

STRUCTURAL INTEGRITY 2019: 9th-10th September 2019, Aberdeen, UK

2<sup>nd</sup> International Conference on Structural  
Integrity for Offshore Energy Industry

# STRUCTURAL INTEGRITY 2019

Aberdeen, UK

9th-10th September 2019

Organised by

**ASRANet**

PRELIMINARY PROGRAMME

*Special issues of Elsevier's International Journal of Fatigue and Taylor & Francis' Journal of Structural Integrity and Maintenance will be published comprising extended versions of selected papers presented at the conference.*

[www.asranet.co.uk](http://www.asranet.co.uk)

## About the Conference

The marine, offshore and subsea energy industry continues to evolve creating new challenges and risks for the safety, integrity and reliability of its structures and systems. For example, wells are being drilled at greater depths, pressures and temperatures, requiring enhanced assessment of the integrity of structures and systems in such extreme conditions. There is a push to expand operations into new locations such as the Arctic, where environmental and operational conditions are considerably harsher. Many assets in the North Sea are rapidly reaching or have already exceeded their original design life and safe but affordable life extension and decommissioning are becoming major objectives. The recent rapid developments in renewable energy technologies have introduced new challenges of maintaining at minimum cost the reliability and integrity of structures and equipment in remote locations and subjected to extreme loads and environmental conditions. There are also exciting new opportunities, but also significant challenges and uncertainties, in applying structural health and condition monitoring, robotics and the novel concepts of additive manufacturing and big data to safety and structural integrity. These and many additional traditional and emerging themes will be covered during the conference through survey, focused and/or case study presentations from the practitioners and researchers in the art and science of structural integrity.

The conference will bring together researchers and practitioners to discuss and address the current and emerging issues and challenges, as well as share successes and state-of-the-art and practice, in structural integrity, safety and reliability of energy industry's marine, offshore and subsea structures and systems. It will feature keynote and invited papers providing broader overviews of the main contemporary themes as well as more focused presentations addressing specific issues of practical relevance. Ample opportunities for informal discussions, sharing of insights and networking will be available.

## Conference Themes

Fatigue, fracture, corrosion, erosion and abrasion

Deterministic deterioration models and analysis

Probabilistic deterioration models and analysis

Dealing with uncertainty in structural integrity assessment

Structural integrity under extreme loads and in extreme environments

Probabilistic computational mechanics and numerical methods

Structural integrity of fixed, floating and submerged structures

Structural integrity of wells, pipes and risers

Structural integrity of wind and tidal turbines and wave energy extractors

Life-cycle assessment, asset integrity management decisions and optimization

Safe and efficient asset life extension

Reusable structures and repowering

Structural integrity in decommissioning

Design for integrity, inspectability and extended safe lifespan

Component and system reliability

Multi-scale material, defect and damage modelling

Structural health and condition monitoring

Non-destructive testing and evaluation

Intelligent use of monitored data

'Digital twins' for structural integrity

Structural integrity of additively manufactured materials

Integrity protection technologies

Industry codes and guidelines

Case studies in structural integrity, safety and reliability

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## International Advisory Committee

**Dr RV Ahilan**, London Offshore Consultants, UK  
**Dr Bostjan Bezensek** Shell, UK  
**Prof Sang-Rai Cho** University of Ulsan, Korea  
**Prof Soren Ehlers**, NTNU, Norway  
**Prof Tat-Hean Gan**, TWI, NSIRC & Brunel University, UK  
**Prof AM Korsunsky** University of Oxford, UK  
**Prof Bernt Leira**, NTNU, Norway  
**Mr Satheesh Manayankath**, Health and Safety Executive, Energy Division, UK  
**Mr Mark Manzocchi**, Atkins, UK  
**Prof Liviu Marsavina**, Politehnica University of Timisoara, Romania  
**Dr Mike Mulheron** University of Surrey, UK  
**Dr Mohammad Nabavian**, Wood, UK  
**Dr Helena Polezhaeva**, Independent, France  
**Prof Jeom Paik**, University of Pusan, Korea & University College London, UK  
**Dr Cesare Marie Rizzo**, University of Genoa, Italy  
**Dr Suhas Vhanmane**, Indian Register of Shipping, India

## Keynote Speakers

**Prof. Kamran Nikbin**, Imperial Collage, UK  
**Prof. Tat-Hean Gan**, TWI, NSRIC and Brunel University, UK

## Invited

**Mr Mark Manzocchi**, Atkins, UK  
**Dr Xiaokang Yin**, China University of Petroleum, China  
**Dr Mike Mulheron**, University of Surrey, UK  
**Mr Hugh Martindale**, Agiletek, UK  
**Dr Mohammad Nabavian**, Wood, UK  
**Prof Dimitrios G. Pavlou**, University of Stavanger, Norway  
**Dr Erik Vanem**, DNVGL  
**Dr Claudio Ruggieri**, University of Sao Paulo, Brazil  
**Dr Ali Mehmanparast**, Cranfield University, UK

## Organising Committee

**Prof Purnendu Das**, *ASRANet Ltd, UK*  
**Dr Piotr Omenzetter**, *The University of Aberdeen, UK*

## Registration Fees

Full Registration:	£400
Student Registration:	£200

8:30—8:55	DELEGATE REGISTRATION
8:55—9:00	<b>WELCOME ADDRESS:</b> PURNENDU DAS, ASRANET LTD, UK
9:00—9:40	<b>KEYNOTE PAPER:</b> DEVELOPMENT OF ADVANCED NDT TECHNIQUES FOR NON-METALLIC POLYETHYLENE PIPES <b>TAT-HEAN GAN</b> , TWI, NSRIC AND BRUNEL UNIVERSITY, UK
9:40—10:10	<b>INVITED PAPER:</b> RELIABILITY-BASED INTEGRITY MANAGEMENT OF OFFSHORE PLATFORMS <b>MARK MANXOCCHI</b> , ATKINS, UK
10:10—10:40	<b>INVITED PAPER:</b> NOVEL ELECTROMAGNETIC NON-DESTRUCTIVE EVALUATION TECHNIQUES FOR ASSESSMENT OF STRUCTURE INTEGRITY <b>XIAOKANG YIN</b> , UNIVERSITY OF PETROLEUM, MALAYSIA
10:40—11:10	<b><u>BREAK</u></b>
11:10— 11:40	<b>INVITED PAPER:</b> DETERIORATION OF OFFSHORE ENERGY INFRASTRUCTURE: MECHANISMS, MODELLING AND RISK MANAGEMENT <b>MIKE MULHERON</b> , UNIVERSITY OF SURREY, UK
11:40— 12:10	<b>INVITED PAPER:</b> VALUE OF INFORMATION AND FATIGUE RELIABILITY ANALYSIS OF MONOPILE FOUNDATION SUBSTRUCTURES OF OFFSHORE WIND TURBINE <b>PIOTR OMENZETTER</b> , UNIVERSITY OF ABERDEEN, UK
12:10—12:40	<b>INVITED PAPER:</b> DETERMINISTIC MODELS FOR FATIGUE DESIGN OF OFFSHORE STRUCTURES <b>DIMITRIOS PAVLOU</b> , UNIVERSITY OF STAVANGER, NORWAY
12:40—14:00	LUNCH
14:00— 14:30	<b>INVITED PAPER:</b> FRACTURE ASSESSMENTS OF DISSIMILAR GIRTH WELDS IN CRA -CLAD SUBSEA PIPELINES AND RISERS <b>CLAUDIO RUGGIERI</b> , UNIVERSITY OF SAO PAULO, BRAZIL
14:30—15:00	<b>INVITED PAPER:</b> ENVIRONMENTAL CONTOURS FOR SAFE DESIGN OF SHIPS AND OTHER MARINE STRUCTURES <b>ERIK VANEM</b> , DNV GL, NORWAY
15:00—15:30	<b>INVITED PAPER:</b> INTEGRITY AND REMAINING LIFE ASSESSMENT THROUGH SMALL SAMPLE ANALYSIS OF HIGH TEMPERATURE AND PRESSURE ENGINEERING COMPONENTS <b>DANIE HATTINGH</b> , NELSON MANDELA UNIVERSITY, SOUTH AFRICA
15:30—16:00	<b><u>BREAK</u></b>
16:00—16:30	<b>INVITED PAPER:</b> STRUCTURAL INTEGRITY OF REELED PIPELINE FOR OFFSHORE APPLICATIONS USING ELASTIC-PLASTIC FRACTURE MECHANICS <b>NOEL O'DOWD</b> , UNIVERSITY OF LIMERICK, IRELAND
16:30—17:00	<b>INVITED PAPER:</b> STRUCTURAL INTEGRITY ASSESSMENT OF OFFSHORE WIND TURBINE MONOPOLE FOUNDATIONS <b>ALI MEHMANPARAST</b> , CRANFIELD UNIVERSITY, UK
17:00—18:30	<b>DRINK NETWORKING SESSION</b>
19:00	<b>CONFERENCE DINNER</b>

## ROOM NUMBER:

- 9:00—9:40      **KEYNOTE PAPER:** FRACTURE MECHANICS-BASED STRUCTURAL INTEGRITY OF OFFSHORE STRUCTURES  
**KAMRAN NIKBIN**, IMPERIAL COLLEGE, UK
- 9:40—10:10      **INVITED PAPER:** ENGINEERING CRITICAL ASSESSMENT FOR SUBSEA PIPELINES SUBJECTED TO CORROSION FATIGUE.  
**ANKANG CHENG, NIAN-ZHONG CHEN**, TIANJIN UNIVERSITY, CHINA  
**YONGCHANG PU**, NEWCASTLE UNIVERSITY, UK
- 10:10—10:40      **INVITED PAPER:** AN IMAGED BASED FEA-DIC APPROACH FOR THE CHARACTERISATION OF STRESS/STRAIN LOCALISATION IN REAL LOCALISED CORROSION DEFECTS.  
**NICOLAS LARROSA**, BRISTOL UNIVERSITY, UK
- 10:40—11:10      **BREAK**
- 11:10-11:40      **INVITED PAPER:** SUBSEA POWER CABLE STRUCTURAL ANALYSIS  
**HUGH MARTINDALE**, AGILETEK, UK
- 11:40—12:00      **PAPER:** DATA-DRIVEN ANALYSIS FOR STRUCTURAL HEALTH MONITORING OF AN OFFSHORE WIND TURBINE  
**STUART KILLBOURN, R. PATIL, C WATT**, FUGRO, UK
- 12:00— 12:20      **PAPER:** REASSESSMENT OF AGING OFFSHORE STRUCTURES  
**STEVEN COULL, MICHAEL MCDONALD**, DNV GL, UK
- 12:20-12:40      **PAPER:** FATIGUE CRACK PROPAGATION IN RESIDUAL STRESS FIELD GENERATED BY SIDE-PUNCHING IN THICK SECTION X65 PIPELINE STEEL: EXPERIMENTS AND NUMERICAL SIMULATIONS USING 3D-FE ADAPTIVE REMESHING TECHNIQUE  
**A SAME**, UNIVERSITY OF COVENTRY, UK
- 12:40-14:00      **LUNCH**
- 14:00-14:20      **PAPER:** TEMPORAL VARIABILITY IN PREDICTION MODELLING OF SCALE PROPAGATION IN WELLS  
**YUE GUAN**, AALBORG UNIVERSITY, DENMARK
- 14:20-14:40      **PAPER:** TBC  
**JENNY MCEWENS**, TECHNIPFMC (TBC)
- 14:40-15:00      **PAPER:** NUMERICAL MODELLING APPROACHES FOR LARGE-SCALE GROUTED CONNECTIONS OF OFFSHORE WIND TURBINES UNDER AXIAL AND LATERAL LOADINGS  
**N. MULLER**, UNIVERSITY OF NANTES, FRANCE, FRAUNHOFER INSTITUTE FOR WIND ENERGY SYSTEMS IWES, DENMARK  
**M. KOHLMEIER, S. SPILL**, FRAUNHOFER INSTITUTE FOR WIND ENERGY SYSTEMS IWES, DENMARK  
**D. LEDUC & F. SCHOEFS**, UNIVERSITY OF NANTES, FRANCE

## PARELLEL SESSION DAY 2—10TH SEPTEMBER

**ROOM NUMBER:**

- 11:40—12:00      **PAPER:** RELIABILITY BASED DESIGN PROCEDURE FOR DESIGN OF WIND TURBINE FOUNDATIONS WITH ADEQUATE BUT NOT EXCESSIVE LEVEL OF SAFETY  
**PURNENDU DAS**, ASRANET LTD, UK
- 12:00—12:20      **PAPER:** FRACTURE MECHANICS ANALYSIS FOR MOORING CHAIN LINKS OF A SEMI-SUBMERSIBLE OPERATED AT THE OFFSHORE WEST AFRICA (OWA).  
**XUTIAN XUE, NIAN-ZHONG CHEN**, TIANJIN UNIVERSITY, CHINA  
**YONGCHANG PU**, NEWCASTLE UNIVERSITY, UK
- 12:20-12:40      **PAPER:** APPLICABILITY OF LOCAL FATIGUE APPROACHES TO A WELDED THIN TUBE-TO-PLATE JOINT  
**MICHAEL KRENZEL**, KIEL UNIVERSITY OF APPLIED SCIENCES, GERMANY
- 12:40-14:00      **LUNCH**
- 14:00-14:20      **PAPER:** RISK-BASED OPTIMAL STRATEGY FOR INSPECTION AND MAINTENANCE OF SUB-SURFACE WELLS SUBJECT TO SCALING  
**AKINYEMI OLUBENGA AKINSANYA**, AALBORG UNIVERSITY, DENMARK
- 14:20-14:40      **PAPER:** FINITE ELEMENT MODELLING OF STRESS CORROSION IN BURIED PIPELINES  
**A.H WORDU & K.F. TEE**, UNIVERSITY OF GREENWICH, UK

## KEYNOTE SPEAKERS

**Prof. Kamran Nikbin, Imperial Collage, UK**

***'Fracture mechanics-based structural integrity of offshore structures'***

Prof. Kamran Nikbin has worked at Imperial College, London since 1979 and holds the Royal Academy/British Energy Research Chair in Structural Integrity at the Mechanical Engineering Department. He has over 200 peer reviewed publications. His aim has been to direct the Advanced Metals Group's research activities to achieve an overall goal of developing failure predictive techniques using fracture and continuum damage mechanics, micro to meso-scale multi-scale modelling techniques and validating the results with appropriate experiments. He has vast experience in advanced structural alloy structural failure response under creep, fatigue and environmental corrosion and degradation. He has been involved with industry and research establishments on numerous multi-disciplinary projects dealing with different aspects of fracture ranging from cryogenic to very high temperatures. His main impetus has been in high temperature creep/fatigue crack growth by considering the experimental, metallurgical, micro-modelling and numerical predictions. His interdisciplinary approach to structural integrity has advanced the high temperature design and life assessment modelling methodologies available to R&D.

**Prof. Tat-Hean Gan, TWI, NSRIC and Brunel University, UK**

***'Development of advanced NDT techniques for non-metallic polyethylene pipes'***

Tat-Hean Gan graduated with first-class honours degree in electrical and electronics engineering from the University of Nottingham. He went on to pursue his M.Sc. degree in Advanced Mechanical Engineering and graduated with a distinction from the University of Warwick in 1998, and continued his Ph.D. studies in Engineering specializing in advanced ultrasonic imaging at the same University. In 2006, he completed his Executive MBA degree at the University of Birmingham. He has worked as an academic and in industry for many years. He has published more than 100 papers and has contributed to several books in the field of non-destructive testing (NDT). Tat-Hean is currently a Professor at Brunel University London, where he is also the chair of acoustic Waves Technologies in the School of Engineering and Design. He is also the Director of the Brunel Innovation Centre (BIC).



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## About Aberdeen

Aberdeen is a thriving city – with people working and studying here from across the world, attracted as to Europe's capital of energy (both O&G and renewables) and offshore and subsea industries with many of the main players and supply chain/services providers having a strong presence. The city itself is home to several museums including the Tolbooth Museum, Aberdeen Maritime Museum, Gordon Highlanders Museum and the Zoology Museum. Scotland's first centre of science and discovery can also be found near Aberdeen Beach and there are a great selection of cultural attractions, with several theatres and art galleries across the city. Equally well-known for its shopping, the city's Union Square (adjacent to Aberdeen Railway Station) has over 50 top shopping brand stores (including MAC, BOSS, Apple and ZARA), and 30 restaurants, as well as a 10-screen cinema. Nearby, the connecting Trinity Shopping Centre is home to a large Primark and Debenhams, and many other shops. Aberdeen's rivers and the North Sea are also home to a host of wildlife, and even dolphins have found a home here. These fascinating mammals are regularly seen playing at the mouth of Aberdeen's working harbour; Dolphin Watch, located at the vantage point of Torry Battery, is open seasonally to help visitors spot these urban dolphins. If you like you can also take on of Aberdeen Harbour Cruises, providing a great opportunity to experience a different viewpoint of the city as well as get up close to wildlife. Aberdeenshire is also home to a large number of traditional castles and outdoor activities. For those attendees that enjoy hiking and hillwalking, Aberdeen acts a great starting point for exploring the Cairngorms National Park.

## Getting Here

Getting to Aberdeen is simple, with a whole variety of transport options available to those travelling, and the city can be reached by road, rail, or sky. Once in the city there are excellent transport links throughout the area meaning most destinations are easily accessible by public transport, taxi or car. For those driving, Aberdeen is approximately 2.5 hours' drive from Edinburgh or Glasgow. Well sign-posted, the surrounding area of Aberdeenshire is within close proximity of Aberdeen with the towns and villages easy to get to by major country and main roads. For those flying, Aberdeen International Airport is located just six miles from Aberdeen city centre and is within easy reach of Aberdeenshire by bus or taxi. The region is well connected globally with daily flights to all major airports including all three London airports, Frankfurt, Paris and Amsterdam. The international airport also has many direct routes to most UK cities as well as many key European destinations. For more information you can visit Aberdeen Airports website [HERE](#). Aberdeen's railway station right in the heart of the city (next to the main shopping centre, Union Square), has frequent, fast and reliable services to and from all Scotland's major cities. Travel on one of the hourly trains from Glasgow and Edinburgh or use the east coast line to travel from cities such as York or Newcastle. For timetables and to book your train tickets to Aberdeen visit the Scotrail website [HERE](#). For those preferring to travel overnight, Aberdeen can also be reached from London on the Caledonian Sleeper. Visit the Caledonian Sleeper website [HERE](#) for more information about this service.

## Accommodation

[Jurys Inn Aberdeen](#)  
[Hotel ibis Aberdeen Centre](#)  
[Travelodge Aberdeen Central](#)  
[Mercure Aberdeen Caledonian Hotel](#)

[Aberdeen Douglas Hotel](#)  
[Hilton Garden Inn Aberdeen City Centre](#)  
[DoubleTree by Hilton Hotel Aberdeen Treetops](#)  
[Premier Inn Aberdeen City Centre](#)



## CONFERENCE VENUE

**DOUBLETREE BY HILTON ABERDEEN TREETOPS**

**161 SPRINGFIELD RD, ABERDEEN**

**AB15 7AQ**

DoubleTree by Hilton Aberdeen Treetops is a quiet retreat in the leafy West End of the city, with close links to Aberdeen Airport, Aberdeen Exhibition and Conference Centre (AECC) and the City Centre. Enjoy a scenic and relaxing location, and reach local restaurants, bars and shopping centres with ease. We're also near golf courses, parks, whisky trails and family-friendly attractions, and we provide quick access to motorways and complimentary car parking.

## DRINK NETWORKING SESSION

**17:00—18:30**

## CONFERENCE DINNER VENUE

**DOUBLETREE BY HILTON ABERDEEN TREETOPS**

**161 SPRINGFIELD RD, ABERDEEN**

**AB15 7AQ**

**Special Delegate Rate - Doubletree by Hilton**

**£70 per night: Single with Breakfast**

**£80 per night: Double with Breakfast**



## Sponsorship & Exhibition Space

### Sponsorship

Cost        £1500 + VAT

#### Package Includes:

- 2 Free Delegate Registration
- Company Logo in the Conference Programme
- Company Logo in the Book of Abstracts
- Company Advert in the Book of Abstract (A4 Size)
- Advert in the Conference Proceedings

### Exhibition

Cost        £1200 + VAT

#### Package Includes:

- 1 Free Delegate Registration
- 1 Display table (1800 x 1200 mm) in Breakout Area
- Display material: Published material, Structural component
- Display Banners

### Sponsorship Package + Exhibition Package

Cost        £2100 + VAT

- 2 Free Delegate Registrations
- 1 Display Table (1800 x 1200 mm) in Breakout Area
- Display Material: Published Material, Structural Component
- Display Banners
- Company Logo in the Conference Programme
- Company Logo & Advert in the Book of Abstracts (A4 Size)
- Advert in the Conference Proceedings