

23rd — 24th May 2019 | Glasgow, UK



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2nd International Conference on
Health Monitoring of Civil & Maritime Structures

HeaMES 2019

PRELIMINARY PROGRAM

Sponsored by



HeaMES 2019

About the Conference

There is an urgent need for further progress in structural health monitoring for both civil and maritime structures. Maximising the availability and productivity of onshore and offshore infrastructure and marine vessels, whilst operating them safely and with minimal impact on the environment, is of major concern to operators. Many such structures are unique, e.g. ships such as FPSOs have specific constraints, loading characteristics and damage consequences that make them different to other offshore installations and conventional ships, and often more challenging to maintain and operate. Market research shows that there is a need for efficient SHM which could facilitate structural, fatigue and corrosion analyses and underpin risk based inspections to address the structural integrity of onshore and offshore structures. Radical developments in the telecommunication, sensor and data processing technologies are transforming the way that asset management is conceived and carried out. Sensors and structural health monitoring systems are increasingly becoming an integral part of new and existing buildings, bridges, offshore structures and installations, and vessels. Sensing arrays can be permanently connected to distributed management networks so that owners, users, and in general, all those involved in the management process - connected via the Internet - can query in real time condition and performance during construction and operation. Whereas today the structural engineer conceives the single building or bridge as a stand-alone project, in future it is likely that structures will be regarded as nodes of a complex infrastructure network. Design specifications, real-time operation, and any decision on maintenance, upgrading and reconstruction of the single node will reflect the management policy of the whole system, properly accounting for concepts such as cost, risk and sustainability and structural health monitoring will play a critical role in these transformed approaches.

HeaMES 2019 provides an ideal platform for innovative industry and practitioners, leading researchers, technology developers, and supply chain partners to meet. Bringing the pioneering experts together, the conference aims to promote exchange of ideas, recent research and ways forward to application and commercialisation.

Technical Advisory Panel

Prof. Sören Ehlers, *Hamburg University of Technology, Germany*

Prof. Michael Havbro Faber, *Aalborg University, Denmark*

Prof. Dan Frangopol, *Lehigh University, USA*

Prof. Nenad Gucunski, *Rutgers University, USA*

Dr Daniele Inaudi, *Switzerland*

Dr Abhishek Kundu, *Cardiff University, UK*

Prof. Franklin Moon, *Rutgers University, USA*

Prof. Carlo Rainieri, *University of Molise, Italy*

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Prof Maria Pina Limongelli, *Polytechnique of Milan, Italy*

Keynote Speakers

Prof. Dan Frangopol, *Lehigh University, USA*

Dr Daniele Inaudi, *CTO, Smartec SA, Switzerland*

Invited Speakers

Prof. Jung-Ryul Lee, *KAIST, Korea*

Dr Abhishek Kundu, *Cardiff University, UK*

Prof. Franklin Moon, *Rutgers University, USA*

Prof. Carlo Rainieri, *University of Molise, Italy*

Prof. Franck Schoefs, *University of Nantes, France*

Prof. S. A. Sudath Siriwardane, *University of Stavanger*

Dr Helder Sousa, *HS Consulting, Portugal*

Organising Committee

Professor Purnendu Das
ASRANet Ltd, UK

Dr Piotr Omenzetter
University of Aberdeen, UK

Day 1–23rd MAY

- 8:15-8:55 DELEGATE REGISTRATION
- 9:00-09:10 OPENING
- 9:10-9:50 **KEYNOTE PAPER:** LONGEVITY OF MARINE STRUCTURES
DAN FRANGOPOL, DAVID Y. YANG, LEHIGH UNIVERSITY, USA
- 9:50-10:30 **KEYNOTE PAPER:** FIBRE OPTIC SENSORS FOR SHM IN HAZARDOUS AND HOSTILE ENVIRONMENTS
DANIELLE INAUDI, SMARTEC SA, SWITZERLAND
- 10:30-11:00 BREAK
- 11:00-11:30 **INVITED PAPER:** AEROSPACE STRUCTURAL EVALUATION BY LASER, MICROWAVE AND ARTIFICIAL INTELLIGENCE
JUNG-RYUL LEE, KAIST, KOREA
- 11:30-12:00 **INVITED PAPER:** TOWARDS DATA-DRIVEN ASSET MANAGEMENT FOR HIGHWAY BRIDGE STRUCTURES AND THE ROLE OF EMERGING TECHNOLOGIES.
FRANKLIN MOON, N. GUCUNSKI, S. BABANAJAD, N. ROMANO, J. BRALEY, AND A. MAHER RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY, USA
- 12:00-12:30 **INVITED PAPER:** LINEAR AND NON LINEAR ANALYSIS FOR COMPENSATION OF ENVIRONMENTAL EFFECTS ON NATURAL FREQUENCY ESTIMATES.
CARLO RAINIERI, UNIVERSITY OF MOLISE, ITALY
- 12:30-13:00 **INVITED PAPER:** SHM OF WHARVES: REVIEW OF CASE STUDIES FROM AROUND THE WORLD AND VALUE OF SHM FOR MAINTENANCE OPTIMIZATION
FRANK SCHOEFS, UNIVERSITY OF NANTES, FRANCE
- 13:00-14:00 LUNCH
- 14:00-14:30 **INVITED PAPER:** FIELD EXPERIENCE MONITORING CIVIL AND MARITIME STRUCTURES SINCE THE MILLENNIUM.
PHIL COLE, MISTRAS GROUP HELLAS A.B.E.E, UK
- 14:30-15:00 **INVITED PAPER:** ACHIEVEMENTS AND CHALLENGES IN THE SERVICEABILITY AND SAFETY OF BRIDGES AND VIADUCTS SUPPORTED BY STRUCTURAL HEALTH AND MONITORING TECHNIQUES
HELDER SOUSA, HS CONSULTING, PORTUGAL
- 15:00-15:30 **INVITED PAPER:** LIFE EXTENSION OF OFFSHORE STRUCTURES: CURRENT PRACTICES IN SHM AND REMAINING FATIGUE LIFE ESTIMATION
S. A. SUDATH SIRIWARDANE, ASHISH AERAN, UNIVERSITY OF STAVANGER, NORWAY
- 15:30-16:00 BREAK
- 16:00– 16:30 **INVITED PAPER:** DATA DRIVEN DAMAGE CHARACTERIZATION IN MULTI-LAYERED COMPOSITE STRUCTURES: A MACHINE LEARNING APPROACH
ABHISHEK KUNDU, CARDIFF UNIVERSITY, UK
- 16:30-17:00 **INVITED PAPER:** INFRASTRUCTURE ASSESMENT BASED ON IOT AND DATA ASSIMILATION TECHNIQUES
TOMONORI NAGAYAMA, THE UNIVERSITY OF TOKYO, JAPAN
- 17:00-17:30 **INVITED PAPER -** DATA TO RISK-INFORMED DECISIONS THROUGH BRIDGE MODEL UPDATING
IRIS TIEN, GEORGIA INSTITUTE OF TECHNOLOGY, USA
- 17:30-18:00 **INVITED PAPER :** CONCEPT OF SMART COMPOSITES FOR OFFSHORE WIND-ENERGY GENERATION. NUMERICAL AND ANALYTICAL MODELING
MONSSEF DRISSI HABTI, IFSTTAR, FRANCE
- 19:00 CONFERENCE DINNER

Day 2 - 24th MAY

- 8:30-9:10 **KEYNOTE:** FORENSIC ENGINEERING OF STRUCTURAL FAILURE
RANJITH DISSANAYAKE, UNIVERSITY OF PERADENIYA , SRI LANKA
- 9:10-9:40 **INVITED PAPER:** DATA DRIVEN STRUCTURAL HEALTH MONITORING WITH APPLICATIONS FOR CIVIL AND MARITIME STRUCTURES
IRINA TRENDAFILOVA, STRATHCLYDE UNIVERSITY, SCOTLAND
- 9:40-10:10 **INVITED PAPER:** SHM IN OFFSHORE WIND TURBINES—A TOOL FOR MORE EFFICIENT DESIGNS
LARS DAMKILDE, AALBORG UNIVERSITY, DENMARK
- 10:10-10:40 **INVITED PAPER:** MONITORING BRIDGES USING BRIDGE-WIM TECHNOLOGY
ALES ZNIDARIC, SLOVANIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE
- 10:40-11:10 **BREAK**
- 11:10-11:40 **INVITED PAPER:** ON THE INTELLIGENT MERGER OF DATA AND MODELS FOR INFRASTRUCTURE ASSESSMENT
ELENI CHATZI, INSTITUTE OF STRUCTURAL ENGINEERING, ETH ZURICH
- 11:40-12:10 **INVITED PAPER:** DIAGNOSIS, MONITORING, AND SERVICE LIFE EXTENSION OF STEEL STRUCTURES: PRESENTATION OF SEVERAL CONTRIBUTIONS AND APPLICATIONS (BRIDGES AND OFFSHORE STRUCTURES).
SYLVAIN CHATAIGNER, IFSTTAR, FRANCE
- 12:10-12:30 FIELD DISPLACEMENT MEASUREMENT FOR STRUCTURAL HEALTH MONITORING
M. ALLAIN & LÉON GROSSE, DIRECTION NATIONALE TP ET NUCLÉAIRE, FRANCE;
N. PRIME, O. PLÉ, P. VACHER, E. ROUX UNIVERSITY GRENOBLE ALPES, FRANCE
- 12:30-12:50 STRUCTURAL HEALTH MONITORING SYSTEM IN ITALY: THE CASE OF MORANDI BRIDGE COLLAPSE, RECENT DEVELOPMENTS AND FUTURE TREND OF AI APPLICATIONS
FABRIZIO MANSUETO & ANDREA BALLARIN, FIELD S.R.L - LALLIO (BG), ITALY
- 12:50-13:50 **LUNCH**
- 13:50-14:10 SERVICE LIFE MONITORING METHODOLOGY FOR MOORING LINES OF FLOATING WIND TURBINES
H-D. PHAM, T. SOULARD, P. CARTRAUD, ECOLE CENTRALE DE NANTES, FRANCE
F. SCHOEFS, UNIVERSITÉ DE NANTES, FRANCE
- 14:10-14:30 INVESTIGATING PERFORMANCE OF NOVEL SHIM PROCEDURES WITH ANTICIPATED BIG DATA SETS
N.S. GULGEC, M.TAKAC, S.N. PAKZAD, LEHIGH UNIVERSITY, USA
- 14:30-14:50 MONITORING STRATEGY OF BIO-COLONISATION ON MOORING SYSTEMS: MODELLING OF MARINE GROWTH AND OPTIMISATION OF SENSING NETWORK EFFICIENCY
B. DECUREY, F. SCHOEFS, UNIVERSITY OF NANTES, FRANCE
- 14:50-15:10 ANALYSIS OF SPATIAL VARIABILITY OF CHLORIDE IN CONCRETE AND OPTIMISATION OF NDT MEASUREMENTS
R. CLERC, F. SCHOEFS, M. OUMOUNI I., OTHMEN & S. BONNET, UNIVERSITY OF NANTES, FRANCE
- 15:10-15:40 **BREAK**
- 15:40-16:00 DEVELOPMENT OF DIGITAL TWIN MODELS FOR OFFSHORE WIND TURBINE CONSIDERING SOIL-STRUCTURE INTERACTION
ALIYU ABDULLAHI, SUBY BHATTACHARYA, YING WANG, UNIVERSITY OF SURREY, UK
- 16:00-16:20 DAMAGE ASSESSMENT OF EXISTING METAL BRIDGES
C. S. BANDARA, J. A. S. C. JAYASINGHE, P. B. R. DISSANAYAKE, UNIVERSITY OF PERADENIYA , SRI LANKA
P. A. K. KARUNANANDA, OPEN UNIVERSITY OF SRI LANKA, SRI LANKA
- 16:20-16:40 VIRTUAL SENSING AS A TECHNIQUE FOR PREDICTING STRAIN IN A NON INSTRUMENTED REMOTE LOCATION: DEMONSTRATION AND VALIDATION
D. GARCIA, K MACLEOD, S. RAJAGOPALAN, E. JAIYEOLA, D. TCHERNIAK UNIVERSITY OF STRATHCLYDE, UK, BRUEL AND KJER SOUND AND VIBRATION MEASUREMENT, DENMARK
- 16:40-17:00 ENERGY DISSIPATION CAPACITY OF COLUMNS UNDER CYCLIC LOADING
T.L PRADEEP, OPEN UNIVERSITY OF SRI LANKA , SRI LANKA
T PRIYADARSHA, P.B.R DISSNAYAKE, UNIVERSITY OF PERADENIYA , SRI LANKA

Keynote Lectures

Prof. Dan Frangopol, Lehigh University, USA

Longevity of marine structures

Dr. Dan Frangopol is the inaugural holder of the Fazlur R. Khan Endowed Chair of Structural Engineering and Architecture at Lehigh University. Before joining Lehigh University in 2006, he was Professor of Civil Engineering at the University of Colorado at Boulder, where he is now Professor Emeritus. He is recognized as a leader in the field of life-cycle engineering of civil and marine structures. His main research interests are in the application of probabilistic concepts and methods to civil and marine engineering including structural reliability, probability-based design and optimization of buildings, bridges and naval ships, structural health monitoring, life-cycle performance maintenance, management and cost of structures and infrastructures under uncertainty, risk-based assessment and decision-making, infrastructure sustainability and resilience to disasters, and stochastic mechanics. Dr. Frangopol is the Founding President of the International Associations for Bridge Maintenance and Safety (IABMAS) and Life-Cycle Civil Engineering (IALCCE). He has authored/co-authored 3 books and over 370 articles in archival journals including 9 award-winning papers. He is the Founding Editor of *Structure and Infrastructure Engineering*. Dr. Frangopol is the recipient of several medals, awards, and prizes from ASCE, IABSE, IASSAR and other professional organizations, such as the OPAL Award, the Newmark Medal, the Alfredo Ang Award, the T.Y. Lin Medal, the F. R. Khan Medal, and the Croes Medal (twice). He holds 4 honorary doctorates and 12 honorary professorships from major universities. He is a foreign member of the Academia Europaea (Academy of Europe, London), a foreign member of the Royal Academy of Belgium, an Honorary Member of the Romanian Academy, an Honorary Member of the Romanian Academy of Technical Sciences, and a Distinguished Member of ASCE.

Dr Daniele Inaudi, CTO, Smartec SA, Switzerland

Fibre optic sensors for SHM in hazardous and hostile environments

Daniele Inaudi received a degree in physics at the Swiss Federal Institute of Technology in Zurich (ETHZ). In 1997, he obtained his Ph.D. in civil engineering at the Laboratory of Stress Analysis (IMAC) of the Swiss Federal Institute of Technology in Lausanne for his work on the development of a fibre optic deformation sensing system for civil engineering structural monitoring. He is co-founder and CTO of SMARTEC SA (Manno, Switzerland, www.smartec.ch), a company active since 1996 in the domains of SHM and fibre optic sensing. He is also CTO of Roctest: a Nova Metrix company which acquired SMARTEC in 2006. He authored more than 200 papers, three book chapters, edited of a book on Optical Non-destructive Testing and co-authored the book "Fibre Optic Methods for Structural Health Monitoring".

Prof. Ranjith Dissanayake, Chairman, Green Building of Sri Lanka, India

Forensic Engineering of Structural Failure

Prof. Dissanayake was a Fullbright Scholar, Endeavour Fellow, and JASSO Research Fellow during 2007 & 2008. He was awarded the young Scientist Award in 2007 for Excellence in Scientific Research by the NSTC of Sri Lanka. He received the Overseas Prize of the ICE in 2007, UK and the Australia Alumni Excellence Award in 2012. He has published over 100 journal papers. He has chaired 10 international conferences. He is a fellow of the IESL. He is the Chairman of the Green Building Council of Sri Lanka (GBCSL) and Civil Engineering Sectional Committee of IESL. He is Chairman for Lego International (Pvt.) Ltd, ICB (Pvt.) Ltd, Lanka AAC (Pvt.) Ltd and IIPS (Pvt.) Ltd. He is chairing the 10th International Conference on Structural Engineering Construction Management which will be held at Earl's Regency Kandy, Sri Lanka in 2019.

About Glasgow

Glasgow has been named as one of the top 20 'Best of the World' destinations for 2016 by influential publication National Geographic Traveler, the city has also been voted the 'friendliest city in the world' in a Rough Guides poll and named a must visit destination by leading publications like the New York Times, The Guardian and Wanderlust! Earning its reputation as one of the world's greatest cities, you can expect a very warm welcome and when you add world-class architecture, a vibrant nightlife, breath taking scenery and out-standing shopping, you'll never want to leave! Further afield, ancient castles, picture-postcard distilleries, tranquil lochs, outstanding golf courses and miles of unspoilt coastline are all just a short journey from the city centre - incredibly, you can get to Loch Lomond, gateway to the Scottish Highlands in only 30 minutes. The capital of Scotland, Edinburgh is only 50 minutes far by train.

Getting Here

Airport Connections

Glasgow is well connected globally by Glasgow International Airport through Emirates, KLM, Air France, Easyjet, Ryanair and many more. The airport is currently linked to Glasgow City Centre by Glasgow Shuttle bus service 500. This is run by First Glasgow under contract to Glasgow Airport. The service runs 24 hours a day, direct via the M8 motorway.

Train Connections

Fast trains run into the centre of Glasgow terminating at Glasgow Central. The train service from London, Manchester, Newcastle terminate at Glasgow Central or at Glasgow Queens Street with connections through Edinburgh Waverley.



George Square



Glasgow Science Centre



Loch Lomond

Visit www.asranet.co.uk for more details

CONFERENCE VENUE

JURY'S INN HOTEL

80 JAMAICA ST, GLASGOW

G1 4QG

Situated on Jamaica Street, the four star hotel in Glasgow is within a ten minute walk of three major stations- Glasgow Central, Queen Street and Argyle Street making it the ideal hotel for transport links within the city centre. With an easy three minute train ride (or 20 minute walk) to the **Scottish Exhibition and Conference Centre** and **The Hydro** Entertainment Arena, Jurys Inn Glasgow is perfectly placed for both business and pleasure guests. Our four star Glasgow hotel is also a stone's throw away from a plethora of restaurants and bars, a three minute walk from **St Enoch shopping centre** and just around the corner from **Alston Bar & Beef**, the best steak and gin that Glasgow has to offer located beneath Glasgow's Central Station. Steeped in heritage, this city also has plenty of beautiful old buildings and monuments to explore, from breath-taking **Glasgow Cathedral** to George Square, offering guests a taste of Glasgow's rich history.

CONFERENCE DINNER VENUE

23rd MAY 2019, 19:00

JURY'S INN HOTEL

80 JAMAICA ST, GLASGOW

G1 4QG



Sponsorship & Exhibition Space

Sponsorship

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ASRANet Ltd was formed in February 2006. It Originated as a spin out company of the Universities of Glasgow and Strathclyde and now it operates as an independent company.

It deals mainly with maritime and civil engineering structures which includes ships, offshore structures, subsea structures and renewable energy structures.

ASRANet specialises in courses and conferences related to maritime engineering and civil engineering structures.

We also offer in-house training throughout the UK and abroad.

See our course and conference details at www.asranet.co.uk

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