

## Advances in monitoring and assessing structural integrity

May 4<sup>th</sup> 2017, TIC Building

**10:00 Registration and Refreshments**

**10:30 Welcome from the Mechanical and Aerospace Engineering Department**

Professor Andrew Heyes, Head of Mechanical and Aerospace Engineering department

### SECTION ONE:

Maintenance and reliable monitoring for wind turbines through vibration-based structural health monitoring methodologies.

**10:50 Challenges of Structural Health Monitoring for industrial implementation**

Gurvinder Jagdev, Senior Structural Engineer at Iberdrola Engineering and Construction, UK  
Bernd Wölfel, Head Offshore solutions at Wölfel Engineering, Germany

This first talk will present the needs and new challenges that the Offshore Wind industry has to confront for reducing risks, costs and for improving the reliability of foundation structures and wind turbines, which make the structural health monitoring, condition monitoring and maintenance a must.

**11:20 Recent advances in Vibration-based Structural Health Monitoring for Wind Turbines**

Dr Dmitri Tcherniak, Research engineer in the Innovation group at Brüel & Kjær S/V, Denmark

The talk will outline two recently developed vibration-based SHM techniques. The first one is based on mechanical actuators and array of sensors. Employing semi-supervised machine learning, this technique is able to detect even small (15-20 cm) structural defects. The second technique, targets detecting of bigger amount of damage. It uses a single sensor located in the nacelle, and detects rotor anisotropy, which is a typical consequence of blade failures via an advanced signal processing method.

**11:50 Monitoring and self-assessment methods for composite laminated structures**

Dr David Garcia Cava, Teaching Associate in Mechanical and Aerospace Engineering department

The talk will focus on the recent advances on damage assessment techniques for composite laminated structures. The presentation will centre on the current expertise from the Mechanical and Aerospace Engineering department in data-driven structural health monitoring methodologies for composites laminated structures and advanced multifunctional materials with self-sensing and self-monitoring capabilities.

**12:20 Lunch**

## **SECTION TWO:**

Advances on pass-fail criteria by improved structural integrity and material response assessment.

### **13:20 Advances in structural integrity assessment of structures subjected to cyclic load scenarios by direct methods**

Dr Daniele Barbera, Research Assistant in Mechanical and Aerospace Engineering department

This talk will present the advances in structures and material modelling based on new numerical procedures, including direct methods. This modelling technique has proven great effectiveness and flexibility in solving many challenges that power industry has to tackle for extending the life of components. The understanding of the structural behaviour is crucial for an efficient and reliable use of health monitoring systems and data obtained for damage characterization.

### **13:50 Introduction & overview of AMRL**

Dr Tiziana Marrocco, Knowledge Exchange in Mechanical and Aerospace Engineering department

The talk will showcase the AMRL capabilities in the area of materials characterisation and testing to provide information for the needs of the possible industrial collaborators. It will present the AMRL facilities located across four laboratories (namely, the materials characterisation and analysis laboratory, mechanical testing laboratory, geomaterials laboratory and bioengineering laboratory) and glance at its current commercial status. It will then provide examples of case studies relevant to specific areas of expertise and to industrial applications.

### **14:10 Discussion and closure**

Refreshments will be provided

### **14:20 Transition from TIC Building to AMRL**

### **14:30 Guided tour in the AMRL facilities**

James Weir Building 75 Montrose Street Glasgow G11XJ