

FERRI M.H. ALIABADI

Professor of Aerostructures & Zaharoff Professor of Aviation – Imperial College London, U.K.

Structural Health Monitoring of Composite Airframe

Design and maintenance of future airframe composite structures is mainly influenced by the requirement to cope with accidental impact damage. The impact detection and identification strategy for existing structures is of primary importance both in structural health monitoring (SHM) and in non-destructive evaluation (NDE) techniques. Accurately detecting and characterizing an impact event based on sensor data leads us towards condition-based monitoring (CBM), where the subsequent damage can then be detected through active sensing strategies. In this talk, SHM techniques based ultrasonic guided wave will be presented for both passive and active SHM system. Application of these methods to complex stiffened panel will be shown through both experimental measurements and finite element simulations.

Biography:

Prof. Ferri M H Aliabadi, PhD, FRAes Zaharoff Professor Aviation and Professor of Aerostructures, Imperial College London, UK. He was the Head of Aeronautics Department from 2009-2017. Prior to joining Imperial College in January 2005, he was Professor of Computational Mechanics and the Director of Aerospace Engineering at Queen Mary, University of London (1997 - 2005) and Reader and Head of Damage Tolerance Division at WIT, Southampton (1987 - 1997). During 1984-1987 he was a research fellow at Southampton University. Professor Aliabadi has worked for 25 years in the field of Computational Structural Mechanics and has established an international reputation for his achievements in development of the Computational Methods and, Fracture and Damage Mechanics. His current research interest include structural health monitoring of composite structures; Multiscale modelling of material degradation, fracture and failure; and general development of computational methods for life assessment of metallic and composite structures. He has over 300 journal publications, similar number of conference papers. Ferri Aliabadi is editor in chief of two international journals and a book series and, serves on editorial board of several other international journals. Professor Aliabadi has participated and coordinated several large national and international research projects and continues to work closely with the aerospace sector in UK and Europe

Selected Journal Publications

- Morse, L., Sharif Khodaei, Z and Aliabadi, M.H. " Reliability based impact localisation in composite panels using Bayesian updating and the Kalman filter". Journal of Mechanical Systems and Signal Processing, 99, 107-128, 2018. 2017
- Morse, L., Sharif Khodaei, Z and Aliabadi, M.H. „Multi-Fidelity Modelling based Structural Reliability Analysis with the Boundary Element Method“, Journal of Multiscale Modelling, accepted on Aug 07, 2017 2017
- Li, Jun, Sharif Khodaei, Z and Aliabadi, M.H. „Spectral BEM for the Analysis of Wave Propagation and Fracture Mechanics“, Journal of Multiscale Modelling, under review, 2017 2017
- Salmanpour, M. S., Z. Sharif Khodaei, and M. H. Aliabadi. „Impact Damage Localisation with Piezoelectric Sensors under Operational and Environmental Conditions“, Sensors 17 (5), 1178, 2017 2016
- A De Luca, Z Sharif-Khodaei, MH Aliabadi, F Caputo, „Numerical simulation of the Lamb wave propagation in impacted CFRP laminate“, Procedia Engineering, 167, pp 109-115, 2016. 2016 V. Mallardo, Z. Sharif Khodaei and M.H. Aliabadi, „A Bayesian Approach or Sensor Optimization in Impact Identification“, Materials, 9(11), 946, 2016. 2016
- Salmanpour, M. S., Z. Sharif Khodaei, and M. H. Aliabadi. "Instantaneous Baseline Damage Localisation Using Sensor Mapping." IEEE Sensors Journal, 17(2), 295-301, 2017. 2016

- Salmanpour, M. S., Z. Sharif Khodaei, and M. H. Aliabadi. "Airborne Transducer Integrity Under Operational Environment for Structural Health Monitoring." MDPI Physical sensors, accepted for publication on 16th Noember 2016. 2016
- Mallardo, V., Sharif Khodaei, Z. And M.H. Aliabadi. "A Bayesian approach for sensor optimisation in impact identification". Material 2016, 9, 946, special issue on Advances in Structural Health Monitoring for Aerospace Structures, November 2016. 2016
- Yue, N. and Sharif Khodaei, Z. "Assessment of Impact Detection Techniques for Aeronautical ApplicationL ANN vs. LSSVM", Journal of Multiscale Modelling, Vol 7, No. 4 (2016) 1650007. 2016
- Zahra Sharif Khodaei and M.H. Aliabadi. " A Multi-Level Decision Fusion Strategy for Condition Based Maintenance of Composite Structures", Materials 2016, 9(9), 790 special issue on Advances in Structural Health Monitoring for Aerospace Structures, September 2016. 2016
- Sharif-Khodaei Z, Ghajari M, Aliabadi MH, 2016, Impact Damage Detection in Composite Plates using a Self-diagnostic Electro-Mechanical Impedance based Structural Health Monitoring System, Journal of Multiscale Modelling, P1550013. 2016
- Salmanpour, M. S., Z. Sharif Khodaei, and M. H. Aliabadi. "Transducer placement optimisation scheme for a delay and sum damage detection algorithm." Structural Control and Health Monitoring (2016): 10.1002/stc.1898 2016
- Salmanpour, M. S., Z. Sharif Khodaei, and M. H. Aliabadi. "Guided wave temperature correction methods in structural health monitoring." Journal of Intelligent Material Systems and Structures (2016): 1045389X16651155. 2016
- Thieme M, Sharif-Khodaei Z, Aliabadi M.H, 2015, Optimal sensor distribution based on Maximum Area Coverage (MAC) for damage detection using lamb-waves, under review 2014
- Huang X, Aliabadi M and Sharif Khodaei Z. (2014) Fatigue crack growth reliability analysis by stochastic boundary element method. CMES: Computer Modeling in Engineering & Sciences 102: 291330. 2014 Sharif-Khodaei Z, Aliabadi MH, Assessment of Delay-and-Sum Algorithms for Damage Detection in Aluminium and Composite Plates, Smart Materials and Structures, 23 (7), 075007, 2014. 2013
- Mallardo V, Aliabadi MH, Sharif Khodaei Z, 2013, Optimal sensor positioning for impact localization in smart composite panels, Journal of Intelligent Material Systems and Structures, Vol:24, ISSN:1045389X, Pages:559-573 2013
- Ghajari M, Sharif Khodaei Z, Aliabadi MH, et al., 2013, Identification of impact force for smart composite stiffened panels, Smart Materials and Structures, Vol:22, ISSN:0964-1726 2012
- Sharif Khodaei Z, Ghajari M, Aliabadi MH, 2012, Determination of impact location on composite stiffened panels, Smart Materials and Structures, Vol:21, ISSN:0964-1726