17:40 – 18:30
Location: Lomond Auditorium

Inspired by Myriad Laughing Waves: Euler, Navier, Stokes and others
Professor Rodney Eatock Taylor, Emeritus Professor, University of Oxford

Who are these people whose names grace the equations many of us use so regularly: Euler, Laplace, Navier, Cauchy, Stokes, Kelvin etc? The lecture will discuss brief aspects of the lives of some of nineteenth century European scientists who were pioneers in the field of hydrodynamics, and some of their interactions.

See page 21 for Professor Rodney Eatock Taylor’s bio.

Wednesday, June 12
17:40 – 18:30
Location: Lomond Auditorium

Enjoyable Marine Engineering Researches on Sports, Environment, not only Water Wave Engineering, Nonlinear Hydrodynamic Forces and Statistics
Professor Takeshi Kinoshita, Visiting Professor, Nagasaki Institute of Applied Science

These several decades we have seen big changes in the field of the ocean technology. In 1983 I firstly studied abroad, in Scotland. At that time the tension leg platform was quite a new concept for deep water structures. Research on wave energy utilization was a kind of fashion for marine hydrodynamists. Offshore oil & gas industry is now one of the most important worldwide businesses. Marine renewable energies are now recognized as really the most promising energy resource. Ocean technology have to contribute the improvement of their safety, reliability and cost reduction. On the other hand the marine sports engineering is also valuable for life and “enjoyable”, and recovering from the environmental damage on ocean and coastal zone is inevitably important and in fact “enjoyable” because of truly interdisciplinary collaboration work with many fields of sciences.

See page 21 for Professor Takeshi Kinoshita’s bio.
Saturday, June 8

**Short Course**

**Corrosion and Fouling in Marine Environment**

09:00 – 17:00  
Location: Jura (Crowne Plaza)

Instructors:  
Dr. Tahsin Tezdogan, Senior Lecturer, University of Strathclyde  
Dr. Yigit Kemal Demirel, Lecturer, University of Strathclyde

This course is split into two parts, i.e. corrosion and fouling. The first part will cover the corrosion concept in marine environment and the prevention methods. It will focus on the combined use of both cathodic protection (CP) and coatings for ships and offshore structures. A hands-on tutorial will be performed to show the CP calculation procedure. The second part of the course aims to provide the fundamental concepts of marine biofouling, state-of-the-art fouling control coatings, and the roughness effects of biofouling and coatings on the boundary layer. This module also aims to describe how to estimate the effect of biofouling on the performance of marine vehicles in terms of resistance/power increase through state-of-the-art numerical and experimental approaches.

**Short Course**

**Verification & Validation of Industrial CFD**

09:00 – 17:00  
Location: Staffa/Shuna (Crowne Plaza)

Instructor:  
Luís Eça, Assistant Professor, IST

CFD simulations have become an engineering tool that complements model testing. As for physical models, such capability requires the assessment of the quality of the results, which depends on the mathematical model (basin for physical models) and its numerical solution (instrumentation for experiments).

This course teaches CFD practitioners to distinguish numerical and modelling errors. It presents the definitions of the different contributions to the numerical error of steady and unsteady flow simulations. Techniques to quantify numerical (Verification) and modelling errors (Validation) in industrial CFD Simulations are presented including examples from practical simulations. The course provides a framework for the establishment of the credibility of simulations so that they can be safely used for engineering decisions.

You will learn how to demonstrate the quality of your CFD simulations and evaluate the accuracy of the mathematical models behind those simulations.
Sunday, June 9

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 – 17:00</td>
<td>Outreach Welcome &amp; Introductions plus Industry Presentations</td>
<td>Castle 1</td>
</tr>
<tr>
<td>09:00 – 17:00</td>
<td>Short Course Offshore Wind Turbines: Dynamic Analysis and Marine Operations</td>
<td>Jura</td>
</tr>
<tr>
<td>09:00 – 17:00</td>
<td>Short Course Introduction to Machine Learning and Data-driven Modelling Methods for Engineering Applications</td>
<td>Castle 2</td>
</tr>
<tr>
<td>18:30 – 20:30</td>
<td>Welcome Reception</td>
<td>Glasgow Science Centre</td>
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</tbody>
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**Short Course**

**Offshore Wind Turbines: Dynamic Analysis and Marine Operations**

**09:00 – 17:00**  
**Location: Jura (Crowne Plaza)**

**Instructors:**  
Erin Bachynski, *Norwegian University of Science and Technology*  
Zhen Gao, *Norwegian University of Science and Technology*

This course reviews several considerations related to design and operation of offshore wind turbines. Fundamental concepts in aerodynamic (with focus on blade element/momentum theory) and hydrodynamics (with focus on first and second order radiation-diffraction and Morison-type models) load calculation are presented. The course addresses theoretical background and important practical considerations for structural response analysis considering these load components simultaneously, including wind turbine control, for ULS and FLS design check. A brief review of the state-of-the-art in combined wind-wave testing and the status of validation of the integrated design tools will be provided. Finally, marine operational issues related to transport, installation and access to wind turbines for maintenance and repair, with focus on numerical simulation of onsite installation and weather window analysis, are discussed.

**Welcome Reception**

**18:30 – 20:30**  
**Location: Glasgow Science Centre**

Welcome / Civic Reception courtesy of The Rt Hon The Lord Provost Councillor Eva Bolander. See Social Events, page 14 for more details.
Monday, June 10

Opening Ceremony and Keynote Plenaries
08:30 – 10:00
Location: SEC Armadillo

Opening Ceremony
Professor Atilla Incecik, Conference Chair, OMAE 2019
Professor Krish Thiagarajan Sharman, Technical Program Chair, OMAE 2019
Professor Antonio C. Fernandes, OAAE Division Chair
Professor Sir Jim McDonald, Principal, University of Strathclyde
Bailie Jacqueline McLaren on behalf of the Lord Provost of Glasgow, Eva Bolander

Keynote Plenary One
Blue Oceans: Offshore Research for Future Maritime Challenges
Dr. Bas Buchner, President, MARIN

What trends do we foresee in offshore energy and transport over sea? What are the related challenges for offshore engineering? Do renewable energy, food from the seas and floating infrastructure provide new opportunities for the offshore industry and its offshore engineers?

Based on the project ‘Blueprint 2050: The Maritime World Beyond the Horizon’ in The Netherlands, Dr. Bas Buchner (MARIN) will discuss questions such as: Can we use our FPSO knowledge to develop floating energy hubs for zero emission shipping with Hydrogen, liquid Methane or Ammonia? How do we use our offshore platform knowledge to support fixed and floating mega wind turbines? Can we develop floating ports and cities to cope with sea level rise and overpopulation? What is the role of autonomy and digitalisation at sea? What is the role of future Offshore Engineers and what are their tools?

Dr. Bas Buchner studied at Delft University of Technology and graduated in 1991. He joined MARIN and was responsible for many offshore model test and simulation projects related to mooring, platform response, offloading analysis and wave impact loading. He specialised in the topics of extreme waves, green water loading and wave impacts. He completed his PhD on the subject of ‘Green Water Loading on Ship Type Offshore Structures’ (2002). He was Manager of the MARIN Offshore Department from 2000 to 2010 and was the leader of many Joint Industry Projects (JIP’s) in the Offshore sector. He was the Chairman of OMAE 2011 in Rotterdam and has authored more than 50 papers in the field of Offshore Hydrodynamics. Since 2011, he is President of MARIN.

Awards
The Subrata Chakrabarti Young Professional Award recipient and the OMAE 2018 Best Paper Awards recipients will be recognized. See page 12 for more details.
Keynote Plenary Two

Advancing a Lower Carbon Future

David Dickson, Vice President, Global Operations, Regions, BP

David Dickson’s presentation focuses on:
• More energy, fewer emissions; and
• Engineering being part of the solution

Dave Dickson joined BP as a Graduate Engineer in 1989.
He is currently the VP Global Operations (Regions), within the upstream segment for BP, with a strong and diverse background in Engineering and Operations, Dave covers upstream production facilities offshore and onshore across the BP portfolio in the Eastern Hemisphere.

He is responsible for the Safe, Reliable operations across a broad range of operating facilities, ensuring conformance to BP’s Operations Management System, it’s HSSE standards and expectations, its operating standards and processes.

Dave began his BP career as a Mechanical Engineer in the North Sea and has acquired deep, engineering, operating and HSE experience in Upstream and Downstream assets including assignments in Engineering and Operations Management in both Upstream Oil and Gas Production facilities and downstream Chemical and Refining facilities.

Dave graduated from the University of Strathclyde, Glasgow with a Bachelor of Engineering - Mechanical Engineering. He is a Chartered Engineer with the Institute of Mechanical Engineers and a Fellow of the Institute of Mechanical Engineers.

Digitalization — Changing the way to provide energy

Professor Kjetil Skaugset, PhD, Chief Researcher Upstream and Downstream, Technology, Equinor Expert Centre, Equinor ASA

Kjetil Skaugset will take the audience through a digital journey seen from an energy company point of view. Importance of digital technologies to improve safety, value creation as well as reduction in environmental footprint will be highlighted. Examples will be given across the value chain on present digital initiatives as well as future opportunities offered by a digital transformation.

Kjetil Skaugset studied at Norwegian University of Science and Technology (NTNU) and graduated with a PhD in 2003. He subsequently held post doc positions at Massachusetts Institute of Technology (MIT), and Centre for Ships and Offshore Structures (CeSOS) at NTNU. Kjetil has also worked at the Norwegian Marine Technology Research Institute (MARINTEK) in Trondheim.

Joining Statoil in 2005, he assumed responsibilities for research and development within the area of platform technology. He has since been central in several major field development projects in Statoil. Kjetil has been managing researchers within arctic, pipeline and deep-water technology in Statoil.

The last 7 years (2012-2019) Kjetil has been the Chief Researcher Upstream and Downstream Technology in Equinor. That responsibility entails corporate technical responsibility for all new technologies between wellhead and market in the oil and gas value chain in addition to renewables, new value chains and HSE technologies.

He is currently Board member Centre of Excellence Autonomous Marine Operations and Systems (AMOS) at NTNU, Chairman of the Board of Norwegian Forum for Marine Minerals and heads up the national research strategy OG21 in Norway, technology target area “Future technologies for production, processing and transportation”.

The exciting journey to deliver an As-Built Digital Twin

Frederic Dabe, Digital Transformation Director, SBM Offshore

SBM Offshore believes the oceans will provide the world with safe, sustainable and affordable energy for generations to come. Since many years, the
company is delivering large floating energy production systems, involving thousands of tons of steels and millions of man-hours. Digitalization is a key element in SBM Offshore's strategy in order to improve safety, sustainability & affordability of its solutions. In this era of digital transformation, we now have the opportunity to deliver a digital twin at the same time we are delivering the physical asset. The potential of a digital twin is impressive and will bring value across the entire life cycle of the asset. It also represents an important paradigm shift for the Engineering, Procurement and Construction value chain both at company level and at the scale of its ecosystem.

Frederic started his career in the naval and nuclear sector as piping production manager and later construction manager. He then spent 6 years developing naval robotics solutions before joining the oil & gas industry. Covering the full EPC scope, Frederic has delivered many projects (FPSO, FSRU, TLP, CPP, …), conducted successful transformations and led business units in Europe, Middle East and Asia.

More recently, Frederic was deeply involved with Industry 4.0 projects, working on transformation roadmap and deployment of digital solutions. Driven by operational excellence and innovation, Frédéric has joined SBM Offshore to lead the overall digital transformation of the group.

OMAE 2020 Presentation
Professor Manhar Dhanak, Conference Chair, OMAE 2020
Professor Ron W. Yeung, Conference Co-Chair, OMAE 2020

Opening Lunch
12:00 – 13:30
Location: Hall 5 (SEC)
Monday lunch sponsored by Elsevier

CONCURRENT SESSIONS
13:30 – 15:00

Offshore Technology
1-1-2 FPSO and Arctic Structures
Monday June 10
Room SEC, Alsh 1 | 13:30 – 15:00
Session Chair: Ewoud van Haalten, Shell Global Solutions International B.V., Netherlands
Session Co-Chair: Anil Sablok, TechnipFMC, USA
Improved Design of Next Generation Hull-platform “Noah-FPSO Hull” OMAE2019-95269
Shigeru Tanaka, Yasuhiro Sogawa
Mitsui E&S Shipbuilding Co., Ltd., Tokyo, Japan

Development of Harsh Environment Field with Ice Loadings using Concrete Spar – Variability of Options OMAE2019-96322
Anil Sablok1 Erland Hovland2 Svein Ole Stromme3 Andrew Blundon4
1. TechnipFMC, Houston, TX, USA; 2. Equinor ASA, Stavanger, Norway; 3. Kvaerner, Lysaker, Norway; 4. TechnipFMC, St. John's, NL, Canada

Conceptual Design of Single Column Drilling Unit for Arctic Climate and Harsh Environment OMAE2019-96474
Mingyuan Sun, Fan Zhang, Lixin Xu
China Merchants Offshore Technology Research Center, Haimen, China

Direct Time Domain Simulations for a FPSO Tandem Offloading Operation OMAE2019-96638
Bonjun Koo, Manoj Jegannathan, Johyun Kyong, Ho-Joon Lim
TechnipFMC, Houston, TX, USA

Offshore Technology
1-2-1 Dynamic Positioning I
Monday June 10 Room SEC, Dechart 2 | 13:30 – 15:00
Session Chair: Allan Magee, National University of Singapore, Singapore
Session Co-Chair: Anil Sablok, TechnipFMC, USA
Optimal Setpoint Learning of a Thruster-assisted Position Mooring System with Model-based Acceleration OMAE2019-95215
Bo Li, Lei Wang, Xuefeng Wang
Shanghai Jiao Tong University, Shanghai, China

Charles Fernandez1 Arun Dev2 Rose Norman3 Wai Lok Woo3 Shashi Kumar1
1. DNV GL Singapore Pte Ltd, Singapore, Singapore; 2. Newcastle University in Singapore, Singapore; 3. Newcastle University, Newcastle upon Tyne, United Kingdom

Surge Response Control of FPSO using Multiple Tuned Liquid Dampers – A Study on Effect of Multiple Frequencies in TLD OMAE2019-96062
Saravanan Gurusamy, Deepak Kumar
Indian Institute of Technology Madras, Chennai, India

Estimating Second Order Wave Drift Forces and Moments for Calculating DP Capability Plots OMAE2019-96307
Saeed Barzegar Valikchali1 Mitchell Anderson2 David Molyneux2 Dean Steinke1
1. Memorial University of Newfoundland, St. John's, NL, Canada; 2. Dynamic Systems Analysis, Victoria, BC, Canada

Structures, Safety and Reliability
2-10-1 Collision and Crashworthiness I
Monday June 10 Room Crowne Plaza, Castle 1 | 13:30 – 15:00
Session Chair: Sören Ehlers, Hamburg University of Technology, Germany
Session Co-Chair: Zhiqiang Hu, Newcastle University, United Kingdom
Dynamic Responses Prediction for a Spar-type Offshore Floating Wind Turbine under Ship Collision Scenarios OMAE2019-95094
Yichi Zhang, Zhiqiang Hu
Newcastle University, Newcastle upon Tyne, United Kingdom
Structures, Safety and Reliability

2-15-1 Data Driven Models
Monday June 10 Room: Crowne Plaza, Castle 2 | 13:30 – 15:00
Session Chair: YeongAe Heo, Case Western Reserve University, USA
Session Co-Chair: Bernt Leira, Norwegian University of Science and Technology, Norway

Motion and Load Prediction of Floating Platform in South China Sea using Deep Learning and Prototype Monitoring Information OMAE2019-95412
Ji Yao, Wenhua Wu, Zishu Zhao
Dalian University of Technology, Dalian, China

Power Spectrum for Surface Description of Corroded Ship Structure from Laser Scan OMAE2019-95907
Karoline Malu Neumann1, Sören Ehlers2
1. Wood, Sandefjord, Norway; 2. Hamburg University of Technology, Hamburg, Germany

YeongAe Heo
Case Western Reserve University, Cleveland, OH, USA

Materials Technology

3-1-2 Formulation of the Fracture Parameter
Monday June 10 Room: SEC, Boisdale 1 | 13:30 – 15:00
Session Chair: Carey L. Walters, Delft University of Technology, Netherlands
Session Co-Chair: Koji Gotoh, Kyushu University, Japan

Evaluations of Ductile and Cleavage Fracture using Coupled GTN and Beremin Model in API X70 Pipelines Steel OMAE2019-96483
Youn-Young Jang1, Ji-Hee Moon2, Nam-Su Huh2, Yun-Jae Kim1
1. Seoul National University of Science and Technology, Seoul, Korea; 2. POSCO, Incheon, Korea; 3. Korea University, Seoul, Korea

Parameter Calibration for Continuum Damage Mechanics Models to Simulate Ductile Fracture of High Strength Pipeline Steels OMAE2019-96316
Filip Van den Abbeele, ArcelorMittal Global R&D, Zavijnaarde, Belgium

Numerical Investigation of Ductile Crack Growth Behavior at Different Locations of Weld Joint for X80 Pipeline Steel OMAE2019-95517
Bin Qiang, Xin Wang
Carleton University, Ottawa, ON, Canada

Pipelines, Risers, and Subsea Systems

4-1-1 Flexible Pipes I
Monday June 10 Room: Crowne Plaza, Staffa / Shuna | 13:30 – 15:00
Session Chair: Svein Sævæk, Norwegian University of Science and Technology, Norway
Session Co-Chair: Zhimin Tan, Baker Hughes, a GE company, USA

Analytical Methodology to Evaluate Flexible Risers Fatigue Lives at the Top Region OMAE2019-96372
Fernando Sousa1, Marcos Queija da Siqueira1, José Renato M. de Sousa1, George Campello1
1. Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. UFRJ/COPPE/ LACEO, Rio de Janeiro, RJ, Brazil; 3. Petrobras, Rio de Janeiro, RJ, Brazil

Study of the Vortex-induced Vibration of the Marine Risers with the Buoyancy OMAE2019-96824
Lin Zhao, Hang Su, Yanju Yin
Ocean University of China, Qingdao, China

Methodology Proposal for Corrosion Fatigue Assessment for Flexible Pipes Tensile Armour in Aggressive Environments OMAE2019-96423
Manuelo Favaro Borges, Mariana dos Reis Tagliari, Rafaela Gonçalves, Carlos Eduardo Fortis Kwietniewski
UFRGS, Porto Alegre, RS, Brazil

Frequency Domain Fatigue Analysis for a Unbonded Flexible Riser – Damage Induced by Dynamic Tension OMAE2019-95118
Jiabei Yuan, Yucheng Hou, Zhimin Tan
Baker Hughes, a GE Company, Houston, TX, USA

Pipelines, Risers, and Subsea Systems

4-3-1 Collapse
Monday June 10 Room: Crowne Plaza, Castle 3 | 13:30 – 15:00
Session Chair: Ison Pasqualino, COPPE/UFRJ, Brazil
Session Co-Chair: Spyros A. Karamanos, University of Thessaly, Greece

Pure Collapse Behavior of Pipelines With D/ t Ratio Below 10: Real Scale Experimental Tests and Numerical Studies OMAE2019-95145
Ana Paula Franca de Souza1, Carolina Vilas Boas1, Rafaela Solano2, Gabriel Jorge1, Julio Mário Silvério e Silva2
1. LTS/COPPE, UFRJ, RJ, Brazil; 2. Universidade Federal do Rio de Janeiro, RJ, Brazil; 3. Petrobras, Rio de Janeiro, RJ, Brazil; 4. Vallourec Competence Center, Vallourec, Hordaland, Norway

Pipe Development ERW/HFIW Casing API5CT Grade P110 High Collapse OMAE2019-95363
Luis Melo, Wilson Cordeiro, Marcus Ferreira
Apolo Tubulares S/A, Lorena, SP, Brazil
Influence of Residual Curvature in the Pipeline Pure Collapse OMAE2019-95768 Ana Paula Franca de Souza, Theodoro Nettò, Carlos Abad Estrada Quispe 1. LTS/COPPE, Niteroi, RJ, Brazil; 2. COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 3. COPPE/USP, Rio de Janeiro, RJ, Brazil

Efficiency of Carbon Fibre Buckle Arrestors for Subsea Pipelines OMAE2019-95821 Hassan Karampour, Mahmoud Alraii, Wayne Hall 1. Griffith School of Engineering, Gold Coast, QLD, Australia; 2. Griffith University, Gold Coast, QLD, Australia; 3. Griffith School of Engineering and Built Environment, Gold Coast, QLD, Australia

Ocean Space Utilization

5-1-1 Marine Utilization and Marine Spatial Planning Monday June 10, Room SEC, Dochart 1 | 13:30 – 15:00

Session Chair: Kazuhiro Iijima, Dept of NAOE, Osaka University, Japan

Impacts of Educational Outreach on Envisioning Marine Cities of the Future Development Project OMAE2019-95431

Ikuko Yoshida Shimizu Corporation, Tokyo, Japan

Trend of Utilization of Ocean Space according to Structural Form of Oceanic Architectures OMAE2019-96453

Ryo Sugahara, Akio Nuryayangi
1. Nihon University, Chiba, Japan; 2. Nihon University, Funabashi-shi, Japan

The Application of Nearshore Risk Assessment of Hazard and Vulnerability in Marine Resources Area for National Spatial Planning OMAE2019-96706

Lien-Kwei Chien, Chi-Wen Huang, Wei-Po Huang, Cheng-Yu Ku, Chih-Hsin Chang
1. National Taiwan Ocean University, Keelung, Taiwan; 2. National Science and Technology Center for Disaster Reduction, New Taipei City, Taiwan

Ocean Engineering

6-1-2 Floating Body Technology Monday June 10, Room SEC, M4 | 13:30 – 15:00

Session Chair: Wei Qiu, Memorial University of Newfoundland, Canada

Virtual Prototyping and Simulation of Multibody Marine Operations using Web-based Technologies OMAE2019-96051

Icaro A. Fonseca, Felipe F. de Oliveira, Henrique M. Gaspar Norwegian University of Science and Technology, Ålesund, Norway

A Study on Motions and Connector Loads for a New Type of Two-module Semi-submersible OMAE2019-96771

Jun Ding, Chao Tian, Yiji Miao, Zhengwei Zhang, Zhanhuo Zhao, Xinyun Ni China Ship Scientific Research Center, Wuxi, China

Evaluation and Optimization of Trimaran Configurations using Deep Neural Network OMAE2019-96832

Dongchi Yu, Lu Wang, Qian Zhong, Ronald W. Yeung University of California, Berkeley, Berkeley, CA, USA

Penetration of Annular and General Jets into Underwater Plates OMAE2019-96805

Zhifan Zhang, Haoliang Hu, Cheng Wang Beijing Institute of Technology, Beijing, China

Ocean Engineering

6-4-1 Marine Control and Automation Monday June 10, Room SEC, M2 & M3 | 13:30 – 15:00

Session Chair: Lokukaluge Prasad Perera, UiT The Arctic University of Norway, Norway

Session Co-Chair: Yihan Xing, University of Stavanger, Norway

Development of a Control Strategy for Underway Tandem-like Oil Transfer Operation between a Conventional and a DP Tanker OMAE2019-96335

Felipe Moreno, José Amendola, Eduardo Tannuri, Marcos Ferreira
1. Universidade de São Paulo, São Paulo, SP, Brazil; 2. Numerical Offshore Tank - Universidade de São Paulo, São Paulo, SP, Brazil; 3. Petrobras, Rio de Janeiro, RJ, Brazil

Dynamic Positioning Observer Design using Exogenous Kalman Filter OMAE2019-96490

Song An, Dengshuo Chen, Yong Bai
Southern University of Science and Technology, Shenzhen, China

Port Channel Navigation Subjected to Environmental Conditions using Reinforcement Learning OMAE2019-96120

José Amendola, Eduardo Tannuri, Fabio Cognani, Anna Reali Costa
1. University of São Paulo, São Paulo, SP, Brazil; 2. Numerical Offshore Tank - Universidade de São Paulo, São Paulo, SP, Brazil

The Modelling and Optimal Control of a Hybrid Propulsion System for an Ice-capable Ship OMAE2019-95142

Yi Zhou, Kayvan Pazouki, Rose Norman
1. Newcastle University, Newcastle, United Kingdom; 2. Marine, Offshore and Subsea Technology Group, School of Engineering, Newcastle upon Tyne, United Kingdom

CFD & FSI

8-1-1 FSI Monday June 10, Room SEC, Loamond Auditorium | 13:30 – 15:00

Session Chair: Allan Magee, National University of Singapore, Singapore

Session Co-Chair: Hyunchul Jang, TechnipFMC, USA

CFD for VIM and Line Forces of a Floating Caisson with Complex Geometry OMAE2019-95789

Boudewijn Decrop, Rohit Kulkarni, Alexander Breugem, Damian Villaverde Vega IMDC, Antwerp, Belgium

Prediction of Hydrodynamic Damping of Moored Offshore Structures using CFD OMAE2019-95995

Changqing Jiang, Ould el Moctar, Thomas Schellin, Kayvan Pazouki, Anna Reali Costa
1. University of Duisburg-Essen, Duisburg, Germany; 2. COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 3. COPPE/USP, Rio de Janeiro, RJ, Brazil

The Vortex and Wall Fluctuating Pressure around Submarine Sail based on DDES Method OMAE2019-96018

Rui Luo, Yue Sun, Hang Zhang, Jin Zhan, Xiao Cai
1. China Ship Design and Development Center, Wuhan, China; 2. Huazhong University of Science and Technology, Wuhan, China; 3. School of Naval Architecture & Ocean Engineering Huazhong University of Science and Technology, Wuhan, China

Boundary Layer Effects in the Modeling of Semi-submersible Columns OMAE2019-96684

Samuel Holmes
Red Wing Engineering, Inc, Palo Alto, CA, USA
**Ocean Renewable Energy**

**9-1-1  Bottom-fixed Wind Turbines**

**Monday June 10**  
Room SEC, Carron 1 | 13:30 – 15:00

Session Chair: Wojciech Popko, Fraunhofer Institute for Wind Energy Systems IWS, Germany

Session Co-Chair: Tonio Sant, Dept of Mechanical Engineering, University of Malta, Malta

**Dynamic Response of a Large-diameter Monopile considering 35-hour Storm Conditions** OMAE2019-95170

Erik E. Bachynski1 Ana Page2 George Katsikogiannis3  
1. Norwegian University of Science and Technology, Trondheim, Norway; 2. Norwegian Geotechnical Institute, Oslo, Norway

**Validation of Numerical Models of the Offshore Wind Turbine from the Alpha Ventus Wind Farm against Full-scale Measurements within OCS Phase III** OMAE2019-95429

Wojciech Popko1 Amy Robertson1 Jason Jonkman2 Fabian Wondt3 Philipp Thomas3 Kolja Müller1 Matthias Kretschmer1 Torbjørn Ruud Hagen1 Chris Ginos4 Jean-Baptiste Le Dreff5 Philippe Gilbert5 Bertrand Auriac5 Sho Oh6 Jacob Ovist7 Sian Hoegh Sørum8 Loup Saja-Thaunvill8 Hynukyoung Shin9 Clément Molins10 Pau Trubat11 Paul Bonnet12 Roger Bergua13 Kai Wang14 Pengcheng Fu15 Jifeng Cai16 Zhisong Cai16 Armando Alexandre17 Robert Harries18  

**REDWIN Foundation Models for Integrated Dynamic Analyses of Offshore Wind Turbines** OMAE2019-96168

Ana Page1 Karin Noor‑Cogriff1 Kristoffer S. Skau1 Amir M. Kaynia1 Ana Page1  
1. Norwegian University of Science and Technology, Trondheim, Norway

**Development of Offshore Structure Analysis Software X-SEA Coupled with FAST** OMAE2019-96778

Ki‑Du Kim1 Sorrasak Vachirapanyakun1 Painin Plodpradit2 Van Nguyen Dinh3 Jin Ho Park4  
1. Konkuk University, Seoul, Korea; 2. MaREI Centre, University College Cork, Cork, Ireland; 3. Korean Register, Busan, Korea

**Petroleum Technology**

**11-7-1  Well Drilling Fluids and Hydraulics I**

**Monday June 10**  
Room Crowne Plaza, Barra | 13:30 – 15:00

Session Chair: Arild Saasen, UI, Norway

Session Co-Chair: Ergun Kuru, University of Alberta, Canada

**Modelling of the Movement of a Prolate Particle in the Steady State Flow of a Non-Newtonian Fluid in an Inclined Annulus with Inner String Rotation** OMAE2019-95049

Eric Cayeux1, NORE, Stavanger, Norway

**A New Three-layer Model for Gravel Packing Applications** OMAE2019-95164

Aliresa Sarraf Shirazi, Ian Friigard

University of British Columbia, Vancouver, BC, Canada

**Cuttings Transport Simulation in Large-diameter Inclined Borehole**

OMAE2019-95228

Yaroslav Ignateng1 Andrey Garvilov1 Oleg Bocharov2 Roland May2  
1. Baker Hughes, Novosibirsk, Russia; 2. Institute of Thermophysics of SB RAS, Krasnoyarsk Branch, Krasnoyarsk, Russia; 3. Baker Hughes, A GE company, Celle, Germany

**How does a Stationary Sand Bed affect the Flow Dynamics in an Eccentric Annulus?**

OMAE2019-96338

Majid Bizhani1 Ergun Yura2  
1. University of British Columbia, Edmonton, AB, Canada; 2. University of Alberta, Edmonton, AB, Canada

**Offshore Geotechnics**

**10-1-1  Seabed Properties and Processes**

**Monday June 10**  
Room Crowne Plaza, Jura | 13:30 – 15:00

Session Chair: Henry Milewski, TechnipFMC, United Kingdom

**Influence of Suction Dredging on the Failure Mechanism of Sandy Submarine Slopes: Revisited with a Coupled Numerical Approach** OMAE2019-95151

Manuela Kanitz1 Jürgen Grabe1  
1. Hamburg University of Technology, Hamburg, Germany

**Effect of Stress History and Shallow Embedment on Centrifuge Penetration Tests in Sand** OMAE2019-95393

Anamitra Roy1 Shiao Huey Chow1 Conleth O’Loughlin4 Mark F. Randolph1  
1. University of Western Australia, Perth, WA, Australia

**On the Selection of an Appropriate Consolidation Coefficient for Offshore Geotechnical Design** OMAE2019-95800

David J White1 Jinbo Chen1 Susan Gourvenec2 Conleth O’Loughlin4  
1. University of Southampton, Southampton, United Kingdom; 2. Shell Global Solutions US Inc., Houston, TX, USA; 3. University of Southampton/ Southampton Marine and Maritime Institute, Southampton, United Kingdom; 4. University of Western Australia, Perth, WA, Australia

**Fundamental Engineering Characteristics of Cohesive Sediments in the Northern Region of South China Sea** OMAE2019-96599

Shuzhao Li1 Xu Jia1 Zhigang Li1 Jiagang Li2  
1. CNOOC Research Institute, Beijing, China; 2. Dalian University of Technology, Dalian, China

**Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics**

**12-1-1  Numerical and Experimental Methods in Hydrodynamics I**

**Monday June 10**  
Room SEC, Carron 2 | 13:30 – 15:00

Session Chair: Paul Taylor, University of Oxford, United Kingdom

Session Co-Chair: Ken Chua, Technology Centre for Offshore and Marine, Singapore

**Numerical and Experimental Modelling of Wave Loads on Thin Porous Sheets**

OMAE2019-95148

Edward Mackay1 Lars Johanning1 Dezhii Ning1 Dongsheng Qiao2  
1. University of Exeter, Penryn, United Kingdom; 2. Dalian University of Technology, Dalian, China
Application of 4-phase Decomposition to the Analysis of Random Time Series from Wave Basin Tests

Thomas A.A. Adcock, Xingyu Feng, Tanning Tang, Ion S. van den Bremer, Sandy Day, Shaihua Dai, Ye Li, Zhihui Lin, Wentao Xu, Paul Taylor
1. University of Oxford, Oxford, United Kingdom; 2. University of Strathclyde, Glasgow, United Kingdom; 3. Shanghai Jiao Tong University, Shanghai, China

Irregular Frequency Removal and Convergence in Higher-order Bem for Wave Diffraction/Radiation Analysis

Omoeakiutsunomiya, Kiyasu University, Fukuoka, Japan

Numerical Study on Seakeeping Performance of a Damaged Ship

Luning Cui, Yi Zheng, Yinggang Li, Ling Zhu, Mingsheng Chen
1. Naval Research Academy, Beijing, China; 2. Wuhan University of Technology, Wuhan, China

Takeshi Kinoshita Honoring Symposium on Offshore Technology

Monday June 10 | Room SEC, Boisdale 2 | 13:30 – 15:00
Session Chair: Daishuke Kitazawa, University of Tokyo, Japan
Session Co-Chair: Yasunori Nihei, Osaka Prefecture University, Japan

Design Methodology and Development of an Independently Rotating Multi-hull Vessel

Yasunori Nihei, Sharath Srinivasamurthy, Hiroshi Sakamoto, Norikazu Murada, Naoyuki Hara
1. Osaka Prefecture University, Osaka, Japan; 2. Fractaly, Osaka, Japan; 3. Nippon Kaiko, Hyogo, Japan

Numerical Hull Resistance and Hydrodynamic Characteristics of an Independently Rotating Multi-hull Vessel

Sharath Srinivasamurthy, Hiroshi Sakamoto, Tatsuo Nishikawa, Yasunori Nihei
1. Osaka Prefecture University, Osaka, Japan; 2. Fractaly, Osaka, Japan; 3. Shipbuilding Research Centre of Japan, Tokyo, Japan

Study on Attitude Control of a Cabin-suspended Catamaran by using a Double-loop Control System

Jialin Han, Sota Kanno, Akitto Mochizuki, Daishuke Kitazawa, Tetsu Maeda, Hiroshi Itakura
1. Osaka Prefecture University, Osaka, Japan; 2. The University of Tokyo, Kashiwa, Japan; 3. Management Strategy Corporation, Yokohama, Japan

REFRESHMENT BREAK
15:00 – 15:30
Location: Hall 5 (SEC)

CONCURRENT SESSIONS
15:30 – 17:30

Offshore Technology

1-4-3 Design Optimization

Monday June 10 | Room SEC, Alth 1 | 15:30 – 17:30
Session Chair: Binbin Zhao, Harbin Engineering University, China
Session Co-Chair: Masoud Hayatdavoodi, University of Dundee, United Kingdom
How Emulation Improves Offshore Operations

Leslie McGuire, Subsea7, Aberdeen, United Kingdom

Machine Learning to Predict Mooring Line Tensions

Hema Wadhwa
INTECEA, Perth, WA, Australia

Efficient Anchoring System for FPSO in Arbritary Waters

Jairo Araujo, Antonio Carlos Fernandes, Joel S. Sales Junior, Mario Santoro, Ana Thurlers
1. ATEA/AV, Rio de Janeiro, RJ, Brazil; 2. COPPE/Universidade Federal do Rio de Janeiro, Rio De Janeiro, RJ, Brazil; 3. Laboratory of Waves and Currents - LOC - Universidade Federal do Rio de Janeiro, Rio De Janeiro, RJ, Brazil; 4. NAVIUM, Rio de Janeiro, RJ, Brazil

The Use of Ensemble Forecast in Defining Offshore Installation Operability: A Case Study on Umbilical Shore Float-in Operations

Francisco Tinoco, Kee Chien Ting, Kishor Chavan
Subsea 7, Sutton, United Kingdom

Trajectory Prediction of Moored Vessels with Reduced Station Keeping Capability due to Exceeded Anchor Load Limits

Michal Josten
Hamburg University of Technology, Hamburg, Germany

Offshore Technology

1-6-1 CFD Numerical Waves and Applications

Monday June 10 | Room SEC, Dochart 2 | 15:30 – 17:30
Session Chair: Csaba Pakodzi, SINTEF Ocean, Norway
Thorough Verification and Validation of CFD Simulation for FPSO Roll Damping

Donghwan Lee, Zhenjia (Jerry) Huang
ExxonMobil Upstream Research Company, Spring, TX, USA

Dynamic Response of Monopile Wind Turbine in Large Waves

Sopekha Seng, Charles Monroy, Sime Malenica
1. Bureau Veritas, Marine & Offshore, Paris, France; 2. Bureau Veritas, Paris, France

Wave Propagation in CFD-based Numerical Wave Tanks

Jang Kim, Aldric Baquet, Hyunchul Jang
TechnipFMC, Houston, TX, USA

CFD-based Numerical Wave Basin for FPSO in Irregular Waves

Aldric Baquet, Hyunchul Jang
TechnipFMC, Houston, TX, USA

Simulation of Irregular Wave Impact on Semi-submersible Platform based on Coupled GN-CFD Method

Kangping Liao, Wenyang Duan, Qingswei Mu, Binbin Zhao, Rong-Gai Han
1. Harbin Engineering University, Harbin, China; 2. Yantai CIMC Raffles Offshore Limited, Yantai, China; 3. TechnipFMC, Houston, TX, USA

#OMAE2019 | 31
A Monte Carlo Based Simulation Method for Damage Stability Problems OMAE2019-95295
Stefan Krueger1 Hendrik Dankowski2
1. Hamburg University of Technology, Hamburg, Germany; 2. Flesno MAR, Friesland, Germany

Kushal Solomon, Deepak Kumar
Indian Institute of Technology Madras, Chennai, India

Extended Kalman Filtering for Estimating Drag and Inertia Coefficients for Slender Offshore Structures OMAE2019-96630
Dhruv Bhagtanil, Nilanjan Saha
Indian Institute of Technology Madras, Chennai, India

Structures, Safety and Reliability
2-10-2 Collision and Crashworthiness II
Monday June 10 | Crowne Plaza, Castle 1 | 15:30 – 17:30
Session Chair: Zhiqiang Tu, Newcastle University, United Kingdom
Session Co-Chair: Soren Ehlers, Hamburg University of Technology, Germany

Materials Technology
3-9-1 Advances in Materials Characterization
Monday June 10 | SEC, Boisdale 1 | 15:30 – 17:30
Session Chair: Sheng Bao, Zhejiang University, China
Session Co-Chair: Yanhui Zhang, TWI Ltd, United Kingdom

Pipelines, Risers, and Subsea Systems
4-1-4 Flexible Pipes IV
Monday June 10 | Crowne Plaza, Staffa / Shuna | 15:30 – 17:30
Session Chair: Anh Tuan Do, TechnipFMC, France
Session Co-Chair: Murillo Augusto Vaz, COPPE/UFRRJ, Brazil

Lean Global Analysis of Marine Slender Structures with Machine Learning OMAE2019-95147
Vinicius Ribeiro Machado da Silva, Matheus Santos, Mario Vignoles, TechnipFMC, Rio de Janeiro, RJ, Brazil

Non-linearly Restoring Performance and its Hysteresis Behavior of Dynamic Catenary OMAE2019-96561
Yilun Li1 Shuangguo Guo1 Yue Kong1 Min Li2 Weimin Chen3
1. Beijing University of Aeronautics and Astronautics, Beijing, China; 2. Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Flexible Riser Top Connection Analysis with I-Tube Interface and Bending Hysteresis Effect OMAE2019-95826
Yangye He1 Hailong Lu1 Murilo Augusto Vaz2 Marcelo Caire3
1. Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Sensitivity Studies on Offshore Submarine Hoses on CALM Buoy with Comparisons for Chinese-Lantern and Lazy-S Configuration OMAE2019-96735
Chiemela Victor Amaechi1 Jianqiao Ye2 Xiaohua Lu1 Feng Wang2, Xiaohua Lu1 Abhilash Sebastian
1. Lancaster University, Lancaster, United Kingdom; 2. Tsinghua University, Beijing, China

Investigation on Mechanical Properties of Fiberglass Reinforced Flexible Pipes under Bending OMAE2019-95457
Yifan Gao1 Jianqiao Ye2 Peng Cheng3 Feihua Han1 Yong Bai2
1. Zhejiang University, Hangzhou, China; 2. Zhejiang University, College of Civil Engineering and Architecture, Hangzhou, China; 3. Zhejiang University, Zhejiang, China

Pipelines, Risers, and Subsea Systems
4-2-5 SCRs and SLWRs II
Monday June 10 | Crowne Plaza, Castle 3 | 15:30 – 17:30
Session Chair: Olav Fyrileiv, DNV GL, Norway

Strength and Fatigue Performance of Steel Lazy Wave Risers with Change in Configuration Parameters OMAE2019-95135
Mayank Lal, Feng Wang, Xiaohua Lu, Abhilash Sebastian, Genesis Oil and Gas Consultants, Houston, TX, USA

Improved Fatigue Design of SCR-modified Miner’s Rule OMAE2019-95344
Hans Olav Knaugen1 Hermits Hauge1 Bård Nyhus3
1. Equinor ASA, Fornebu, Norway; 2. Equinor ASA, Ranheim, Norway; 3. SINTEF, Trondheim, Norway
# Ocean Engineering

## 6-4-2 Marine Operations and Vessel Motions

**Monday June 10**  
Room: SEC, M2 & M3  |  15:30 – 17:30

**Session Chair:** Lin Li, University of Stavanger, Norway  
**Session Co-Chair:** Shuzheng Sun, Harbin Engineering University, China

**Generic On-board Decision Support System Framework for Marine Operations**  
OMAE2019-95146  
Sitan Skjong1 Lars T. Kyllestad2 Karl I. Reite3 Joakim Haugen4  
1. SINTEF Ocean, Trondheim, Norway; 2. SINTEF Ocean, Tromsø, Norway

**A Simulation Program for Load-out Operation using Self-propelled Modular Transporters**  
OMAE2019-95673  
Zunfeng Du, Haiming Zhu, Dong Xu  
Tianjin University, Tianjin, China

**Seismic RTDT – Real-time Digital Twin for Boosting Performance of Seismic Operations**  
OMAE2019-95885  
Severin Sadjina1 Stanislav Pobitzer2 Lars T. Kyllestad2 Roy-Jostein Fiskerstrand3 Sverre Torben4 Jason D. D. A. Granholm5  
1. SINTEF Ålesund, Ålesund, Norway; 2. SINTEF Ocean, Trondheim, Norway; 3. Raffi-Royce Marine AS, Aalesund, Norway; 4. GGS Services AS, Oslo, Norway

**Impact of the Uncertainties of the RAOs of a Semi-submersible Platform on the Performance of a Motion-based Wave Inference Method**  
OMAE2019-96670  
Jordi Mas Soler1 Pedro C. de Mello2 Eduardo Tammuri3  
1. Technical University of Madrid (UPM), Madrid, Spain; 2. Universidade de São Paulo, São Paulo, SP, Brazil; 3. Numerical Offshore Tank - University of São Paulo, São Paulo, SP, Brazil

**Downtime Technique using Artificial Intelligence: A Case Study for an Exposed Berthing Facility**  
OMAE2019-95312  
Ghassan El Chahal1 Peter Morel3 Sindhur Mole4 Nadib Saadali1  
1. COWI A/S, Copenhagen, Denmark; 2. COWI A/S, Århus, Denmark; 3. COWI A/S, Dubai, United Arab Emirates

## Ocean Engineering

## 6-11-1 Autonomous Vehicle Technology

**Monday June 10**  
Room: SEC, M4  |  15:30 – 17:30

**Session Chair:** Celso Pesce, University of S. Paulo - Escola Politecnica, Brazil  
**Session Co-Chair:** Daniel Costa, COPPE/UFRJ, Brazil

**Path Following and Collision Avoidance of Underactuated Marine Vessels based on MPC Design**  
OMAE2019-95081  
Guoping Zheng, Cheng Liu, Cheng Li  
Dalian Maritime University, Dalian, China

**Situation Awareness of Autonomous Ship Navigation in a Mixed Environment with Advanced Ship Predictor**  
OMAE2019-95571  
Lokukaluge Prasad Perera, Brian Murray  
UIT The Arctic University of Norway, Tromso, Norway

**Time-varying Vector Field Guidance Law for Path Following and Obstacle Avoidance Control for Underactuated Autonomous Vehicles**  
OMAE2019-96618  
Haitong Xu1 Miguel Hinostroza2 Carlos Guedes Soares3  
1. Instituto Superior Técnico, Universidade de Lisboa, Lisbon, Portugal; 2. Centro for Marine Technology and Ocean Engineering (CENTEC), Lisbon, Portugal; 3. Istituto di Energetica, CNR, Rome, Italy
**An AIS-based Multiple Trajectory Prediction Approach for Collision Avoidance in Future Vessels**
OMAE2019-95963
Brian Murray, Lokukaluge Prasad Perera
Ulf The Arctic University of Norway, Tramso, Norway

**Towards the Development of an Ocean Engineering Library for OpenModelica**
OMAE2019-95954
Savin Viswanathan, Christian Holden
Dept. Mechanical and Industrial Engineering, Norwegian University of Science and Technology, Trondheim, Norway

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**CFD & FSI**

**8-1-2 Surface Waves**
Monday June 10  
Room: SEC, Lomond Auditorium  |  15:30 – 17:30
Session Chair: Luis Eca, Technical University of Lisbon, Portugal
Session Co-Chair: Owen H. Oakley, Jr, Retired, USA

**Numerical Simulation of the Effect About Speed and Pitch Angle of Initial Stage on a Airplane Landing in Smooth Water**
OMAE2019-95438
Yong Ding, Shenggang Li, Kaise Hu, Mo Chen
Harbin Engineering University, Harbin, China

**Numerical Investigations of Ship Parametric Rolling in Regular Head Waves of DTC**
OMAE2019-95515
Qing Wang
Huazhong University of Science and Technology, Wuhan, China

**Numerical Maneuverable Tank on Wave Based Moving Domain**
OMAE2019-95714
Dakui Feng1 Xiao Cai1 Yue Sun1 Zhi Guo Zhang1 Xiao Wei Huang1
1. Huazhong University of Science and Technology, Wuhan, China; 2. China Ship Design and Development Center, Wuhan, China

**Assessment of LNG Pump Tower Loads**
OMAE2019-96138
Michael Thome, Jens Neugebauer, Oudil Oc Moctar
University of Duisburg-Essen, Duisburg, Germany

**Numerical Simulation of Damaged Ship's Motion in Beam Waves**
OMAE2019-96791
Qing Wang1 Xuanshu Chen1 Lizhi Li1 Xianzhou Wang1 Mingjing Liu1
1. Huazhong University of Science and Technology, Wuhan, China; 2. China Ship Design and Development Center, Wuhan, China

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**Ocean Renewable Energy**

**9-2-1 Aerodynamics I**
Monday June 10  
Room: SEC, Carron 1  |  15:30 – 17:30
Session Chair: Jason Jonkman, National Renewable Energy Laboratory, USA

**Impact of Rotor Misalignment due to Platform Motions on Floating Offshore Wind Turbine Blade Loads**
OMAE2019-95759
Rachael E. Smith, Ajiit C Pillai, Gavin Tabor, Philipp R. Thies, Lars Johanning
University of Exeter, Exeter, United Kingdom

**An Experimental Apparatus for Investigating the Unsteady Aerodynamics of a Floating Wind Turbine**
OMAE2019-95915
Binrong Wen, Qi Zhang, Hanxue Liu, Xinliang Tian, Xingjian Dong, Zhi-Ke Peng, Yongsheng Zhao, Yufeng Kou
Shanghai Jiao Tong University, Shanghai, China

**A 6-DOFs Hardware-in-the-loop System for Wind Tunnel Tests of Floating Offshore Wind Turbines**
OMAE2019-95967
Alessandro Fontanella1 Ilmas Bayati1 Federico Taruffi1
Francesco La Mura2 Alan Facchinetti1 Marco Belloli1
1. Politecnico di Milano, Milano, Italy; 2. MARN, Wageningen, Netherlands

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**Offshore Geotechnics**

**10-3-1 Anchors**
Monday June 10  
Room: Crowne Plaza, Jura  |  15:30 – 17:30
Session Chair: Fu-Ping Gao, Institute of Mechanics, Chinese Academy of Sciences, China

**CFD Analysis on Hydrodynamic Characteristics for Optimizing Torpedo Anchors**
OMAE2019-95778
Jing Sun, Haixiao Liu
Tianjin University, Tianjin, China

**CFD Analysis on Similarity Criteria of Hydrodynamic Characteristics for Gravity-installed Anchors**
OMAE2019-95690
Jiancai Gao, Haixiao Liu
Tianjin University, Tianjin, China

**Effect of Seabed Trenching on Holding Capacity of Suction Anchors in Deepwater Gulf of Guinea Clays – A Numerical Study**
OMAE2019-96096
Pablo Castillo Garcia1 Regis Wallerand2 Dinh Hong Doan1
1. Subsea7 France, Suresnes, France; 2. Total, La Défense, France

**Combined Wave-current Induced Instantaneous Liquefaction of a Sandy Seabed**
OMAE2019-96665
Lijing Yang1 Chang Fei Li1 Jun Qin Wang1 Fu-Ping Gao1
1. Institute of Mechanics, Chinese Academy of Sciences, Beijing, China; 2. China National Offshore Oil Company (CNOOC) Research Institute, Beijing, China

**Petroleum Technology**

**11-7-3 Well Drilling Fluid and Hydraulics III**
Monday June 10  
Room: Crowne Plaza, Barra  |  15:30 – 17:30
Session Chair: Ergun Kuru, University of Alberta, Canada

**Rheology of Brine-based Fuzzy-ball Drilling Fluids in Deepwater Drilling**
OMAE2019-96094
Zhaochuan Li1 Liu Hui Zheng1 Panfeng Wei1 Xiaojian Dai1 Weian Huang1
1. China University of Petroleum, Beijing, China; 2. Jilin University, Jilin, China; 3. China University of Petroleum (East China), Qingdao, China

**A Field Study on the Marine Environmental Impact of the Drilling Fluid’s Discharge**
OMAE2019-96231
Meirong Jiang1 Xiao Han2
1. CNOOC Research Institute, Beijing, China; 2. China MEHECO Corporation, Beijing, China
Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics

12-2-1 Multi-Body Hydrodynamics

Monday June 10  Room SEC, Carron 2  |  15:30 – 17:30

Session Chair: Wei Bai, Manchester Metropolitan University, United Kingdom
Session Co-Chair: Wei Qu, Memorial University of Newfoundland, Canada

Model Experiments of Floating Side-by-side Barges OMAE2019-92328
Kie Hian Chua1 Pedro de Mello2 Kazuo Nishimoto3 Yoo Sang Choo4
1. Technology Centre for Offshore and Marine, Singapore, Singapore; 2. Tanque de Provas (TPN-USP), São Paulo, SP, Brazil; 3. University of São Paulo, São Paulo, SP, Brazil; 4. National University of Singapore, Singapore, Singapore

Numerical Modelling of Wave Resonance in a Narrow Gap between Two Floating Bodies in Close Proximity using a Hybrid Model OMAE2019-95247
Shiqiang Yan, Qingwei Ma, Junxian Wang, Jinghua Wang
City, University of London, London, United Kingdom

Unified One-fluid Approach for Multi-body Hydrodynamics OMAE2019-96514
Liuyi Huang1 Yuyan Li1 Yi Ni2 Hui Cheng3 Xue-gang Wang4
1. Ocean University of China, Qingdao, China; 2. University of Stavanger, Stavanger, Norway

Numerical Analysis of GBS Float-over Deck Installation at Docking and Undocking Stages based on a Coupled Heave-Roll-Pitch Impact Model OMAE2019-95717
Mingsheng Chen, Meiyan Zou, Ling Zhu, Liang Sun
Wuhan University of Technology, Wuhan, China

Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics

13-2-1 Numerical Methods

Monday June 10  Room SEC, Beisdale 2  |  15:30 – 17:30

Session Chair: Celso Morooska, University of Campinas, Brazil
Session Co-Chair: Yuri Coelho Del Sarto, Universidade Estadual de Campinas, Brazil

Investigation on the Effect of DNVGL OTG 13 on Air Gap Assessment of a Semi-submersible Unit OMAE2019-95072
Youwei Kang1 Bing Wang2 Lei Li2 Zhao Ziguang1
1. CIMC Offshore Co. Ltd., Shenzhen, China; 2. COOEC Subsea Technology Ltd, Shenzhen, China

European Research Council – Funding Opportunities for Creative Minds from All Over the World

Dr.-Ing. Luiz Alves dos Santos, Scientific Officer, European Research Council

See Afternoon Lecture Series, page 22 for more details.

Afternoon Lecture
17:40 – 18:10  Location: Lomond Auditorium (SEC)

The Analysis of the Joint Limitation Condition of Wave Height-period on the Floating Crane Lifting Operation OMAE2019-96461
Xue-gang Wang, Ying Zong-quan, Chen Ze-cong
CCCC Fourth Harbor Engineering Institute Co., Ltd, Guangzhou, China

European Research Council – Funding Opportunities for Creative Minds from All Over the World

Dr.-Ing. Luiz Alves dos Santos, Scientific Officer, European Research Council

See Afternoon Lecture Series, page 22 for more details.

Afternoon Drinks Reception
18:15 – 19:15  Location: Hall 5 (SEC)
Tuesday, June 11

Offshore Technology

1-2-2 Mooring System Design and Analysis I
Tuesday June 11, Room SEC, Alsh 2 | 08:30 – 10:00
Session Chair: Dioni Sidarta, TechnipFMC, USA
Session Co-Chair: Jaakko Lehtonen, TechnipFMC Genesis, USA

Snap Load Induced by Slack-taut Process in a Taut Mooring Line OMAE2019-95016
Dongsheng Giao1 Wei Tang1 Yunfei Suo1 Jun Yan1 Yugang Li1 Daoceng Zhou1
1. Dalian University of Technology, Dalian, China; 2. CCCC-FHD Engineering Company, Guangzhou, China

Spring-Dashpot Simulations of Polyester Ropes – Validation of the Syrope Model OMAE2019-95469
Erik Falkenberg, Limin Yang, Vidar R. Åbjorn
DNV GL, Havik, Norway

Three-Dimensional Dynamic Analysis Method of Multi-component Mooring Lines OMAE2019-96056
Yuda Aprí Hermawan, Yoshitaka Furukawa
Kyushu University, Fukuoka, Japan

Structures, Safety and Reliability

2-4-1 Fatigue and Fracture Reliability I
Tuesday June 11, Room SEC, Alsh 2 | 08:30 – 10:00
Session Chair: Marcelo Igor Lorencó Souza, UFRJ, Brazil
Session Co-Chair: Fredhi Agung Prasetyo, Research & Development Division, Biro Klasifikasi Indonesia, Indonesia

Inner Bend Cracks in Mooring Chain – Investigation of Cracks Observed on Chains Taken Out of Service OMAE2019-95084
Oystein Gabrielsen1 Inge Morten Kulbotten2 Imanol Martinez Perez3 Lars Häskoll4
1. Equinor, Trondheim, Norway; 2. Equinor ASA, Trondheim, Norway; 3. Principia, La Ciotat, France; 4. Equinor ASA, Stjørdal, Norway

Fracture Mechanics Based Mooring Fatigue Analysis for a Semi-submersible Subjected to Triple Narrow-band Loading Processes OMAE2019-95108
Yutian Xue1 Nianzhong Chen2 Yongchang Pu3
1. Newcastle University, Newcastle upon Tyne, United Kingdom; 2. Tianjin University, Tianjin, China; 3. Marine, Offshore and Subsea Technology Group, School of Engineering, Newcastle upon Tyne, United Kingdom

Computational Fatigue Assessment of Mooring Chains Working in Twisted Conditions OMAE2019-96000
Imanol Martinez Perez2 Oystein Gabrielsen3
1. Principia, La Ciotat, France; 2. Equinor, Trondheim, Norway

Predictions of Tensile Strain Capacity for Strain-based Pipelines with a Circumferential and Internal Surface Flaw OMAE2019-96480
Youn-Young Jang1 Ju-Yeon Kang1 Nam-Su Huh1
1. Seoul National University of Science and Technology, Seoul, Korea; 2. KOGAS, Ansan, Korea
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Location</th>
<th>Room</th>
<th>Time</th>
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<tbody>
<tr>
<td>2-9-1</td>
<td>Extreme Loading and Responses I</td>
<td></td>
<td>Crowne Plaza, Castle 1</td>
<td>08:30 – 10:00</td>
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<tr>
<td>2-12-1</td>
<td>Structural Analysis and Optimization I</td>
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<td>Crowne Plaza, Castle 2</td>
<td>08:30 – 10:00</td>
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<td>3-1-1</td>
<td>Fracture Toughness Measurement and Assessment</td>
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<td>SEC, Boisdale</td>
<td>08:30 – 10:00</td>
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<td>4-1-2</td>
<td>Flexible Pipes II</td>
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<td>Crowne Plaza, Staffa / Shuna</td>
<td>08:30 – 10:00</td>
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Pipelines, Risers, and Subsea Systems

4-3-2 Installation

Tuesday June 11 | Room: Crowne Plaza, Castle 3 | 08:30 – 10:00

Session Chair: Julian Hallai, ExxonMobil, USA
Session Co-Chair: Chris Timms, C-FER Technologies, Canada

Improved Pipelay Equipment Settings Methodology for Rigid Pipes OMAE2019-95475
Geoffrey Marmouret, Andrew Harrop, Ludovic Lacan
TechnipFMC, Westhill, United Kingdom

Prediction of Liner Wrinkling during High Strain Bending of Mechanically Lined Pipe OMAE2019-95511
Aurelien Pepin1 Tomasz Tkaczyk2 Martinez Michael1 Noel O’Dowd1 Kamran Nikbin3
1. Technip UK / Imperial College London, Aberdeen, United Kingdom; 2. TechnipFMC, Westhill, United Kingdom; 3. IFP Energies Nouvelles, Salon, France; 4. University of Limerick, Limerick, Ireland; 5. Imperial College London, London, United Kingdom

Influence of Lined-pipe Fabrication on Liner Wrinkling OMAE2019-95743
Ilias Gavrilidou1 Spyros A. Karamanos1
1. School of Engineering, Edinburgh, United Kingdom; 2. The University of Edinburgh, Edinburgh, United Kingdom

Polymer Liner Collapse Design Model OMAE2019-96219
Scott Mathieson, Colin Jones, Allan Feeaney
Swagelining, Glasgow, United Kingdom

Ocean Space Utilization

5-2-1 Aquaculture I: Design and Modeling I

Tuesday June 11 | Room: SEC, Dochart 1 | 08:30 – 10:00

Session Chair: Muk Chen Ong, University of Stavanger, Norway
Session Co-Chair: Lin Li, University of Stavanger, Norway

Biao Su1 Karl J. Reite2 Martin Fare3 Karl Gunnar Aarsaether1 Morten Omholt Alver1
1. University of Stavanger, Stavanger, Norway; 2. IKM Technology AS, Bryne, Norway

Coupled Motion and Sloshing Analysis of a Cylindrical Closed Fish Cage in Regular Waves OMAE2019-96002
Yue Lin Tan1 Yanlin Shao2 Robert Read3
1. Technical University of Denmark, Vanlase, Denmark; 2. Technical University of Denmark, Kongens Lyngby, Denmark; 3. Delft University of Technology/Mechnical Engineering, Lyningen, Denmark

Ming Chen1 Solomon Yin1 Daniel Cox1 Taiping Wang1 Michael Huesemann2 Zhaoqing Yang1 Thomas Mumford3 Geoffrey Wood4
1. Oregon State University, Corvallis, OR, USA; 2. Pacific Northwest National Laboratory, Sequim, WA, USA; 3. Pacific Northwest National Laboratory, Seattle, WA, USA; 4. Marine Aquanomics, LLC, Olympia, WA, USA; 5. Composite Recycling Technology Center, Port Angeles, WA, USA

Ocean Engineering

6-2-1 Coastal Engineering I

Tuesday June 11 | Room: SEC, M4 | 08:30 – 10:00

Session Chair: Masoud Hayatdavoodi, University of Dundee, United Kingdom

Numerical Study on Influence of Width of Vegetated Zone on Wave Attenuation OMAE2019-95713
Jian Tang, Yongming Shen
Dalian University of Technology, Dalian, China

Wave Response of a Novel Floating Breakwater-windbreak with Oscillating Water Columns OMAE2019-95860
Mengmeng Han1 Chien Ming Wang1 Wenhu Duan2
1. University of Queensland, Brisbane, QLD, Australia; 2. Monash University, Clayton, VIC, Australia

Solitary Wave Interaction with Vertical Porous Barriers OMAE2019-95194
Vivek Francis1 Babaji Ramakrishnan1 Murray Rudman1
1. IIT-Monash Research Academy, Mumbai, India; 2. IT Bombay, Mumbai, India; 3. Monash University, Melbourne, VIC, Australia

Effect of the Wind Drag Estimation Methods on Numerical Storm Surge Modeling OMAE2019-95895
C. Gowri Shankar, Manasa Ranjan Behera
Indian Institute of Technology Bombay, Mumbai, India

Ocean Engineering

6-4-3 Marine Engineering and Applications I

Tuesday June 11 | Room: SEC, M2 & M3 | 08:30 – 10:00

Session Chair: Muk Chen Ong, University of Stavanger, Norway
Session Co-Chair: Guang Yin, University of Stavanger, Norway

Multi Objective Design of Ships: A Pareto Procedure OMAE2019-96643
Sander Calisal
University of British Columbia, Vancouver, BC, Canada

Noise Reduction of Bio-inspired Marine Propeller based on Serrated Trailing Edge OMAE2019-96782
Wencai Zhu, Hongtao Gao
Dalian Maritime University, Dalian, China

Experimental and Numerical Study Propeller Shaft Oil Whip OMAE2019-95331
Adarsh D1 Kiran Vijayan2 Karthikeyan Amaranj1
1. IGEN, IIT Kharagpur, Kharagpur, India; 2. IIT Kharagpur, Kharagpur, India

Openmodelica Modelling of the Thruster in a Compact Work-class Remotely Operated Vehicle OMAE2019-96839
Yihan Xing1 Kristian Folland2 Muk Cheng1
1. University of Stavanger, Stavanger, Norway; 2. IKM Technology AS, Bryne, Norway
**Offshore Geotechnics**

### 10-4-1 Pile Foundations I

Tuesday June 11  
Room: Crowne Plaza, Jura  
08:30 – 10:00

**Session Chair:** Susan Gourvenec, University of Southampton/ Southampton Marine and Maritime Institute, United Kingdom

**Method Evaluating Axial Response of Vertically-loaded Piles during Spudcan Penetration**  
OMAE2019-95422

Yifei Fan, Jianhua Wang  
Tianjin University, Tianjin, China

**Feasibility Study of an Innovative Large Open-ended Monopile Foundation for Offshore Wind Turbine**  
OMAE2019-95641

Jiale Li, Xuefei Wang, Xiong Yu, Youngang Tang

1. Hebei University of Technology, Tianjin, China; 2. Case Western Reserve University, Cleveland, OH, USA; 3. Tianjin University, Tianjin, China

**Evaluation of Uncertainty of Damage Results in Experimental Modelling of Monopile Foundation Scour Protection**  
OMAE2019-95793

Jinghao Wu, Jonas Amrout, Josep Molina Ruiz, Carlos Arboleda Chavez, Vasiliki Stratigaki, Peter Troch

1. Ghent University, Zwijnaarde, Belgium; 2. Ghent University, Ghent, Belgium

**Application of Friction Fatigue Pile Driving Models in GRLWEAP**  
OMAE2019-95944

Henry Milewski, Justin Kennedy  
TechnipFMC, Westhill, United Kingdom

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**Petroleum Technology**

### 11-7-2 Well Drilling Fluids and Hydraulics II

Tuesday June 11  
Room: Crowne Plaza, Barra  
08:30 – 10:00

**Session Chair:** Ergun Kuru, University of Alberta, Canada

**Session Co-Chair:** Majid Bzhi, University of British Columbia, Canada

**Hydraulic Behaviour in Cased and Open Hole Sections in Highly Deviated Wellbores**  
OMAE2019-96347

Jan David Ytrehus, Bjørnar Lund, Ali Taghipour, Birgitte Ruud Konsberg, Luca Carazza, Knud Richard Gyland, Arild Saasen


**Use of Tracer Particles for Tracking Fluid Interfaces in Primary Cementing**  
OMAE2019-96400

Amir Taheri, Jan David Ytrehus, Ali Taghipour, Bjørnar Lund, Alexandre Lavrov, Malin Torseter

1. Norwegian University of Science and Technology, Trondheim, Norway; 2. SINTEF, Trondheim, Norway; 3. Sintef Petroleum Research AS, Trondheim, Norway

**Hole Cleaning Related Stuck Pipe Analysis during Extended Reach Drilling by using a Transient Cuttings Transport Model – A Case Study**  
OMAE2019-96617

Hao Zeng, Yi Jin Zeng, Feifei Zhang, Guang Yang, Yuezheng Wang, Xi Wang, Xi Wang

1. Sinopec, Beijing, China; 2. Yangtze University, Wuhan, China; 3. CNPC, Beijing, China

**Mechanical Friction in Well Construction and Laboratory Testing of Friction Coefficients**  
OMAE2019-95594

Parisa Ghaedi, Mahmoud Khalifeh, Arild Saasen, Helge Hodne, Tor Henry Omland, Farzad N Shoghi

1. University of Stavanger, Stavanger, Norway; 2. University of Stavanger, Stavanger, Norway; 3. Equinor ASA, Stavanger, Norway

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**Ocean Renewable Energy**

### 9-3-1 Wave Energy Converter Control Systems Competition (WECCCOMP)

Tuesday June 11  
Room: SEC, Carron 1  
08:30 – 10:00

**Session Chair:** John Ringwood, Maynooth University, Ireland

**The WECCCOMP Wave Energy Control Competition – Overview**  
OMAE2019-95216

John Ringwood, Francesco Ferri, Nathan Tom, Keely Ruelh


**An Energy-maximising MPC Solution to the WEC Control Competition**  
OMAE2019-95197

Paulino Toma, Guillaume Sabiron, Hoai-Nam Nguyen

IFP Energies Nouvelles, Solaise, France

**Development of a Model Predictive Controller for the Wave Energy Converter Control Competition**  
OMAE2019-95544

Bradley A. Ling

Northwest Energy Innovations, Portland, OR, USA

**Learning a Predictionless Resonating Controller for Wave Energy Converters**  
OMAE2019-95619

Shuo Shi, Ron Patton, Mustafa Abdelrahman, Yanhua Liu

University of Hull, Hull, United Kingdom

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**CFD & FSI**

### 8-2-1 Free Surface Modeling

Tuesday June 11  
Room: SEC, Lomond Auditorium  
08:30 – 10:00

**Session Chair:** Hans Bihs, Norwegian University of Science and Technology, Norway

**Numerical Simulation of Solitary Wave Breaking with Adaptive Mesh Refinement**  
OMAE2019-95224

Yuanxing Zhang, Wenyang Duan, Kangqing Liao, Shan Ma, Guihua Xia

Harbin Engineering University, Harbin, China

**REEF3D Wave Generation Interface for Commercial CFD Codes**  
OMAE2019-96278

Csaba Pakodi, Hans Bihs, Arun Kamath, Elin Marta H. Hermundstad

1. SINTEF Ocean, Trondheim, Norway; 2. Norwegian University of Science and Technology, Sar-Trondelag, Norway; 3. Norwegian University of Science and Technology, Trondheim, Norway

**Numerical Study on the Temporal Discretization Schemes in Two-phase Wave Simulation**  
OMAE2019-96524

Young Jun Kim, Benjamin Boussacse, Sophiek Seng, David Le Touze

1. Ecole Centrale de Nantes, Nantes, France; 2. Bureau Veritas, Marine & Offshore, Paris, France

**REEF3D::FNP – A Flexible Fully Nonlinear Potential Flow Solver on Fixed Grids**  
OMAE2019-96524

Hans Bihs, Weizhi Wang, Tobias Martin, Arun Kamath

1. Norwegian University of Science and Technology, Sar-Trondelag, Norway; 2. Norwegian University of Science and Technology, Trondheim, Norway

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**Petroleum Technology**

### 11-7-2 Well Drilling Fluids and Hydraulics II

Tuesday June 11  
Room: Crowne Plaza, Barra  
08:30 – 10:00

**Session Chair:** Ergun Kuru, University of Alberta, Canada

**Session Co-Chair:** Majid Bzhi, University of British Columbia, Canada

**Hydraulic Behaviour in Cased and Open Hole Sections in Highly Deviated Wellbores**  
OMAE2019-96347

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**Use of Tracer Particles for Tracking Fluid Interfaces in Primary Cementing**  
OMAE2019-96400

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1. Sinopec, Beijing, China; 2. Yangtze University, Wuhan, China; 3. CNPC, Beijing, China

**Mechanical Friction in Well Construction and Laboratory Testing of Friction Coefficients**  
OMAE2019-95594

Parisa Ghaedi, Mahmoud Khalifeh, Arild Saasen, Helge Hodne, Tor Henry Omland, Farzad N Shoghi

1. University of Stavanger, Stavanger, Norway; 2. University of Stavanger, Stavanger, Norway; 3. Equinor ASA, Stavanger, Norway
Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics

12-4-1 Hydrodynamic Aspects of Offshore Renewable Energy

Tuesday June 11
Room SEC, Carron 2 | 08:30 – 10:00

Session Organizer: Xingya Feng, University of Oxford, United Kingdom
Session Co-Chair: Deborah Greaves, University of Plymouth, United Kingdom

Experimental and Numerical Investigations on Wave Dynamics of a Dual-chamber OWC Wave Energy Device

OMAE2019-95165
Dezhi Ning1 Rongquan Wang1 Qingping Zou1Bin Teng1
1. Dalian University of Technology, Dalian, China; 2. Heniot-Watt University, Edinburgh, United Kingdom

Evaluation of the Performance of an Integrated WEC Type of Breakwater System

OMAE2019-95739
Haoyu Ding1 Jun Zang1 Dezhi Ning1 Xuanlie Zhao2
Qiang Chen1 Chris Blenkinkoop1 Junliang Gao3
1. University of Bath, Bath, United Kingdom; 2. Dalian University of Technology, Dalian, China; 3. Jiangsu University of Science and Technology, Zhenjiang, China

Rigid and Flexible Inter-connection of Arrays of Oscillating Water Column Wave Energy Converters: Findings from the WETFEET Project

OMAE2019-96731
Keri Collins1 Deborah Greaves2 Martyn Hann2 Ben Howey2
Rui P.F. Gomes3 Joao C.C. Henriques3
1. School of Engineering, University of Plymouth, Plymouth, United Kingdom; 2. University of Plymouth, Plymouth, United Kingdom; 3. IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal

Time-domain Diffraction Modelling with Mean Force Effects and Experimental Comparison with Slack-moored M4 Wave Energy Converter

OMAE2019-96756
Peter Stansby1, Ehrain Carpintero Moreno University of Manchester, Manchester, United Kingdom

Takeshi Kinoshita Honoring Symposium on Offshore Technology

13-2-2 Experiments and Numerical Validation

Tuesday June 11
Room SEC, Boisdale 2 | 08:30 – 10:00

Session Chair: Marcio Yamamoto, National Maritime Research Institute, Japan
Session Co-Chair: Celso Morooka, University of Campinas, Brazil

Ship as a Wave Buoy – Estimating Relative Wave Direction from In-service Ship Motion Measurements using Machine Learning

OMAE2019-96201
Bart Mak1, Bulent Duz2
1. Maritime Research Institute in the Netherlands (MARIN), Wageningen, Netherlands
2. University of Manchester, Manchester, United Kingdom

Ship as a Wave Buoy – Using Simulated Data to Train Neural Networks for Real Time Estimation of Relative Wave Direction

OMAE2019-96225
Bart Mak1, Bulent Duz2
1. Maritime Research Institute in the Netherlands (MARIN), Wageningen, Netherlands
2. University of Manchester, Manchester, United Kingdom

An Experimental Study of Snap Loads on a Vertical Hanging Cable System

OMAE2019-96424
Wei-Ting Hu1 Tzu-Ching Chuang2 Wen-Yang Hsu1 Krish Sharman3 Ray-Yeng Yang3
1. Energo Engineering, a KBR Company, Houston, TX, USA; 2. National Cheng Kung University, Tainan, Taiwan; 3. Tsinghua University, Beijing, China

Experimental and Numerical Study of Motion of Rotating Drill Pipe Owing to Magnus Effect

OMAE2019-95602
Tomoya Inoue1 Hiroshiki Suzuki1 Toshihiro Katsuy1 Keita Tsujiy2 Yusuke Notani3
1. JAMSTEC, Yokosuka, Japan; 2. Osaka University, Suita, Japan; 3. Kobe University, Kobe, Japan

Refreshment Break
10:00 – 10:30
Location: Hall 5 (SEC)
Sponsored by Babcock

Babcock

CONCURRENT SESSIONS
10:30 – 12:00

Offshore Technology

1-1-4 Fixed Platforms and Foundations

Tuesday June 11
Room SEC, Alsh 1 | 10:30 – 12:00

Session Chair: Partha Chakrabarti, Zentech Inc, USA
Co-Chair: Marc Cahay, TechnipFMC

Punch-through Structural Analysis of Jack-up Rigs during Preloading of the Foundations

OMAE2019-95537
Partha Chakrabarti1 Abhijeet Chawan Zentech, Inc., Houston, TX, USA

Critical Review of Early Age Cycling Effects on the Capacity of Pile to Sleeve Grouted Connections as Treated in ISO 19902

OMAE2019-95626
Andi Merxhani1 Jacob Fisker Jensen1 Joao Caetano2 Casper Klinta Christiansen3
1. Ramboll Energy, Copenhagen, Denmark; 2. Ramboll Offshore Wind, Copenhagen, Denmark

Effects of Cap Bottom Elevation on Wave Loads on the Piles under the Cap

OMAE2019-96777
Jifu Zhou1, Xa Wang Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Offshore Technology

1-2-3 Dynamic Positioning II

Tuesday June 11
Room SEC, Dochart 2 | 10:30 – 12:00

Session Chair: Xinshu Zhang, Shanghai Jiao Tong University, China
Session Co-Chair: Xinhai Tian, Shanghai Jiao Tong University, China
Session Co-Chair: Dimitris Chalkias, GustoMSC, Netherlands

Learning from Our Dynamic Positioning Events

OMAE2019-96710
Arne Kvitrud Petroleum Safety Authority (PSA), Stavanger, Norway
QUAD Lift: Enabling Lifting of Larger Integrated Topsides  OMAE2019-95375
Ivan van Wijse, Rudi Veldman, Dijkstra
Heerema Marine Contractors, Leiden, Netherlands

Can the Shore Tension System Reduce Sloshing during LNG Terminal Loading Operations  OMAE2019-96548
Olger Koop
Aktis Hydraulics, Zwolle, Netherlands

Realistic Adaptive DP Controller for Flotel Operating in Side-by-side Configuration with FPSO  OMAE2019-96777
Anuarag Vendra1 Allan Magee2 Jing Liu3 Wei Xu2 Ankit Choudhary2 Anis Aliau Hussain2 1. National University of Singapore, Singapore, Singapore; 2. Keppe Offshore and Marine Technology Centre, Singapore, Singapore

Structures, Safety and Reliability

2-4-2 Fatigue and Fracture Reliability II  Tuesday June 11  Room SEC, Alsh 2 | 10:30 – 12:00
Session Chair: Nianzhong Chen, Tianjin University, China
Session Co-Chair: Fang Wang, Shanghai Ocean University, China

Low-cycle-fatigue Crack Closure Effect of Ship Cracked Plate considering the Accumulative Plastic Damage  OMAE2019-99230
Yuelin Song, Ying Yang, Zi Yang, Wei Jiang, Kang Hu  Wuhan University of Technology, Wuhan, China

Multiobjective Reliability-based Design of Ship Structures Subjected to Fatigue Damage and Compressive Collapse  OMAE2019-96666
Yordan Garbatov, Huang Yingcai  University of Lisbon, Lisboa, Portugal

Comparative Study on Fatigue Damage Assessment of a Structure Member in a Bulk Carrier using Various Environmental Conditions  OMAE2019-96760
Fredhi Agung Prasetyo1 Naoki Osawa2 Mohammad Arif Kurniawan3 Siti Komariyah3 1. Research & Development Division, Biro Klasifikasi Indonesia, Jakarta, Indonesia; 2. Osaka University, Osaka, Japan

Fatigue Behavior of Large, Rolled-after-heat-treatment and Hot-dip Galvanized HT Bolts  OMAE2019-96808
Julian Unglaub, Klaus Thiele  Institute of Steel Structures, TU Braunschweig, Braunschweig, Germany

Structures, Safety and Reliability

2-9-2 Extreme Loading and Responses II  Tuesday June 11  Room Crowne Plaza, Castle 1 | 10:30 – 12:00
Session Chair: Kazuhiro Iijima, Dept of NAOE, Osaka University, Japan
Session Co-Chair: Hans Bilis, Norwegian University of Science and Technology, Norway

Erik Vanem, Bingjie Guo  DNV GL, Havik, Norway

Long-term Extreme Response Analysis for a Straight Floating Bridge Across the Bjørnafjord  OMAE2019-95212
Finn-Idar G. Giske1 Arnt G. Fredriksen2 1. Multiconsult, Oslo, Norway; 2. Multiconsult, Tramsø, Norway

A New Approach for Environmental Contour and Multivariate De-clustering  OMAE2019-95993
Quentin Derbanne1 Guillaume de Hauteclocque2 1. Bureau Veritas, Marine & Offshore, Paris, France; 2. Bureau Veritas, Paris, France

Experimental Assessment of Vertical Shear Force and Bending Moment in Severe Sea Conditions  OMAE2019-96372
Boris Horel1 Benjamin Boussac2 Arnaud Herriers1 Guillaume de Hauteclocque2 1. Ecole Centrale Nantes, LHEA res. dept. (ECN and CNRS), Nantes, France; 2. Ecole Centrale de Nantes, Nantes, France; 3. Bureau Veritas, Paris, France

Structures, Safety and Reliability

2-12-2 Structural Analysis and Optimization II  Tuesday June 11  Room Crowne Plaza, Castle 2 | 10:30 – 12:00
Session Chair: Paulo M. Vedeiro, LACEO/COPPE/ Federal University of Rio De Janeiro, Brazil
Session Co-Chair: Jonas M. Ringsberg, Chalmers University of Technology, Sweden

Numerical Simulation of Container Stacks Dynamics under Typical Motion Excitation  OMAE2019-95644
Chuntong Li, Deyu Wang, Jiagi Liu  Shanghai Jiao Tong University, Shanghai, China

Dynamic Response of Metallic Y-type Core Sandwich Panels Subjected to Air Blast Loading – Numerical Investigation  OMAE2019-96628
Ting Liu, Yuansheng Chen, Jun Liu, Ganchao Chen, Changhui Chen, Pan Zhang  Huazhong University of Science and Technology, Wuhan, China

Quasi-static and Dynamic Compressive Behaviors of Closed-cell Stochastic Foams based on Voronoi Model  OMAE2019-95924
Jianyong Chen, Jun Liu, Yuansheng Chen, Pan Zhang  Huazhong University of Science and Technology, Wuhan, China

Materials Technology

3-4-1 Steel Performance in Sour Environment  Tuesday June 11  Room SEC, Boisdale 1 | 10:30 – 12:00
Session Chair: Agnes Marie Horn, DNV GL, Norway
Session Co-Chair: Carol Johnston, TWI Ltd, United Kingdom

Fatigue Performance and Crack Growth Assessments of Riser Welds in Mild Sour Environment  OMAE2019-96329
Rupak Ghosh1 Robert Aune2 Carl Popelar3 1. ExxonMobil, Spring, TX, USA; 2. ExxonMobil Production Company, Spring, TX, USA; 3. Southwest Research Institute, San Antonio, TX, USA

Local Hard Zones in Sour Service Steels  OMAE2019-96593
Doug Fairchild1 Brian Newbury1 Tim Anderson2 Neeraj Thirumalai3 1. ExxonMobil Production Company, Spring, TX, USA; 2. ExxonMobil Research and Engineering Co, Annandale, NJ, USA; 3. ExxonMobil Upstream Research Company, Spring, TX, USA

Qualification of TMCP Pipe for Sour Service: Mitigation of Local Hard Zones  OMAE2019-96614
Brian Newbury1 Doug Fairchild1 Andrew Prescott3 Andrew Wasson1 Tim Anderson2 1. ExxonMobil Production Company, Spring, TX, USA; 2. ExxonMobil Upstream Research Company, Spring, TX, USA; 3. ExxonMobil Upstream Research Company, Spring, TX, USA
**An Investigation Concerning the Sulfide Stress Cracking of TMCP Steels**

OMAE2019-96556

Xinyue Xiao1 Andrew Wason1 David Fischer1 Tim Anderson2

Brian Newbury2 Weiji Huang2 Doug Fairchild2

1. Exxonmobil Upstream Research Company, Spring, TX, USA; 2. ExxonMobil Upstream Integrated Solutions, Spring, TX, USA

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**Pipelines, Risers, and Subsea Systems**

**4-1-3 Flexible Pipes III**

Tuesday June 11

Room Crowne Plaza, Staffa / Shuna | 10:30 – 12:00

**Session Chair:** Murilo Augusto Vaz, COPPE/UFRJ, Brazil

**Session Co-Chair:** Anh Tuan Do, TechnipFMC, France

**Evaluation of the Temperature Effect on the Viscoelastic Responses of Flexible Risers**

OMAE2019-95141

Jinpeng Liu1 Jinsong Mao2 Murilo Augusto Vaz2 Menglian Duan3

1. China University of Petroleum, Beijing, China; 2. Fudan University, Shanghai, China; 3. COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

**Study on Mechanical Behavior of Tensile Armor Wires of Marine Flexible Pipes and Cables during Winding Process**

OMAE2019-95426

Qingchen Lu1 Shanghua Wu1 Dong Wang1 Zhiyun Yang2

1. Dalian University of Technology, Panjin, China; 2. Dalian University of Technology, Dalian, China

**Recent Advances in the Prediction and Mitigation of Flow Induced Pulsations in Flexible Risers and Flowlines**

OMAE2019-95906

Stefan Belfroid, Nestor Gonzalez Diez, Harry Korst

TNK, Delft, Netherlands

**Effect of Local Model Dynamics on Flexible Riser Tensile Armor Wire Stress Predictions**

OMAE2019-95103

Gabriel Rombado1 Krasimir Doynov2 Nathan Cooke3 Arya Majer1

1. ExxonMobil Production Company, Spring, TX, USA; 2. ExxonMobil Upstream Integrated Solutions, Spring, TX, USA; 3. INTECSEA, St. John’s, NL, Canada; 4. INTECSEA, Houston, TX, USA

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**Pipelines, Risers, and Subsea Systems**

**4-3-6 ECA**

Tuesday June 11

Room Crowne Plaza, Castle 3 | 10:30 – 12:00

**Session Chair:** Bostjan Bezensek, Shell, United Kingdom

**Session Co-Chair:** Andrew Cosham, Ninth Planet Engineering Ltd, United Kingdom

**Fatigue Life Assessment for Pipeline Dents under Highway Crossings**

OMAE2019-95450

M Liu1 Colin Cross2 Jason Brown3

1. Aker Solutions, Windsor, United Kingdom; 2. Aker Solutions, London, United Kingdom; 3. Aker Solutions, Aberdeen, United Kingdom

**Integrity Assessment of Subsea Pipeline Dent / Buckle using ILI Data**

OMAE2019-95470

Gurumurthy Kagita1, Gudimella G. S.2, Acharya1 Mahesh Babu Addala1, Balaji Srinivasan1, Penchala S. K.1, Pottem1, Deepak Gupta1, Subramanyam V. R.1, Sripatha2

Managements Ltd India, Gurugram, India

**ECAs and Lateral Buckling**

OMAE2019-95529

Andrew Cosham1 Malcolm Carr1 Ian Marae1 Kenneth Macdonald2

1. Ninth Planet Engineering Ltd, Newcastle upon Tyne, United Kingdom; 2. Crondall Energy, Cramlington, United Kingdom; 3. Crondall Energy, Aberdeen, United Kingdom; 4. University of Stavanger, Hafsland, Norway

**Dented Externally-pressurised Pipes Subjected to Cyclic Axial Loading**

OMAE2019-95814

Konstantinos Chatziioannou1, Yunier Huang1, Spyros A. Karamanos2

1. The University of Edinburgh, Edinburgh, United Kingdom

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**Ocean Space Utilization**

**5-2-2 Aquaculture II: Design and Modeling II**

Tuesday June 11

Room SEC, Dohert 1 | 10:30 – 12:00

**Session Chair:** Yanlin Shao, Technical University of Denmark, Denmark

**Session Co-Chair:** Xu Xiang, Norwegian Public Roads Administration, Norway

**Numerical Modelling of Net Motion in Waves and Current using CFD**

OMAE2019-95154

Tobias Martin1 Arun Kamath1 Hans Bihs2

1. Norwegian University of Science and Technology, Trondheim, Norway; 2. Norwegian University of Science and Technology, Sandfjellet, Norway

**Numerical Study of a Single-point Mooring Gravity Fish Cage with Different Deformation Suppression Methods**

OMAE2019-95670

Hui Cheng1 Karl Gunnar Aursaether2 Lim Li1 Muk Chen Ong1

1. University of Stavanger, Stavanger, Norway; 2. SINTEF Ocean, Trondheim, Norway

**Experimental Study on the Motion of a Flexible Hose Net used in Automated Net-hauling System**

OMAE2019-95670

Yue Li1 Yoichi Mizukami2 Takero Yoshida3 Qiao Li4 Jialin Han3 Daisuke Kitazawa4

1. The University of Tokyo, Tokyo, Japan; 2. Institute of Industrial Science, The University of Tokyo, Tokyo, Japan; 3. The University of Tokyo, Tokyo, Japan; 4. College of Marine Sciences, Shanghai Ocean University, Shanghai, China; 4. The University of Tokyo, Tokyo, Japan

**Three-Dimensional Physical Environment Modelling for Integrated Multi-trophic Aquaculture (IMTA)**

Implementation in Onagawa Bay, Japan

OMAE2019-95672

Jinxin Zhou1 Takero Yoshida2 Junbo Zhang2 Sanggyu Park3 Daisuke Kitazawa4

1. Institute of Industrial Science, The University of Tokyo, Chiba, Japan; 2. Institute of Industrial Science, The University of Tokyo, Tokyo, Japan; 3. College of Marine Sciences, Shanghai Ocean University, Shanghai, China; 4. The University of Tokyo, Tokyo, Japan

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**Ocean Engineering**

**6-2-2 Coastal Engineering II**

Tuesday June 11

Room SEC, M4 | 10:30 – 12:00

**Session Chair:** Neelamani Subramaniam, Kuwait Institute for Scientific Research, Kuwait

**Session Co-Chair:** Ghassan El Chahal, COWI A/S, Denmark

**Impact on the Reinforced Concrete Pier for Integrated Multi-trophic Aquaculture (IMTA)**

OMAE2019-95727

Xiaozhou Xia1 Yuner Huang2 Konstantinos Chatziioannou1, Yuner Huang1, Spyros A. Karamanos2

1. The University of Tokyo, Tokyo, Japan; 2. Institute of Industrial Science, The University of Tokyo, Kashiwa, Japan

**Numerical Simulation of Consecutive Multiple Lateral Impact on the Reinforced Concrete Pier**

OMAE2019-95608

Shuai Yang1 Xiaozhou Xia1 Qing Zhang1 Xue-gang Wang2 Ying Zong-quan3

1. CCCC Fourth Harbor Engineering Institute Co., Ltd., Guangzhou, China; 2. Hohai University, Nanjing, China
Coastal Engineering Analysis, Field Measurements, Numerical Modeling and Design for the Optimized Extension of the Beach in Ras Al-Ardh Area, Salmiya, Kuwait
Neelamani Subramaniam, Bassam Shuhaibar, Khaled Al-Salem, Yousef Al-Osairi, Qusai E. Karam, Dana Al-Houti, Noor Al-Anjari
Kuwait Institute for Scientific Research, Shuwaikh, Kuwait

Ocean Renewable Energy

Ocean Engineering

6-4-4 Marine Engineering and Applications II

Tuesday June 11 Room SEC, M2 & M3 | 10:30 – 12:00
Session Chair: Muk Chen Ong, University of Stavanger, Norway
Session Co-Chair: Zhenhui Liu, Aker Solutions AS, Norway

A Broadband Underwater Acoustic Signal Array
Signal Processing Method based on the Joint Sparsity of Signal Spatial Domain OMAE2019-95530
Daqian He, Dahai Zhang, Congying Wang, Xirui Peng
China Ship Development and Design Center, Wuhan, China

Research on Characteristics of Removing Particles in Ship Exhaust Gas by Charged Droplets OMAE2019-96716
Lei Jiao, Zhaohui Qian, Dekai Huang, Pengfei Chen, Lida Meng
1. Zhejiang University, Zhoushan, China; 2. University of Strathclyde, Glasgow, United Kingdom

Lei Hu, Jiangyu Yang
Wuhan University of Technology, Wuhan, China

The Design and Simulation of Hull Segmentation Docking and Correcting Hydraulic System OMAE2019-99326
Yuhao Zeng, Zaya Yu, Tang Xu
Huazhong University of Science and Technology, Wuhan, China

CFD & FSI

8-2-2 Free Surface Loading and Structure Interaction I

Tuesday June 11 Room SEC, Lomond Auditorium | 10:30 – 12:00
Session Chair: Tim Bunnik, MARIN, Netherlands
Session Co-Chair: Craba Palozzli, SINTEF Ocean, Norway

A Ghost Cell Method Based FDM-FEM Model for Free-surface Flow Interactions with Deformable Structures OMAE2019-95209
Xizeng Zhao, Zhijian Yang, Kaipyu Zheng, Songchang Duan
Zhejiang University, Zhoushan, China

Numerical Prediction of the Ship Resistance and Vertical Motions in Regular Head Waves OMAE2019-95237
Adham S. Bekhit, Adrian Lungu
“Dunărea de Jos” University of Galati, Galati, Romania

Unsteady Numerical Simulation of the Behavior of a Ship Moving in Head Sea OMAE2019-95239
Adrian Lungu
“Dunărea de Jos” University of Galati, Galati, Romania

Numerical Investigation of the Roll Decay of a Container Ship Moving with Forward Speed in Calm Water OMAE2019-95240
Adrian Lungu
“Dunărea de Jos” University of Galati, Galati, Romania

Ocean Renewable Energy

9-4-4 Optimization and Load Analysis

Tuesday June 11 Room SEC, Carron 1 | 10:30 – 12:00
Session Chair: Yi-Hsiang Yu, National Renewable Energy Laboratory, USA

Making Effective WEC Design Choices based on Simulation and Analysis OMAE2019-95138
Charlene Vance, Jonas W. Ringsberg, Shun-Han Yang
Chalmers University of Technology, Gothenburg, Sweden

Fluid-Structure-Soil Interaction of a Moored Wave Energy Device OMAE2019-95419
Joe Tom’1 Dirk Rippsdorp2 Raffaele Ragni3 David J White2
1. University of Western Australia, Perth, WA, Australia; 2. University of Southampton, Southampton, United Kingdom

Shape Optimization of a Submerged Pressure Differential Wave Energy Converter for Load Reductions OMAE2019-96390
Michael Kelly, Mohammad-Reza Aalam
University of California, Berkley, Berkeley, CA, USA

Offshore Geotechnics

10-5-1 Bucket Foundations, Suction Caissons and Spudcans

Tuesday June 11 Room Crowne Plaza, Jura | 10:30 – 12:00
Session Chair: Tulio Quiroz, Fraunhofer Institute for Wind Energy Systems IWES, Germany

Protection of Pipelines and Cables with a Combination of Soil and Rock Cover OMAE2019-95262
Damian R Morrow1 Andrew A Small1
1. Marine Geoengineering Ltd, Aberdeen, United Kingdom; 2. Rados Group, Aberdeen, United Kingdom

Simplified Numerical Simulation of the Dense Sand Progressive Failure involved in Spudan Punch-through Failure OMAE2019-95911
Jun Zhao, Futai Sun, Wenbo Jin
Xi’an Shiyou University, Xi’an, China

Bearing Capacities of Shallow Skirted Foundations after the Action of Multi-directional Cyclic Displacements considering Soil Degradation OMAE2019-96036
Zhong Xiao, Donghai Zhang, Haixiao Liu, Ying Liu
Tianjin University, Tianjin, China

Cone Penetration Test in Stiff Over Soft Clay in Centrifuge Test OMAE2019-96698
Qiang Xie1 Yuxia Hu1 Mark J. Cassidy2 Alireza Salehi2
1. University of Western Australia, Perth, WA, Australia; 2. University of Melbourne, Parkville, VIC, Australia
**Petroleum Technology**

*11-6-1 Integrity of Well Barriers I*

**Tuesday June 11**

*Room: Crowne Plaza, Barra | 10:30 – 12:00*

**Session Chair:** Jan David Ytrehus, SINTEF, Norway

**Numerical Modelling and Sensitivity Analysis of Gas Kick Migration and Unloading of Riser**

OmaE2019-95214

Daliaa Gomes1 Knut Bjerkevoll2 Kjell Kåre Fjeld3 Johnny Fryden3

1. University of Stavanger, Stavanger, Norway; 2. SINTEF Petroleum, Bergen, Norway

**Nanomodified Rock-based Geopolymers as Supplement to Portland Cement for Oil Well Cementing**

OmaE2019-95380

Mahmoud Khaliifeh1 Saeed Salehi2 Aleksandra Jamrozik3

1. UoS, Stavanger, Norway; 2. Mewbourne School of Petroleum and Geology Engineering, Norman, OK, USA; 3. AGH University of Science and Technology, Krakow, Poland; 4. The Oklahoma University, Norman, OK, USA; 5. University of Stavanger, Stavanger, Norway

**Improved Model for Tubular Burst**

OmaE2019-95819

Bjorn Brechan, Sigbjørn Sangsøl, Stein Dåle

Norwegian University of Science and Technology, Trondheim, Norway

**Next Generation Well Design and Integrity Digital Tools – Boosting Drilling Systems Automation (DSA)**

OmaE2019-95995

Bjorn Brechan, Stein Dåle, Sigbjørn Sangsøl

Norwegian University of Science and Technology, Trondheim, Norway

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**Rodney Eatock Taylor Honoring Symposium on Marine and Offshore Hydrodynamics**

*12-5-1 Non-Linear Waves and Wave Effects I*

**Tuesday June 11**

*Room: SEC, Carron 2 | 10:30 – 12:00*

**Session Chair:** Ronald W. Yeung, University of California, Berkeley, USA
**Session Co-Chair:** Marnoun Naciri, Single Buoy Moorings Inc, Monaco

**Numerical Analysis of Nonlinear Wave Loads on an Offshore Wind Turbine Monopile**

OmaE2019-95161

Xingya Feng1 Richard H. J. Wilden2 Binchen Zhou3 Thomas A. A. Adcock1

1. University of Oxford, Oxford, United Kingdom; 2. Harbin Engineering University, Harbin, China

**Nonlinear Wave Loads on Offshore Wind Turbines: Extreme Statistics and Fatigue**

OmaE2019-96679

Yu Zhang, Paul Scalavuono

MIT, Cambridge, MA, USA

**Numerical Simulation of Multidirectional Waves with Full-spectrum using DualSPHysics**

OmaE2019-96405

Takuya Kanekita1 Hideki Matsuda2 Samuel Draycott1 David Ingram1 Yasuaki Doi1

1. Hiroshima University, Hiroshima, Japan; 2. The University of Edinburgh, Edinburgh, United Kingdom

**Recreating the Draupner Wave in the Laboratory**

OmaE2019-96817

Mark McAllister1 Sam Draycott1 Thomas A.A. Adcock1 Paul Taylor1 Ton van den Bremer1


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**Takeshi Kinoshita Honoring Symposium on Offshore Technology**

*13-2-3 Flow-Induced Motions (FIM)*

**Tuesday June 11**

*Room: SEC, Boisdale 2 | 10:30 – 12:00*

**Session Chair:** Rodolfo T. Gonçalves, University of Tokyo, Japan
**Session Co-Chair:** Longfei Xiao, Shanghai Jiao Tong University, China

**Experimental Study of the Effect of the Pontoon Presence on the Flow-induced Motions of a Semi-submersible Platform with Four Square Columns**

OmaE2019-95250

Rodolfo T. Gonçalves1 Hideyuki Suzuki2 Fredi Cenc1

1. University of Tokyo, Bunkyo, Japan; 2. University of Tokyo, Tokyo, Japan; 3. Federal University of Santa Catarina, Joinville, SC, Brazil; 4. The University of Tokyo, Chiba, Japan

**Hydrodynamics Interactions on Vortex-induced Motions of a Multi-body Floating System**

OmaE2019-95597

Yibo Liang, Longbin Tao

University of Strathclyde, Glasgow, United Kingdom

**Numerical Study on Vortex-induced Motions of Semi-submersibles with Three Columns with Different Sections Types**

OmaE2019-95601

Chenling Tian, Longfei Xiao, Mingyue Liu, Lijun Yang, Jing Liu

Shanghai Jiao Tong University, Shanghai, China

**Analysis of Wake Interaction of Oscillating Platform with Four Columns**

OmaE2019-95749

Shinichiro Hirabayashi1 Munio M. Cicoli2 Rodolfo T. Gonçalves3 Gustavo R. S. Assi4

1. The University of Tokyo, Chiba, Japan; 2. University of Sao Paulo, Sao Paulo, SP, Brazil; 3. The University of Tokyo, Tokyo, Japan; 4. The University of Tokyo, Tokyo, Japan

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**Lunch**

12:00 – 13:30

*Location: Hall 5 (SEC)*

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**Concurrent Sessions**

13:30 – 15:00

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**Offshore Technology**

*1-1-5 Artificial Intelligence and Advance Analysis*

**Tuesday June 11**

*Room: SEC, Alsh 1 | 13:30 – 15:00*

**Session Chair:** Allan Magee, National University of Singapore, Singapore
**Session Co-Chair:** Erwan Auburtin, TechnipFMC, France

**Detection of Mooring Line Failure of a Spread-moored FPSO, Part 1: Development of an Artificial Neural Network Based Model**

OmaE2019-96288

Djoni Sidarta1 Ho-Joon Lim1 Jyhoun Kyoung2 Nicolas Tcherniguin2 Timothee Lefebvre1 Jim O’Sullivan2

1. TechnipFMC, Houston, TX, USA; 2. TechnipFMC, Paris, France

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Detection of Mooring Line Failure of a Spread-moored FPSO, Part 2: Global Performance Analysis using MLTSIM
Yohyun Kyoung1 Ho-Joon Lim1 Dijoe Sidarta1 Nicolas Tcherniguit2 Timothee Lefebvre1
1. TechnipFMC, Houston, TX, USA; 2. TechnipFMC, Paris, France

Response Based Time Domain Structural Analysis on Floating Offshore Platform
Yohyun Kyoung1 Sagar Samaria1 Jung Kim1 Brian Duffy3
1. TechnipFMC, Houston, TX, USA; 2. TechnipFMC/Genesis, Houston, TX, USA

A Study of Trajectory based on AIS Positions by Genetic Algorithm
Hitomi Tamaru, Ruri Shoji
Tokyo University of Marine Science and Technology, Tokyo, Japan

Offshore Technology
1-2-4 Mooring System Design and Analysis II
Tuesday June 11 Room SEC, Dochart 2 | 13:30 – 15:00
Session Chair: David Molyneux, Memorial University of Newfoundland, Canada
Session Co-Chair: Allan Magee, National University of Singapore, Singapore

Study on Anchor Leg Installation Sequence of Nanhai Shengli FPSO under Typhoon Season
Hui Shen1 Huoping Wang2 Weiquan Zhu1 Deyang Wang1
1. COTEC Offshore Engineering Services(Beijing), Beijing, China; 2. CNOOC China Ltd., Shenzhen, China

A New Fully Detailed Finite Element Model of Wire Rope for Fatigue Life Estimation of a Mooring Line
Federico Bussolati1 Martin Guiton2 Pierre-Alain Guidault2
1. IFP Energies Nouvelles, Solaize, France; 2. ENS-Paris-Saclay, Cachan, France

Fatigue Performance of Mooring Chains Subjected to Wear Degradation
Gilang Muhammad Gemilang1 Philippa Reed2 Adam Sobey2
1. University of Permatina and University of Southampton, Southampton, United Kingdom; 2. University of Southampton, Southampton, United Kingdom

Structures, Safety and Reliability
2-4-3 Fatigue and Fracture Reliability III
Tuesday June 11 Room SEC, Alsh 2 | 13:30 – 15:00
Session Chair: Yordan Garbatov, University of Lisbon, Portugal
Session Co-Chair: Myung-Hyun Kim, Pusan National University, Korea

On Calculating the Crack Growth within a Single Load-Dwell-Unload Cycle for Metal Structures
Fang Wang, Xuezhong Zhang, Zhe Jiang, Weicheng Cui
Shanghai Ocean University, Shanghai, China

Two-parameter J-A Estimation for Weld Centerline Cracks in Welded Single Edge Cracked Plate under Tensile Loading
Chuanjie Duan, Shuhua Zhang
Hohai University, Nanjing, China

Study on Fatigue Crack of Marine Typical Sandwich Composite Joint
Luo Bailu, Shaoren Zheng
China Ship Development and Design Center, Hubei, China

Structures, Safety and Reliability
2-12-3 Structural Analysis and Optimization III
Tuesday June 11 Room Crowne Plaza, Castle 2 | 13:30 – 15:00
Session Chair: Jonas W. Ringsberg, Chalmers University of Technology, Sweden
Session Co-Chair: Paulo M. Videiro, LACEO/COPPE/
Federal University of Rio De Janeiro, Brazil

Study on Impact Resistance of Ship Arrow-shaped Negative Poisson Ratio Honeycomb Pedestal
Haoran Wu, Xiaobin Li, Jie Zhang
Wuhan University of Technology, Wuhan, China

Study on the Effect of Impact Load Generated from Pile Driving on Aged Berthing Structure
Jeena Mary John1 Nilanjan Saha2 Ramganathan Sundaravadivel2
1. Department of Ocean Engineering, Chennai, India; 2. Indian Institute of Technology Madras, Chennai, India

Study on Mechanical Behaviors of Low-cycle Fatigue Crack Tip for Notch Cracked Plate under Variable Amplitude Loading
Bo Du
Qinzhou University, Qinzhou, China

Experimental Validation of FORM-based Approach for Predicting Extreme Value Distribution of Hull Girder Bending Moment in a Ship
Tomoki Takami1 Yusuke Komoriyama2 Takahiro Ando3 Kazuhiro Iijima4
1. National Institute of Maritime, Port and Aviation Technology, Mitaka, Japan; 2. Department of NAOE, Osaka University, Osaka, Japan

Evaluation of an Equivalent Design Wave Method to Define Lifetime Combined Loading Scenarios for Trimarans
Harleigh C Seyffert, Austin Kana
Technical University Delft, Delft, Netherlands

Dynamic Load Inversion Method of Ship Body based on Influence Coefficient Matrix
Huiliang Ren, Guoqing Feng, Hao Liu, Yuecong Hu, Jian Zou
Harbin Engineering University, Harbin, China

Analysis of Fatigue Life of Ship Structure under the Non-linear Slamming Load
Huiliang Ren, He Ma
Harbin Engineering University, Harbin, China
TUESDAY 13:30 – 15:00

**Materials Technology**

### 3-3-2 Performance of Mooring Chains

**Tuesday June 11**

**Room: SEC, Boisdale 1 | 13:30 – 15:00**

**Session Chair:** Jens Tronskar, Det Norske Veritas Pte Ltd, Singapore

**Session Co-Chair:** Koji Gotoh, Kyushu University, Japan

**Testing and Modeling of Mooring Chains Subjected to Cyclic Out-of-plane Bending**

OMAE2019-95369

Edgar Mamity, Fabio Caristo, Lucival Malcher, Guilherme Ferreira, Eduardo Nunes Filho

1. Universidade de Brasilia, Brasilia, DF, Brazil; 2. Petrobras Brasil, Rio de Janeiro, RJ, Brazil; 3. Galp Energia, Lisbon, Portugal

**A Comprehensive Set of Round-bar Stress Intensity Factor Solutions for ECA of Mooring Shackles and Chain Components**

OMAE2019-96631

Pinghsa Dong, Jean-Michel Aubert, Jean-Pierre Sauvage

1. University of Michigan, Ann Arbor, MI, USA; 2. Total, France; 3. Bureau Veritas, Paris, France

**Wear Performance of Mooring Chain in Wet Environment with Substitute Oceano Steel**

OMAE2019-95822

Koji Gotoh, Tetsuya Ueda, Koji Murakami, Tomoaki Utsunomiya

Kyushu University, Fukuoka, Japan

**Development of a New Material Technology for Offshore Mooring Chains – High Manganese Steel**

OMAE2019-95541

Neerav Verma, Andrew Wasson, Zhen Li, Harpreet Sidhar, Haiqing He

1. ExxonMobil Upstream Research Company, Spring, TX, USA; 2. ExxonMobil, Spring, TX, USA; 3. ExxonMobil Research and Engineering Co, Annandale, NJ, USA

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**Pipelines, Risers, and Subsea Systems**

### 4-2-1 General Design and Analysis I

**Tuesday June 11**

**Room: Crowne Plaza, Castle 3 | 13:30 – 15:00**

**Session Chair:** Vishnu Vijayaraghavan, Aker Solutions Inc., USA

**Session Co-Chair:** Jens Tronskar, Det Norske Veritas Pte Ltd, Singapore

**Corrosion-fatigue Crack Growth Performance of Titanium Grade 29 Welds in Tapered Stress Joints**

OMAE2019-95175

Gabriel Rombado, David Baker, Lars M. Haldorsen

Pedro Crandall, Jim H. Feiger, Stephen J. Hudak

1. ExxonMobil Production Company, Spring, TX, USA; 2. Exxon Mobil Upstream Research Co, Spring, TX, USA; 3. Equinor Forus, Norway; 4. Petrobras R&D Center, Rio de Janeiro, RJ, Brazil; 5. SouthWest Research Institute, San Antonio, TX, USA; 6. Consultant, San Antonio, TX, USA

**Vessel Interface Considerations for Ultra-deepwater Intervention Risers**

OMAE2019-9519

Rohit Vaidya, Mahesh Sonawane, Ben Toleman, Elaine Whiteley, Jonathan Rourke

1. ZH Offshore Inc, Houston, TX, USA; 2. ZH Offshore Engineering Ltd, Bridge of Don, United Kingdom; 3. Helix, Houston, TX, USA

**Life Extension of Deepwater Risers used for a Spar Application in Gulf of Mexico**

OMAE2019-95804

Yongming Cheng, Chente Hu, Guiqing Yang, Manuel Carballo

1. Flowtec, A Company of Keppel, Houston, TX, USA; 2. ABS, Spring, TX, USA; 3. Exxon Mobil Company, Spring, TX, USA; 4. ExxonMobil, Spring, TX, USA

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**Ocean Space Utilization**

### 5-4-1 Underwater Vehicle and Technology

**Tuesday June 11**

**Room: SEC, Dochart 1 | 13:30 – 15:00**

**Session Chair:** Yoshitaka Watanabe, JAMSTEC, Japan

**Session Co-Chair:** Tomoya Inoue, JAMSTEC, Japan

**A Low Cost Autonomous Underwater Vehicle for Interventional Purposes**

OMAE2019-95134

Mamoon Masud, Suleman Mazhar

Information Technology University, Lahore, Pakistan

**On the Use of Consumer-grade Remotely Piloted Aircraft Systems for Monitoring Shallow Coral Reefs in Colombia:**

Case Old Providence Island

OMAE2019-95385

Manuela Lopera-Gil, Rafael E. Vasquez, Carlos A. Zuluaga, Paula Andrea Zapata-Ramirez

Universidad Pontificia Bolivariana, Medellin, Colombia

**Integrated Acoustic Communication and Positioning System between an Autonomous Surface Vehicle and Multiple Autonomous Underwater Vehicles**

OMAE2019-96623

Yoshitaka Watanabe, Koji Meguro, Mitsuyasu Deguchi, Yoshihiro Kida, Takuya Shimura

JAMSTEC, Yokosuka, Japan
Ocean Engineering

6-2-3 Coastal Engineering III
Tuesday June 11  Room SEC, M4 | 13:30 – 15:00
Session Chair: Ian Robertson, University of Hawaii, USA
Study of Extreme Waves Propagating over Reefs in Large Wave Flume OMAE2019-95039
Songgui Chen1 Zeming Wang1 Jinbai Zheng1 Chi Zhang2 Xi Hu3
1. Tianjin Research Institute of Water Transport Engineering, Tianjin, China; 2. Hohai University, Nanjing, China
Numerical Simulation of Drifting and Run-up Ice Floes driven by Tsunami OMAE2019-95010
Shinji Kikaj1 Maiko Ishida2 Takahiro Takeuchi2
1. Civil Engineering Research Institute for Cold Region Public Works Research, Sapporo, Japan; 2. Hachinohe Institute of Technology, Hachinohe, Japan
Designing Coastal Structures for Tsunami Loads per ASCE 7-16 OMAE2019-95101
Ian Robertson, Jacob McKamey University of Hawaii, Honolulu, HI, USA

Ocean Engineering

6-4-5 Very Large Floating Structures
Tuesday June 11  Room SEC, M2 & M3 | 13:30 – 15:00
Session Chair: Zhengshun Cheng, Shanghai Jiao Tong University, China
Session Co-Chair: Xu Xiang, Norwegian Public Roads Administration, Norway
Numerical Study into Site-specific Effect on the Response of Sea-crossing Bridge under Correlated Wind and Wave Loadings OMAE2019-95687
Kai Wei1 Saad Riaz2 Jin Zhu3 Hakan Imam1 Jianlu Zhang2
1. Southwest Jiaotong University, Chengdu, China; 2. Sharif University of Technology, Tehran, Iran
Dynamic Analysis of an Array of Submersible Mussel Rafts in Waves and Current OMAE2019-96388
Tobias Dewhurst1 Spencer Hallowell2 Carter Newell3
1. Maine Marine Composites, Portland, ME, USA; 2. Independent Author, West Bath, ME, USA; 3. Pemaquid Mussel Farm, Damariscotta, ME, USA
Extreme Response Analysis of an End-anchored Floating Bridge OMAE2019-96793
Zhengshun Cheng1 Zhen Guo2 Torgeir Moan3
1. Shanghai Jiaotong University, Shanghai, China; 2. Norwegian University of Science and Technology, Trondheim, Norway; 3. Center For Ships & Ocean Structures, Trondheim, Norway
Experimental and Numerical Investigation on Planar Motion Responses of a Single Point Moored Shuttle Tanker in Waves OMAE2019-95251
Ning He1 Cheng Zhang2 Zhuan Kang4 Youwei Kang1 Changhong Wang2
1. China Offshore Oil Engineering Co., (COOEC), Tianjin, China; 2. Harbin Engineering University, Harbin, China; 3. CMIC Offshore Co. Ltd., Shenzhen, China
Dynamic Response of Spar Wind Turbine Moored by Dynamic Catenaries under Random Wind and Wave Loads OMAE2019-95658
Yilun Li1 Shuangqi Guo1 Yue Kong1 Weimin Chen2 Min Li1
1. Beijing University of Aeronautics and Astronautics, Beijing, China; 2. Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Ocean Renewable Energy

9-5-2 Concepts and Design
Tuesday June 11  Room SEC, Carron 1 | 13:30 – 15:00
Session Chair: Madjid Karimirad, Queen's University Belfast, United Kingdom
Session Co-Chair: Wei Shi, Dalian University of Technology, China
Feasibility Study of Mooring Lines Design for a Tidal Turbine Platform using Floating Double Hull OMAE2019-95998
Nu Rahaida Arini1 Philipp R. Thies2 Lars Johanning3 Edward Ransley4 Scott Brown5 Nan Xie6 Deborah Greaves6
1. University of Exeter, Penryn, United Kingdom; 2. Plymouth University, Plymouth, United Kingdom; 3. University of Plymouth, Plymouth, United Kingdom; 4. MARIN, Wageningen, Netherlands
Synergistic Flow Induced Vibration of Multiple Cylinders in Harvesting Marine Hydrokinetic Energy OMAE2019-96671
Hai Sun1 Michael Bemtsa2 Chen Zhiyun2
1. Harbin Engineering University, Harbin, China; 2. University of Michigan, Michigan, MI, USA
FIV Energy Harvesting from Sharp-edge Oscillators OMAE2019-95227
Vahid Tamimi1 Milad Armin2 Selda Shahvaghar-Asl3
1. University of Tehran, Tehran, Iran; 2. Liverpool John Moores University, Liverpool, United Kingdom; 3. Sharif University of Technology, Tehran, Iran

CFD & FSI

8-2-3 Free Surface Loading and Structure Interaction II
Tuesday June 11  Room SEC, Lomond Auditorium | 13:30 – 15:00
Session Chair: Arun Kamath, Norwegian University of Science and Technology, Norway
Session Co-Chair: Csaba Pakozdi, SINTEF Ocean, Norway
Multi-phase Simulation of Droplet Trajectories of Wave-impact Sea Spray Over a Vessel OMAE2019-95799
Shaofu Mintu, David Molyneux, Bruce Calibreune Memorial University of Newfoundland, St. John’s, NL, Canada
Wave Impact Loads Prediction with Compressible Air Effects using CFD OMAE2019-96026
Inno Gatin1 Shengnan Liu1 Nikola Vladimir1 Hrvoje Jasak2
1. University of Zagreb, Zagreb, Croatia; 2. University of Stavanger, Stavanger, Norway; 3. Wikki Ltd, Lendon, United Kingdom
Computational Methods for Moving and Deforming Objects in Extreme Waves OMAE2019-96321
Arthur Veldman1 Henk Seubers1 Matin Hosseini1 Xing Chang2 Peter Wellens2 Peter van der Plas2 Joop Helders2
1. University of Groningen, Groningen, Netherlands; 2. TU Delft, Delft, Netherlands; 3. MARIN, Wageningen, Netherlands

Tuesday 13:30 – 15:00
Implementation of Tidal Stream Turbines and Tidal Barrage Structures in DG-SWEM  
Andrea M. Schnabl1 Tulio M. Moreira2 Dylan Wood3 Ethan J. Kubatko3  
Guy T. Houlsby4 Ross A. McAdam5 Thomas A. A. Adcock6  
1. University of Oxford, Oxford, United Kingdom; 2. Federal University of Minas Gerais (UFMG), Belo Horizonte, MG, Brazil; 3. The Ohio State University, Columbus, OH, USA; 4. Department of Engineering Science, University of Oxford, Oxford, United Kingdom

**Offshore Geotechnics**

**10-6-1 Pipeline Geotechnics**  
**Tuesday June 11**  
**Room Crowne Plaza, Jura | 13:30 – 15:00**  
**Session Chair: Borana Kulloli, Bundesanstalt für Materialforschung - und Prüfung, Germany**

**Axial Resistance of Smooth Polymer Pipelines on Sand**  
OMAE2019-95938  
Henry Milewski1 Matt Dietz2 Andrea Diambraci3 Lawrence de Leelu4  
1. TechnipFMC, Westhill, United Kingdom; 2. University of Bristol, Bristol, United Kingdom

**Drained Lateral Breakout Resistance of Subsea Pipelines**  
OMAE2019-96174  
Jean-Christophe Ballard1 Zack Westgate2  
1. Fugro Geoconsulting, Brussels, Belgium; 2. Fugro USA Marine, Inc., Houston, TX, USA

**Centrifuge Modelling of Skirted Spudcan Penetration in Layered Soil**  
OMAE2019-96541  
Conleth O’ Loughlin1 Christophe Gaudin2 Matthew Quah3  
1. University of Western Australia, Perth, WA, Australia; 2. Keppel, Singapore, Singapore

**FEA Based Simplified Integrated Analysis for Mudmat Design**  
OMAE2019-96754  
Srikanth Srigiriraju1, Burak Ozturk2, Arindam Chakraborty1, Srikanth Srigiriraju1, Virtual Integrated Analytics Solutions, Houston, TX, USA

**Petroleum Technology**

**11-6-2 Integrity of Well Barriers II**  
**Tuesday June 11**  
**Room Crowne Plaza, Barra | 13:30 – 15:00**  
**Session Chair: Jan David Ytrehus, SINTEF, Norway**

**Numerical Modeling of Radial Fracturing of Cement Sheath Caused by Pressure Tests**  
OMAE2019-96319  
Sohrab Gheibi1 Sigbjørn Sangesland2 Torbjorn Vralstad3  
1. SINTEF Industry, Trondheim, Norway; 2. SINTEF, Trondheim, Norway

**Effect of Rock on Cement Sheath Integrity: Shale vs. Sandstone**  
OMAE2019-96738  
Ragnhild Skorpa1 Benjamin Werner2 Torbjorn Vralstad3  
1. SINTEF, Trondheim, Norway

**A Discussion on Different Types of Cement Bond Strength**  
OMAE2019-96773  
Nils Opedal1 Pierre Cerasi2 Torbjorn Vralstad2  
1. SINTEF Industry, Trondheim, Norway; 2. SINTEF, Trondheim, Norway

**Comparative Evaluation of Elastomer Seal Energization in Conventional and Expandable Hanger Assembly**  
OMAE2019-96776  
Harshkumar Patel1 Saeed Salehi2  
1. University of Oklahoma, Norman, OK, USA; 2. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA

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**Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics**

**12-5-2 Non-Linear Waves and wave Effects II**  
**Tuesday June 11**  
**Room SEC, Carron 2 | 13:30 – 15:00**  
**Session Chair: Robert Beck, University of Michigan, USA**

**CFD Investigations of 2D Greenwater Overtopping of a Freely Floating Offshore Vessel**  
OMAE2019-95965  
Xiantao Zhang1 Scott Draper2 Hugo Wolgamot3 Wenthua Zhao4 Lifen Chen5 Liang Cheng6  
1. Shanghai Jiao Tong University, Shanghai, China; 2. University of Western Australia, Perth, WA, Australia

**Development of 3-Dimensional Fully Nonlinear Potential Flow Wave Tank in Framework of Openfoam**  
OMAE2019-96098  
Zaibin Lin1 Ling Qian2 Wei Bai3 Zhuhua Ma4 Hao Chen5 Jian Guo Zhou6  
1. Shanghai Jiao Tong University, Shanghai, China; 2. University of Western Australia, Perth, WA, Australia

**A 2D Nonlinear Numerical Wave Tank with a Moored Floating Body**  
OMAE2019-96669  
Hui Sun1 Jennifer Helmers1  
1. DNL GL, Haik, Norway; 2. DNV GL, Haik, Norway

**Wave Interaction with a Shallowly Submerged Step in 2D**  
OMAE2019-95993  
Gay McCauley1 Hugo Wolgamot2 Scott Draper3 Jana Orszaghova4  
1. Technomar Engenharia, São Paulo, SP, Brazil; 2. MARIN, Wageningen, Netherlands; 3. University of Saint Pauls, São Paulo, SP, Brazil; 4. University of Tokyo, Bunkyo, Japan

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**Takeshi Kinoshita Honouring Symposium on Offshore Technology**

**13-2-4 Fluid-Structure Interactions (FSI)**  
**Tuesday June 11**  
**Room SEC, Boisdale 2 | 13:30 – 15:00**  
**Session Chair: Longfei Xiao, Shanghai Jiao Tong University, China**  
**Session Co-Chair: Shinichiro Hribayashi, University of Tokyo, Japan**

**Force Measurements and Stationarity Analysis on the Flow around a Single Square Column with Rounded Edges**  
OMAE2019-95353  
Denis Gambarine1 Arjen Koop2 Gustavo R. S. Assi3  
1. Technomar Engenharia, São Paulo, SP, Brazil; 2. MARIN, Wageningen, Netherlands; 3. University of Saint Pauls, São Paulo, SP, Brazil

**Hydrodynamics around a Deep-draft Semi-submersible with Biomimetic Tuberle Corner Design**  
OMAE2019-95867  
Yibo Liang1 Weichao Shi2 Longbin Tao3  
1. Shanghai Jiao Tong University, Shanghai, China; 2. University of Strathclyde, Glasgow, United Kingdom

**Investigation of the 2D Behavior of a Rotating Cylinder in Flow using the Discrete Vortex Method**  
OMAE2019-95841  
Changkyu Rheem1  
1. The University of Tokyo, Tokyo, Japan

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**REFRESHMENT BREAK**  
15:00 – 15:30  
Location: Hall 5 (SEC)
CONCURRENT SESSIONS
15:30 – 17:30

Offshore Technology

1-6-2 Loads and Responses in Current and Wind I
Tuesday June 11
Room SEC, Ahl 1 | 15:30 – 17:30
Session Chair: Arjen Koop, MARIN, Netherlands
Session Co-Chair: Antonio Maximiano, WatVeC - Offshore Renewables, Portugal

Thorough Verification and Validation of CFD Prediction of FPSO Current Load for Confident Applications OMAE2019-95017
Wei Xu1 Zhenjia (Jerry) Huang2 Hyun Joe Kim4
1. ExxonMobil, Spring, TX, USA; 2. Exxonmobil Upstream Research Company, Spring, TX, USA; 3. Samsung Heavy Industries, Daegu, Korea

Hyunchul Jang, Jong Kim
TechnipFMC, Houston, TX, USA

Thorough Verification and Validation of CFD Prediction of FPSO Wind Load for Confident Applications OMAE2019-95018
Wei Xu1 Zhenjia (Jerry) Huang2 Hyun Joe Kim4
1. ExxonMobil, Spring, TX, USA; 2. Exxonmobil Upstream Research Company, Spring, TX, USA; 3. Samsung Heavy Industries, Daegu, Korea

Numerical Investigation of Scour around Subsea Pipelines near the Seabed OMAE2019-96689
Guang Yin1 Zhen Cheng2 Shengnan Liu1 Muk Chen Ong2

Numerical Modeling Practice and Verification of the Wind Load Estimation for FPSO and Semi-submersible OMAE2019-96429
SeongMo Yeon1 Hyunchul Jang2 Jong Kim3 Joo-Sung Kim2 Bo Woo Nam4

Structures, Safety and Reliability

2-9-4 Extreme Loading and Responses IV
Tuesday June 11
Room Crowne Plaza, Castle 1 | 15:30 – 17:30
Session Chair: Yeong Ae Heo, Case Western Reserve University, USA
Session Co-Chair: Deyu Wang, Shanghai Jiao Tong University, China

A Calculation Method for the Quasi-stationary Pressure in Cabin Explosion with Venting OMAE2019-95776
Pengduo Zhao1 Haojie Wang2 Zhiquing Du3 Xiaobin Li2
1. Naval Research Academy, Beijing, China; 2. Wuhan University of Technology, Wuhan, China

Explosion Response of Cold Bond Corrosion Repairs Applied to Offshore Living Quarters OMAE2019-95810
Trey Turner, Abhimanyu Kumar Atkins, Houston, TX, USA

Localisation Analysis in an X65 Offshore Pipeline Steel OMAE2019-96786
Martin Kristoffersen, David Morin, Odd Sture Hopperstad, Tore Bervik Norwegian University of Science and Technology, Trondheim, Norway

Materials Technology

3-3-3 Advances on Assessing Performance of Steel
Tuesday June 11
Room SEC, Boisdaile 1 | 15:30 – 17:30
Session Chair: Carol Johnston, TWI Ltd, United Kingdom
Session Co-Chair: Jens Tronskar, Det Norske Veritas Pte Ltd, Singapore

Life Extension of Environmental Assisted Cracking of High Strength Subsea Material due to CP OMAE2019-96685
Agnes Marie Horn1 Erling Bøhly2 Viggo Ronaldo3 Finn Kirkemo3
1. DNV GL, Oslo, Norway; 2. DNV GL, Havik, Norway; 3. Equinor, Trondheim, Norway

Investigation of Strain-based Failure Assessment based on Reference Strain Method for Welded Pipes OMAE2019-96288
Jae Sung Lee, Myung-Hyun Kim Pusan National University, Busan, Korea

Accurate Closed-form SIF Determination and Fatigue Life Investigation on Ship Construction Model OMAE2019-95268
Benchiang Lou Jiangsu University of Science and Technology, Zhenjiang, China

Magnetoelastic Characteristics of Pipeline Steel under Tensile Stress OMAE2019-95275
Sheng Bao1 Pengfei Jin2 Ashri Mustapha2 Zhengye Zhao3
1. Zhejiang University, Hangzhou, China; 2. University of São Paulo, São Paulo, SP, Brazil; 3. Petrobras, Rio de Janeiro, RJ, Brazil

Material Property Requirements for High Strength Steels used in Mobile Offshore Units OMAE2019-95644
Rolf H. Hinderaker Petroleum Safety Authority, Stavanger, Norway
Pipelines, Risers, and Subsea Systems

4-2-2 General Design and Analysis II

Tuesday June 11 | Room: Crowne Plaza, Castle 3 | 15:30 – 17:30
Session Chair: Olav Fyrilev, DNV GL, Norway

Multi-pronged approach for the Design of HP/HT
Deepwater Steel Catenary Riser
OMAE2019-96249
Gurudutt Bangalore, Yongming Cheng, Surya Banumurthy
KelpFLowTEC, Houston, TX, USA

Seismic Design Challenges of High Pressure Riser
Systems on Gravity Based Structures
OMAE2019-96409
Mehesh Sonawane1 Rohit Vadya1 Ronak Kadakia1 Hunter Haerberle1 Phil Ward3
1. JH Offshore Inc, Houston, TX, USA; 2. Baker Hughes, a GE Company, Houston, TX, USA; 3. JH Offshore Engineering Ltd, Bridge of Don, United Kingdom

Flow Past a Forced Oscillating Cylinder:
A Three-Dimensional Numerical Study
OMAE2019-96477
Huan Ping, Yan Bao, Dai Zhou, Zhulong Han
Shanghai Jiao Tong University, Shanghai, China

A Numerical Investigation on the Effect of Heave Motion Frequency in the Deep Sea Mining System
OMAE2019-95392
Qi Wu, Jianmin Yang, Haining Lu, Wenyue Lu, Tao Peng, Jun Li
Shanghai Jiao Tong University, Shanghai, China

Ocean Space Utilization

5-3-1 Development of Deep Sea Mining and Resources

Tuesday June 11 | Room: SEC, Dechart 1 | 15:30 – 17:30
Session Chair: Yoshiyus Watanabe, Tokai University, Japan
Session Co-Chair: Masao Ono, National Maritime Research Institute, Japan

Experimental Study on Bubble Size Measurement for Development of Seafloor Massive Sulphides
OMAE2019-95186
Seira Imai1 Yasuyoshi Nakajima1 Motokito Murai2
1. Yokohama National University, Yokohama, Japan; 2. Yokohama National University, Yokohama, Japan; 2. National Maritime Research Institute, Mitaka, Japan; 3. National Maritime Research Institute, Mitaka, Japan

Study on Pipe Wear Evaluation based on Large Scale Experiment for Deep Sea Mining
OMAE2019-95270
Satoru Takano1 Hirotaka Sato2 Takashi Terao1 Satoshi Masanobu4 Seiya Kawano5

Research and Development on a Self-walking Vertical Mining System using DTH for Seafloor Mining and Sampling
OMAE2019-95394
Yoshiyus Watanabe1 Keisuke Watanabe1 Hideyuki Suzuki1 Teruo Ooshima1 Yoshiaki Tsukamoto3
1. Tokai University, Shizuoka-shi Shizuoka, Japan; 2. University of Tokyo, Tokyo, Japan; 3. Furukawa Co., Ltd., Tsukuba-Shi Ibaraki-Ken, Japan

Experimental Analysis of Reduced-scale Jumper for Deep-sea Mining
OMAE2019-95990
Marcio Yamamoto, Tomo Fujiyura, Shigeo Kanada, Masao Ono, Satoru Takano, Joji Yamamoto
National Maritime Research Institute, Mitaka, Japan

Development of Elemental Technologies for Seafloor Mineral Processing of Seafloor Massive Sulphides
OMAE2019-96040
Yasuharu Nakajima1 Joji Yamamoto2 Tomoko Takahashi2 Blair Thornton1 Yuta Yamabe1 Gergely Dobszai2 Toyohisa Fujita1
1. National Maritime Research Institute, Mitaka, Japan; 2. Institute of Industrial Science, The University of Tokyo, Meguro-ku, Japan; 3. Institute of Industrial Science, The University of Tokyo, and University of Southampton, Meguro-ku, Japan; 4. University of Tokyo, Bunkyo, Japan; 5. University of Tokyo, Meguro-ku, Japan

Ocean Engineering

6-4-6 Towed Cables, Ropes and Mooring Systems

Tuesday June 11 | Room: SEC, M2 & M3 | 15:30 – 17:30
Session Chair: Muk Chen Ong, University of Stavanger, Norway
Session Co-Chair: Zhiyu Jiang, University of Agder, Norway

Application for Improved Awareness of Cable Geometry during Seismic Survey Operation
OMAE2019-95838
Jan Vidar Grindheim1 Ken Weker2 Inge Revhaug2
1. Geomat AS, Stavanger, Norway; 2. NMBU, REALTEK, Ås, Norway

Sensitivity Analysis of Different Parameters of Taut Mooring System of a Truss Spar
OMAE2019-95490
Zhuang Kang1 Rui Chang1 Youwei Kang2 Shanchuan Liu1
1. Harbin Engineering University, Harbin, China; 2. CMC Offshore Co. Ltd., Shenzhen, China

Pipelines, Risers, and Subsea Systems

4-5-1 Flow Assurance I

Tuesday June 11 | Room: Crowne Plaza, Staffa / Shuna | 15:30 – 17:30
Session Organizer: Daniel Carneiro, Wood, Brazil
Session Co-Chair: Paulo Paz, Federal University of Rio de Janeiro, Brazil
Session Co-Chair: Huaile Yi, CNOOC Research Institute Co., Ltd, China

Flow-induced Vibration Analysis of a Water Injection System at Elevated Flow Rates of an FPSO
OMAE2019-95919
Nestor Gonzalez Diez1 Olwuseanu M. Awe2 Pieter Van Beek2 Can Turner3 Juan Ponta3
1. TNO, Delft, Netherlands; 2. Shell Nigeria Exploration & Production Company, Ltd, Lagos, Nigeria; 3. Shell, Houston, TX, USA

On Deriving High Pressure Empirical Multiphase Forcing Functions from CFD Analysis
OMAE2019-96133
Olivier Macchioni1 Stefan Bellard1 Leszek Stachyra1 Alte Jensen1
1. TechnipFMC, Stavanger, Norway; 2. TNO, Delft, Netherlands; 3. University of Oslo, Oslo, Norway

Examination and Analysis of Four-phase Four-fluid Flow Techniques in Offshore Pipelines
OMAE2019-95005
Mohamed Odan1 Faraj Ben Rajeb3 Mohammad Azizur Rahman1 Amer Abor1 Syed Imtiaz1 Yan Zhang4 M. M. Awad4
1. Memorial University of Newfoundland, St. John’s, NL, Canada; 2. Texas A&M University at Qatar, Doha, Qatar; 3. Mansoura University, Mansoura, Egypt

Computational Investigation of Oil Accumulation in a Subsea Deadleg
OMAE2019-96884
Egemen Caglar, Yi Zeng, Jeyhoon Khodadadi
Auburn University, Auburn, AL, USA

Automated Subsea Architecture Optimization using Low-dimensional Multiphase Flow Models
OMAE2019-96291
Zurua Khan1 Amine Mezine2 Beza Tafesh3 Matthew Franchecl Karolos Grigriod1
1. Texas A&M University at Qatar, Doha, Qatar; 2. University of Houston, Houston, TX, USA
Ocean Engineering

6-11-2 Floating Bodies Technology

Tuesday June 11 | Room SEC, Dochart 2 | 15:30 – 17:30

Session Chair: Joel S. Sales Junior, Laboratory of Waves and Current - LOC - Universidade Federal do Rio de Janeiro, Brazil
Session Co-Chair: Milad Shadman, COPPE/UFRJ, Brazil

Experimental and Numerical Study on Dynamic Responses of FSRU-LNGC Side-by-side Mooring System
Jan Vidar Grindheim1, Antonio Carlos Fernandes1, Joel S. Sales Junior1, Inge Revhaug1
1. Geograf AS, Stavanger, Norway; 2. UFRJ/UFRJ, Rio de Janeiro, RJ, Brazil

Study on the Multi-body Dynamic Characteristics of FPSO Soft Yoke Mooring System based on Symplectic Algorithm
Qianjin Yue1, Weili Kang1
1. Kyushu University, Fukuoka, Japan; 2. Sonic Corporation, Tokyo, Japan

Effect of Irregular Seabed on the Dynamic Response of Spar-type Floating Offshore Platform
Fan Jiang1, Meng Wu1
1. Shanghai Investigation, Design & Research Institute Co., Ltd., Shanghai, China; 2. Rolls-Royce Marine AS, Ulsteinvik, Norway

Experimental Study on the Mechanics of a Coiled Tubing Working within a Marine Riser under the Affection of Marine Loads
Yingchun Chen1, Chang Wang1, Xinhua Wang1, Wending Wang1, Xiangyu Su1, Mengbela Yu1
1. Beijing University of Technology, Beijing, China; 2. China University of Petroleum-Beijing, Beijing, China; 3. China HuanQiu Contracting & Engineering Corp, Ltd, Beijing, China

Ocean Engineering

6-12-1 Ocean Measurement and Data Interpretation

Tuesday June 11 | Room SEC, M4 | 15:30 – 17:30

Session Chair: Gus Jeans, Oceanalysis Ltd, United Kingdom

Developments in Metocean HF Radar Technology, Applications and Accuracy
Lucy Wyatt1, M.D. Moorhead1, I.A. Fairley1
1. University of Sheffield, Sheffield, United Kingdom; 2. Neptune Radar Ltd, Gloucester, United Kingdom; 3. Swansea University, Swansea, United Kingdom

Studies Toward the Development of Accurate Directional Spectrum Estimation Method using Field Observation Data
Noriaki Hashimoto1, Masao Mitsui2, Koji Kawaguchi2, Takashi Fujiki2
1. Kyushu University, Fukuoka, Japan; 2. Sonic Corporation, Tokyo, Japan
3. Port and Airport Research Institute, kanagawa, Japan

Effective Harmonic analysis with Spectrum Filtering Technique
Zhong Peng1, Hazel Grant, Richard Sproson
Fugro GB Marine Limited, Wallingford, United Kingdom

Polar and Arctic Sciences and Technology

7-1-1 Arctic Frontiers and Manoeuvring in Ice

Tuesday June 11 | Room SEC, Alsh 2 | 15:30 – 17:30

Session Chair: Walter Kuehnlein, sea2ice Ltd & Co. KG, Germany

A Voyage Planning Tool for Arctic Transit of Cargo Ships
Sören Ehlers1, Sverre Torben1, Ingge Revhaug1
1. Hamburg University of Technology, Hamburg, Germany

The Calving Events of Petermann Glacier from 2008 to 2012: Ice Island Drift Characteristics, Assessment of Fracture Events, and Geographical Data Analysis
Reza Zeinali Torbati1, Ian Turnbull2, Rocky Taylor2, Derek Mueller2
1. Memorial University of Newfoundland, St. John’s, NL, Canada; 2. Captain Robert A. Bartlett Building, C-CORE, St. John’s, NL, Canada; 3. Carlton University, Ottawa, ON, Canada
TUESDAY 15:30 – 17:30

**CFD & FSI**

**8-5-1 Wave CFD Modeling Applications**

*Room: Crowne Plaza, Barra | 15:30 – 17:30*

**Tuesday June 11**

**Session Chair:** Madhusuden Agrawal, BP USA

**Session Co-Chair:** Yuwang Xu, Shanghai Jiao Tong University, China

Numerical and Mechanistic Modelling of Two-phase Liquid-gas Flow's Pressure Drop across Sharp-edged Orifices

Zurua Khan1, Reza Tafreshi1, Matthew Franchek1, Karolis Gregoriadis2

1. Texas A&M University at Qatar, Doha, Qatar; 2. University of Houston, Houston, TX, USA

Numerical Simulation of Ship-Ship Interactions in Waves

Xueshen Xie1, Yuxiang Wan1, Qiu Jin1, Xinyun Ni1, Chao Tian1

1. China Ship Scientific Research Center, Wuhan, China; 2. Huazhong University of Science and Technology, Wuhan, China

Numerical Convergence on the Hydroelasticity of a Large ContainerShip

Ye Lu1, Pandeli Temarel1, Qiu Jin1, Yousheng Wu1, Xinyun Ni1, Chao Tian1

1. China Ship Scientific Research Center, Wuhan, China; 2. University of Southampton, Southampton, United Kingdom

Two-phase MPS Method for Dam-break Flows

OMAE2019-95518

Xiao Wen, Decheng Wan

Shanghai Jiao Tong University, Shanghai, China

Numerical Investigations on the Flow Past an Inclined Thin Square Plate at Re=300

Yakun Zhao, Xinliang Tian, Xia Wu, Xiantao Zhang, Xin Li

Shanghai Jiao Tong University, Shanghai, China

**Ocean Renewable Energy**

**9-2-3 Floating Wind Designs**

*Room: Crowne Plaza, Barra | 15:30 – 17:30*

**Tuesday June 11**

**Session Chair:** Amy Robertson, National Renewable Energy Laboratory, USA

Performance of a Passive Tuned Liquid Column Damper for Floating Wind Turbines

OMAE2019-96360

Wei Yu, Frank Lemmer, Po Wen Cheng

University of Stuttgart, Stuttgart, Germany

A Novel Semi-submersible Floating Wind Turbine Platform

OMAE2019-95945

Baijin Mao, Jili Sun, Zecheng Tang, Bo Feng, Weijie Zhang, Dahai Zhang, Yulin Si

Zhejiang University, Hangzhou, China

Bottom Supported Tension Leg Tower with Inclined Tethers for Offshore Wind Turbines

OMAE2019-95014

Mohd Ishtiyak, Arunjoyti Sarkar

Indian Institute of Technology, Kharagpur, India

Coupled Numerical Analysis of a Concept TLB Type Floating Offshore Wind Turbine

OMAE2019-95244

Iman Ramzanpoor, Martin Nuenberg, Longbin Tao

University of Strathclyde, Glasgow, United Kingdom

Dynamic Response of a Conceptual Designed Articulated Offshore Wind Turbine

OMAE2019-95635

Yan Li, Zheng Liu, Yougang Tang, Xiyang Zhu, Ruoyu Zhang

Tianjin University, Tianjin, China

**Offshore Geotechnics**

**10-7-1 Pile Foundations II**

*Room: Crowne Plaza, Jura | 15:30 – 17:30*

**Tuesday June 11**

**Session Chair:** Manuela Kanitz, Hamburg University of Technology, Germany

Assessment of Offshore Wind Turbine with Hybrid Monopile Foundation under Lateral Load using Centrifuge Tests

OMAE2019-95637

Xuefei Wang1, David Zeng1, Jiale Li1, Yougang Tang2

1. Hebei University of Technology, Tianjin, China; 2. Case Western Reserve University, Cleveland, OH, USA; 3. Tianjin University, Tianjin, China

Model Tests and Numerical Simulation on Effect of Spudcan Penetration on P-Delta of an Adjacent Pile

OMAE2019-95752

Jianhua Wang, Yifei Fan, Dong Guo

Tianjin University, Tianjin, China

An Enhanced Interface Model for Friction Fatigue Problems of Axially Loaded Piles

OMAE2019-96078

Boran Kullioli1, Matthias Baesler1, Pablo Cuellar2, Shilton Rico3, Frank Rackwitz3

1. Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany; 2. University of Luxembourg, Luxembourg, Luxembourg; 3. Technische Universität Berlin, Faculty Planning Building Environment, Berlin, Germany

Influence of Different Pile Installation Methods on Dense Sand

OMAE2019-96109

Severin Spill, Tulio Quiroz, Aliog Foglia

Fraunhofer Institute for Wind Energy Systems IWES, Hanover, Germany

**Petroleum Technology**

**11-12-1 Cementing I**

*Room: Crowne Plaza, Barra | 15:30 – 17:30*

**Tuesday June 11**

**Session Chair:** Ian Frigaard, University of British Columbia, Canada

Exchange Flow in Well Abandonment Operations

OMAE2019-95131

Mónica Naccache1, Priscilla Vargas1, Paulo de Souza Mendes1, Bruno Fonseca1, Gabriella Cavalcante1, Cristiane Miranda2

1. Pontificia Universidade Católica do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. Petrobras, Rio de Janeiro, RJ, Brazil

A Fast 3D Model for Annular Flows of Wellbore Completion Fluids

OMAE2019-95133

Philippe M.J. Tardy

Schlumberger Technology Corp., Sugar Land, TX, USA

Efficient Fluid-Fluid Displacement of Yield Stress Fluids in Axially Rotating Pipes

OMAE2019-95382

Shan Lyu, Seyed Mohammad Taghavi

Université Laval, Québec, QC, Canada

Effect of Buoyancy and Inertia on Viscoplastic Fluid-Fluid Displacement in an Eccentric Annulus with an Irregular Section, Part 2: Displacements in Vertical Annulus

OMAE2019-95700

Hans Joakim Skadsem, Steinar Kragset

Norwegian Research Centre AS, Stavanger, Norway

Enhanced Cement Composition for Preventing Annular Gas Migration

OMAE2019-95589

Mustafa Al Ramadan1, Saeed Salehi2, Catalin Teodoriu2, George Kwiat3

1. University of Oklahoma, Norman, OK, USA; 2. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA

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**TUESDAY 15:30 – 17:30**
Rodney Eatock Taylor Honouring Symposium on Marine and Offshore Hydrodynamics

12-7-1 Large-Amplitude Non-Linear Ship Motions

Tuesday June 11 Room SEC, Carron 2 | 15:30 – 17:30
Session Chair: Allan Magee, National University of Singapore, Singapore
Session Co-Chair: Longbin Tao, University of Strathclyde, United Kingdom

Experimental Study on a Relation between Nonlinear Hydrodynamic Forces and Wave-induced Ship Motions OMAE2019-95555
Masakazu Taguchi, Masashi Kashiwagi
Osaka University, Osaka, Japan

An Improved Body-exact Method to Predict the Maneuvering of Ships in a Seaway OMAE2019-96441
Rahul Subramaniam1, Robert Beck2
1. Texas A&M University, Galveston, TX, USA; 2. University of Michigan, Ann Arbor, MI, USA

Solving 2-D Slamming Problems by the Higher-order MPS Method with an Improved Pressure Gradient Model OMAE2019-96775
Ruosi Zha, Heather Peng, Wei Qiu
Memorial University of Newfoundland, St. John's, NL, Canada

CFD Modelling to Investigate Design of a Whaleback-type Forecastle for Greenwater Protection OMAE2019-95198
Lifen Chen1, Xiantao Zhang1, Paul Taylor2, Scott Draper1, Hugh Wolgamot1
1. University of Western Australia, Perth, WA, Australia; 2. University of Oxford, Oxford, United Kingdom

Takeshi Kinoshita Honoring Symposium on Offshore Technology

13-2-5 Loads Induced in Floating Systems

Tuesday June 11 Room SEC, Boisdale 2 | 15:30 – 17:30
Session Chair: Shinichiro Hirabayashi, University of Tokyo, Japan

Evaluation of Contact Forces in the Vertical Connection of a Flexible Riser in the Subsea Equipment OMAE2019-95204
Yuri Coelho Del Sarto1, Ricardo Francisco2, Celso Morooka1
1. Universidade Estadual de Campinas, Campinas, SP, Brazil; 2. University of Petropolis, Petropolis, RJ, Brazil

Effects of Euler Angles of Vertical Cambered Otter Board on Hydrodynamics based on Response Surface Methodology and MOGA OMAE2019-95308
Gang Wang1, Rong Wan1, Liuyi Huang1, Fenfang Zhao1, Xinmin Wang1, Wenhui Zhu1, Lei Wang2, Qingsong Xie1, Yuyan Li1
1. Ocean University of China, Qingdao, China; 2. Marine Fisheries Research Institute of Zhejiang, Zhejiang, China; 3. East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences, Shanghai, China

Fundamental Study on Structural Strength of Large-scale Floating Coal Transshipment Station OMAE2019-96482
Hiroaki Eto1, Koji Iizuka1, Ryo Nishiguchi1, Tomoki Ikoma1, Yasuhiro Aida1, Koichi Masuda1
1. Nihon University, Funabashi, Japan; 2. Nihon University, Chiba, Japan

On GIS Based Facility Scale and Selection of Suitable Site of Floating Medical Support System on Big Disaster OMAE2019-96493
Hiroaki Eto1, Sachio Togawa1, Morikazu Yamamoto2, Shintaro Miyasawa1, Jinko Yamaguchi1, Tomoki Ikoma1, Yasuhiro Aida1, Koichi Masuda1, Sena Shimomoto1, Yuichi Kitabatake1
1. Nihon University, Funabashi, Japan; 2. Nihon University, Tokyo, Japan; 3. S Music and Express, Setagaya, Japan; 4. Nihon University, Itabashi, Japan; 5. Nihon University, Chiba, Japan; 6. Penta-Ocean Construction Co., Ltd., Bunkyo, Japan

Afternoon Lecture Series

17:40 – 18:30 Location: Lomond Auditorium

Inspired by Myriad Laughing Waves: Euler, Navier, Stokes and Others
Professor Rodney Eatock Taylor, Emeritus Professor, University of Oxford

See Afternoon Lecture Series, page 22 for more details.
### Structures, Safety and Reliability

#### 2-1-1 Abnormal or Rogue Waves I

**Wednesday June 12**  
**Room Crowne Plaza, Castle 1 | 08:30 – 10:00**

**Session Chair:** Elzbieta M. Bitner-Gregersen, DNV GL, Norway  
**Session Co-Chair:** Alexander V. Babanin, University of Melbourne, Australia

**Identifying Higher-order Interactions in Wave Time-series**  
OMAE2019-95578  
Kevin Evans, Marios Christou, Suzana Ilie, Philip Jonathan  

**Extending Integrability of Nonlinear Water Wave Equations: Nonlinear Fourier Analysis of Breather Packets and Rogue Waves at Higher Order**  
OMAE2019-95543  
Alfred R. Osborne  
Nonlinear Wave Research Corporation, Alexandria, VA, USA

**Quantification of Predicted Wave Forces from Distant Elevation Measurements**  
OMAE2019-96289  
Spencer Hallowell, Sanjay R. Arwade, Hannah Jolhas, Andrew T. Myers  
1. Independent Author, West Bath, ME, USA; 2. University of Massachusetts Amherst, Amherst, MA, USA; 3. O.H. Hinsdale Wave Research Laboratory, Carvallis, OR, USA; 4. Northeastern University, Boston, MA, USA

**Nonlinear Airy Wave Pulses on the Sea Surface**  
OMAE2019-96298  
Igor Shugan, Sergei Kuznetsov, Yana Saprykina, Y. Y. Chen  
1. National Sun Yat-Sen University, Kaoshiung, Taiwan; 2. Shirshov Institute of Oceanology of the Russian Academy of Sciences, Moscow, Russia; 3. Shirshov Institute of Oceanology, Moscow, Russia

#### 2-11-1 Ultimate Strength I

**Wednesday June 12**  
**Room Crowne Plaza, Castle 2 | 08:30 – 10:00**

**Session Chair:** Masahiko Fujikubo, Osaka University, Japan  
**Session Co-Chair:** Deyu Wang, Shanghai Jiao Tong University, China

**Numerical and Experimental Research on Residual Ultimate Strength of Hull Plates under Uniaxial Cyclic Loads**  
OMAE2019-95226  
Tian Xia, Ping Yang, Cui Cong, Ziya Peng, Li Ma  
1. Wuhan University of Technology, Wuhan, China; 2. Xinlian College of Henan Normal University, Zhengzhou, China

**An Empirical Formula for Predicting Elastic Ultimate Buckling Strength of Flat-bar Stiffened Panels with Initial Imperfections**  
OMAE2019-95683  
Hongyang Mei, Deyu Wang  
Shanghai Jiao Tong University, Shanghai, China

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**CONCURRENT SESSIONS**

**08:30 – 10:00**

### Offshore Technology

#### 1-5-1 FLNG

**Wednesday June 12**  
**Room SEC, Alsh 1 | 08:30 – 10:00**

**Session Chair:** Wenhua Zhao, University of Western Australia, Australia  
**Session Co-Chair:** Marc Cahay, TechnipFMC, France

**Support of Operational Decisions for Prelude’s Side-by-side LNG Offloading**  
OMAE2019-96090  
Erwan Auburtin, Thiago Miliante, Ewoud van Haaften, Lionel Wamba, Ziming Yuan  
1. TechnipFMC, La Defense Cedex, France; 2. Shell Global Solutions International B.V., Rijswijk, Netherlands

**A Simple Conceptual Methodology for the Operability Analysis of a Floating Liquefied Natural Gas (FLNG) Unit in Small Production Fields**  
OMAE2019-96135  
Lionel Wamba, Ziming Yuan  
1. University of Strathclyde, Glasgow, United Kingdom; 2. University of Strathclyde, NAOME, Glasgow, United Kingdom

**ARCOS: Advancing Ship-to-Ship LNG Transfer Solutions**  
OMAE2019-96840  
Raphael Poichot, Stephane Paquet  
TechnipFMC, Sena, France
**Materials Technology**

3-6-1 Advances in Materials Characterization

*Wednesday June 12*  
Room: SEC, Boisdale 1 | 08:30 – 10:00

Session Chair: Agnes Marie Horn, DNV GL, Norway  
Session Co-Chair: Xi Wang, Carleton University, Canada

**Safe Operations of Bolted Connections in the Oil and Gas Industries**  
OMAE2019-95260

Morten Lange, Rolf H. Hinderaaker, Terje L. Andersen  
Petroleum Safety Authority, Stavanger, Norway

**An Improved Methodology to Assess Weldability of Line Pipe Steel**  
OMAE2019-95593

Laura Alleva1 Mauro Monti2 Emanuele Paravicini Bagliani2  
1. Rina Consulting Centro Sviluppo Materiali, Roma, Italy; 2. Dalmine S.p.A., Dalmine, Italy

**Standardisation on Measurement and Interpretation of Residual Stress Data**  
OMAE2019-96165

Ali Mirzaee Sisan1 P John Bouchard2  
1. University of Leicester, Leicester, United Kingdom; 2. TWI Ltd, Cambridge, United Kingdom

**Small-scale HISC Testing of a Superduplex Stainless Steel Welded Joint: The Impact and Interaction of Testing and Residual Stresses**  
OMAE2019-95053

Lisa Blanchard1 Kasra Sotoudeh2 Tyler London3 Saurabh Kabra4  
1. University of Leicester, Leicester, United Kingdom; 2. TWI Ltd, Cambridge, United Kingdom; 3. TWI Ltd, Middlesbrough, United Kingdom; 4. Science and Technology Facilities Council, Didcot, United Kingdom

**Improving the Measurement of Welding Consumables in Construction of Chemical Cargo Tanker Made of Duplex Stainless Steel**  
OMAE2019-95818

Takayuki Yotsuzuka1 Yotsumasa2 Yusuke Endo1 Eiji Niiro1 Koji Gotob1  
1. Shin Kurushima Dockyard Co., Ltd., Imabari, Japan; 2. Kyushu University, Fukuoka, Japan

**Application of the MCC Model on 2-D Finite Element Analyses for the Assessment of Pipe-Soil Lateral Response**  
OMAE2019-95577

Tianna Thomas1 Daniel Carneiro2 Gilberto Bruno Ellwanger3 Leonardo Nascimento4  

**Mechanical Analysis of Fiber Glass Reinforced Bonded Flexible Pipe under External Pressure**  
OMAE2019-95692

Xiaojie Zhang1 Yong Bai2 Chang Liu2 Zhao Wang2 Jiannan Zhao2  
1. Southern University of Science and Technology, Shenzhen, China

**Pipelines, Risers, and Subsea Systems**

4-3-4 Thermo-Mechanical I

*Wednesday June 12*  
Room: Crowne Plaza, Castle 3 | 08:30 – 10:00

Session Chair: Rafael F. Solano, Petrobras, Brazil  
Session Co-Chair: Celso Morooka, University of Campinas, Brazil

**Analytical Study for Lateral Buckling of Imperfect Pipelines with Distributed Buoyancy Section**  
OMAE2019-95031

Zhenkai Wang1 G.H.M. van der Heijden2 Yougang Tang3  
1. Tianjin University, Tianjin, China; 2. University College London, London, United Kingdom

**Large Diameter Deepwater Gas Pipelines Subjected to Global Buckling Behavior**  
OMAE2019-95434

Bruno R. Antunes1 Rafael F. Solano2 Carlos O. Cardoso3  
1. Petrobras, Rio de Janeiro, RJ, Brazil

**Controllable Lateral Buckling of a Pipeline on the Seabed by Residual Curvature Imperfections**  
OMAE2019-96694

Weihan Zhang1 Stelios Kyriakides2  
1. University Texas at Austin, Austin, TX, USA

**Application of the MCC Model on 2-D Finite Element Analyses for the Assessment of Pipe-Soil Lateral Response**  
OMAE2019-95577

Tianna Thomas1 Daniel Carneiro2 Gilberto Bruno Ellwanger3 Leonardo Nascimento4  

**Ocean Space Utilization**

5-5-1 Floating Systems for Renewable Energy

*Wednesday June 12*  
Room: SEC, Dochart 1 | 08:30 – 10:00

Session Chair: Motohiko Mura, Yokohama National University, Japan  
Session Co-Chair: Qiao Li, Institute of Industrial Science, the University of Tokyo, Japan

**Validation of the Motion Analysis Method of Floating Offshore Wind Turbines using Observation Data Acquired by Full Scale Demonstration Project**  
OMAE2019-95828

Haruki Yoshimoto1 Ken Kamizawa2  
1. Japan Marine United Corporation, Yokohama, Japan

**Development of Wireless Control System with Underwater Fish Eye Video Camera to Monitor Fish at the Test Site of Marine Renewable Energy**  
OMAE2019-95978

Takumi Yoshida1 Yoichi Mizukami2 Irimon Zhou3 Daiusuke Kitazawa4  
1. Institute of Industrial Science, The University of Tokyo, Kashiwa, Japan; 2. Institute of Industrial Science, The University of Tokyo, Chiba, Japan; 3. The University of Tokyo, Kashiwa, Japan

**Mechanical Analysis of Fiber Glass Reinforced Bonded Flexible Pipe under External Pressure**  
OMAE2019-95692

Xiaojie Zhang1 Yong Bai2 Chang Liu2 Zhao Wang2 Jiannan Zhao2  
1. Southern University of Science and Technology, Shenzhen, China
Investigation on the Relationship between Rotor Speed and Flow Rate of Rotary Energy Recovery Device  OMAE2019-96715
Lei Jiao, Dekai Huang, Zhaohui Qian, Tianzhuan Ye, Ming Sheng, Han Ge
Zhengjiang University, Zhoushan, China

On the Hydrodynamic Interaction between Ship and Free-surface Motions on Vessels with Moonpools  OMAE2019-99392
Senthuran Ravintharakumar1 Tryge Kristiansen2 Babak Ommani2
1. Norwegian University of Science and Technology, Trondheim, Norway; 2. SINTEF Ocean, Trondheim, Norway

Ocean Engineering

6-3-1 Fluid-Structure Interaction/Hydroelasticity
Wednesday June 12  Room SEC, M4  |  08:30 – 10:00
Session Organizer: Pierre Ferrant, Ecole Centrale De Nantes/CNRS, France

A Fluid-structure Interaction Study on a Passively Deformed Fish Fin  OMAE2019-95579
Yang Luo1 Qing Xiao1 Guangyu Shi1 Li Wei1 Zhiming Yuan1
1. University of Strathclyde, Glasgow, United Kingdom; 2. Beihang University, Beijing, China; 3. University of Strathclyde, NAOME, Glasgow, United Kingdom

Impact of a Plate on an Asymmetric Water Wedge  OMAE2019-95556
Xueling Wen, Beiying Li, Qilin Qu, Qingchuan Liu
Beihang University, Beijing, China

The Development of 3D Hydroelastic Software and its Application on Platform  OMAE2019-96122
Xinyun Ni, Zhengwei Zhang, Chao Tian, Ye Lu, Jun Ding
China Ship Scientific Research Center, Wuji, China

Air-gap Analyses of a Semi-submersible considering Full Second Order Effects  OMAE2019-95100
Zhiyuan Pan, Torgeir Kirkhorn Vada, Arne Nestegaard
DNV GL, Hort, Norway

A Numerical Evaluation of the Quadratic Transfer Function for a Floating Structure  OMAE2019-95620
Zhilian Xie, Yujie Liu, Jeffrey Falzarano
Texas A&M University, College Station, TX, USA

Ocean Engineering

6-5-1 Advanced Marine Hydrodynamics I
Wednesday June 12  Room SEC, M2 & M3  |  08:30 – 10:00
Session Chair: Gregor Macfarlane, Australian Maritime College, University of Tasmania, Australia
Session Co-Chair: Sanne van Essen, MARIN, Netherlands

Validation of Hydrodynamic Loads on a Large-diameter Monopile in Regular Waves  OMAE2019-95299
Fatemeh H. Dadmarzi1 Maxim Thys2 Erin E. Bachynski2
1. University of Strathclyde, Glasgow, United Kingdom; 2. Delft University of Technology, wind, Aarhus University, Aarhus, Denmark; 3. University of Strathclyde, Glasgow, United Kingdom

Improvement of Wave Loads Estimation using Spatial Pressure Distribution on Ship Hull  OMAE2019-95273
Kumiawnan T. Waskito, Masashi Kishiwagi
Osaka University, Osaka, Japan

Large Amplitude Time Domain Seakeeping Simulations of KVLCC2 in Head Seas taking into account Forward Speed Effect  OMAE2019-95316
Christos Pollalis1 Evangelos Boulougouris1 Osman Turan1 Olgun Hizir1
1. University of Strathclyde, Glasgow, United Kingdom; 2. University of Strathclyde, NAOME, Glasgow, United Kingdom

Ocean Engineering

6-8-1 Wave Loads
Wednesday June 12  Room SEC, Dochart 2  |  08:30 – 10:00
Session Chair: Longbin Tao, University of Strathclyde, United Kingdom

Preliminary Experimental Study on the Influence of the Local Wind Field on Forces from Breaking Waves on a Circular Cylinder  OMAE2019-95179
Julie Caroe Kristoffersen1 Henrik Bredmose2 Christos Thomas Georgakis3 Longbin Tao1
1. Aarhus University, Aarhus, Denmark; 2. Delft University of Technology wind, Copenhagen, Denmark; 3. University of Strathclyde, Glasgow, United Kingdom

A Method for Designing the Backbone for the Segmented Model of an Ultra-large Container Carrier  OMAE2019-96136
Hui Li1 Jian Zou1 WeiJia Sheng1 Xuecong Hu1 Wenjia Hu1
1. Harbin Engineering University, Harbin, China; 2. Haerbin Engineering University, Harbin, China

Numerical and Experimental Study on the Dynamics of a High Compressed Air Generated Bubble  OMAE2019-95232
Shiping Wang, Xiuxiang Lu, Aman Zhang
Harbin Engineering University, Harbin, China

Polar and Arctic Sciences and Technology

7-3-1 Structures in Ice
Wednesday June 12  Room SEC, Alsh 2  |  08:30 – 10:00
Session Chair: Michael Huisman, Hamburg University of Technology, Germany
Session Co-Chair: Walter Kuehnlein, Seatice Ltd. & Co. KG, Germany

Wear Amount of Steel Structure in Ice-infested Sea by Sliding Wear Test  OMAE2019-95645
Takahiro Takeuchi1 Shinji Kioka2
1. Hachinohe Institute of Technology, Hachinohe, Japan; 2. Civil Engineering Research Institute for Gold Region Public Works Research, Sapporo, Japan

Validation of Pack Ice Resistance in Oblique Condition by the Comparison with Ice Model Test Results  OMAE2019-95689
HyunSoo Kim1 Erinc Ozden2 Jae-bin Lee2
1. Inha Technical College, Incheon, Korea; 2. South Korea / Inha university, Incheon, Korea
Hydrodynamic Modelling and Estimating Response of Glacial Ice Near a Drilling Rig  OMAE2019-95798
Babak Ommani1 Petter Andreas Berthelsen1 Halvor Lie1 Vegard Aksnes1 Geir Laland2
1. SINTEF Ocean, Trondheim, Norway; 2. Petroleum Safety Authority Norway, Stavanger, Norway

Eliminating the Uncertainties in Hydraulic and Ice Loads on Berm Breakwaters  OMAE2019-95319
Maria Pontika1 Bernt Leira1 Knut Vilhelm Heyland2
1. University of Delaware, Department of Civil and Environmental Engineering, Newark, DE, USA; 2. Norwegian University of Science and Technology, Trondheim, Norway

Semi-submersible Floating Offshore Wind Turbines  OMAE2019-96240
Shengtao Zhou1 Chao Li1 Yiqing Xiao1 Frank Lemmer1 Wei Yu2 Poe Wen Cheng2
1. Harbin Institute of Technology, Shenzhen, China; 2. University of Stuttgart, Stuttgart, Germany

CFD & FSI
8-3-1 Data-Driven Modeling and Machine Learning
Wednesday June 12 Room SEC, Lomond Auditorium | 08:30 – 10:00
Session Chair: Rajeev Kumar Jaiman, University of British Columbia, Canada
Session Co-Chair: Luis Eca, Technical University of Lisbon, Portugal
Numerical Study of Breaking Waves and Associated Wave Forces on a Jacket Substructure for Offshore Wind Turbines  OMAE2019-95233
Ankit Aggarwal, Tobias Martin, Seimur Shirinov, Hans Blihs, Arun Kamath
Norwegian University of Science and Technology, Trondheim, Norway
Three-Dimensional Numerical Analysis of Horizontal and Vertical Coalescence of Bubbles at Two Submerged Horizontal Orifices on the Wall  OMAE2019-95850
Zhipeng Li, Longquan Sun, Xiongliang Yao, Yi Piao
Harbin Engineering University, Harbin, China
Tharindu Pradeeptha Miyanawala1 Rajeev Kumar Jaiman1
1. National University of Singapore, Singapore, Singapore; 2. University of British Columbia, Vancouver, BC, Canada
Reduced Order Model for Unsteady Fluid Flows via Recurrent Neural Networks  OMAE2019-96543
Sandeep Bukka Reddy1 Allam Magee2 Rajeev Kumar Jaiman2

Ocean Renewable Energy
9-1-3 FWT – Numerical Analysis II
Wednesday June 12 Room SEC, Carron 1 | 08:30 – 10:00
Session Chair: Carlos Souza, Norwegian University of Science and Technology, Norway
Session Co-Chair: Wei Shi, Dalian University of Technology, China
Numerical Simulations of OC3 Spar and OC4 Semi-submersible Type Platforms under Extreme Conditions in the East Sea, Korea  OMAE2019-95919
Hyunkyoung Shin, Youngjae Yu, Thanh Dam Pham, Junbae Kim, Rupesh Kumar University of Ulsan, Ulsan, Korea
Wei Shi1 Lixian Zhang1 Dezhì Ning1 Zhiju Jiang1 Constantine Michailides1 Madjid Karimirad2
1. Dalian University of Technology, Dalian, China; 2. University of Agder, Grimstad, Norway; 3. Cyprus University of Technology, Limassol, Cyprus; 4. Queen’s University Belfast, Belfast, United Kingdom

Shengtao Zhou1 Chao Li1 Yiqing Xiao1 Frank Lemmer1 Wei Yu2 Poe Wen Cheng2
1. Harbin Institute of Technology, Shenzhen, China; 2. University of Stuttgart, Stuttgart, Germany
Dynamic Response of Spar-type Floating Offshore Wind Turbine in Freak Wave  OMAE2019-95638
Yougang Yang1 Yan Li1 Peng Xie1 Xiaojie Qi1 Bin Wang2
1. Tianjin University, Tianjin, China; 2. CCS, Tianjin, China

Petroleum Technology
11-1-5-1 Well Abandonment I – Rules and Regulations
Wednesday June 12 Room Crowne Plaza, Jura | 08:30 – 10:00
Session Chair: Mahmoud Khalifeh, UiS, Norway
Well Abandonments in British Columbia  OMAE2019-95163
Majid Bzhani1 Elizabeth Trude2 Ian Frigaard2
1. University of British Columbia, Edmonton, AB, Canada; 2. University of British Columbia, Vancouver, BC, Canada
A Critical Review of Rules and Regulations for Permanently Plugged and Abandoned Wells  OMAE2019-95338
Mahmoud Khalifeh1 Babak Akbari1 Ahsan Khan2 Daniel Braga2
1. UiS, Stavanger, Norway; 2. Louisiana State University, Baton Rouge, LA, USA
Robust Leakage Modeling for Plug & Abandonment Applications  OMAE2019-95512
Mustafa Al Ramadan1 Saved Saleh2 Catalin Teodoriu2
1. University of Oklahoma, Norman, OK, USA; 2. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA
Fate of Hydrocarbon Leaks from Plugged and Abandoned Wells Compared to Natural Seepages  OMAE2019-95674
Mari R. Tveit1 Mahmoud Khalifeh2 Tor Nordam2 Arild Saassen2

Petroleum Technology
11-2-1 Drilling Mechanics Session I
Wednesday June 12 Room Crowne Plaza, Barra | 08:30 – 10:00
Session Chair: Jorge H B Sampaolo Jr, Colorado School of Mines, USA
On the Importance of the Coupling between Transient Mechanical, Hydraulic and Thermal Effects for the Modelling of Real-time Drilling Operations  OMAE2019-95062
Erik W. Dvergsnes1 Eric Gage1
1. NORSK, Kristiansand, Norway; 2. NORSK, Stavanger, Norway
Experimental Study of Drillstring Dynamics using a High-speed Camera as a Non-invasive Motion Sensor  OMAE2019-95217
Ekaterina Wiktorski, Milad Khatibi, Suranga Geekiyanage, Dan Sui, Rune Wigglo Time University of Stavanger, Stavanger, Norway
Modal Interactions in Drillstring Borehole Interactions  OMAE2019-95871
Karthikee Amaroju1 Kiran Vijayan1 Michael Hrivnac1
1. OSEA, IIT Kharagpur, Kharagpur, India; 2. IIT Kharagpur, Kharagpur, India; 3. Swansea University, Bay Campus, Swansea, United Kingdom
Wednesday 08:30 – 12:00

12-1-2 Numerical and Experimental Methods in Hydrodynamics II

Wednesday June 12

Room SEC, Carron 2 | 08:30 – 10:00

Session Chair: Arne Løken, Dr. Ing. Arne E. Løken Engineering & Consulting, Norway
Session Co-Chair: Xiu Xiang, Shanghai Jiao Tong University, China

Hydro-elastic Analysis and Validation of an End-anchored Floating Bridge under Wave and Current Loads
Xiaoye Yang, Bin Teng, Ying Gou
Shanghai Jiao Tong University, Shanghai, China; DNV GL – Oil & Gas China, Shanghai, China; COSCO Shipping Specialized Carriers Co. Ltd, Guangzhou, China

Development of an Experimental System for the Twin-lift Decommissioning Operation
Xin Li, Zhihuan Hu, Yuanyuan Wu, Xiaozhi He
Tongji University, Shanghai, China; Shanghai Ocean University, Shanghai, China; China Merchants Offshore Technology Research Center, Haimen, China

Edge Effect on Numerical Calculation of Nonlinear Radiation Forces for a Submerged Body
Jianye Yang, Bin Teng, Ying Gou
Shanghai Jiao Tong University, Shanghai, China; Dalian University of Technology, Dalian, China

Hydrodynamic Investigation of a Novel Concept of OWC Type Wave Energy Converter Device
Kourosh Rezanejad, Carlos Guedes Soares
1. University of Technology and Free University of Brussels, Brussels, Belgium; 2. Centrica, Houston, TX, USA

Takeshi Kinoshita Honoring Symposium on Offshore Technology

Wednesday June 12

Room SEC, Boisdale 2 | 08:30 – 10:00

Session Chair: Kevin Ewans, MetOcean Research Ltd, New Zealand

Estimation of Expected Loss by Storm Surges along Tokyo Bay Coast
Rikitake Hisamatsu, Soeyoul Kim, Shigeru Tabeta
1. The University of Tokyo, Tokyo, Japan; 2. Tottori University, Tottori, Japan

Estimating Extreme Waves in Gulf of Mexico using a Simple Spatial Extremes Model
Nyuya Wada, Phillip Johnson, Takaji Waseda, Shejun Fan
1. The University of Tokyo, Tokyo, Japan; 2. Shell Research Ltd, London, United Kingdom; 3. Shell Oil Company, Houston, TX, USA

Environmental Restoration for a Small-scale Beach
“Heda-Mihama Project”
Takayoshi Kato, Tomohiro Fukuda, Tetsuya Kinoshita
1. The University of Tokyo, Tokyo, Japan; 2. Yokohama National University, Yokohama, Japan; 3. Chuo University, Tokyo, Japan

Application of the Spectral Nudging on Global Tides towards a Global Total Water Level Prediction System
Tsubasa Kodaira, Natacha Bernier, Keith Thompson
1. The University of Tokyo, Tokyo, Japan; 2. Environment and Climate Change Canada, Dorval, QC, Canada; 3. Dalhousie University, Halifax, NS, Canada

USE OF MESSAGE \( \text{OMAE2019-95883} \)
Tsubasa Kodaira, Natacha Bernier, Keith Thompson
1. The University of Tokyo, Tokyo, Japan; 2. Environment and Climate Change Canada, Dorval, QC, Canada; 3. Dalhousie University, Halifax, NS, Canada

Use of 3D Scan of Weld Joint in Finite Element Analysis during Float-over Mating Operation
Vikas Arora, Shyam Sethi, Marie Lützen, Sune Algers, Akinori Hino
1. Department of Mechanical Engineering,大连理工大学, Dalian, China; 2. University of Tokyo, Tokyo, Japan; 3. Shell Research Ltd, London, United Kingdom; 4. Shell Oil Company, Houston, TX, USA

Component-based Modeling and Simulation of Nonlinear Drill-string Dynamics
Njaal Tengdaal, Christian Holden, Elif Pedersen
1. Dept. Mechanical and Industrial Engineering, Norwegian University of Science and Technology, Trondheim, Norway; 2. Norwegian University of Science and Technology, Trondheim, Norway

Use of 3D Scan of Weld Joint in Finite Element Analysis and Stochastic Analysis of Hot-spot Stresses in Tubular Joint for Fatigue Life Estimation
Mikkel L. Larsen, Vikas Arora, Marie Lützen, Ronnie R. Pedersen, Eric Putnam
1. Ramboll Offshore Wind, Aarhus, Denmark; 2. University of Southern Denmark, Odense, Denmark; 3. Ramboll Offshore Wind, Esbjerg, Denmark; 4. FORGE Technology, Munkbø, Denmark

Asymmetrical Twin-hull Crane Vessel Global Performance Study
Joe Zhou, Kai Huang, Jinguang Wang, Indra Datta, Linxin Xu
China Merchants Offshore Technology Research Center, Haizhou, China

REFRESHMENT BREAK
10:00 – 10:30
Location: Hall 5 (SEC)

CONCURRENT SESSIONS
10:30 – 12:00

Offshore Technology
**Structures, Safety and Reliability**

### 2-1-2 Abnormal or Rogue Waves II

**Wednesday June 12**

**Session Chair:** Alexander V. Babarin, University of Melbourne, Australia

**Session Co-Chair:** Konstantinos Anyfantis, National Technical University of Athens, Zografou, Greece

**Evaluation of Hull Girder Capacity considering the Effects of Lateral Pressure and Transverse Stresses**

**Karan Doshi**, Delft University of Technology, Delft, Netherlands

**Experimental Study on Ultimate Strength of Thin-walled Square Tube under Axial Compression**

**Ole Johan Aanes**

**Effect of Spectrum Tail Length on Modulational Instability and Freak Wave Occurrence in JONSWAP Sea States**

**Olgun Gramstad**

**Predicting Extreme Waves from Wave Spectral Properties using Machine Learning**

**Anne Karin Magnusson**

**“Three Sisters” Measured as a Triple Rogue Wave Group**

**Elzbieta M. Bitner-Gregersen**

**Numerical Investigation on Surface Crack Growth in Steel Plates Repaired with Carbon Fiber-reinforced Polymer**

**Zongchen Li**

**World First Fatigue S-N Curve for Bonded Repairs and FPSO Application**

**Hamza Abd El Andaloussi**

**Development of Flexible Composite Pipe Cross-section Design Software based on Visual Basic**

**Xinyu Sun**

**Thermal and Mechanical Coupled Analysis of Marine Composite Cryogenic Pipeline**

**Haitao Hu**

**A Three-Dimensional FE Approach for the Stress Analysis of Tensile Armors inside End Fittings**

**Marcelo Miyazaki**

**An Analytical Approach for Predicting the Collapse Pressure of the Flexible Risers with Initial Ovulation and Gap**

**Xiao Li**

**Materials Technology**

### 3-3-1 Fatigue Improvement and Repairs

**Wednesday June 12**

**Session Chair:** Myung-Hyun Kim, Pusan National University, Korea

**Session Co-Chair:** Gilberto Bruno Ellwanger, Technip FMC, Brazil

**Comparison of Temporal and Spatial Statistics of Nonlinear Waves**

**Elzbieta M. Bitner-Gregersen, Odin Gramstad**

**Numerical Fatigue Life Evaluation for the Repaired Methods of High Pressure Gas Pipeline**

**Woo Sik Kim**

**Comparison of Temporal and Spatial Statistics of Nonlinear Waves**

**Hamza Aabed Abd El Andaloussi**

**Numerical Investigation on Surface Crack Growth in Steel Plates Repaired with Carbon Fiber-reinforced Polymer**

**Zongchen Li**

**World First Fatigue S-N Curve for Bonded Repairs and FPSO Application**

**Hamza Abd El Andaloussi**

**Development of Flexible Composite Pipe Cross-section Design Software based on Visual Basic**

**Xinyu Sun**

**Thermal and Mechanical Coupled Analysis of Marine Composite Cryogenic Pipeline**

**Haitao Hu**

**A Three-Dimensional FE Approach for the Stress Analysis of Tensile Armors inside End Fittings**

**Marcelo Miyazaki**

**An Analytical Approach for Predicting the Collapse Pressure of the Flexible Risers with Initial Ovulation and Gap**

**Xiao Li**

**Structures, Safety and Reliability**

### 2-1-2 Ultimate Strength II

**Wednesday June 12**

**Session Chair:** Deyu Wang Shanghai Jiao Tong University, China

**Session Co-Chair:** Xiaoli Jiang, Hans Hopman, DNV GL, Norway

**Evaluation of Hull Girder Capacity considering the Effects of Lateral Pressure and Transverse Stresses**

**Karan Doshi**

**Experimental Study on Ultimate Strength of Thin-walled Square Tube under Axial Compression**

**Ole Johan Aanes**

**Ultimate Compressive Strength of Eccentrically Loaded Stiffened Panels in Ship Structures: A Computational Study**

**Konstantinos Anyfantis**

**Ultimate Compressive Strength of Eccentrically Loaded Stiffened Panels in Ship Structures: A Computational Study**

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**Ultimate Compressive Strength of Eccentrically Loaded Stiffened Panels in Ship Structures: A Computational Study**

**Konstantinos Anyfantis**

**Ultimate Compressive Strength of Eccentrically Loaded Stiffened Panels in Ship Structures: A Computational Study**

**Konstantinos Anyfantis**
Ocean Engineering

6-3-2 Wave-Body Interactions/CFD

Wednesday June 12  
Room SEC, M4 | 10:30 – 12:00

Session Chair: Jeffrey Falzarano, Texas A&M University, USA

Interaction of Fixed Cylinder with Waves through Weakly Coupled FNPT and Lagrangian Navier-stokes

Shagun Agarwal, Siram Venkatachalam, K. Murali
Indian Institute of Technology Madras, Chennai, India

Numerical Simulation of Fully Nonlinear Interaction between Regular and Irregular Waves and a 2D Floating Body

Haoran Li, Erin E. Bachynski
Norwegian University of Science and Technology, Trondheim, Norway

Gap Resonance of Fixed Floating Multi Caissons

OMAE2019-96383

Limin Chen, Guanghua He, Harry B. Bingham, Hanyi Shao
1. Harbin Institute of Technology, Harbin, China; 2. Harbin Institute of Technology, Weihui, China; 3. Delft University of Technology, Lyngby, Denmark; 4. Technical University of Denmark, Københavns Universitet, Denmark

A Numerical Study of Wave Impacts on a Semi-submersible

OMAE2019-95070

Yanfei Deng, Wei Feng, Lei Li, Youwei Kang, Xiqia Chen
CMC Offshore Co. Ltd., Shenzhen, China

Ocean Engineering

4-3-5 Thermo-Mechanical II

Wednesday June 12  
Room Crowne Plaza, Castle 3 | 10:30 – 12:00

Session Chair: Daniel Carneiro, Wood, Brazil
Session Co-Chair: Ilmas Bayati, MARIN, Netherlands

Analysis of the Coupled Dynamics of an Offshore Floating Multi-purpose Platform, Part B: Hydro-elastic Analysis with Flexible Support Platform

OMAE2019-96232

Carlo Ruzzo, Giuseppe Failla, Felice Arena, Maurizio Collu, Liang Li, Alessandra Mariotti
1. Mediterranea University, Reggio Calabria, Italy; 2. University of Strathclyde, Glasgow, United Kingdom; 3. Fincosat S.r.l., Genova, Italy

Ocean Engineering

5-1-2 Hybrid and Complex Use of Floating Systems I

Wednesday June 12  
Room SEC, Dochart 1 | 10:30 – 12:00

Session Chair: Fonseca Nuno, SINTEF Ocean, Norway
Session Co-Chair: Tomoki Ikoma, Nihon University, Japan

New Engineering Approach for the Development and Demonstration of a Multi-purpose Platform for the Blue Growth Economy

OMAE2019-96104

Fabrizio Lagasco, Maurizio Collu, Alessandra Mariotti, Echuan Saifer, Felice Arena, Timothy H. Atack, Giulio Brizzi, Paul Tet, Anita Santoro, Sylvain Bourdier, Fernando Salcedo Fernandez, Muggiasca Sara, Ibon Larrea

Frequency Domain Analysis of a Hybrid Aquaculture-Wind Turbine Offshore Floating System

OMAE2019-96171

Abhinav K A, Maurizio Collu, Sun Ke, Zhou Bin, Zhen
1. Dept. of Naval Architecture, Ocean and Marine Engineering, University of Strathclyde, Glasgow, United Kingdom; 2. University of Strathclyde, Glasgow, United Kingdom; 3. College of Shipbuilding Engineering, Harbin, China

Analysis of the Coupled Dynamics of an Offshore Floating Multi-purpose Platform, Part A: Rigid Body Analysis

OMAE2019-96212

Liang Li, Maurizio Collu, Carlo Ruzzo, Giuseppe Failla, K A Abhinav, Felice Arena
1. University of Strathclyde, Glasgow, United Kingdom; 2. Mediterranea University, Reggio Calabria, Italy


OMAE2019-96232

Carlo Ruzzo, Giuseppe Failla, Felice Arena, Maurizio Collu, Liang Li, Alessandra Mariotti
1. Mediterranea University, Reggio Calabria, Italy; 2. University of Strathclyde, Glasgow, United Kingdom; 3. Fincosat S.r.l., Genova, Italy

Ocean Engineering

6-5-2 Advanced Marine Hydrodynamics II

Wednesday June 12  
Room SEC, M2 & M3 | 10:30 – 12:00

Session Chair: Ilmas Bayati, MARIN, Netherlands

Numerical Modelling of Wave Interaction with an FPSO under Different Incident Wave Conditions

OMAE2019-96004

Arun Kamath, Tobias Martin, Hans Bihs
1. Norwegian University of Science and Technology, Trondheim, Norway; 2. Norwegian University of Science and Technology, Trondheim, Norway

Wave Effects on the Turning Circle Ability of an Ultra Large Container Ship in Shallow Water

OMAE2019-96346

Manases Tello Ruiz, Jose Villagomez, Guillaume Delefortrie, Evert Lataire, Marc Vantorre
1. Ghent University, Ghent, Belgium; 2. Flanders Hydraulics Research, Antwerp, Belgium

System Identification of Ackbowitz Model for Ship Maneouvrning Motion based on Epsilon-support Vector Regression

OMAE2019-96699

Bin Liu, Yuting Jin, Allan Magee, Lucas J. Yiew, Shanli Zhang
1. Technology Centre for Offshore and Marine Singapore, Singapore, Singapore; 2. TCOMS, Singapore, Singapore
Ocean Engineering

6-8-2 Ship Hydrodynamics

**Wednesday June 12**  
Session Chair: Claudio A. Rodriguez C., Universidade Federal de Rio de Janeiro, Brazil

- **Uncertainty Analysis of Free Running Maneuvering Model Tests on a Modern Ferry, with Emphasis on Heel Angles**  
  OMAE2019-9513  
  Anton Kjøs1 Frans H. H. A. Quadflieg2 Victor Ferran2  
  1. MARIN, Overveen, Netherlands; 2. MARIN, Wageningen, Netherlands

- **Biofouling Characterization and its Effect on Resistance of Surface Ship**  
  OMAE2019-96220  
  Della Thomas, S. Suresh, Nilesh J. Vasa  
  Indian Institute of Technology Madras, Chennai, India

- **Estimation of Roll Damping Coefficients based on Model Tests Responses of a FPSO in Waves**  
  OMAE2019-96334  
  Claudio Alexis Rodriguez1 Paula de Tanaro T. Esperança2 Mauro C. de Oliveira4  
  1. LabOceano - Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. LabOceano/COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 3. CNPES/PETROBRAS, Rio de Janeiro, RJ, Brazil

- **Experimental and Numerical Investigation on the Hydrodynamic Performance of a CRP Propulsor**  
  OMAE2019-95311  
  Zheng Huang, Shancheng Li, Peng Yi, Ying Xiong  
  NUE, Wuhan, China

- **Outcomes of Recent Work on the Optimisation of Ride Control Operation to Reduce Motions and Loads of high-speed Catamarans**  
  OMAE2019-96562  
  Javad Mehr1 Jason Lavroff2 Damien Holloway3 Michael Davis3 Giles Thomas3  

Polar and Arctic Sciences and Technology

7-4-1 Vessels in Ice and Waves

**Wednesday June 12**  
Session Chair: Sören Ehlers, Hamburg University of Technology, Germany

- **Numerical Simulation of Ship-Ice Interaction**  
  OMAE2019-96740  
  Michael Huismann, Sandro Errec, Rüdiger Ulrich Franz Von Bock Und Polach, Thomas Rung, Sören Ehlers  
  Hamburg University of Technology, Hamburg, Germany

- **Numerical Simulation of Ice-Wave Interaction by Coupling DEM-CFD**  
  OMAE2019-95105  
  Lu Tengchao, Zaojian Zou  
  Shanghai Jiao Tong University, Shanghai, China

- **Numerical Study on Nonlinear Wave-Ice-Interaction**  
  OMAE2019-95116  
  Moritz Hartmann1 Rüdiger Ulrich Franz Von Bock Und Polach2 Sören Ehlers3 Norbert Hoffmann3 Miguel Onorato4 Marco Klein1  
  1. Hamburg University of Technology, Hamburg, Germany; 2. Universita di Torino, Torino, Italy

- **State of the Art and Knowledge Gaps on Modelling Structures in Cold Regions**  
  OMAE2019-95085  
  Rüdiger Ulrich Franz Von Bock Und Polach, Marco Klein, Jan Kubicek, Leon Kellner, Moritz Braun, Hauke Herming  
  Hamburg University of Technology, Hamburg, Germany

CFD & FSI

8-3-2 Code Development and V&V

**Wednesday June 12**  
Session Chair: Luis Eca, Technical University of Lisbon, Portugal

- **Plastic Accumulation in Front of a Plate in Cross Flow – Model Scale Test and CFD-DEM Modeling**  
  OMAE2019-96095  
  Hendrik Wrenger1 Bruno Sainte-Rose2 Christoph Goniva2 Renan Hilberta4  
  1. The Ocean Cleanup, Rotterdam, Netherlands; 2. DCS Computing, Linz, WA, Austria; 3. Y-plus, Paris, France

- **Comparisons between the Particle-based Methods Smoothed Particle Hydrodynamics (SPH) and Moving Particle Semi-implicit (MPS) to Model Dam Breaking Event**  
  OMAE2019-95102  
  Sergey Buruchenko1 Rubens Augusto Amaro Jr2 Liang-Yee Cheng2  
  1. South Ural State University, Chelyabinsk, Russia; 2. University of São Paulo, São Paulo, SP, Brazil

- **Numerical Study on Vortex Induced Motion of Circular Cylinder with Low Aspect Ratio in Currents**  
  OMAE2019-95525  
  Jiawei He, D.C. Wan  
  Shanghai Jiao Tong University, Shanghai, China

- **Understanding the Capability of RANS Based Turbulence Models on Fully Turbulent Channel Flow**  
  OMAE2019-96290  
  Yasin Kaan Ilter, Uğur Oral Unal  
  Istanbul Technical University, Istanbul, Turkey

Ocean Renewable Energy

9-2-2 Aerodynamics II

**Wednesday June 12**  
Session Chair: Kurt Delerce, Pacifico Energy K.K., Japan

- **The Aerodynamic Performance of Offshore Twin Vertical Axis Wind Turbines with Deflector**  
  OMAE2019-95104  
  Yichen Jiang, Peidong Zhao, Li Zou, Guiyong Zhang, Zhi Zong  
  Dalian University of Technology, Dalian, China

- **The Aerodynamic Analysis of Helical-type VAWT with Semi Empirical and CFD Method**  
  OMAE2019-95207  
  Ying Guo, Liquin Liu, Xinlin Lu, Yougang Tang  
  Tianjin University, Tianjin, China

- **Analyzing the Effect of Shaft and End-plates of a Newly Developed Elliptical-bladed Savonius Rotor from Wind Tunnel Tests**  
  OMAE2019-95570  
  Nur Alom1 Nitish Kumar2 Ujjwal K. Saha3  
  1. Indian Institute of Technology Guwahati, Guwahati, India; 2. Larsen and Toubro, Mumbai, India

- **Aeromechanical Analysis of Wind Turbines using Non-linear Harmonic Method**  
  OMAE2019-96256  
  Shine Win Naung, Mohammad Rahmati, Hamed Farokhi  
  Northumbria University, Newcastle upon Tyne, United Kingdom
Ocean Renewable Energy

9-3-2  Wave Energy: Oscillating Water Column I
Wednesday June 12  Room SEC, Carron 2  |  10:30 – 12:00
Session Chair: Kourosh Rezanejad, Centre for Marine Technology and Ocean Engineering (CENTEC), Instituto Superior Técnico (IST), Portugal
Geometrical Optimization of U-Oscillating Water Columns in Random Waves  OMAE2019-95973
Andrea Sialb, Giovanni Malara, Felice Arena
Mediterranea University, Reggio Calabria, Italy
Oscillating Water Column Motion inside Circular Cylindrical Structures  OMAE2019-96048
Daniel de Oliveira Costa1 Joel S. Sales Junior2 Antonio Carlos Fernandes2
1. Laboratory of Waves and Current - LOC - Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. UFRJ/COPPE, Rio de Janeiro, RJ, Brazil

The Impact of Modelling Air Compressibility in the Selection of Optimal OWC Design Parameters in Site Specific Wave Conditions  OMAE2019-96123
Irene Simonetti, Lorenzo Cappietti
University of Florence, Florence, Italy
Improving the Hydrodynamic Performance of OWC Wave Energy Converter by Attaching a Step  OMAE2019-96048
Kourosh Rezanejad1 Jorge Filipe Marques Gadelho2 Ivan López2
1. Centre for Marine Technology and Ocean Engineering (CENTEC), Instituto Superior Técnico (IST), Lisbon, Portugal; 2. Hydraulic Engineering Area, Universidade de Santiago de Compostela, Lugo, Spain

Petroleum Technology

11-15-2 Well Abandonment II – Research and Operational Experiences
Wednesday June 12  Room Crowne Plaza, Jura  |  10:30 – 12:00
Session Chair: Mahmoud Khalifeh, US, Norway
Cement Plug Sealing Studies of Silica Cement System  OMAE2019-95928
Anisa Noor Corina1 Nils Opdal2 Torbjørn Vråstad2 Sigbjørn Sangesland2
1. Norwegian University of Science and Technology, Trondheim, Norway; 2. SINTEF Industry, Trondheim, Norway; 3. SINTEF, Trondheim, Norway
Time-to-failure Estimation of Barrier Systems in Permanently Plugged and Abandoned Wells  OMAE2019-96546
Øystein Arild1 Hans Petter Lohne1 Hans Joakim Skadsem1
1. Equinor ASA, Stavanger, Norway; 2. University of Stavanger, Stavanger, Norway

Experimental Study of Pipe Pulling through Settled Barite  OMAE2019-96607
Farzad N. Shoghli1 Arild Saaser2 Mahmoud Khalifeh3
1. Equinor ASA, Stavanger, Norway; 2. US, Gullegg, Norway; 3. US, Stavanger, Norway

Effect of Well Construction on Efficient P&A Process  OMAE2019-95607
Eric Patrick Ford1 Jon Tammera Selvik2
1. NORSOL, Stavanger, Norway; 2. University of Stavanger, Stavanger, Norway

Preparation of Research for Plugging and Abandonment  OMAE2019-95767
Hans Petter Lohne1 Sigbjørn Sangesland2
1. Equinor ASA, Stavanger, Norway; 2. SINTEF Industry, Trondheim, Norway

Takeshi Kinoshita Honoring Symposium on Offshore Technology

13-1-2 Fluid Body Interaction
Wednesday June 12  Room SEC, Boisdale 2  |  10:30 – 12:00
Session Organizer: Takatori Hino, Yokohama National University, Japan

Evaluation of Flow Field in the Layouts of Cross-shaped Artificial Reefs  OMAE2019-95192
YanLi Tang, Qi Hu, Xinxin Wang, Fenfang Zhao, Liuyi Huang, Tao Xie
Ocean University of China, Qingdao, China
Nonlinear Wave Surface Elevation Characteristic Analysis around a Multi-body Offshore Platforms System  OMAE2019-95203
Xiudi Ren, Yibo Liang, Longbin Tao
University of Strathclyde, Glasgow, United Kingdom

Two-Dimensional Numerical Simulation of Vortex Shedding of Multiple Stranded Rope  OMAE2019-95225
Xinmin Wang, Liuyi Huang, Yanli Tang, Fenfang Zhao, Peng Sun
Ocean University of China, Qingdao, China

Experimental Study on the Hydrodynamic Characteristics of Artificial Reefs  OMAE2019-96019
Fenfang Zhao1 Muk Chen Ong1 Yanli Tang1 Ximmeng Wang2
1. Ocean University of China, Qingdao, China; 2. University of Stavanger, Stavanger, Norway

Lunch
12:00 – 13:30
Location: Hall 5 (SEC)
CONCURRENT SESSIONS
13:30 – 15:00

Offshore Technology

1-3-1 Nonlinear Wave and Wave Effects
Wednesday June 12
Room SEC, Alsh 1 | 13:30 – 15:00
Session Chair: Longfei Xiao, Shanghai Jiao Tong University, China
Session Co-Chair: Zhennhua Huang, University of Hawaii at Manoa, USA

- Behaviour of a Suspended Wellbay Module and Flare Tower in Waves during Transit to Shore OMAE2019-95001
  Hoi-Sang Chan, Eren Armaoglu, Matthew Thomson, Alastair Garner, Saipem Ltd, Kingston-upon-Thames, United Kingdom

- Slaming Force Contributions due to Plunging Breakers on Different Geometrical Cylinders OMAE2019-95126
  Xin Wang¹ Arun Dev² Longbin Tao¹ DW Chia³ Yali Zhang¹
  1. Newcastle University, Singapore, Singapore; 2. University of Strathclyde, Glasgow, United Kingdom; 3. Lloyd’s Register Singapore Pte Ltd, Singapore, Singapore

- Hydrodynamic Analysis of Deep-water Fish Cage based on Two Different Methods in Waves OMAE2019-96486
  Yihou Wang, Yuwang Xu, Shuai Li, Haojie Ren, Shixiao Fu, Shanghai Jiao Tong University, Shanghai, China

- Experimental Research of Wave Transformation on Porous Coral Reef OMAE2019-96582
  Gancheng Zhu¹ Bing Ren¹ Yongxue Wang¹ Chao Wang²
  1. State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology, Dalian, China; 2. Dalian University of Technology, Dalian, China

Structures, Safety and Reliability

2-2-1 Probabilistic and Spectral Wave Models I
Wednesday June 12
Room Crowne Plaza, Castle 1 | 13:30 – 15:00
Session Chair: Carlos Gaires Soares, Instituto Superior Técnico, Universidade de Lisboa, Portugal
Session Co-Chair: Felice Arena, Univ Mediterranea, Italy

- Nonlinear Fourier Analysis Algorithm and Models for Water Waves in Terms of Surface Elevation, Amplitude Modulations and Frequency Modulations OMAE2019-95546
  Alfred R. Osborne, Nonlinear Wave Research Corporation, Alexandria, VA, USA

- Optimal Methods for Estimating the JONSWAP Spectrum Peak Enhancement Factor from Measured and Hindcast Wave Data OMAE2019-95451
  Kevin Evans¹ Jason McConochie²

  Andreas F Haselsteiner¹ Ryan Cor¹ Lance Manuel³
  1. University of Bremen, Bremen, Germany; 2. Sandia National Laboratories, Albuquerque, NM, USA; 3. University of Texas at Austin, Austin, TX, USA; 4. Sandia National Labs, Albuquerque, NM, USA

Structures, Safety and Reliability

2-11-3 Ultimate Strength III
Wednesday June 12
Room Crowne Plaza, Castle 2 | 13:30 – 15:00
Session Chair: Masahiko Fujikubo, Osaka University, Japan
Session Co-Chair: Deyu Wang, Shanghai Jiao Tong University, China

- Analysis of Strain Characteristic of Carbon Filament-wound Composite Cylinders under Hydrostatic Pressure OMAE2019-95106
  Ke Chun Shen, Guang Pan, Ran Feng Wei, Zhun Li, Northwestern Polytechnical University, Xi’an, China

- Study on Residual Strength of Egg-shaped Pressure Shell with Local Damage OMAE2019-95456
  Siming Yuan, He Gao, Naval Research Academy, PLA, Beijing, China

- Axial and Moment Carrying Capacity of Split Sleeve Grouted Connection for Tubular Members OMAE2019-96267
  Vignesh Chellappan N, Nallayarasu Seeninaiadu, Indian Institute of Technology Madras, Chennai, India

Materials Technology

3-11-1 Developments in BS 7910 and other Fitness-for-service Procedures: Session I
Wednesday June 12
Room SEC, Alsh 1 | 13:30 – 15:00
Session Chair: Bostjan Bezensek, Shell Global Solutions UK, United Kingdom
Session Co-Chair: Isabel Hadley, TWI Ltd, United Kingdom

- A Brief Guide to BS 7910 OMAE2019-96619
  Isabel Hadley, TWI Ltd, Cambridge, United Kingdom

- Emerging Technology in Fitness-for-service: Assessment of Crack-like Flaws OMAE2019-96415
  Ted Anderson, T.L. Anderson Consulting, Longmont, CO, USA

- Estimating Fracture Toughness from Charpy Data OMAE2019-95787
  Henryk Pisarski¹ Bostjan Bezensek²
  1. Independent Consultant, Cambridge, United Kingdom; 2. Shell, Laurencekirk, United Kingdom

- Residual Stress in Girth Welds: Seeing Measurement Data Differently OMAE2019-96422
  Ali Mirzaee Sisan¹ Guiyi Wu²
  1. AMS Energy Solutions, Barnet, United Kingdom; 2. TWI Ltd, Cambridge, United Kingdom

Pipelines, Risers, and Subsea Systems

4-2-3 Drilling Risers I
Wednesday June 12
Room Crowne Plaza, Castle 3 | 13:30 – 15:00
Session Chair: Chenteh Alan Yu, ABS, USA

- Emergency Disconnect and Storm Hang-off – Reducing Risk for Drilling Risers in Harsh Environments OMAE2019-95213
  Conor Gallagher, Tara Williams, Wood PLC, Galway, Ireland
Mitigated Riser Response during Submerged BOP Move through use of Drillingstring Active Heave Compensation System OMAE2019-95809
Lucas Sevillano1 Celso Morooka2 Sijbgyn Sangsland2
1. University of Campinas, Campinas, SP Brazil; 2. Norwegian University of Science and Technology, Trondheim, Norway

Advances in Riser Management Technology: Efficiently Deepwater and Fracture Environment Drilling OMAE2019-96261
Donogh Lang1 Paul Bohn3 Victor Gomez2 Germain Venero2 Hugues Corrigan2
1. Wood PLC, Galway, Ireland; 2. Wood, Rio de Janeiro, RJ, Brazil

Field Trial of Vortex-induced Vibration Suppression Technology for Drilling Riser Buoyancy OMAE2019-96426
Phillip P. Kuts1 Hayden Marcolli2 Andrew A. Kilner1
Daniel Johnston3 Andrew E. Potts1 Peter Pezet1 Tricia Hill4
1. AMOG Consulting, Houston, TX, USA; 2. AMOG Consulting, Netting Hill, VIC, Australia; 3. Matrix Composites and Engineering, Henderson, WA, Australia; 4. Matrix Composites and Engineering, Houston, TX, USA

Ocean Engineering

6-15-1 Underwater Vehicles Control
Wednesday June 12 Room SEC, Dochart 2 | 13:30 – 15:00
Session Organizer: Eduardo Tannuri, Numerical Offshore Tank - University of São Paulo, Brazil
Session Co-Chair: Zhe Jiang, Shanghai Ocean University, China
Session Co-Chair: Alexandre Immas, University of California, Berkeley, USA
Development of an Image Processing Module for Autonomous Underwater Vehicles through Integration of Object Recognition with Stereoscopic Image Reconstruction OMAE2019-95321
Yu-Hsien Lin, Shao-Yu Chen
National Cheng-Kung University, Tainan, Taiwan
Avilash Sahoo1 Santosa K. Dwivedi2 P. S. Rohil1
1. National Institute of Technology Meghalaya, Shillong, India; 2. Indian Institute of Technology Guwahati, Guwahati, India

6-3-3 Damping and Viscous Effects
Wednesday June 12 Room SEC, M4 | 13:30 – 15:00
Session Organizer: Torgeir Kikkjem Vada, DNV GL, Norway
Vortex Shedding and Roll Damping from Hulls with Rounded Bilges OMAE2019-95629
Ian A Milne1 Feifei Tong1 J. Michael R. Graham2
1. University of Western Australia, Perth, WA, Australia; 2. Imperial College London, London, United Kingdom

Ocean Space Utilization

5-1-3 Hybrid and Complex Use of Floating Systems II
Wednesday June 12 Room SEC, Dochart 1 | 13:30 – 15:00
Session Chair: Maurizio Collu, University of Strathclyde, United Kingdom
Session Co-Chair: Tomoki Ikoma, Nihoan University, Japan
Experimental and Numerical Study on the Hydrodynamic Properties of a Simplified Floating Hydrocarbon Storage Facility OMAE2019-96753
Chi Zhang1 Fonseca Nuno1 Allan Magee1 Nianxin Ren1
1. National University of Singapore, Singapore, Singapore; 2. SINTEF Ocean, Trondheim, Norway

Hydrodynamic Model Tests with a Large Floating Hydrocarbon Storage Facility OMAE2019-96761
Fonseca Nuno1 Chi Zhang2 José Miguel Rodrigues1
1. SINTEF Ocean, Trondheim, Norway; 2. National University of Singapore, Singapore, Singapore

Effect of Special Outermost Module Designs on the Hydrodynamic Responses of a Modular Multi-purpose Floating Structure System OMAE2019-96789
Nianxin Ren1 Chi Zhang2 Allan Magee2 Xiao Liu3 Oyvind Hellan1 Kok Keng Ang3
1. National University of Singapore, Singapore, Singapore; 2. SINTEF Ocean, Trondheim, Norway

Design and Inclusion of a Desalination System in a Floating Offshore Wind Farm OMAE2019-95924
Davide Mirelli1 Michael Walker2 Loris Canizares2 Aaron Smith3 Dominique Roddier2

Ocean Engineering

6-15-1 Underwater Vehicles Control
Wednesday June 12 Room SEC, Dochart 2 | 13:30 – 15:00
Session Organizer: Eduardo Tannuri, Numerical Offshore Tank - University of São Paulo, Brazil
Session Co-Chair: Zhe Jiang, Shanghai Ocean University, China
Session Co-Chair: Alexandre Immas, University of California, Berkeley, USA
Development of an Image Processing Module for Autonomous Underwater Vehicles through Integration of Object Recognition with Stereoscopic Image Reconstruction OMAE2019-95321
Yu-Hsien Lin, Shao-Yu Chen
National Cheng-Kung University, Tainan, Taiwan
Avilash Sahoo1 Santosa K. Dwivedi2 P. S. Rohil1
1. National Institute of Technology Meghalaya, Shillong, India; 2. Indian Institute of Technology Guwahati, Guwahati, India

6-3-3 Damping and Viscous Effects
Wednesday June 12 Room SEC, M4 | 13:30 – 15:00
Session Organizer: Torgeir Kirkhom Vada, DNV GL, Norway
Vortex Shedding and Roll Damping from Hulls with Rounded Bilges OMAE2019-95629
Ian A Milne1 Feifei Tong1 J. Michael R. Graham2
1. University of Western Australia, Perth, WA, Australia; 2. Imperial College London, London, United Kingdom
**Ocean Engineering**

### 6-5-3 Advanced Marine Hydrodynamics III

**Wednesday June 12**

**Session Chair:** Mohammad Rahmati, Northumbria University, United Kingdom  
**Session Co-Chair:** Joop Helder, MARIN, Netherlands

- **The Increase in Wave Wake Characteristics of Marine Vessels when Accelerating**  
  Fredrik Mentzoni, Trygve Kristiansen  
  Norwegian University of Science and Technology, Trondheim, Norway

- **The Hydrodynamic Reflection Characteristic Study on the Wave Dissipating and Protecting System with a Submerged Structure Before the Vertical Wall**  
  Zhenglin Tian, Zhaochen Sun, Shuxia Liang  
  The State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology, Dalian, China

### 7-11-1 Ice Model Tests and Structure-Ice-Interactions

**Wednesday June 12**

**Session Chair:** Walter Kuehnlein, sea2ice Ltd. & Co. KG, Germany  
**Session Co-Chair:** Sören Ehlers, Hamburg University of Technology, Germany

- **Ice Model Tests for Semi-submersible Platforms in Pack Ice Conditions**  
  Leping Liu, Xin Li, Xiao Wu, Bo Wu  
  Shanghai Jiao Tong University, Shanghai, China

- **Experimental and Theoretical Investigations on the Characteristics of Ice Floes Broken by Ships Sailing Ahead in Level Ice**  
  Daniela Myland  
  HSV, Hamburg, Germany

- **Anti-icing and De-icing of Pipe Structures on Marine Vessels using Waste Heat Recovery**  
  Lene Aesøy  
  1. Norwegian University of Science and Technology, Trondheim, Norway; 2. Norwegian University of Science and Technology, Ålesund, Norway; 3. Ulmace Pyne, Gamlem, Norway

### 8-1-3 Ship Performance I

**Wednesday June 12**

**Session Chair:** Mohammad Rahmati, Northumbria University, United Kingdom  
**Session Co-Chair:** Prasanta Sahoo, Florida Institute of Technology, USA

- **A Study of Ship’s Frictional Resistance in Extremely Shallow Water**  
  Qingsong Zeng, Robert Heckenberg, Cornel Thill  
  Delft University of Technology, Delft, Netherlands

- **Added Resistance CFD Analysis of the KVLCC2 with the Naval Hydro Pack**  
  Vuko Vukcevic  
  1. Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia; 2. University of Zagreb, Zagreb, Croatia; 3. Hyundai Heavy Industries, Hyundai Maritime Research Institute, Ulsan, Korea; 4. Wikki Ltd, London, United Kingdom

- **Numerical Simulation of Trim Optimization on Resistance Performance based on CFD Method**  
  Wenyang Duan, Prasanta Sahoo, Florida Institute of Technology, USA

### 9-4-2 Wave Farms and Alternative Markets

**Wednesday June 12**

**Session Chair:** Kelley Ruehl, Sandia National Laboratories, USA  
**Session Co-Chair:** Ryan Coe, Sandia National Laboratories, USA

- **Wave-powered AUV Recharging: A Feasibility Study**  
  Blake Driscoll, Andy Gish  
  1. US Naval Academy, Annapolis, MD, USA; 2. Sandia National Laboratories, Albuquerque, NM, USA

- **Development Demonstration of an Automated, Economic Patented Modular Industrial, Environmentally Friendly Multi-functional Platform for Open Sea Farm Installations**  
  Elchanan Safer  
  Safier Ingenierie SAS, Serris, France
Analysis of WEC Array and Influence of Plant Level
Power Management Control OMAE2019-96466
Jeremy Stekel, Dominique Bain, Yi-Hsiang Yu, Dale Jenne, Greg Stark
National Renewable Energy Laboratory, Golden, CO, USA

Ocean Renewable Energy
9-6-1 Thermal, Hybrid and Others: Analysis, Design and Prediction
Wednesday June 12 Room SEC, Carron 2 | 13:30 – 15:00
Session Chair: Fabio Licheri, University of Cagliari, Italy
Impact of the Swansea Bay Lagoon on Storm Surges in the Bristol Channel OMAE2019-95075
Qian Ma1 Tulu M. Moreira2a Thomas A.A. Adcock1
1. University of Oxford, Oxford, United Kingdom; 2. Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil
Numerical Study on Aerohydrodynamics with Inter-turbine Spacing Variation for Two Floating Offshore Wind Turbines OMAE2019-95520
Yang Huang, Decheng Wan
Shanghai Jiao Tong University, Shanghai, China
Evaluation of Entropy Generation Methods in Wells Turbines OMAE2019-95613
Fabio Licheri1 Tiziano Ghisli1 Irene Vrdis1 Pierpaolo Puddu1 Francesco Cambuli2
1. University of Cagliari, Italy; 2. University of Cagliari, DIMCM, Cagliari, Italy
Failure Estimation of Offshore Renewable Energy Devices based on Hierarchical Bayesian Approach OMAE2019-95089
Mohammad Mahdi Abaei, Yuanhang Chen, Frederick B Growcock2
1. The University of Tokyo, Kashiwa, Japan; 2. MS&AD InterRisk Research & Consulting, Inc., Tokyo, Japan; 3. Waseda University, Tokyo, Japan; 4. National Renewable Energy Laboratory, Golden, CO, USA

Petroleum Technology
11-5-1 Well Inflow Control and Reservoir Management
Wednesday June 12 Room Crowne Plaza, Jura | 13:30 – 15:00
Session Chair: Bernt Aadnoy, University of Stavanger, Norway
Probabilistic Estimation of Recovery from Naturally Fractured Bottom-water Reservoir with Uncertain Well Placement in Fracture Network OMAE2019-96836
Samir Prasad, Andrew Wojtanowicz
Louisiana State University, Baton Rouge, LA, USA
Visualization Study on Plugging Mechanism of Fibers and Particles in Rough and Tortuous Fracture OMAE2019-95480
Fan Fan, Fujian Zhou, Lishan Yuan, Xuda Yang
China University of Petroleum-Beijing, Beijing, China
Increased Recovery using Autonomous Inflow Management OMAE2019-96903
Bernt Aadnoy1 Beder Al Furati1
1. University of Stavanger, Stavanger, Norway; 2. Equinor AS, Bergen, Norway
A Pilot Study on Time-dependent Dissolution of CO2 in Oil for Prediction of Gas Kick Behaviors in Non-aqueous Fluids OMAE2019-96778
Mahendra Kunju1 James L. Nielsen1 Yuanhang Chen1 Otto Santos1 Wesley Williams1 Paulo Ribeiro1 Felipe Chagas2
1. Louisiana State University, Baton Rouge, LA, USA; 2. University Estadual de Campinas, Campinas, SP, Brazil

Takeshi Kinoshita Honoring Symposium on Offshore Technology
13-1-3 Nonlinear Waves I
Wednesday June 12 Room SEC, Boisdale 2 | 13:30 – 15:00
Session Organizer: Alessandro Iaffati, CNR-INM (Institute of Marine Engineering), Italy
On Signatures and Features of Modulational Instability in Ocean Waves OMAE2019-95633
Alexander V. Babanin
University of Melbourne, Melbourne, VIC, Australia
Data Assimilation of the Stereo Reconstructed Wave Fields to a Nonlinear Phase Resolved Wave Model OMAE2019-95349
Shogor Watanabe1 Wataru Fujimoto1 Takehiko Noda2 Hiwasa Koidaira2
1. The University of Tokyo, Kashiwa, Japan; 2. MS&AD InterRisk Research & Consulting, Inc., Tokyo, Japan; 3. Waseda University, Tokyo, Japan; 4. Karlruhe Institute of Technology, Karlsruhe, Germany
On the Rogue Wave Occurrence in Crossing Wave Fields OMAE2019-96029
Shuai Liu, Xinxu Zhang, Xinqiu Song, Ke Chen
Shanghai Jiao Tong University, Shanghai, China
Generalized Nonlinear Fourier Analysis for Water Waves OMAE2019-96613
Alfred R. Osborne
Nonlinear Wave Research Corporation, Alexandria, VA, USA

REFRESHER BREAK
15:00 – 15:30
Location: Hall 5 (SEC)
CONCURRENT SESSIONS
15:30 – 17:30

Offshore Technology

1-3-2 Fluid-Structure Interaction

Wednesday June 12  Room SEC, Aish 1 | 15:30 – 17:30
Session Chair: Tahsin Tezdogan, University of Strathclyde, United Kingdom
Session Co-Chair: Yibo Liang, University of Strathclyde, United Kingdom
Hydrodynamic Forces on Intermittently Spanning Pipelines in Steady Currents OMAE2019-95585
Yunfei Tong1, Liang Cheng1, Hongwei An1, Feifei Tong2
1. Dalian University of Technology, Dalian, China;
2. University of Western Australia, Perth, WA, Australia

The Effect of Aspect Ratio on the Drag of Bare Cylinders OMAE2019-96431
Douglas A. Potts1, Jonathan R. Binns1, Andrew E. Potts2, Hayden Marcollo2
1. University of Tasmania Australian Maritime College, Launceston, TAS, Australia;
2. AMOG Consulting, Notting Hill, VIC, Australia

Structures, Safety and Reliability

2-6-1 Reliability of Mooring and Riser Systems I

Wednesday June 12  Room Crowne Plaza, Castle 2 | 15:30 – 17:30
Session Chair: Ying Min Low, National University of Singapore, Singapore
Session Co-Chair: Luis V.S. Sargilo, LACEO/COPPE/Federal University of Rio De Janeiro, Brazil
An Efficient System Reliability Approach against Mooring Overload Failures OMAE2019-95048
Darrel Leong1, Ying Min Low1, Youngkook Kim2
1. National University of Singapore, Singapore, Singapore;
2. Lloyd’s Register, Singapore, Singapore

Numerical Modelling of the Mooring Line Failure Induced Performance Changes of a Marine Fish Cage in Irregular Waves and Currents OMAE2019-95730
Hung-Jie Tang1, Ray-Yeng Yang1, Chai-Cheng Huang2
1. National Cheng Kung University, Tainan, Taiwan;
2. National Sun Yat-sen University, Kaohsiung, Taiwan

Assessment of the Reliability of the Moorings of a Floating Structure against the Extreme Cyclone Hazard OMAE2019-96832
Mark Manzocchi1, Vikas Kejriwal1, Eric Hoo2
1. Atkins Energy, Edinburgh, United Kingdom;
2. Atkins - SNC Lavalin, Perth, WA, Australia

Extreme Value Estimation of Mooring Lines Top Tension OMAE2019-96210
Marina L. Simão1, Paulo M. Videira1, Mauro C. de Oliveira1, Luis V.S. Sargilo2
1. LACEO/Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil;
2. LACEO/COPPE/Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil;
3. CENPES/PETROBRAS, Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Application of Machine Learning Techniques as a Means of Mooring Integrity Monitoring OMAE2019-96411
Jonathan M. Gumley1, Hayden Marcollo2, Stuart Wales, Andrew E. Potts, Christopher J. Carra
1. Shell, Laurencekirk, United Kingdom;
2. AMOG Consulting, Notting Hill, VIC, Australia

Materials Technology

3-11-2 Developments in BS 7910 and other Fitness-for-service Procedures; Session II

Wednesday June 12  Room SEC, Boisdale 1 | 15:30 – 17:30
Session Chair: Isabel Hadley, TWI Ltd, United Kingdom
Session Co-Chair: Bostjan Bezensk, Shell Global Solutions UK, United Kingdom
Proposed Updates to the Buried-to-Surface Flaw Recharacterization Rules in the Annex E of BS 7910 OMAE2019-96327
Bostjan Bezensk1, Yuri Tkach (W/G)2, John Sharples3, Harry Coules1
1. Shell, Laurencekirk, United Kingdom;
2. Wood PLC, Aberdeen, United Kingdom;
3. Wood PLC, Warrington, United Kingdom, 4. University of Bristol, Bristol, United Kingdom

The Assessment of Locally Thinned Areas subject to a Hoop Stress and an Axial Stress: Background to the Guidance given in Annex G of BS 7910:2013 OMAE2019-95532
Andrew Cosham1, Robert Andrews2
1. Ninth Planet Engineering Ltd, Newcastle upon Tyne, United Kingdom;
2. ROSEN Group, Newcastle upon Tyne, United Kingdom
Optimising Fracture Assessment of Welded Structures using BS 7910, R6 and FEAAOMAE2019-95934
Isabel Hadley1 Tyler London2
1. TWI Ltd, Cambridge, United Kingdom; 2. TWI Ltd, Middlebrough, United Kingdom

Peyman Amirafshari1 Alexander Stacey2
1. University of Strathclyde, Glasgow, United Kingdom; 2. Energy Division, Health & Safety Executive, London, United Kingdom

BS7910 Procedure for Probabilistic Fracture Mechanics AssessmentAOMAE2019-96843
Alexander Stacey
Energy Division, Health & Safety Executive, London, United Kingdom

WEDNESDAY 15:30 – 17:30

Pipelines, Risers, and Subsea Systems

4-2-4 SCR and SLWRs I
Wednesday June 12 Room: Crowne Plaza, Castle 3 | 15:30 – 17:30
Session Chair: Alan Whoolroy, Wood Plc, USA

Impact of Soil Modeling on Fatigue Design of Lazy Wave Riser SystemsAOMAE2019-96156
Rupak Ghosh1 Haydar Arslan1
1. Exomobil, Spring, TX, USA; 2. Exomobil Production Company, Spring, TX, USA

Design of Steel Lazy Wave Riser for External Turret Moored FPSOAOMAE2019-96422
Jingyun Cheng, Peimin Cao
SBM Offshore, Houston, TX, USA

Fatigue Assessment of SLWR Riser in Brazilian Pre-salt: The Impact of Slope Changing Point in SN CurveAOMAE2019-96592
Stael Ferreira Sena1 Ludimar L. Aguiar1 Eduardo Hippert1 Alexandre G. Garmbis1 Marcelo Dos Santos1 Marcos Andre Duarte Martins1 Luis Manuel Paiva Nunes1
1. Petrobras, Rio de Janeiro, RJ, Brazil; 2. Petrobras, São José dos Campos, SP, Brazil; 3. Petrobras (cenpes), Rio de Janeiro, RJ, Brazil

The Impact of Second-order FPSO Motions on the Fatigue Performance of Large Diameter SCRAOMAE2019-96451
Rasoul Hejazi, Andrew Grime, Mark F. Randolph, Mike Ethymiou
University of Western Australia, Perth, WA, Australia

Guanyu Hu1 Chaojun Huang1 Fengjie Yin1 Mark Cerkovnik1 Guangqiang Yang1
1. Zh Offshore Inc., Houston, TX, USA; 2. Exomobil Production Company, Spring, TX, USA

Numerical Simulation of the Fluid-Solid Two-phase in the Horizontal Pipe based on DEM-CFD Coupling MethodAOMAE2019-95455
J.S., Pu1 Yongping Chen2 Peng Yao2
1. Hohai University, Nanjing, China; 2. Hohai University, Han, China; 3. Sun yat-sen University, Guangdong, China

Introducing a Novel MEG/EtOH Mixture to Improve Gas Hydrate Blockages Removal during Offshore Oil and Gas ProductionAOMAE2019-95808
Paulo Pau1 Theodoro Netto1
1. Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. COPPE/Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Analysis of Heat Transfer Performance for Deepwater Phase Change Material Sandwich PipesAOMAE2019-95876
Chen An, Hui Wang, Menglan Duan
China University of Petroleum, Beijing, China

Ocean Engineering

6-15-2 Underwater Vehicles Design Technology and Hydodynamics
Wednesday June 12 Room: SEC, Dochart 2 | 15:30 – 17:30
Session Organizer: Celso Morooka, University of Campinas, Brazil
Session Co-Chair: Zhe Jiang, Shanghai Ocean University, China
Session Co-Chair: Alexandre Immas, University of California, Berkeley, USA

Zhe Jiang, Tao Sun, Gaozheng Luo, Biao Wang, Wei Guo
Shanghai Ocean University, Shanghai, China

Analysis of the Pitting corrosion’s Effect on the Residual Strength of Submerged Pressure ShellAOMAE2019-96001
Weijun Xu, Tianyu Chen, Chenfeng Li, Xueqian Zhou, Feng Liu
Harbin Engineering University, Harbin, China

Hydrodynamic Design of a Morphic Autonomous Underwater Vehicle using Neural NetworksAOMAE2019-95469
Quentin Becker, Mohammad-Reza Alam, Alexandre Immas
University of California, Berkeley, Berkeley, CA, USA

Experimental Study on Hydrodynamic Performance of Mini-AUV in Non-uniform Flow FieldAOMAE2019-96835
Jiayuan Zhuang1 Chaojun Huang1 Xuangguo, Wang Zhaqiang
Shanghai Waigaoqiao Shiplbuilding Co., Ltd., Shanghai, China

A Study on Piping Design Neutral File to Convert Augmented Reality Model in Real-timeAOMAE2019-96553
Jung Min Lee, Kyung Ho Lee, Young Soo Han
Inha University, Incheon, Korea

Pipelines, Risers, and Subsea Systems

4-5-2 Flow Assurance II
Wednesday June 12 Room: Crowne Plaza, Staffa / Shuna | 15:30 – 17:30
Session Organizer: Daniel Carneiro, Wood, Brazil
Session Co-Chair: Jongbae Kim, University of Ulsan, Korea
Session Co-Chair: Nestor Gonzalez Diez, TNO, Netherlands

A Study of Hydrate Inhibition for Deepwater Gas Field DevelopmentAOMAE2019-95177
Huaili Yi1 Yun Hao1 Xiaohong Zhou2
1. CNODC Research Institute, Beijing, China; 2. CNODC, Beijing, China

Optimization Design of FPSO Central Cooling Water System based on Pipe Network Fluid AnalysisAOMAE2019-95966
Huan Zhang, Yuan Hongtian, Wang Chao, Rong Weiren, Xu Jiangguo, Wang Zhaqiang
Shanghai Waigaoqiao Shiplbuilding Co., Ltd., Shanghai, China

Isabel Hadley
**Ocean Engineering**

**6-3-4 Wave-Body Interactions: Special Problems**

*Wednesday June 12  | Room SEC, M4  | 15:30 – 17:30*

Session Organizer: Fonseca Nuno, SINTEF Ocean, Norway

Experimental Investigation of Wave Runup on Offshore Intake Wells in a Random Wave Environment  
OMAE2019-96505

Venkatraman Prabu Kumar, Ranganathan Sundaravadivelu, K. Murali
Indian Institute of Technology Madras, Chennai, India

Efficacy of Analysis Techniques in Assessing Broken Wave Loading on a Cylinder Upon a Shoal  
OMAE2019-96262

Darshana T. Dassanayake, Alessandro Antonini, Alison Ruby  
Plymouth University, Plymouth, United Kingdom

Piston-modal Resonance in a Box-wall System  
OMAE2019-95006

Sheng-Chao Jiang1 Yu-Xin Huang1 Baoeli Geng2  
1. Dalian University of Technology, Dalian, China; 2. Tianjin Research Institute for Water Transport Engineering, Tianjin, China

Dynamic Response of a Gangway between Two Floating Bodies in a Side-by-side Configuration  
OMAE2019-96578

Qing Dong1 Jianmin Yang1 Haining Lu2 Xin Li2 Wenyue Lu2 Lei Liu3  
1. State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, Shanghai, China; 2. Shanghai Jiao Tong University, Shanghai, China; 3. Shanghai Jiao Tong University, Shanghai, China

Water Wave Scattering by Two Circular-arc-shaped Thin Plates with Non-uniform Permeability  
OMAE2019-95498

Rupanwita Gayen, Sourav Gupta  
Indian Institute of Technology, Kharagpur, India

**Ocean Engineering**

**6-5-4 Advanced Marine Hydrodynamics IV**

*Wednesday June 12  | Room SEC, M2 & M3  | 15:30 – 17:30*

Session Chair: Jule Schamke, MARIN, Netherlands

Session Co-Chair: Joost Sterenborg, MARIN, Netherlands

Big Data Analytics as a Tool to Monitor Hydrodynamic Performance of a Ship  
OMAE2019-95815

Prateek Gupta1 Sverre Steen1 Adil Rasheed2  
1. Department of Marine Technology, Norwegian University of Science and Technology (NTNU), Trondheim, Norway; 2. Department of Engineering Cybernetics, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

An Investigation of the Effect of Biomimetic Tubercles on a Flat Plate  
OMAE2019-96276

Alessandro Marino, Mehmet Atta1 Yigit Demir1  
University of Strathclyde, Glasgow, United Kingdom

Research on the Probability Distribution of the Underwater Moving of the Wrecked Targets  
OMAE2019-96581

Wenyang Duan, Zhang SHI, Yunsai Chen, Li Min Huang, Guanzhou Cao, Hongsen Zhang  
Harbin Engineering University, Harbin, China

**Ocean Engineering**

**6-5-4 Advanced Marine Hydrodynamics IV**

*Wednesday June 12  | Room SEC, Lomond Auditorium  | 15:30 – 17:30*

Session Chair: Prasanta Sahoo, Florida Institute of Technology, USA

Session Co-Chair: Ould el Mocar, University of Duisburg-Essen, Germany

Studies About Design of Rear Stator of Ducted Propeller using CFD  
OMAE2019-96020

Dakui Feng1 Hang Zhang1 Yue Sun2 Qing Wang3 Xiaofei Hu4  
1. Huazhong University of Science and Technology, Wuhan, China; 2. China Ship Design and Development Center, Wuhan, China

Shipboard Fuel Consumption Reduction by Air Lubrication and Trim Optimization  
OMAE2019-96770

Waleed Yehia1 A. M. Moustafa2 Adel A. Tawfik3 A. Nasef4  
1. Port Said University, Port Said, Egypt; 2. Egyptian Authority for Maritime Safety, Suez, Egypt

**Polar and Arctic Sciences and Technology**

**7-12-1 Numerical Ice Sciences**

*Wednesday June 12  | Room SEC, Alsh 2  | 15:30 – 17:30*

Session Chair: Sören Ehlers, Hamburg University of Technology, Germany

Session Co-Chair: Walter Kuehnlein, sea2ice Ltd. & Co. KG, Germany

A Numerical Method for Ice Resistance Calculation of Polar Ships Navigating in Floating Ice Region  
OMAE2019-96131

Hui Li1 Yuan Qian1 Yan Feng1 WeiJia Sheng2 Hao Jin Li2  
1. Harbin Engineering University, Harbin, China

InVESTigation of the Effect of Block Size, Shape and Freeze-bond Strength on Flexural Failure of Freshwater Ice Rubble using the Discrete Element Method  
OMAE2019-96722

Soroosh Afsahi1 Rocky Taylor1 Eleanor Bailey1 Robert Sarracin2 Marjan Taghi Boroojerdi3  
1. Memorial University of Newfoundland, St. John’s, NL, Canada; 2. C-CORE, St. John’s, NL, Canada

Closing Remarks  
OMAE2019-96845

Walter Kuehnlein  
sea2ice Ltd. & Co. KG, Hamburg, Germany

**CFD & FSI**

**8-1-4 Ship Performance II**

*Wednesday June 12  | Room SEC, Lomond Auditorium  | 15:30 – 17:30*

Session Chair: Jule Schamke, MARIN, Netherlands

Session Co-Chair: Joost Sterenborg, MARIN, Netherlands

Evaluation of a Practical Approach to Numerical Propulsion Tests  
OMAE2019-95339

Andreas Giannoulis, Karl Haase  
Norwegian University of Science and Technology, Alesund, Norway

#OMAE2019  | 69
Wednesday 15:30 – 17:30

CFD & FSI

8-4-1 Cylinder VIV

Wednesday June 12
Room SEC, Dochart 1 | 15:30 – 17:30
Session Chair: Michael Bernittas, University of Michigan, USA
Session Co-Chair: Long Ge, BP, USA
Cross-flow VIV Simulation of a Circular Cylinder under Oscillatory Flow with Different KC Number OMAE2019-95271
Kunpeng Wang, Qinghai Chi, Yuhao Zhang
Jiangsu University of Science and Technology, Zhenjiang, China
Vortex Induced Vibration of a Steel Catenary Riser under Out-of-plane Current: An Experimental Study OMAE2019-96112
Yuwang Xu1, Junqiao Wang2, Haogie Ren1, Mengmeng Zhang1, Shixiao Fu1
1. Shanghai Jiao Tong University, Shanghai, China; 2. Norwegian Public Roads Administration, Stavanger, Norway
In-line VIV based on Forced-vibration Tests OMAE2019-95972
Decao Yin1, Jie Wu1, Elizabeth Passiano2, Halvor Lie1, Ralf Peek1
Octavio Sequeiros1, Sae Yang2, Chiara A. Bernardi1, Meliza Atienza1
1. SINTEF Ocean, Trondheim, Norway; 2. Norwegian University of Science and Technology, Trondheim, Norway
Hyunchul Jang, JangKim
TechnipFMC, Houston, TX, USA
Vortex-induced Vibration of a Flexible Cylinder Experiencing Oscillatory Flow with Different Aspect Ratios OMAE2019-95522
Di Deng, Lei Wu, Decheng Wan
Shanghai Jiao Tong University, Shanghai, China

Ocean Renewable Energy

9-1-2 FWT – Numerical Analysis I

Wednesday June 12
Room SEC, Carron 1 | 15:30 – 17:30
Session Chair: Alessandro Fontanella, Politecnico di Milano, Italy
Session Co-Chair: Ilmas Bayati, MARIN, Netherlands
Impact of Simulation Duration Analysis for Offshore Floating Wind Turbines using a Coupled FAST-OrcaFlex Model OMAE2019-95159
Ajt C Pillai, Phillip R. Thies, Lars Johanning
University of Exeter, Exeter, United Kingdom
Upgrading the Numerical Analysis of the Mooring System and the Aerodynamics of the TELLWIND Platform OMAE2019-96380
Tommaso Battistella1, José Armesto1, Álvaro Rodríguez Luis1, Lucia Meneses1, Bernardino Coulaudo1, José Serna1, Raúl Guanche1, Joaquín Urbano2, Sergio Hernandez2, José Fernandez2
1. Environmental Hydraulics Institute of Cantabria, Santander, Spain; 2. Esteyco SAD Madrid, Spain
Second-order Responses of a 10 MW Floating Wind Turbine, considering the Full QTF OMAE2019-95661
Qun Cao, Longfei Xiao, Xiaoxian Guo, Mingyue Liu
Shanghai Jiao Tong University, Shanghai, China
Impact of High Order Wave Loads on a 10MW Tension-leg Platform Floating Wind Turbine at Different Tendon Inclination Angles OMAE2019-96243
Daniel Milano1, Christophe Peyrand2, Matteo Capaldo3
David Ingram2, Qing Xiao1, Lars Johanning4
1. University of Edinburgh, Edinburgh, United Kingdom; 2. EDF R&D, Chatou, France; 3. EDF Lab Saclay, Paris, France; 4. The University of Edinburgh, Edinburgh, United Kingdom; 5. University of Strathclyde, Glasgow, United Kingdom; 6. University of Exeter, Penryn, United Kingdom
Hybrid Model Testing of Floating Wind Turbines: Test Bench for System Identification and Control Performance Assessment OMAE2019-96574
Vincent Amal, Feliçen Bonnefoy, Jean-Christophe Gilletoaux, Sandrine Aubrun
École Centrale de Nantes, Nantes, France

Ocean Renewable Energy

9-7-1 Drivetrain Design, Operation and Condition Monitoring I

Wednesday June 12
Room SEC, Carron 2 | 15:30 – 17:30
Session Chair: Amir R. Nejad, Norwegian University of Science and Technology, Norway
Session Co-Chair: Jan Helsen, Vrije Universiteit Brussel, Belgium
On Digital Twin Condition Monitoring System for Drivetrains OMAE2019-95152
Sigrid Sikske Johansen, Amir R. Nejad
Norwegian University of Science and Technology, Trondheim, Norway
Gaining Insights in Wind Turbine Drivetrain Dynamics by Means of Automatic Operational Modal Analysis combined with Machine Learning Algorithms OMAE2019-96731
Nicoletta Gioia1, Roberto Medico1, Pietro-Jan Daems2, Cédric Peeters3
Dirk Deschrijver1, Tom Dhame2, Patrick Guillaume3
1. Vrije Universiteit Brussel, Brussels, Belgium; 2. Ghent University, Gent, Belgium
The Effect of Operational Parameters on Vibration Signals of Wind Turbine Gearboxes OMAE2019-96720
Sofia Koukoura1, Eric Bechhoefer1, James Carroll2, Alasdair McDonald3
1. University of Strathclyde, Glasgow, United Kingdom; 2. GPMs, Cornwall, VT, USA
Wind Turbine Planetary Gear Fault Identification using Statistical Condition Indicators and Machine Learning OMAE2019-96713
Cédric Peeters, Timothy Verstraeten, Ann Nowé, Jan Helsen
Vrije Universiteit Brussel, Brussels, Belgium
On Design and Analysis of a Drivetrain Test Rig for Wind Turbine Health Monitoring OMAE2019-96721
Lorenzo Balestra1, Amir R. Nejad2, Giovanni Naldi3
1. University of Bologna, Cervia, Italy; 2. Norwegian University of Science and Technology, Trondheim, Norway; 3. University of Bologna, Bologna, Italy
Petroleum Technology

11-4-1 Petroleum Production Systems Design and Operation

Wednesday June 12

Session Organizer: Sergio Bordalo, Unicamp, Brazil
Session Chair: Juliana Baioco, LAMCSO/COPPE/UFRJ, Brazil

CFD Simulation of Two-phase Vertical Annular Flow in Both Upward and Downward Direction in a Small Pipe OMAE2019-95311
Ekhwaiater Abobaker1 Abadelhalim Elsamouny1 John Shirokoff1 Mohammad Rahman1
1. Memorial University of Newfoundland, St. John’s, NL, Canada;
2. Texas A&M University at Qatar, Doha, Qatar

Operational Safety Risk Assessment in Offshore Oil Wells OMAE2019-95069
Marcelo A. Jaculli1 Danilo Colombo1 José Ricardo P. Mendes1
Cinia F. G. Marculino1 Beethoven G. S. Costa1
1. University of Campinas, Campinas, SP, Brazil; 2. Petrobras, Rio de Janeiro, RJ, Brazil

Optimizing Production Facilities using a Transient Multiphase Flow Simulator OMAE2019-95002
Abdulaziz AlQasim1 Fahad AlMudairis1 Abdulrahman Bin Omar1 Abdullatif Omair1
1. Saudi Arabian Co., Dhahran, Saudi Arabia; 2. Kuwait University, Kuwait, Kuwait

Uncertainty Analysis in the Multi-objective Optimization of Hydraulic Fracture OMAE2019-96103
Juliana Baioco1 Breno Jacob1 Luís Felipe Mazaidiego1
1. LACED/COPPE/Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 3. UPM - Polytechnic University of Madrid, Madrid, Spain

Petroleum Technology

11-12-2 Cementing II

Wednesday June 12

Session Chair: Ian Frigaard, University of British Columbia, Canada
Session Co-Chair: Majid Bizhani, University of British Columbia, Canada

Laminar Displacement Flows in Vertical Eccentric Annuli: Experiments and Simulations OMAE2019-95180
Ali Etrati, Ian Frigaard
University of British Columbia, Vancouver, BC, Canada

Removal of Viscoplastic Gels from Conduits OMAE2019-95218
Kamran Alba1 Olamide Oladosu1 Paris Brown1 Jai Bhakta1 Ian Frigaard1
1. University of Houston, Houston, TX, USA;
2. University of British Columbia, Vancouver, BC, Canada

Real-time Measurement of Eccentricity in Primary Cementing of Oil and Gas Wells OMAE2019-95415
Amir Maleki, Ian Frigaard
University of British Columbia, Vancouver, BC, Canada

Developing Sensitivity Response Curves to Evaluate Mechanical Integrity of Set Cement OMAE2019-95588
Harshkumar Patel1 Saeed Salehi2 Catalin Teodoriu1
1. University of Oklahoma, Norman, OK, USA; 2. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA

Real Time Cementing Hydraulics Simulations
Bring Risk Down OMAE2019-95100
Swiatoslaw Pelipenko1 Nicolas Hamant1 Simon Impey1
1. Oxford Numerics, London, United Kingdom; 2. Schlumberger, Sugar Land, TX, USA

Afternoon Lecture Series

17:40 – 18:30

Location: Lomond Auditorium (SEC)

Enjoyable Marine Engineering Researches on Sports, Environment, not only Water Wave Engineering, Nonlinear Hydrodynamic Forces and Statistics
Professor Takeshi Kinoshita, Visiting Professor, Nagasaki Institute of Applied Science

See Afternoon Lecture Series, page 22 for more details.

Conference Banquet

Banquet: 19:00 – 24:00
Location: Merchant Square

See Social Events, page 14 for more details.
Thursday, June 13

**CONCURRENT SESSIONS**

**08:30 – 10:00**

**Offshore Technology**

**1-1-1 Semi-submersibles and TLPs**

**Thursday June 13**

Room SEC, Alsh 1 | 08:30 – 10:00

Session Chair: Jothyun Kyoung, TechnipFMC, USA  
Session Co-Chair: Sandeep Bukka Reddy, National University of Singapore, Singapore  

Raehyoung Yuck1, Daehoon Kang1, Eung-su Kim2, Munsung Kim3, Tae-min Kim4, Hyun Joe Kim5  
1. Samsung Heavy Industries, Daejeon, Korea; 2. Samsung Heavy Industries, Seongnam, Korea; 3. Williams, Houston, TX, USA  

Jiaqiu Feng1, Yi Yu1, Yan Qu2, Wenhui Xie3, Min Wu4, Jingrui Zhao5  
1. CNODC Research Institute, Beijing, China; 2. CNODC, Ltd., Beijing, China; 3. Southern University of Science and Technology, Shenzhen, China; 4. SBM Offshore USA, Inc., Houston, TX, USA; 5. CNODC Research Institute, Shenzhen, China  

First in Place Replacement of a TLP Top Tendon Connector Flex Bearing OMAE2019-96232  
Jeffrey D. Otten1, Vinu Kuriakose2, Shabih Amin2  
1. SBM Offshore USA, Inc., Houston, TX, USA; 2. Baker Hughes a GE Company, Houston, TX, USA  

Concept Design of Very Large Floating Structures and Laboratory-scale Modelling OMAE2019-96259  
Lorenzo Cappetti1, Irene Simonetti1, Ilaria Crema1  
1. University of Florence, Florence, Italy

**Structures, Safety and Reliability**

**2-13-1 Risk Analysis and Management I**

**Thursday June 13**

Room Crowne Plaza, Castle 2 | 08:30 – 10:00

Session Chair: Marcelo Ramos Martins, LabRisk - Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, Brazil  
Session Co-Chair: Amir R. Nejad, Norwegian University of Science and Technology, Norway  

Carlos H. B. Morais1, Danilo T. M. Abreu2, Joaquim Santos2  
1. LabRisk - Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, São Paulo, SP, Brazil; 2. University of São Paulo, São Paulo, SP, Brazil; 3. Centro Tecnologico da Marinha em Sao Paulo, Sao Paulo, SP, Brazil; 4. Petrobras, Rio de Janeiro, RJ, Brazil  

On Disaster Risk Reduction in Norwegian Oil & Gas Industry through Life-cycle Perspective OMAE2019-95422  
Michaela Ibroin, Nicola Paltintrieri, Amir R. Nejad  
Norwegian University of Science and Technology, Trondheim, Norway  

Towards Implementing Condition-based Maintenance (CBM) Policy for Offshore Blowout Preventer (BOP) System OMAE2019-95539  
Tobiloba Elusakin, Mahmood Shafee, Tosin Aededepe  
Cranfield University, Bedford, United Kingdom  

Subsea Spares Analysis Optimisation OMAE2019-96100  
Tiantian Coffey, Christopher Rai, John Greene, Stephen O’Brien Bromley  
Wood, Galway, Ireland  

Research on Assessment Method for Bridge Pier Foundation Stability using Non-destructive Tests OMAE2019-95845  
Mintaek Yoo  
Korea Railroad Research Institute, UI Wang, Korea

**Structures, Safety and Reliability**

**2-6-2 Reliability of Mooring and Riser Systems II**

**Thursday June 13**

Room Crowne Plaza, Castle 1 | 08:30 – 10:00

Session Chair: Luis V.S. Sagrilo, LACEO/COPPE/Federal University of Rio de Janeiro, Brazil  
Session Co-Chair: Ying Min Low, National University of Singapore, Singapore  

Fatigue Tests on Corroded Mooring Chains Retrieved from Various Chains Fatigue Performance OMAE2019-95276  
Seyhun Aliyari, Thomas F. Willert, Svein-Arne Reinholdtsen1  
1. Danish Maritime Institute, Copenhagen, Denmark; 2. University of Southern Denmark, Odense, Denmark; 3. University of Stavanger, Stavanger, Norway; 4. Equinor ASA, Stjørdal, Norway; 5. Equinor ASA, Trondheim, Norway  

Finite Element Analysis of the Effect of Twist on Chain Fatigue Performance OMAE2019-95276  
Justin Jones  
Petrofac, Woking, United Kingdom  

Fatigue Tests on Corroded Mooring Chains Retrieved from Various Fields in Offshore West Africa and the North Sea OMAE2019-95618  
Kai-tung Ma1, Øystein Gabrielsen2, Zhen Li3, David A. Baker4, Aifeng Yao5, Pedro Vargas6, Meng Luo7, Amir Izadparast8, Alberto Arredondo9  
Linfang Zhu1, Nina Sverdlova2, Ingrid Skutle Høgsæt1,2, Xiying Zhang1, Xujun Zhai1,2, Xiying Zhang1, Xiaoqin Zhan1,2

1. University of Strathclyde, Glasgow, United Kingdom; 2. Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt

Effect of Seabed Imperfection on the Buckling of Buried Pipelines Subjected to Wave-induced Loads

OMAE2019-94909
Duggivalasa Suresh Kumar, Mohammed Rabius Sunny, Trilochan Sahoo

Technology Institute of Technology Kharagpur, Kharagpur, India

Effect of Weld Porosity on Super Duplex Stainless Steel Umbilical Tubes under Hydrogen Induced Stress

OMAE2019-95836
M. Liu1,2, Mahmoud Chizari1,2

1. Aker Solutions, Windsor, United Kingdom; 2. Aker Solutions, London, United Kingdom

Materials Technology

3-2-1 Fabrication and Performance of Clad Pipes

Thursday June 13
Room SEC, Boisdale 1 | 08:30 – 10:00
Session Chair: Agnes Marie Høn, DNV GL, Norway
Session Co-Chair: Koji Gotoh, Kyushu University, Japan

Review of the In-air Fatigue Behaviour of CRA Lined Offshore Pipelines

OMAE2019-96233
Carol Johnston, Jennifer Crump

TWI Ltd, Cambridge, United Kingdom

Assessment of Weld Overlays in a Cladded Piping Systems with Varied Thicknesses

OMAE2019-96148
Bridget Koya1, Bin Wang2, Luiz Wrobel2


Pipelines, Risers, and Subsea Systems

4-3-7 Thermo-Mechanical III

Thursday June 13
Room Crowne Plaza, Castle 3 | 08:30 – 10:00
Session Chair: Celso Morooka, University of Campinas, Brazil
Session Co-Chair: Daniel Carneiro, Wood, Brazil

Validation of a Multi-Level Approach to the Prediction of the Added Resistance and Powering of Ships in Waves

OMAE2019-95113
Shukui Liu1,2, Apostolos Papanikolaou3, Peiyuan Feng1, Sheming Fan2

1. Nanyang Technological University, Singapore, Singapore; 2. National Technical University of Athens, Athens, Greece; 3. Marine Design and Research Institute of China, Shanghai, China

Study of Wave Added Resistance and Motions of KCS in Waves with Different Wave Lengths

OMAE2019-95526
Hao Guo, D.C. Wan

Shanghai Jiao Tong University, Shanghai, China

An Experimental Investigation of the Trim Effect on the Behaviour of a Containership in Shallow Water

OMAE2019-95790
Khaled Elsherbiny1, Tahsin Tezdogan1, Mohamed Kotb1, Atilla Inceirk2, Sandy Day2

1. University of Strathclyde, Glasgow, United Kingdom; 2. Arabian Academy for Science, Technology and Maritime Transport, Alexandria, Egypt
Ocean Engineering

6-17-1 Wave Loads on Structures

Thursday June 13  Room SEC, Dochart 2 | 08:30 – 10:00
Session Chair: Sanne van Essen, MARIN, Netherlands
Systematic Experimental Validation of High-order Spectral Method for Deterministic Wave Prediction OMAE2019-95663
Marco Klein1 Matthias Duder2 Günther Clauss3 Norbert Hoffmann1 Jasper Behrendt1 Sören Ehlers1
1. Hamburg University of Technology, Hamburg, Germany; 2. New Wave Design & Technology GmbH, Rostock, Germany; 3. Technische Universität Berlin, Berlin, Germany

Variability in Encountered Waves during Deterministically Repeated Seakeeping Tests at Forward Speed OMAE2019-95065
Sanne van Essen, MARIN, Wageningen, Netherlands

Multi-focused Wave Groups in Wave Flume OMAE2019-95831
Qinghe Fang1 Canbao Zhao2 Anrin Guo2
1. Harbin Institute of Technology, Harbin, China; 2. Shijiazhuang Tiedao University, Shijiazhuang, China

Experimental Study of Wave Loading by Internal Solitary Waves on a Semi-submersible Platform OMAE2019-95891
Jingjing Zhang, Ke Chen, Yunsiang You, Xinchun Zhang
Shanghai Jiao Tong University, Shanghai, China

Linear Evolution of a Narrow-banded Surface Gravity Wavepacket Over an Infinite Step OMAE2019-96802
Yan Li, Thomas A.A. Adcock, Ton S. van den Bremer
University of Oxford, Oxford, United Kingdom

Numerical Simulation of the Loads on Cylinders Exerted by Internal Wave Trains OMAE2019-96828
Xu Wang, Jifu Zhou
Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Ocean Engineering

6-7-1 Regional Metocean

Thursday June 13  Room SEC, M4 | 08:30 – 10:00
Session Chair: Gus Jeans, Oceanalysis Ltd, United Kingdom
Session Co-Chair: Kevin Ewans, MetOcean Research Ltd, New Zealand
Study on Gust Parameters and Wind Spectrum of South China Sea OMAE2019-95779
Botao Xie1 Xue Ren1 Jiagiang Li1 Wenyang Duan1 Junrong Wang2 Binbin Zhao3
1. CVODE Research Institute, Beijing, China; 2. Harbin Engineering University, Harbin, China; 3. Ocean University of China, Qingdao, China

Statistical Analysis for the Duration and Time Intervals of Tropical Cyclones, Hong Kong OMAE2019-95791
Shanshan Tao, Jialing Song, Zhifeng Wang, Yong Liu, Sheng Dong
Ocean University of China, Qingdao, China

Evaluation of the Ocean Circulation for the Solomon Sea using the Regional Ocean Modelling System (ROMS) OMAE2019-96179
A. Rute Bento, Henrique Ceolho, Chunxue Yang
Fugro GB Marine Ltd, Wallingford, United Kingdom

A Probabilistic Approach to Tropical Cyclone Modelling OMAE2019-96245
Stephen Grey, Ye Liu
HR Wallingford Ltd, Wallingford, United Kingdom

CFD & FSI

8-1-5 Seakeeping I

Thursday June 13  Room SEC, Dochart 1 | 08:30 – 10:00
Session Chair: Sandy Day, University of Strathclyde, United Kingdom
Session Co-Chair: Kie Hian Chua, Technology Centre for Offshore and Marine, Singapore
URANS Predictions of Low-frequency Viscous Damping of a LNGC OMAE2019-95171
Frédéric Jaouen1 Arjen Koop1 Lucas Vatinel1
1. MARIN, Wageningen, Netherlands; 2. MARIN Academy, Wageningen, Netherlands

Predicting Roll Damping for Barge-type FPSO using CFD OMAE2019-95306
Arjen Koop1 Frédéric Jaouen1 Xavier Wabbel1 Erwan Corbineau1
1. MARIN, Wageningen, Netherlands; 2. MARIN Academy, Wageningen, Netherlands

Numerical Simulations of KCS Parametric Rolling in Head Waves OMAE2019-95563
Shuang Wang1 Jun-Ji Wei2 Xianshu Chen1 Liwei Liu1 ZhiGuo Zhang2
1. Huazhong University of Science and Technology, Wuhan, China; 2. China Ship Design and Development Center, Wuhan, China

URANS Prediction of ONR Tumblehome Parametric Rolling Characteristics in Waves OMAE2019-96425
ZhiGuo Zhang1 Lixiang Guo1 Shuang Wang2 Ye Yuan2 Can Chen2
1. Huazhong University of Science and Technology, Wuhan, China; 2. China Ship Design and Development Center, Wuhan, China

CFD & FSI

8-4-2 Risers, Jumpers and Pipelines

Thursday June 13  Room SEC, Lomond Auditorium | 08:30 – 10:00
Session Chair: Hai Sun, Harbin Engineering University, China
Session Co-Chair: Aravind Nair, DNV GL, USA
Flow-induced Vibration Screening of a Thermoplastic Composite Pipe Water Injection Jumper OMAE2019-95930
Juan Pontaza1 Meng Luo2 Varadarajan Nadathur2 John Rosche3
1. Shell, Houston, TX, USA; 2. Shell International Exploration and Production Inc., Houston, TX, USA

Vertical Riser under VIV: A Numerical Assessment of Experimental Results using a Reduced Order Model OMAE2019-95150
Renato Orsino1 Guilherme Lopes2 Celso Pesci2 Guilherme Franzini1 Fernanda Takafugi1
1. University of São Paulo, São Paulo, SP, Brazil; 2. University of São Paulo – Escola Politécnica, São Paulo, SP, Brazil

Youn-Wook Moon1 Narakorn Sirinil1 Jong-Chun Park2
1. Newcastle University, Newcastle upon Tyne, United Kingdom; 2. Pusan National University, Busan, Korea

Fluid Dynamics Numerical Assessment to Evaluate the Ice Formation around the Pipeline OMAE2019-95528
Giuseppe Blasioli, Furio Marchesani
SaipeM S.p.A., Fano, Italy
Ocean Renewable Energy

9-1-5  FWT – Mooring Systems

Thursday June 13 Room SEC, Carron 1 | 08:30 – 10:00

Session Chair: Tonio Sant, Dept of Mechanical Engineering, University of Malta, Malta
Session Co-Chair: Erin E. Bachynski, Norwegian University of Science and Technology, Norway

Mooring Line Dynamics of a Semi-submersible Wind Energy Platform: Cross Validation of Two Commercial Numerical Codes with Experimental Data
Rachel Chester1 Can Desmond1 Jimmy Murphy1 Simon J. Watson1
1. University College Cork, Cork, Ireland; 2. TU Delft, Delft, Netherlands

Force Dynamics and Stationkeeping Costs for Multiline Anchor Systems in Floating Wind Farms with Different Spatial Parameters
Casey M. Fontana1 Sanjir R. Arwade1 Don J. Degroot1 Spencer Hallowell2
Melissa E. Landon1 Charles Aubeny1 Brian Diaz1 Andrew T. Myers1 Senol Ozmutlu1
1. University of Massachusetts Amherst, Amherst, MA, USA; 2. Independent Author, West Bath, ME, USA; 3. University of Maine, Orano, ME, USA; 4. Texas A&M University, College Station, TX, USA; 5. Northeastern University, Boston, MA, USA; 6. Vryhof Anchors, Schiedam, Netherlands

Analysis on Hydrodynamic Responses of a Spar Offshore Wind Turbine with an Innovative Type of Mooring System
Yuan Ma, Chaohu Chen, Xinkuan Yan, Yijun Shen, Tianhui Fan
South China University of Technology, Guangzhou, China

Modeling a Non-linear Mooring System for Floating Offshore Wind using a Hydraulic Piston Analogy
Magnus Harrold1 Philipp R. Thies2 David Newsam2
Claudio Bittencourt Ferreira1 Lars. Johanning1
1. University of Exeter, Penryn, United Kingdom; 2. Teqniqa Systems Ltd., Lavister, United Kingdom; 3. DNV GL, London, United Kingdom

Ocean Renewable Energy

9-5-3  Numerical Analysis I

Thursday June 13 Room SEC, Carron 2 | 08:30 – 10:00

Session Chair: Marc Cahay, TechniopFM, France
Session Co-Chair: Qing Xiao, University of Strathclyde, United Kingdom

CFD-based Study of a Tidal Current Turbine in a Horizontal Axis under Regular Waves
Jing Liu1 Longfei Xiao1 Fengmei Jing2
1. Shanghai Jiao Tong University, Shanghai, China; 2. Harbin Engineering University, Harbin, China

Local Blockage Effects for Idealised Turbines in Tidal Channels
Lei Chen1 Paul A. Bonar1 Christopher Vogel1 Thomas A.A. Adcock1

Numerical Analysis of Tidal Turbine Performance for Floating Platform
XIUQING XING1 SAKURAYA1
1. Institute of High Performance, A*STAR, Singapore, Singapore; 2. The University of Tokyo, Tokyo, Japan; 3. Mako Turbines Asia Pte Ltd, Singapore, Singapore

Effects of Tubercles on Blade and Wake of HAMCT in Post Stall Regimes – Linear Cascade Study
Varun Dondapati1 K. Murali2
1. Indian Institute of Technology Madras, Chennai, India; 2. Indian Institute of Technology Madras, Chennai, India

Petroleum Technology

11-1-1  General Petroleum Technology – Production Enhancement

Thursday June 13 Room Crowne Plaza, Jura | 08:30 – 10:00

Session Chair: Stephen Butt, Memorial University of Newfoundland, Canada
Session Co-Chair: Mohammad Rahman, Texas A&M University at Qatar, Qatar

CO2 Foam Rheology Behavior under Reservoir Conditions
Abdulaziz AlQasim, Sunil Kokal, Fawaz AlDhaibi
Saudi Aramco, Dhahran, Saudi Arabia

Experimental and Numerical Investigation of Gas-yield Power-law Fluids in a Horizontal Pipe
Abdulsalam Ibmad1 M. M. Awad1 Mohammad Adizur Rahman1 Stephen Butt1
1. Memorial University of Newfoundland, St. John’s, NL, Canada; 2. Mansoura University, Mansoura, Egypt; 3. Texas A&M University at Qatar, Doha, Qatar

Software Simulation and Experimental Study on Wax Deposition Pattern of Deep Condensate Gas
Jie Wang1 Fujian Zhou2 Erdong Yao3 Fan Fan3 Lishan Yuan1 Yanpeng Xue2
1. China University of Petroleum-Beijing, Beijing, China; 2. Tarim Oilfield, CNPC, Karla, China

Experimental Investigation on Stress Sensitivity Behavior for Tight Naturally Fractured Sandstone Reservoirs
Y.C. Wang, Fujian Zhou, Lufeng Zhang, Jin Wang
China University of Petroleum, Beijing, China

Petroleum Technology

11-13-1  LSU Workshop on Riser Gas Management and Well Control

Thursday June 13 Room Crowne Plaza, Barra | 08:30 – 10:00

Session Chair: Yuanhang Chen, Louisiana State University, USA
Session Co-Chair: Kjell Kåre Fjelde, University of Stavanger, Norway

Buoyancy Induced Convection of Riser Gas in Deepwater Drilling Operations
Syed Y. Nahr1 Yuanhang Chen1 Wesley Williams1 Otto Santos1 Ting Sun2
1. Louisiana State University, Baton Rouge, LA, USA; 2. China University of Petroleum, Beijing, China

Numerical Simulations of Riser Gas Behavior in Non-aqueous Muds using a Modified Drift Flux Model
Ninamdi Nwaka, Yuanhang Chen
Louisiana State University, Baton Rouge, LA, USA

Well Control Simulation with Non-aqueous Drilling Fluids
Felipe Chagas1 Paulo Ribeiro1 Otto Santos2
1. Universidade Estadual de Campinas, Campinas, SP, Brazil; 2. Louisiana State University, Baton Rouge, LA, USA

Experimental Investigation of Absorption and Desorption of Gas in Riser during MDP Well Control
James L. Nielsen1 Mahendra Kunju1 Yuanhang Chen1 Ting Sun2
1. Louisiana State University, Baton Rouge, LA, USA; 2. China University of Petroleum, Beijing, China
Takeshi Kinoshita Honoring Symposium on Offshore Technology

13-3-2 Wave Energy I

Thursday June 13 Room SEC, Beisdale 2 | 08:30 – 10:00
Session Organizer: Tomoki Ikoma, Nihon University, Japan
Session Co-Organizer: Yoon-Jin Ha, Nanyang Technological University, Singapore

Study on Wave Power Generation for Wave Absorption Systems Using the Particle Method for Evaluation of Wave Power Generating Systems with Pendulum Type by the Particle Method

Qiao Li, Motohiko Murai
Yokohama National University, Yokohama, Japan

Fundamental Study on Development on Numerical Method for Evaluation of Wave Power Generating Systems with Pendulum Type by the Particle Method

Kazuki Murata1, Chiyuki Rheem2, Tomoki Ikoma2
1. Institute of Industrial Science, The University of Tokyo, Meguro-ku, Japan; 2. The University of Tokyo, Tokyo, Japan; 3. Nihon University, Funabashi, Japan

A Strategy of a Control Algorithm for a Point Absorber Wave Energy Converter

Yoon-Jin Ha1, Nam-Woo Kim2
1. Korea Institute of Ocean Science and Technology, Daejeon, Korea; 2. 3. Nihon University, Funabashi, Japan

Fundamental Study on Development on Numerical Method for Evaluation of Wave Power Generating Systems with Pendulum Type by the Particle Method

Tomoki Ikoma3, seafood2, Masahiro Matsui2, Chiyuki Rheem2, Tomoki Ikoma2
1. LabRisk Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, Brazil; 2. Centro Tecnológico da Marinha em São Paulo, São Paulo, SP, Brazil; 3. Brazilian Maritime Pilots Association (CONAPRA), Rio de Janeiro, RJ, Brazil

A Hybrid Methodology for Maritime Accident Analysis: The Case of Ship Collision

OMAE2019-96663
Ludví Pražík1, Bowo, Ramdhani Eka Prilana, Masao Furusho
Kobe University, Kobe, Japan

Human Reliability Analysis of Ship Maneuvers in Harbor Areas

OMAE2019-96251
Danilo T. M. P. Abreu1, Marco S. Maturana2, Marcelo Ramos Martins3, Siegberto R. Schenk Jr.4
1. LabRisk - Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, São Paulo, SP, Brazil; 2. Centro Tecnológico da Marinha em São Paulo, São Paulo, SP, Brazil; 3. Brazilian Maritime Pilots Association (CONAPRA), Rio de Janeiro, RJ, Brazil

Risk Assessment of Ship Systems based on Forward FTF Method

OMAE2019-95320
SongYan Mai1, Ji Zeng1, Qi Feng1, Renan Liu2, Yan Chen3
1. Shanghai Maritime University, Shanghai, China; 2. Shanghai Honghua Ocean Oil & Gas Equipment Co., Ltd., Shanghai, China; 3. Affco Flow Control (Shanghai) Co., Ltd., Shanghai, China

Risk Assessment in Offshore Salt caverns to Store CO2

OMAE2019-96230
Marco A. Pestana1, Carlos H. B. Morais2, Alvaro M. Costa2
1. LabRisk Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, São Paulo, SP, Brazil; 2. MDO/EM - Tecnología en Geomecánica e Modelagem Cudicional, Rio de Janeiro, RJ, Brazil; 3. Shell Brasil Ltda., Rio de Janeiro, RJ, Brazil

REFRESHMENT BREAK
10:00 – 10:30
Location: Hall 5 (SEC)

CONCURRENT SESSIONS
10:30 – 12:00

Offshore Technology

1-7-1 Wave Loading and Motions in Extreme Seas I

Thursday June 13 Room SEC, Alsh 1 | 10:30 – 12:00
Session Chair: Limin Yang, DNV GL, Norway

Experimental Evaluation of Wave Impact Loads on Semi-submersible Structure according to Trim Angle

OMAE2019-95406
Min-Guk Sae1, Yoon-Jin Ha1, Nam-Woo Kim2, Kang-Su Lee2
1. Korea Research Institute of Ships and Ocean Engineering, Daejeon, Korea; 2. Korea Institute of Ocean Science and Technology, Daejeon, Korea

Efficient Indicators for Screening of Random Waves for Wave Impacts on a Jacket Platform and a Fixed Offshore Wind Turbine

OMAE2019-95481
Tim Bunnik, Jule Scharnek, Erik-Jan de Ridder
MARIN, Wageningen, Netherlands

Effect of Non-Gaussian Distribution in Fully-nonlinear Waves on Offshore Platform Motion Responses

OMAE2019-95465
Aldric Baquet, Ho-Joon Lim, Jang Kim
TechnipFMC, Houston, TX, USA

Structures, Safety and Reliability

2-13-2 Risk Analysis and Management II

Thursday June 13 Room Crowne Plaza, Castle 2 | 10:30 – 12:00
Session Chair: Marcelo Ramos Martins, LabRisk - Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, Brazil
Session Co-Chair: Mahmood Shafee, Cranfield University, United Kingdom

Risk Assessment of Ship Systems based on Forward FTF Method

OMAE2019-95320
SongYan Mai1, Ji Zeng1, Qi Feng1, Renan Liu2, Yan Chen3
1. Shanghai Maritime University, Shanghai, China; 2. Shanghai Honghua Ocean Oil & Gas Equipment Co., Ltd., Shanghai, China; 3. Affco Flow Control (Shanghai) Co., Ltd., Shanghai, China

Risk Assessment in Offshore Salt caverns to Store CO2

OMAE2019-96230
Marco A. Pestana1, Carlos H. B. Morais2, Alvaro M. Costa2
1. LabRisk Analysis, Evaluation and Risk Management Laboratory - University of São Paulo, São Paulo, SP, Brazil; 2. MDO/EM - Tecnología en Geomecánica e Modelagem Cudicional, Rio de Janeiro, RJ, Brazil; 3. Shell Brasil Ltda., Rio de Janeiro, RJ, Brazil

Reliability of Mooring and Riser Systems III

Thursday June 13 Room Crowne Plaza, Castle 1 | 10:30 – 12:00
Session Chair: Ying Min Low, National University of Singapore, Singapore
Session Co-Chair: Luis V.S. Sagrilo, LACEO/COPPE/UFF, Brazil

Review and Comparison of Collated Offshore Mooring Chain Fatigue Test Data

OMAE2019-95875
Gary H. Farrow1, Andrew E. Potts1, Andrew A. Kilner2
1. AMOG Consulting, Notting Hill, VIC, Australia; 2. AMOG Consulting, Houston, TX, USA

Development of a New, Correlated FEA Method of Assessing Mooring Chain Fatigue

OMAE2019-95882
Gary H. Farrow1, Andrew E. Potts1, Andrew A. Kilner2
1. AMOG Consulting, Notting Hill, VIC, Australia; 2. AMOG Consulting, Houston, TX, USA
Numerical Methods for Interlink Stiffness Formulations and Parameters Sensitivity of Out-of-plane Bending
Fatigue Failure in Mooring Chains  OMAE2019-96042
Cezar Edward, Arun Dev, Newcastle University in Singapore, Singapore

Fatigue of Mooring Chains Connected to Offshore Floating Structures considering out-of-plane Bending Effects  OMAE2019-96114
Vidar Hellum1 Songdong Ding1 Tom Lassen2 1. University of Agder, Grimstad, Norway; 2. APL/NOV, Arendal, Norway

Materials Technology

3-5-1 Fatigue Assessment and Improvement  
Thursday June 13  Room SEC, Boisdale 1 | 10:30 – 12:00
Session Chair: Carol Johnston, TWI Ltd, United Kingdom
Session Co-Chair: David A. Baker, Exxon Mobil Upstream Research Co, USA
Fatigue Life Estimation for HFMI Treated Weldments considering Weld Toe Magnification Factor  OMAE2019-95910
Dong Yub Kim1 Myung-Hyun Kim1 1. Dept. of Naval Architecture and Ocean Engineering; Pusan National University, Busan, Korea; 2. Pusan National University, Busan, Korea
Girth Weld Joints from Long Upset Pipe Ends for Improving Fatigue Strength of Offshore Oil & Gas Pipelines  OMAE2019-96145
Israel Marines-Garcia1 Aaron Aguilar2 Ramon Aguilar2 Mauricio Pélcastre2 Philippe Dancis3 1. Tenaris ITSA, Veracruz, VER, Mexico; 2. Testing and Technical Solutions S.A De C.V, Veracruz, VER, Mexico; 3. Tubos de Acero de Mexico S.A, Veracruz, VER, Mexico; 4. Dalmine S.p.A., Dalmine, Italy
Process-Structure-Property Fatigue Characterisation for Welding of X100 Steel Catenary Risers  OMAE2019-96516
Ronan J. Devaney1 Adrian Connaire2 Padraig E. O’Donoughue1 Sean B. Leen1 1. NUI Galway, Galway, Ireland; 2. Wood, Galway, Ireland
Evolution of the Stress-induced Magnetic Field of Pipeline Steel due to Fatigue Loading  OMAE2019-95447
Sheng Bao, Zhengye Zhao, Qiang Luo, Yibin Gu, Zhejiang University, Hangzhou, China
Data Mining for Estimating Fatigue Strength based on Composition and Processing Parameters  OMAE2019-95755
Arvind Kepakate, R.M. Chandima Ratnayake, University of Western Australia, Crawley, WA, Australia; 2. Dalian University of Technology, Dalian, China; 3. Woodside Energy Ltd, Perth, WA, Australia; 4. University of Southampton, Southampton, United Kingdom

Pipelines, Risers, Subsea Systems

4-1-13 Umbilicals and Cables II  
Thursday June 13  Room Crowne Plaza, Staffa / Shuna | 10:30 – 12:00
Session Chair: Alan Dobson, Technip Umbilicals, United Kingdom
Session Co-Chair: Jun Yan, Dalian University of Technology, China
Analysis of Mechanical Properties of Carbon Fiber Reinforced Spiral Rod in Umbilical  OMAE2019-95988
Yu Zhang1 Peng Zhang1 Ningyi Cheng1 Yi Zhao2 1. China University of Petroleum, Beijing, China; 2. Fudan University, Shanghai, China
Coupled thermo-elastic Analysis on Cross-section of Umbilical Cables  OMAE2019-96195
Jun Yan1 Haitao Hu2 Qi Su2 Qingshen Lu2 Zhixun Yang2 Qianjin Yue2 1. Dalian University of Technology, Dalian, China; 2. Dalian University of Technology, Panjin, China

Experimental Study on Friction of Steel Wires of Dynamic Umbilical for Fatigue Life Analysis  OMAE2019-96491
Yuancho Yan1 Qingchen Lu1 Shanghua Wu1 Jun Yan1 Qianjin Yue1 Jinhong Chen2 1. Dalian University of Technology, Dalian, China; 2. Dalian University of Technology, Panjin, China; 3. Panjin Institute of Industrial Technology, Dalian University of Technology, Panjin, China

Analysis of Subsea Umbilical Mechanical Behavior under Simultaneous Bending, Tension and torsion  OMAE2019-96596
Mohsen Saneian1 Yifan Gao1 Yong Bai2 Ting Liu2 1. Zhejiang University, Hangzhou, China; 2. Zhejiang University, Zhejiang, China
Ocean Engineering

**6-17-2 Nonlinear and Breaking Waves**

*Thursday June 13*

**Session Chair:** Thomas A. A. Adcock, University of Oxford, United Kingdom

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**The Average Shape of Large Waves in the Norwegian Sea — Is Non-Linear Physics Important?** [OMAE2019-95068]

Tianming Tang1, Margaret J. Yelland2, Thomas A. A. Adcock3

**Nonlinear Evolution of a Steep, Focusing Wave Group in Deep Water Simulated with OceanWave3D** [OMAE2019-95299]

Dylan Barratt1, Harry B. Bingham2, Thomas A. A. Adcock3
1. University of Oxford, Oxford, United Kingdom; 2. Delft University of Technology, Lyngby, Denmark

**Numerical Simulation of Water Wave Propagation over Porous Slope Bottom by using Two-domain Method** [OMAE2019-95664]

Eun-Hong Min1, Weonseoul Koo2
1. Inha University, Incheon, Korea; 2. Korea Maritime University, Busan, Korea

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**Characteristics of Transforming Waves Breaking over a Fringing Reef** [OMAE2019-96674]

Fuxian Gong1, Manhar Dhanak2
1. Florida Atlantic University, Boca Raton, FL, USA; 2. Florida Atlantic University, Daytona Beach, FL, USA

**Numerical Modeling of the Nonlinear Standing Waves in a Rectangular Tank and Damping Devices** [OMAE2019-95790]

Xin Jin1, Pengbi Lin2
1. Chengdu University of Technology, Chengdu, China; 2. Sichuan university, Chengdu, China

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**Ocean Engineering**

**6-7-2 Regional Metocean II**

*Thursday June 13*

**Session Chair:** Gus Jeans, Oceanalysis Ltd, United Kingdom

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**The Wave Climate of the Southern Ocean** [OMAE2019-95168]

Ian Young
The University of Melbourne, Melbourne, VIC, Australia

**The Increasing Prevalence of High Frequency Internal Waves in an Arctic Ocean with Declining Sea Ice Cover** [OMAE2019-96621]

Tom Rippeth1, Vasily Vlasenko2, Igor Kozlov2, Nataliya Stashchuk2
1. Bangor University, Menai Bridge, United Kingdom; 2. School of Biological and Marine Sciences, Plymouth, United Kingdom; 3. Russian State Hydrometeorological University, St Petersburg, Russia; 4. Plymouth University, Plymouth, United Kingdom; 5. School of Ocean Sciences, Ynys Môn, United Kingdom; 6. Bangor University, School of Ocean Sciences, Bangor, United Kingdom; 7. School of Ocean Sciences, Menai Bridge, United Kingdom

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**CFD & FSI**

**8-1-6 Seakeeping II**

*Thursday June 13*

**Session Chair:** Steve Cosgrove, Altair Engineering, Inc., USA

**Development and Validation of CFD Analysis Procedure for Predicting Wind Load on Commercial Ships** [OMAE2019-95410]

Eung-Hoon Lee1, Young-Bum Lee2
1. Daewoo Shipbuilding and Marine Engineering CO., Ltd., Geoje-si, Korea; 2. Daewoo Shipbuilding and Marine Engineering CO., Ltd., Seoul, Korea

**Numerical Study on Scale Effect of KCS Cargo Liquefaction and Influence on Ship Stability** [OMAE2019-96448]

Kie Hian Chua1, Yali Zhang2, Dimitrios Konovostis3

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**CFD & FSI**

**8-4-3 Interference, Proximity and Geometry Effects**

*Thursday June 13*

**Session Chair:** Rajeev Kumar Jaiman, University of British Columbia, Canada

**Numerical Investigation on Vortex Dynamics around Vibrant Monopile Regarding Cross-sectional Shape and Keulegan-Carpenter Number** [OMAE2019-96827]

Mohammad Mohammad Beigi Kasvaei1
1. Iranian National Institute for Oceanography and Atmospheric Science, Tehran, Iran; 2. Iran University of Science and Technology, Tehran, Iran

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**Ocean Engineering**

**6-17-2 Nonlinear and Breaking Waves**

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Eun-Hong Min1, Weonseoul Koo2
1. Inha University, Incheon, Korea; 2. Korea Maritime University, Busan, Korea

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Fuxian Gong1, Manhar Dhanak2
1. Florida Atlantic University, Boca Raton, FL, USA; 2. Florida Atlantic University, Daytona Beach, FL, USA

**Numerical Modeling of the Nonlinear Standing Waves in a Rectangular Tank and Damping Devices** [OMAE2019-95790]

Xin Jin1, Pengbi Lin2
1. Chengdu University of Technology, Chengdu, China; 2. Sichuan university, Chengdu, China

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**Ocean Engineering**

**6-7-2 Regional Metocean II**

*Thursday June 13*

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**The Wave Climate of the Southern Ocean** [OMAE2019-95168]

Ian Young
The University of Melbourne, Melbourne, VIC, Australia

**The Increasing Prevalence of High Frequency Internal Waves in an Arctic Ocean with Declining Sea Ice Cover** [OMAE2019-96621]

Tom Rippeth1, Vasily Vlasenko2, Igor Kozlov2, Nataliya Stashchuk2
1. Bangor University, Menai Bridge, United Kingdom; 2. School of Biological and Marine Sciences, Plymouth, United Kingdom; 3. Russian State Hydrometeorological University, St Petersburg, Russia; 4. Plymouth University, Plymouth, United Kingdom; 5. School of Ocean Sciences, Ynys Môn, United Kingdom; 6. Bangor University, School of Ocean Sciences, Bangor, United Kingdom; 7. School of Ocean Sciences, Menai Bridge, United Kingdom

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**CFD & FSI**

**8-1-6 Seakeeping II**

*Thursday June 13*

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**Development and Validation of CFD Analysis Procedure for Predicting Wind Load on Commercial Ships** [OMAE2019-95410]

Eung-Hoon Lee1, Young-Bum Lee2
1. Daewoo Shipbuilding and Marine Engineering CO., Ltd., Geoje-si, Korea; 2. Daewoo Shipbuilding and Marine Engineering CO., Ltd., Seoul, Korea

**Numerical Study on Scale Effect of KCS Cargo Liquefaction and Influence on Ship Stability** [OMAE2019-96448]

Kie Hian Chua1, Yali Zhang2, Dimitrios Konovostis3

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**CFD & FSI**

**8-4-3 Interference, Proximity and Geometry Effects**

*Thursday June 13*

**Session Chair:** Rajeev Kumar Jaiman, University of British Columbia, Canada

**Numerical Investigation on Vortex Dynamics around Vibrant Monopile Regarding Cross-sectional Shape and Keulegan-Carpenter Number** [OMAE2019-96827]

Mohammad Mohammad Beigi Kasvaei1
1. Iranian National Institute for Oceanography and Atmospheric Science, Tehran, Iran; 2. Iran University of Science and Technology, Tehran, Iran
Ocean Renewable Energy

9-1-8  FWT Hydrodynamics I
Thursday June 13  Room SEC, Carron 1  |  10:30 – 12:00
Session Chair: Jean-Christophe Gilletoaux, Ecole Centrale de Nantes, France
Investigation of Focused Wave Impact on Floating Platform for Offshore Floating Wind Turbine – A CFD Study OMAE2019-96043
Yang Zhou1 Qiqing Xiao1 Yuanchuan Liu1 Atilla Incice1 Christophe Peyrard1
1. University of Strathclyde, Glasgow, United Kingdom, 2. EDF-R&D, Chatou, France
Development of a Panel Cutting Method Coupled with a Time-domain Potential Flow Model based on the Weak-scatterer Approximation OMAE2019-96296
Pierre-Yves Wuillaume1 Aurelien Babarit1 Mattias Lynch1 Pierre Ferrard1
1. LHEEA Ecole Centrale de Nantes / INNOSEA, Nantes, France; 2. Centrale Nantes, Nantes, France; 3. INNOSEA, Nantes, France; 4. Ecole Centrale de Nantes/CNRS, Nantes, France
Hydrodynamic Analysis of a Suspended Cylinder under Regular Wave Loading based on Computational Fluid Dynamics OMAE2019-95533
Philipp Mucha, Amy Robertson, Jason Jonkman, Fabian Wendt
National Renewable Energy Laboratory, Golden, CO, USA
On Motion and Hydroelastic Analysis of a Floating Offshore Wind Turbine OMAE2019-96034
Azin Lameli1 Masoud Hayatdavoodi1 Carlos Wong1 Bin Tang1
1. University of Dundee, Dundee, United Kingdom; 2. CBU Ocean Engineering Corp., Zhuhai, China; 3. Harbin Engineering University, Harbin, China

Ocean Renewable Energy

9-4-3  Advanced Controls
Thursday June 13  Room SEC, Carron 2  |  10:30 – 12:00
Session Chair: Ryan Coe, Sandia National Laboratories, USA
Study on a Wave Energy Converter with Tension Leg Mooring under Optimal Control OMAE2019-95650
Jun Umeda1 Tomoki Taniguchi1 Toshifumi Fujimura1
1. National Maritime Research Institute, Mitaka, Japan; 2. National Maritime Research Institute, Tokyo, Japan
Assessment of Latching Control of Hemispherical Heaving Buoy Point Absorber with Nonlinear Froude-Krylov Force OMAE2019-96055
Sung-Jae Kim, Weoncheol Koo, Chul Hee Jo
Inha University, Incheon, Korea
Load Reduction for a WEC via PTO Control OMAE2019-96382
Ryan Coe, Giorgio Bacelli, Steven J. Spencer, Hancheol Cho, Victor Nevarez
Sandia National Laboratories, Albuquerque, NM, USA
Modeling and Analysis of Nonlinear Effects of Ocean Waves and Power-take-off Control on Wave Energy Conversion System Dynamics OMAE2019-96802
Solomon Yim1 Nasim Adami1 Bert Bosma1 Ted Brekkenn1 Ming Chen1 Leila Ghorban Zadeh1 David Glennon1 Yushun Lian1 Pedro Lomonaco1 Ali Mohit1 Tuba Gokcen-Haller1 Jim Thompson1
1. Oregon State University, Corvallis, OR, USA; 2. O.H. Hinsdale Wave Research Laboratory, Corvallis, OR, USA; 3. University of Washington, Seattle, WA, USA

Petroleum Technology

11-1-2  General Petroleum Technology – Production and Drilling Enhancement
Thursday June 13  Room Crowne Plaza, Jura  |  10:30 – 12:00
Session Chair: Stephen Butt, Memorial University of Newfoundland, Canada
Session Co-Chair: Mohammad Rahman, Texas A&M University at Qatar, Qatar
Evaluation Adaptability of Nano Wetting Fluid for Releasing Tight Sandstone Gas Reservoir Water Locking Effect OMAE2019-95402
Erdong Yao1 Jie Wang1 Yaqinpeng Xue1 Fujian Zhou1 Le Zhang1 Yafei Li1
1. China University of Petroleum-Beijing, Beijing, China; 2. Tarim Oilfield, CNPC, Karla, China
Study of the Influence of Controlled Axial Oscillations of pVARD on Generating Downhole Dynamic WOB and Improving Coring and Drilling Performance in Shale OMAE2019-96189
Abdelsalam Abgharaha, John Molgaard, Charles Hurich, Stephen Butt
Memorial University of Newfoundland, St. John’s, NL, Canada
An Experimental Development to Characterise the Flow Phenomena at the Near-wellbore Region OMAE2019-96373
Mohammad Ahammad1 Mohammad Rahman1 Stephen Butt1 Jahrol Alam1
1. Memorial University of Newfoundland, St. John’s, NL, Canada; 2. Texas A&M University at Qatar, Doha, Qatar
Understanding the Phenomenon of Dissolved Gas Migration of Gas in Riser during Drilling Operations OMAE2019-96683
Syed Y. Nahir1 Jianjun Zhu1 Wesley Williams1 Otto Santos1
Louis Thiodeaux1 Yuanhang Chen1
1. Louisiana State University, Baton Rouge, LA, USA; 2. University of Tulsa, Tulsa, OK, USA

Petroleum Technology

11-10-1  New Materials for Well Construction Repair
Thursday June 13  Room Crowne Plaza, Barra  |  10:30 – 12:00
Session Chair: Mihail Minescu, University Oil And Gas Ploiesti, Romania
Session Co-Chair: Catalin Teodoriu, Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA
Potentials of Nano-designed Plugs: Implications for Short and Long Term Well Integrity OMAE2019-95614
Raymos Kimani1 Harshkumar Patel1 Mahmoud Khalifeh2 Saeed Saleh2 Catalin Teodoriu2
1. University of Oklahoma, Norman, OK, USA; 2. US, Stavanger, Norway; 3. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA
Efficiency Assessment of the Composite Materials Repair Systems Intended for Corrosion Damaged Pipelines OMAE2019-96279
Andrei Dumitrescu, Alin Dinita
Petroleum-Gas University of Ploiesti, Ploiesti, Romania
Assessment of Variations in the Physico-mechanical Properties of Fiberglass Tubing Working in Different Environments OMAE2019-96283
Alin Dinita¹ Mihail Minescu² Andrei Dumitrescu² Catalin Teodoriu² Codrut-Stefan Sararu³ ¹. Petroleum-Gas University of Ploiesti, Ploiesti, Romania; ². University Oil And Gas Ploiesti, Ploiesti, Romania; ³. Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA; ⁴. OMV Petrom SA, Bucharest, Romania

How Heuristics and Biases Impact Judgment and Decision Making in Well Integrity Operations OMAE2019-9620
Catalin Teodoriu, Saeed Salehi Mewbourne School of Petroleum and Geological Engineering, Norman, OK, USA

Takeshi Kinoshita Honoring Symposium on Offshore Technology

13-3-4 Wave Energy II

Thursday June 13 Room SEC, Boisdale 2 | 10:30 – 12:00
Session Chair: Yasunori Nihei, Osaka Prefecture University, Japan

A Basic Study on Influence of Airchamber Volume on OWC Models to Power Conversion Performance OMAE2019-99225
Tomoki Ikoma¹ Yoshiyuki Kihara¹ Shota Hitai¹ Youshin Aida² Koichi Masuda³ Hiroaki Ito³ ¹. Nihon University, Funabashi, Japan; ². Nihon University, Chiba, Japan

Numerical Modelling of a Relatively Small Floating Body's Wave and Low Frequency Motion Response, Compared with Observational Data OMAE2019-96443
Christopher Wright¹ Haruki Yoshimoto² Ryota Wada² Ken Takagi² ¹. The University of Tokyo, Chiba, Japan; ². Japan Marine United Corporation, Yokohama, Japan; ³. The University of Tokyo, Kashiwa, Japan

Observation of Waves in Naru Strait, Goto, Nagasaki, a Tidal Current Test Site OMAE2019-96652
Yusaku Kyozuka Nagasaki University, Nagasaki, Japan

Technical Session Organizers’ Lunch
12:00 – 13:30
Location: Hall 5 (SEC)
Thursday lunch sponsored by Greater Fort Lauderdale Convention & Visitors Bureau

GREATER FORT LAUDERDALE
CONVENTION & VISITORS BUREAU

CONCURRENT SESSIONS
13:30 – 15:00

Offshore Technology

1-7-2 Wave Loading and Motions in Extreme Seas II

Thursday June 13 Room SEC, Alsh 1 | 13:30 – 15:00
Session Chair: Babak Ommani, SINTEF Ocean, Norway

Wave Impact Load and Corresponding Nonlinear Response of a Semi-submersible OMAE2019-95693
Yinghao Guo¹ Longfui Xiao¹ Handi Wei² Lei Li³ Yanfei Deng³ ¹. Shanghai Jiao Tong University, Shanghai, China; ². State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, Shanghai, China; ³. CIMC Offshore Co. Ltd., Shenzhen, China

The Ocean Cleanup System 001 Performance during Towing and Seakeeping Tests OMAE2019-96207
Joost Sterenberg² Nicola Grass¹ Roger Schouten³ Arjen Tjallema³ ¹. MARIN, Wageningen, Netherlands; ². The Ocean Cleanup, Rotterdam, Netherlands

Structures, Safety and Reliability

2-14-1 Risk Based Maintenance

Thursday June 13 Room Crowne Plaza, Castle 2 | 13:30 – 15:00
Session Chair: Bernt Leira, Norwegian University of Science and Technology, Norway
Session Co-Chair: Nianzhong Chen, Tianjin University, China

New Advances and Developments in Risk-based Inspection (RBI) of Marine Structures OMAE2019-95137
Mahmood Shafiee¹ Carlos Guedes Soares² ¹. Cranfield University, Bedford, United Kingdom; ². Instituto Superior Técnica, Universidade de Lisboa, Lisboa, Portugal

An Ontology-based Approach for Developing Offshore and Onshore Process Equipment Inspection Knowledge Base OMAE2019-95478
Andika Rachman, R.M. Chandima Ratnayake University of Stavanger, Stavanger, Norway

Bayesian Networks for Risk-based Decision Making OMAE2019-96833
Sima Rastayesh Aalborg University, Aalborg, Denmark

Structures, Safety and Reliability

2-7-1 Reliability of Renewable Energy Systems

Thursday June 13 Room Crowne Plaza, Castle 1 | 13:30 – 15:00
Session Chair: Zhen Gao, Norwegian University of Science and Technology, Norway
Session Co-Chair: Athanasios Kolios, University of Strathclyde, United Kingdom

Sensitivity Analysis of a 5MW Bottom Fixed Offshore Wind Turbine using the Environmental Contour Method OMAE2019-95390
David Barreto¹ Abdolmajid Moghtadaei¹ Madjid Karimirad² Arturo Ortega³ ¹. Universidad Nacional de Ingeniería, Lima, Peru; ². Queen’s University Belfast, Belfast, United Kingdom; ³. The University of Edinburgh, Edinburgh, United Kingdom
Materials Technology

3-2-2 Analysis and Fatigue Performance of Tubular Joints (John Sharp Honorary Session)

Thursday June 13
Room SEC, Boisdale 1 | 13:30 – 15:00

Session Chair: Alexander Stacey, Energy Division, Health & Safety Executive, United Kingdom
Session Co-Chair: Carol Johnston, TWI Ltd, United Kingdom

Large-scale Resonant Fatigue Testing of Welded Tubular X-Joints for Offshore Jacket Foundations OMAE2019-96371
Jeroen Van Wittenberge, Philippe Thibaux, Maarten Van Poucke
OCAS NV, Gent, Belgium

Fatigue of Welded Tubular X-Joints in Offshore Wind Platforms OMAE2019-95812
Theocharis Papatheocharis, Gregory C. Sarvanis, Philip C. Perdikaris, Spyros A. Karamanos
University of Thessaly, Volos, Greece

Numerical Simulation and Result Interpretation of Large Scale Fatigue Testing of Tubular X-Joint Close to Resonance Frequency OMAE2019-96198
Philippe Thibaux, Jeroen Van Wittenberge, Maarten Van Poucke
OCAS NV, Gent, Belgium

Study of Grouted Connections in Offshore Structures OMAE2019-95446
Efstathios Theotheokoglou, Georgia Papaefthimiou
National Technical University of Athens, Athens, Greece

Pipelines, Risers, and Subsea Systems

4-6-1 Innovative Technologies for Deepwater Low-Cost Production I

Thursday June 13
Room Crowne Plaza, Castle 3 | 13:30 – 15:00

Session Chair: Chris Timms, C-FER Technologies, Canada
Session Co-Chair: Ruud Selker, INTECSEA, Netherlands

Full Scale Thermal Testing of a New Flowline Intervention System OMAE2019-95314
Stéphanie Harcambois1 Vincent Le Tour2 Geoffroy Guindeul2
Romain Vivet3 François-Xavier Pasquet4 Guillaume Tosi2
Thierry Pa lemo5 Christophe T’oen6 Gilbert Herrera7
1. TechnipFMC, Rueil-Malmaison, France; 2. Total, Pau, France; 3. Shell, Rijswijk, Netherlands

CFD Modelling of an Electrically Charged Heat Blanket OMAE2019-95493
Vincent Le Tour2 Stéphanie Harcambois1 Geoffroy Guindeul2
Romain Vivet3 François-Xavier Pasquet4 Guillaume Tosi2
Thierry Pa lemo5 Gilbert Herrera7 Christophe T’oen6
1. TechnipFMC, Rueil-Malmaison, France; 2. TechnipFMC, Rueil-Malmaison, France; 3. Total, Pau, France; 4. Shell, Houston, TX, USA; 5. Shell, Rijswijk, Netherlands

Active Control of Flexible Riser Vibration by Boundary Control based on LQR Controller OMAE2019-95839
Jin Xin Yu1 Weimin Chen2
1. Institute of Seismology, China Earthquake Administration, Wuhan, China; 2. Institute of Mechanics, Chinese Academy of Sciences, Beijing, China

Hydrate Remediation Philosophy for a New Flowline Intervention System based on Active Heating OMAE2019-96059
Geoffroy Guindeul2 Arnaud Sanchez1 Stéphanie Harcambois1 Romain Vivet3
Thierry Pa lemo5 François-Xavier Pasquet4 Guillaume Tosi2
1. TechnipFMC, Rueil-Malmaison, France; 2. TechnipFMC, Lysaker, Norway; 3. Total, Pau, France; 4. Shell, Houston, TX, USA; 5. Shell, Rijswijk, Netherlands

Ocean Engineering

6-13-3 Numerical Methods

Thursday June 13
Room SEC, M2 & M3 | 13:30 – 15:00

Session Chair: D.C. Wan, Shanghai Jiao Tong University, China

RANS Based Resistance Prediction for Tumblehome Hull with Different Bow Appendages in Calm Water OMAE2019-95449
Shuzheng Sun1, Xin Zhao2
1. 2H Offshore Inc., Houston, TX, USA; 2. 2H Offshore Engineering Ltd., Woking, United Kingdom

Jianhua Wang1 D.C. Wan2
1. Shanghai Jiao Tong University, Shanghai, China; 2. Shell, Houston, TX, USA
CFD & FSI

8-4-1 Power Take-offs and Experiments

Thursday June 13
Room SEC, Carron 2 | 13:30 – 15:00
Session Chair: Masoud Hayatdavoodi, University of Dundee, United Kingdom
Session Co-Chair: Jerica Nolte, Principle Power, France

Bradley A. Ling1 Terry Lettenmaier2 Matthew Fowler3
Matthew Cameron1 Anthony M. Viselli3
1. Northwest Energy Innovations, Portland, OR, USA; 2. Williwave Engineering, South Beach, OR, USA; 3. UMaine Advanced Structures and Composites Center, Orono, ME, USA

Ocean Renewable Energy

9-4-1 Power Take-offs and Experiments

Thursday June 13
Room SEC, Carron 2 | 13:30 – 15:00
Session Chair: Masoud Hayatdavoodi, University of Dundee, United Kingdom
Session Co-Chair: Jerica Nolte, Principle Power, France

Bradley A. Ling1 Terry Lettenmaier2 Matthew Fowler3
Matthew Cameron1 Anthony M. Viselli3
1. Northwest Energy Innovations, Portland, OR, USA; 2. Williwave Engineering, South Beach, OR, USA; 3. UMaine Advanced Structures and Composites Center, Orono, ME, USA

Ocean Engineering

6-7-3 Metocean Criteria I

Thursday June 13
Room SEC, M4 | 13:30 – 15:00
Session Chair: Gus Jeans, Oceanalysis Ltd, United Kingdom
Session Co-Chair: Kevin Ewans, MetOcean Research Ltd, United Kingdom

Including the Impact of Climate Change in Offshore and Onshore Metocean Design Criteria to Ensure Asset Robustness OMAE2019‑95205
Alison Brown1 Ag Stephens2 Ben Rabb3 Richenda Connell4 Jon Upton4
1. Shell Research Ltd, Aberdeen, United Kingdom; 2. STFC Centre for Environmental Data Analysis, Didcot, United Kingdom; 3. Acclimatise Group Ltd, Cardiff, United Kingdom; 4. Acclimatise Group Ltd, Oxford, United Kingdom; 5. Shell Research Ltd, Aberdeen, United Kingdom

David Lambkin, Ian Wade, Robin Stephens
ABPmer, Southampton, United Kingdom

Decisional Criteria for Offshore Operations Interruption due to Adverse Weather OMAE2019‑95872
Michele Drago1 Luigino Vitali1 Andrea Del Guzzo1 Federico Gaggiotti1
1. Saipem S.p.A., Fano, Italy; 2. Saipem, Kuala Lumpur, Malaysia

A New Method for Deriving Soliton Design Criteria OMAE2019‑95637
Gus Jeans1 Oliver Jones2 Michael Zhang2 Chris Jackson1 Nataliya Statshchuk2

The Investigation of a Circular Cylinder with a Detached Flexible Plate using Immersed Smoothed Point Interpolation Method OMAE2019‑95610
Bogian Yan1 Shuangang Wang1 Guiyong Zhang1 Qihang Xiao2 Peng Wang2
1. School of Naval Architecture, Dalian University of Technology, Dalian, China; 2. Dalian University of Technology, Dalian, China

Staggered Grooves for the Suppression of Vortex-induced Vibration in Flexible Cylinders OMAE2019‑95649
Yun Zhi Love1 Rajeev Kumar Jaiman2
1. National University of Singapore, Singapore, Singapore; 2. University of British Columbia, Vancouver, BC, Canada

Forced Vibration Tests for In-line VIV to Assess Partially Strake-covered Pipeline Spans OMAE2019‑95970
Jie Wu1 Dacuo Yin1 Elizabeth Passano2 Halvor Lie1 Ralf Peek2

Laboratory Investigation of Helical Strakes with Serrated and Twisted Fins to Suppress VIV OMAE2019‑95129
Gustavo R. S. Assi, Tommaso Crespi
University of São Paulo, São Paulo, Brazil

CFD Study of Propeller Cavitation with Hull-propeller Interaction OMAE2019‑95892
Chang Wei Kang, Xiaojing Xing
Institute of High Performance, A*STAR, Singapore, Singapore

Ocean Energy

6-7-3 Propulsion

Thursday June 13
Room SEC, Dochart 1 | 13:30 – 15:00
Session Chair: Karl Halset, Norwegian University of Science and Technology, Norway
Session Co-Chair: Samuel Holmes, Red Wing Engineering, Inc, USA

An Investigation into the Effect of Biofouling on Full-scale Propeller Performance using CFD OMAE2019‑95315
Soonsook Song, Yigit Demirel, Mehmet Atlar
University of Strathclyde, Glasgow, United Kingdom

Huiling Ren1 Chen Xu2 Xueqian Zhou1 Serge Sutulov3 Carlos Guedes Soares3
1. Harbin Engineering University, Harbin, China; 2. Shanghai Jiao Tong University, Shanghai, China

Improved Transient FSI Model in SPH Method and its Applications OMAE2019‑95257
Aman Zhang1 Pingping Wang2 Furen Ming3 Pengjun Sun2
1. Harbin Engineering University, Harbin, China; 2. Ecole Centrale Nantes, Nantes, France

Computations of Hydrodynamic Forces on Vessels Advancing in Waves by Four-node Higher-order Boundary Element Method OMAE2019‑96972
Yuntao Yang, Runchao Zhu, Shan Huang
Shanghai Jiao Tong University, Shanghai, China

Research on The Blade Element Theory Coupled with Viscous Flow OMAE2019‑95887
Zhiheng Li1 Jiawei Yu1 Dakui Feng2 Kaijun Jiang1 Yueji Zhou2
1. China Ship Design and Development Center, Wuhan, China; 2. Huazhong University of Science and Technology, Wuhan, China

Numerical Simulation of Submarine Self-propulsion based on Different Turbulent Simulation Models OMAE2019‑95874
Tiechao Bai1 Yongfeng Wu2 Peng Wei1 Shuang Wang2 Liviei Liu2
1. China Ship Design and Development Center, Wuhan, China; 2. Huazhong University of Science and Technology, Wuhan, China

CFD & FSI

8-4-1 VIV Suppression and Control

Thursday June 13
Room SEC, Lomond Auditorium | 13:30 – 15:00
Session Chair: Deaco Yin, SINTEF Ocean, Norway
Session Co-Chair: Madhusuden Agrawal, BP, USA

Staggered Grooves for the Suppression of Vortex-induced Vibration in Flexible Cylinders OMAE2019‑95649
Yun Zhi Love1 Rajeev Kumar Jaiman2
1. National University of Singapore, Singapore, Singapore; 2. University of British Columbia, Vancouver, BC, Canada

Forced Vibration Tests for In-line VIV to Assess Partially Strake-covered Pipeline Spans OMAE2019‑95970
Jie Wu1 Dacuo Yin1 Elizabeth Passano2 Halvor Lie1 Ralf Peek2

Laboratory Investigation of Helical Strakes with Serrated and Twisted Fins to Suppress VIV OMAE2019‑95129
Gustavo R. S. Assi, Tommaso Crespi
University of São Paulo, São Paulo, Brazil

The Investigation of a Circular Cylinder with a Detached Flexible Plate using Immersed Smoothed Point Interpolation Method OMAE2019‑95610
Bogian Yan1 Shuangang Wang1 Guiyong Zhang1 Qihang Xiao2 Peng Wang2
1. School of Naval Architecture, Dalian University of Technology, Dalian, China; 2. Dalian University of Technology, Dalian, China

Ocean Renewable Energy

9-4-1 Power Take-offs and Experiments

Thursday June 13
Room SEC, Carron 2 | 13:30 – 15:00
Session Chair: Masoud Hayatdavoodi, University of Dundee, United Kingdom
Session Co-Chair: Jerica Nolte, Principle Power, France

Bradley A. Ling1 Terry Lettenmaier2 Matthew Fowler3
Matthew Cameron1 Anthony M. Viselli3
1. Northwest Energy Innovations, Portland, OR, USA; 2. Williwave Engineering, South Beach, OR, USA; 3. UMaine Advanced Structures and Composites Center, Orono, ME, USA
MISSING TEXT
Thursday June 13

1-4-1 Experimental Design and Analysis

15:30 – 17:30

Session Chair: M A Hannan, Newcastle University, UK (Singapore Unit), Singapore
Session Co-Chair: David Molyneux, Memorial University of Newfoundland, Canada

Numerical Solutions and Model Test Design for Anti-typhoon Drilling Riser

Jinlong Wang1 Lihui Li1 Frank Lim2 Zhang Hui2 Xu Liangqin2 Sheng Leixiang2 Ruijia Jin2
1. Zh Offshore, Beijing, China; 2. CNODC Research Institute, Beijing, China;
2. Tianjin Research Institute for Water Transport Engineering, Tianjin, China

Vortex-induced-vibration of Jack-ups with Cylindrical Legs in Regular Waves

Suheesh Ramadasan1 Longbin Tao2 Arun Dev3
1. Newcastle University in Singapore (Cybermarine Technologies Pte Ltd), Singapore, Singapore; 2. University of Strathclyde, Glasgow, United Kingdom;
3. Newcastle University in Singapore, Singapore, Singapore

Numerical Investigation of Wave-frequency Pontoon Responses of a Floating Bridge based on Model Test Results

Yanlin Shao1 Xu Xiang2 Jianyu Liu3
1. Technical University of Denmark, Kongens Lyngby, Denmark; 2. Norwegian Public Roads Administration, Oslo, Norway; 3. Harbin Engineering University, Harbin, China

Lazy Wave Riser Design in High Current and Mild Sour Environment

Rupak Ghosh1 Carlo Pellegrini2 Tyler Visco2
1. ExxonMobil, Spring, TX, USA; 2. Saipem America, Houston, TX, USA

Investigations on Mode Localization of Offshore Wind Turbine Blades

Dongsheng Li1 Yongpeng Zhang1 Xin Guo2 Xinliang Guo2
1. Shantou University, Shantou, China; 2. Dalian University of Technology, Dalian, China

Materials Technology

3-13-1 Dr. John Sharp Honorary Session

15:30 – 17:30

Session Chair: Gerhard Ersdal, Petroleum Safety Authority, Norway
Session Co-Chair: Alexander Stacey, Energy Division, Health & Safety Executive, United Kingdom

Overview of Structural Integrity Research & Development for the Safe Operation of Offshore Installations on the UKCS

Alexander Stacey1 John Sharp2
1. Energy Division, Health & Safety Executive, London, United Kingdom;
2. Cranfield University, Bedford, United Kingdom

The International Committee on Regulatory Authority Research and Development (ICRARD) an Early History

Charles Smith
Consultant, Bay Roberts, NL, Canada

Inspection and Repair of Ageing Offshore Structures

John Sharp
Cranfield University, Bedford, United Kingdom

Ageing and Life Extension of Offshore Structures

Gerhard Ersdal
Petroleum Safety Authority, Stavanger, Norway

CONCURRENT SESSIONS

15:30 – 17:30

Offshore Technology

REFRESHERMEN T BREAK

15:00 – 15:30
Location: Hall 5 (SEC)
Pipelines, Risers, and Subsea Systems

4-4-2 Subsea Structures II
Thursday June 13  
Room Crowne Plaza, Staffa / Shuna  |  15:30 – 17:30
Session Chair: Duane DeGeer, INTECESEA, USA
Session Co-Chair: Ruud Selker, INTECESEA, Netherlands

The Influence of Piping Arrangement on the Response of Vibration Isolation System under Underwater Explosion Loading  
OMAE2019-95683
Chen Pan1, Wei Qiang2, Liu Zhizhong2, Wang Guan2
1. China Ship Development and Design Center/National Key Laboratory on Ship Vibration & Noise, Wuhan, China; 2. China Ship Development and Design Center, Wuhan, China

A PDE Model for Estimating the Life Time of a Riser  
OMAE2019-96185
Halvor Snersrud Gustad1, Per T. Mo2, Elena Celledoni3
1. TechnipFMC, Trondheim, Norway; 2. TechnipFMC, Kongsvinger, Norway; 3. Norwegian University of Science and Technology, Trondheim, Norway

CFD Simulation of a Flow Homogenizer for Subsea Pumping Systems  
OMAE2019-96255
Nicola Lima, Karla Holzmeister, Raphaël Santor, Diener Volpin, Roberto Nunez
State University of Campinas, SP, Brazil

Computational Simulation of the Drilling Vessel Motion and its Effects on the Riser/BOP Connection  
OMAE2019-96367
Xavier Castillo1, José Luis Quispe1, Segen Estefer1
1. COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil; 2. Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Multiphase Flow Induced Forces on Bend Structures  
OMAE2019-96387
Stefan Belfroid, Nestor Gonzalez Diez, Hajo Pereboom, Can Tümer
TNO, Delft, Netherlands

Pipelines, Risers, and Subsea Systems

4-6-2 Innovative Technologies for Deepwater Low-Cost Production II
Thursday June 13  
Room Crowne Plaza, Castle 3  |  15:30 – 17:30
Session Chair: Ping Liu, INTECESEA, Netherlands
Session Co-Chair: Doug Swayne, C-FER Technologies, Canada

Self-healing Concrete for under Water Cementitious Structures: using Urea-decomposable and Urea Non-degradable Microbial Co-cultures Capsule, Part 1  
OMAE2019-96492
Muhammad Salman Haider, Wasi Muhammad, Saajad Miran
University of Gujrat, Gujrat, Pakistan

Self-healing Concrete for under Water Cementitious Structures: using Urea-decomposable and Urea Non-degradable Microbial Co-cultures Capsule, Part 2  
OMAE2019-96498
Muhammad Salman Haider, Wasi Muhammad, Saajad Miran
University of Gujrat, Gujrat, Pakistan

Submerged Production Unit: Design and Method for Launch and Tow to Field  
OMAE2019-95291
Venkatesan Arumugam Elumalai1, Saghbirn Daasvatu2
Daniel Karunakaran1, Kjell Larsen2, Bernt Leira3
1. Subsea 7 Norway AS, Stavanger, Norway; 2. Equinor ASA, Trondheim, Norway; 3. Norwegian University of Science and Technology, Trondheim, Norway

Ocean Engineering

6-7-4 Metocean Criteria II
Thursday June 13  
Room SEC, M4  |  15:30 – 17:30
Session Chair: Guis Jeans, Oceanalysis Ltd, United Kingdom
Session Co-Chair: Kevin Ewans, MetOcean Research Ltd, New Zealand

Spatial and Seasonal Variability of Metocean Design Criteria in Southern South China Sea from Covariate Extreme Value Analysis  
OMAE2019-95913
Vadim Anokhin1, Emma Ross1, David Randell2, Philip Jonathan3
1. Sarawak Shell Bhd, Kuala Lumpur, Malaysia; 2. Shell Global Solutions BV, Amsterdam, Netherlands; 3. Shell Research Ltd, London, United Kingdom

Metocean Criteria for the Fatigue Analysis of Subsea Pipelines  
OMAE2019-96363
Richard Gibson, Marios Christou
Offshore Consulting Group, London, United Kingdom

The Derivation and Interpretation of Directional Design Criteria  
OMAE2019-96386
Graham Feld1, Philip Jonathan1, David Randell1

On Environmental Contours for Marine Design  
OMAE2019-96857
Emma Ross1, Ole Christian Astrup2, Elizaeta M. Bitner-Gregersen2, Nigel Bunn2, Graham Feld3, Ben Gouldby4, Anne Huseby5, Ye Liu6, David Randell7, Erik Vannem7, Philip Jonathan8

CFD & FSI

8-5-2 VIV Theory and CFD & FSI Symposium Workshop
Thursday June 13  
Room SEC, Lomond Auditorium  |  15:30 – 17:30
Session Chair: Yiannis Constantinides, Chevron, USA
Session Co-Chair: Owen H. Oakley, Jr, Retired, USA

Dispersion Relation for Flow Induced Oscillations (VIV/Galloping) Revealed at the Fluid-Structure Interface  
OMAE2019-96823
Michael Bemtis, James Olfingbe, Jau-Uei Chen, Hai Sun
University of Michigan, Ann Arbor, MI, USA

Ocean Renewable Energy

9-2-6 Hybrid Systems and Farm Analysis
Thursday June 13  
Room SEC, Carron 1  |  15:30 – 17:30
Session Chair: Maurizio Collu, University of Strathclyde, United Kingdom
Session Co-Chair: K A Abhinav, University of Strathclyde, United Kingdom

Characterizing Impacts of Atmospheric Turbulence on Wind Farms through Large Eddy Simulation (LES)  
OMAE2019-95837
Jahaul Alam1, Anton Alnasasyev2, Jagdeep Singh3
1. Memorial University of Newfoundland, St John’s, NL, Canada; 2. University of British Columbia, Vancouver, BC, Canada

Development of a Hybrid Power Generation Platform Combining Floating Wind Turbine and Oscillating Water Column Wave Energy Converters  
OMAE2019-95968
Zheng Chen, Weijian Zeng, Ming Tan, Dahai Zhang, Yulin Si, Zhejiang University, Zhoushan, China

#OMAE2019  |  85
Design Methodology for a Floating Offshore Wind Turbine
Large-scale Outdoor Prototype OMAE2019-95979
Alessandro Fontanella, Federico Taruffi, Muggiasca Sara, Marco Belloli
Politecnico di Milano, Milano, Italy

Luis Recalde1, Hong You2, William Lethlid1, Olimpo Anaya-Lana1, Hongda Liu2, Jiang You3
1. University of Strathclyde, Glasgow, United Kingdom; 2. Harbin University, Harbin, China

Progress on the Development of a Holistic Coupled Model of Dynamics for Offshore Wind Farms, Phase II: Study on a Data-driven Based Reduced-order Model for a Single Wind Turbine OMAE2019-95542
Zi Lin1, Adrian-Mihai Stetco1, Jesus Carmona-Sanchez1, Debra Cevatof1
Maurizio Colla1, Goran Nenadic1, Ognjen Marjanovic2, Mike Barnes1
1. University of Strathclyde, Glasgow, United Kingdom; 2. Manchester University, Manchester, United Kingdom

Ocean Renewable Energy
9-3-3 Wave Energy: CFD Simulations
Thursday June 13 Room SEC, Carron 2 | 15:30 – 17:30
Session Chair: Jennifer van Rij, National Renewable Energy Laboratory, USA

A Validation of a Pivoted Point Absorber Type Wave Energy Converter using CFD OMAE2019-96030
Injun Yang, Tahnih Tsendogan, Atilla Inciçek
University of Strathclyde, Glasgow, United Kingdom

Extreme Load CFD Analysis and Verification for a Multi-body Wave Energy Converter OMAE2019-96197
Jennifer van Rij1, Yi-Hsien Yu2, Alan McCall2, Ryan Cox2
1. National Renewable Energy Laboratory, Golden, CO, USA; 2. Ecomerit Technologies, Santa Barbara, CA, USA; 3. Sandia National Laboratories, Albuquerque, NM, USA

A Study of Harbor Resonant Wave Energy Harvester OMAE2019-95325
Bang-Fuh Chen, Yun-Da Si
National Sun Yat-Sen University, Kaohsiung, Taiwan

Experimental and Numerical Analysis of Performance of Oscillating Column Water Wave Energy Converter Applicable to Breakwaters OMAE2019-95650
Sewn Park, Kyung-Hwan Kim, Bo Woo Nam, Jeong-Seok Kim, Keyyong Hong
Korea Research Institute of Ships and Ocean Engineering, Daejeon, Korea

Petroleum Technology
11-11-2 Innovations in Drilling, Production and Transport
Thursday June 13 Room Crowne Plaza, Barra | 15:30 – 17:30
Session Chair: Ming Feng, Chongqing University, China
Session Co-Chair: Wenting Qin, China University of Petroleum Beijing, China
Optimization of Temporary Plugging Parameters under Rough Fractures OMAE2019-95748
Lishan Yuan1, Fujian Zhou1, Jianbo Huang1, Ben Li2, Junjie Gao3, Caizhong Wang1, Yanxin Tan1
1. China University of Petroleum-Beijing, Beijing, China; 2. PetroChina Xinjiang Oilfield, Xinjiang, China

Study on Acid Fracturing Technology for Carbonate Reservoirs in Ordos Basin OMAE2019-95802
Lufeng Zhang, Fujian Zhou, Jianye Mou, Jie Wang, Jin Wang, Yuechun Wang
China University of Petroleum-Beijing, Beijing, China

The Tentative Case Study of Annulus Build Up Pressure in the Deepwater Gas Production Well in South China Sea OMAE2019-95847
Ming Feng
Chongqing University, Chongqing, China

Study on Desulfurization and Decarbonization Technology of Natural Gas on Bohai Offshore Platform OMAE2019-96733
Ping Lu, Zhaoguang Gu, Guoqiang Gao, Yan Huang, Xin Qian, Lin Cheng
Bohai Oilfield Research Institute, Tianjin Branch, CNPC China Limited, Tanggu, China

Takeshi Kinoshita Honoring Symposium on Offshore Technology
13-3-1 Wind Energy
Thursday June 13 Room SEC, Boisdale 2 | 15:30 – 17:30
Session Organizer: Tomoaki Utsunomiya, Kyushu University, Japan
Session Co-Organizer: Hideyuki Suzuki, University of Tokyo, Japan

Weather Vane Performance and Stability Analysis of Single Point Moored FOWTs under Wind-current Coexisting Field OMAE2019-95404
Sharath Srinivasasumurthy1, Kazuki Hashimoto2, Kazuhiro Iijima3, Yasunori Nihel2
1. Osaka Prefecture University, Osaka, Japan; 2. Dept of NAOE, Osaka University, Osaka, Japan

New Spar Design for Floating Offshore Wind Turbine with Damping Plates OMAE2019-95688
Shigehsuke Ishida, Yasutaka Imai
Saga University, Saga, Japan

Comparison of Dynamic Response in a 2MW Floating Offshore Wind Turbine during Typhoon Approaches OMAE2019-95889
Koji Tanaka1, Iku Sato2, Tomoaki Utsunomiya2, Hiromu Kakin1
1. TODA CORPORATION, Tokyo, Japan; 2. Kyushu University, Fukuoka, Japan

Response Characteristics of a Floating Structure with Moon Pools Installed with Vertical-axis Wind Turbines OMAE2019-96045
Mitsuru Nakamura1, Tomoki Ikoma2, Tomoaki Utsunomiya2, Iku Sato3, Koichi Masuda4
1. Toda Corporation, Tokyo, Japan; 2. Kyushu University, Fukuoka, Japan; 3. Hitachi, Ltd, Hitachi-shi, Japan

Farewell Reception
17:30 – 19:00
Location: Argyll Suite, Crowne Plaza
See Social Events, page 14 for more details.

Sponsored by Greater Ft. Lauderdale Convention Bureau

THURSDAY 15:30 – 19:00
Technical Tours: Friday, June 14

The Local Organizing Committee has arranged two technical day tours that promise to be an excellent addition to your conference experience. On Friday, June 14th you have the option of a morning tour of either the University of Strathclyde’s Advanced Forming Research Centre (AFRC) or the Glasgow Subsea 7 facilities. Both tours will join together for lunch and then visit the Falkirk Wheel for a boat tour of the world’s only rotating boatlift. A stop to visit the iconic Kelpies is included on the way to the Wheel.

Tour 1: Advanced Forming Research Centre (AFRC) and Falkirk Wheel
Tour 2: Subsea 7 and Falkirk Wheel

Registration: Pre-purchased tickets for the tour are provided with your name badge. Additional tickets will be for sale at the Registration Desk if space is still available.

Meeting Point for Technical Tour: Main Entrance / Lobby of the Crowne Plaza Hotel

Technical Tour Departure Times:
- Subsea 7 and Falkirk Wheel Departure: 08:30
- Advanced Forming Research Centre (AFRC) and Falkirk Wheel Departure: 09:15

Approximate Return Time: 18:30

Technical Tour Ticket: £65 (includes 20% VAT, lunch and Falkirk Wheel boat admission)

Advanced Forming Research Centre
The University of Strathclyde’s Advanced Forming Research Centre (AFRC) is a globally-recognised centre of excellence in innovative manufacturing technologies, engineering research and development, and metal forming and forging research.

For almost a decade the centre has been at the heart of manufacturing research in Scotland. It is the only High Value Manufacturing Catapult centre in the country, one of only 7 in the UK making it the critical link between manufacturers in Scotland and the rest of this world-class network of manufacturing innovation and expertise.

The AFRC helps to fill the gap between fundamental academic research and industry. We help companies to turn innovative technologies and ideas into a commercial reality that will increase their competitiveness, boost their business and secure the manufacturing sector in Scotland and the UK for generations to come.

We offer world-class expertise and cutting edge technologies that help firms develop solutions that bring about real business benefits for companies of all sizes from across the UK and internationally.

Subsea 7
Subsea 7 is a global leader in the delivery of offshore projects and services for the evolving energy industry.

Subsea 7’s Global Pipeline Welding Development Centre is a world-class facility that supports the continued development of leading-edge welding and material technology to meet demands of high-integrity pipelines for the subsea oil and gas industry. Built in 2013 it serves as a technical authority for the rolling-out of welding enhancements and polymer lining solutions to all Subsea 7 fabrication bases globally.

The centre provides and uses:
- Integrated R&D welding and inspection capability
- Pre-fabrication welding qualification and procedures
- Wide range of welding technologies & solutions
- Ultrasonic & radiographic NDE testing
- Laboratory & sectioning capability.
- Home to Swagelining, the world’s leading polymer lining specialist for subsea pipelines

Falkirk Wheel
The Falkirk Wheel is a rotating boat lift in central Scotland, connecting the Forth and Clyde Canal with the Union Canal. The lift is named after Falkirk, the town in which it is located. It reconnects the two canals for the first time since the 1930s. It opened in 2002 as part of the Millennium Link project.

The wheel raises boats by 24 metres (79 ft), but the Union Canal is still 11 metres (36 ft) higher than the aqueduct which meets the wheel. Boats must also pass through a pair of locks between the top of the wheel and the Union Canal. The Falkirk Wheel is the only rotating boat lift of its kind in the world, and one of two working boat lifts in the United Kingdom, the other being the Anderton Boat Lift.
13th Annual Outreach for Engineers Specialty Forum

“I have learned a lot on so many levels and I am so thankful to the Committee for having granted me a scholarship for this event. The forum has given me great insights on what working in industry could represent and thanks to that I am now considering new stimulating options for my future career.”

—Comment from an Outreach attendee.

Overview
The Ocean, Offshore and Arctic Engineering Division (OOAE) of ASME is hosting a specialty forum at the 2019 International Conference on Ocean, Offshore and Arctic Engineering (OMAE) in Glasgow, United Kingdom. The specialty forum is designed for students and early professionals who may not be familiar with the industry as well as those who have already specialized in this area.

This is the thirteenth year of the Outreach for Engineers Forum. Highlights of the Forum will include presentations of the various technologies required (e.g. from ocean and/or offshore engineering, civil engineering, petroleum engineering, aerospace engineering, mechanical/structural engineering and project management), types of job opportunities, possible career paths and a team building activity. As each year is different, a site tour or job fair may be included.

In addition, Outreach for Engineers Specialty Forum delegates will be provided with the opportunity to participate at OMAE 2019 as full conference delegates. This conference will showcase over 900 technical papers from engineers and scientists from around the world, with 13 Symposia representing the range of technologies.

Attendee Profile
- Senior Undergraduate Students enrolled in Engineering or Science Curricula
- Graduate Students (both Master and Doctoral levels) with specialization in fields such as ocean and/or offshore engineering, civil engineering, mechanical engineering, petroleum engineering, and aerospace engineering
- Early professionals with an interest in the oil & gas industry and ocean, offshore & arctic engineering

Scholarships
Through funding provided by the OOAE Division of ASME and corporate sponsors, the organizers of the Outreach to Engineers Specialty Forum will be offering scholarships to cover registration costs and a limited number of travel subsidies. The scholarships are open to students and early professionals from around the world. If you qualify and have not been a recipient yet, please feel free to apply for OMAE 2020 on the conference website.

Conference Schedule with Outreach Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday, June 8</td>
<td>Outreach Team Building Exercise</td>
<td>17:00 – 19:00</td>
<td>Staffa/Shuna (Crowne Plaza)</td>
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<tr>
<td>Saturday, June 8</td>
<td>Outreach Welcome Dinner</td>
<td>19:00</td>
<td>Off-site</td>
</tr>
<tr>
<td>Sunday, June 9</td>
<td>Outreach Welcome &amp; Introductions plus Industry Presentations</td>
<td>08:00 – 17:00</td>
<td>Castle 1 (Crowne Plaza)</td>
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<tr>
<td></td>
<td>OMAE 2019 Conference Registration</td>
<td>13:00 – 20:00</td>
<td>Hall 5 (SEC)</td>
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<td></td>
<td>OMAE 2019 Conference Welcome Reception</td>
<td>18:30 – 20:30</td>
<td>Glasgow Science Centre</td>
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<tr>
<td>Monday, June 10</td>
<td>OMAE 2019 Conference</td>
<td>See detailed program for session locations and times.</td>
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<tr>
<td>Tuesday, June 11</td>
<td>OMAE 2019 Conference</td>
<td>See detailed program for session locations and times.</td>
<td></td>
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<tr>
<td>Wednesday, June 12</td>
<td>OMAE 2019 Conference</td>
<td>See detailed program for session locations and times.</td>
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<tr>
<td></td>
<td>OMAE 2019 Conference Banquet</td>
<td>19:00 – 24:00</td>
<td>Merchant Square</td>
</tr>
<tr>
<td>Thursday, June 13</td>
<td>Outreach Breakfast / Feedback Session</td>
<td>07:30 – 10:00</td>
<td>Alsh 2 (SEC)</td>
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<tr>
<td>Friday, June 14</td>
<td>OMAE 2019 Conference</td>
<td>See detailed program for session locations and times.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OMAE Technical Tour (Optional)</td>
<td>See Technical Tour on page 87 for locations and times.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Outreach only events are bolded.
Invitation to OMAE 2020

Please join us for the 39th International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2020) in Fort Lauderdale, Florida, USA June 28 – July 3.

Located in southeast Florida, Fort Lauderdale is home to Port Everglades, one of the top three cruise ports in the world and among the most active containerized cargo ports in the United States. It is South Florida’s main seaport for petroleum products including gasoline and jet fuel.

The City of Fort Lauderdale is famous for its award-winning, palm-fringed, golden-sand beaches, arts, culture and events. It provides a water-centric culture from the ocean and blue wave beaches to the exotic Everglades, and includes shopping malls, fine dining, entertainment, boat rides along canals, and golf courses. The City features a landscaped beachfront promenade, luxury hotels, a front to its historic New River, and mansions and yachts dotting its Millionaires Row. The Stranahan House is a preserved 1900s home furnished with antiques of the era. The “red brick road” of Riverwalk leads to the Arts and Entertainment District, where the Museum of Discovery and Science typically has substantial exhibits with thousands of visitors annually. The NSU Art Museum is home to diverse and innovative collections of art from around the world. The City’s Flamingo Gardens features over 3000 species of tropical plants and a sanctuary of 90 native wildlife species.

OMAE 2020 will be hosted by the Department of Ocean and Mechanical Engineering (OME) and its Institute for Ocean and Systems Engineering (IOSE) at Florida Atlantic University, one of ten state universities in Florida with a student body of 30,000 students. The Department is part of FAU’s College of Engineering and Computer Science and offers B.S., M.S. and PhD degrees in ocean engineering and mechanical engineering. The ocean engineering program, initiated in 1965 as the world’s first undergraduate program of its kind, aims to provide an outstanding academic environment for education, research, and development of ocean technologies. IOSE, established in 1999 as an extension of the ocean engineering program, is located on eight acres of land between the Atlantic Ocean and the Intra Coastal water-way at FAU’s SeaTech campus in Dania Beach. The Department and IOSE have been involved in a period of sustained sponsored research activity over the past twenty years, culminating in an aggregate of over $60 million expenditures in ocean engineering research and technology development, together with granting of over 400 degrees in ocean engineering. The Institute has research focus areas in marine vehicles, hydrodynamics and physical oceanography, marine materials and corrosion, control and automation, nano-composites, and acoustics and vibrations. It provides the means for technology advancement, and transition of research products to applications. R&D projects at IOSE have included unmanned underwater and surface vehicles, multi-domain, multi-vehicle maritime autonomy, ocean energy technologies, air-deployable buoys, durability of fiber-reinforced concrete and composite materials in seawater, nano-composites, underwater communication, and seabasing technologies. These projects complement basic research in ocean engineering as well as training and education of the next generation of ocean engineering workforce.

A strong technical program in offshore engineering is being put together for OMAE 2020, with thematic foci on renewable ocean energy and automation in maritime systems. The technical tours will include a visit to Port Everglades. The social program will include water and sports activities, shopping tours, everglades airboat adventure, Intracoastal boat tours, and much more.

We very much hope you can join us for OMAE 2020 and look forward to welcoming you to Fort Lauderdale next year.

—Professor Manhar R. Dhanak
Conference Chair, OMAE 2020
Professor and Chair, Dept. of Ocean and Mechanical Engineering
Director, Institute for Ocean and Systems Engineering
Florida Atlantic University, USA

—Professor Ronald W. Yeung
Conference Co-Chair, OMAE 2020
Distinguished Professor (E.) of Hydromechanics and Ocean Engineering
University of California at Berkeley, USA
We welcome you to the 39th ASME International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2020) to be held in Fort Lauderdale, Florida, United States from June 28 – July 3, 2020.

Abstract Submission is now open!

Please visit the OMAE 2020 conference website (www.asme.org/events/omae) to view the conference details.

Following OMAE 2019, we anticipate another successful conference showcasing the excellent technical content that OMAE has become known for internationally.

**Abstract/Paper Submission Guidelines**
Authors should submit a title/abstract to begin the paper submission process. Prior to the date noted below, authors should then submit full-length manuscripts for peer review. Draft manuscripts and final-paper submissions must conform to ASME publication guidelines.

**Important Dates and Information**
- **Monday, November 4, 2019** – Deadline for Abstract Submission
  
  NOTE: Abstracts submitted to individual topics will be automatically accepted by the system and assigned a paper number. Submission of the draft paper for review must be before the stated deadline. Presentation-only abstracts must be 400–650 words.
- **Monday, January 13, 2020** – Full-length Draft Paper Submission
- **Monday, February 17, 2020** – Notification of Draft Paper Acceptance / Rejection
- **Monday, March 30, 2020** – Final Paper Submission

For the full publications schedule and to submit your Abstract and Draft Paper, please visit www.asme.org/events/omae.

**PLEASE NOTE THAT THESE DEADLINES ARE FIRM AND WILL NOT BE EXTENDED.** Due to the tremendous success of the OMAE conferences, the number of papers has increased steadily over the years hence we need to uphold firm deadlines to ensure proper management of the review and publication process. Your cooperation in adhering to the publication schedule and making OMAE 2020 a success will be greatly appreciated.

We ask that you return home from OMAE 2019 and start working on your Abstract and Full-length Draft Paper soon! We look forward to your contribution to a very successful OMAE 2020.

Sincerely,

Professor Manhar R. Dhanak  
Conference Chair, OMAE 2020  
Professor and Chair,  
Department of Ocean and Mechanical Engineering  
Director, Institute for Ocean and Systems Engineering  
Florida Atlantic University, USA

Professor Ronald W. Yeung  
Conference Co-Chair, OMAE 2020  
Distinguished Professor (E.) of Hydromechanics and Ocean Engineering  
University of California at Berkeley, USA

Professor Antonio C. Fernandes  
Technical Program Chair, OMAE 2020  
Head, Ocean Engineering Program of COPPE/UFRJ LOC (Laboratório de Ondas e Correntes – Waves and Currents Laboratory), Coordinator LabOceano,  
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