

Structural Health Monitoring Using Statistical Pattern Recognition

A 3-Day Short Course for Aerospace, Civil and Mechanical Engineers offered for the 19th time!
Palo Alto, California, September 6-8, 2009

Offered prior to the

7th International Workshop on Structural Health Monitoring
September, 9th-11th, 2009 , Stanford University
<http://structure.stanford.edu/workshop/>

Structural Health Monitoring Using Statistical Pattern Recognition will introduce engineers to the most recently developed techniques for detection and location of damage in structures by changes in their measured dynamic properties, in addition to the historical motivation and development of the methods. The course will cover the theory, application, and computerized implementation of this technology. Many **real-world** examples and results will be presented from the fields of aerospace, civil, and mechanical engineering. The application of techniques involving **statistical pattern recognition** will be emphasized.

Course Goals

Upon completion of this course, attendees will be able to:

- Describe structural health monitoring as a problem in statistical pattern recognition
- Describe and classify the primary methods of structural health monitoring, with their associated advantages and disadvantages
- Describe the historical and current real-world applications of damage identification in the aerospace, civil, and mechanical engineering fields
- Summarize current and emerging sensing technologies being used for structural health monitoring
- Discuss the primary practical implementation issues,

Course Outline

Introduction

Historical Overview

Operational Evaluation

Active SHM Sensing Technologies

Emerging SHM Sensing Technologies

Feature extraction

Introduction to Statistical Inference

Basic Statistical Tools

Unsupervised Learning Methods

Supervised Learning Methods

Data Normalization

Examples/Applications

Software/Hardware Demonstration

Course Instructors

Dr. Charles Farrar, Los Alamos National Laboratory

Prof. Michael Todd, University of California – San Diego

Dr. Gyuhae Park, Los Alamos National Laboratory

Prof. Jerome Lynch, University of Michigan

Prof. Hoon Sohn, KAIST University

Sample Course Notes, Instructor Bios and Online Registration at
www.la-dynamics.com

Please direct questions to farrar@la-dynamics.com