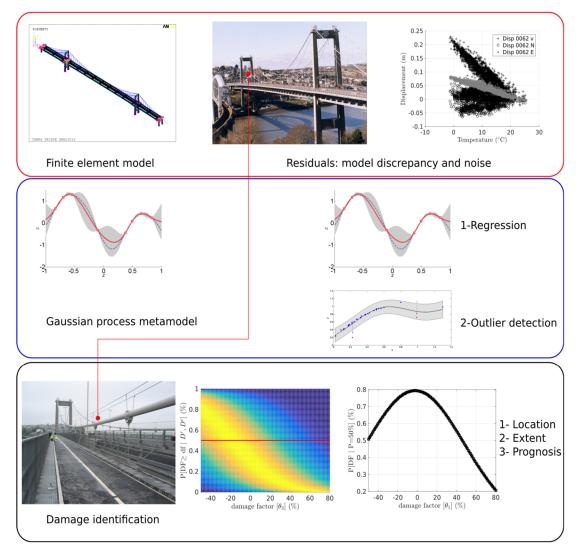# ABCPhDOPENTalks2023

The role of hybrid models for vibration-based civil structural health monitoring

Assistant Prof. Andre Jesus

Even though structural health monitoring (SHM) has considerably improved the automated assessment of mechanical and aerospace structures, its reliability and standardisation has proved to be much more challenging in civil engineering applications. This talk is devoted to SHM of civil structures, such as bridges, using a class of hybrid models based on both physical laws and data learning techniques. The proposed models merge the predictive ability of conventional finite element models with Gaussian processes, capable of pattern recognition and outlier detection, so that damage can be effectively detected and characterised. The framework will be presented, as well as its validation and application to the Tamar long suspension bridge. The talk will be completed by highlighting future developments and a similar modelling approach for modal testing using a human excitation.

Tuesday July 18, 2023, H: 15.00
Politecnico di Milano, Campus Leonardo
Aula Beltrami, building 5
piazza Leonardo Da Vinci 32, Milano

Finite element model

Residuals: model discrepancy and noise

Gaussian process metamodel

1-Regression

2-Outlier detection

Damage identification

1- Location
2- Extent
3- Prognosis