

Digital SHM

1 Day - Hands-on Short Course

Speakers:

**Dr. Howard Chung,
Dr. Amrita Kumar,
Dr. Spandan Mishra,**
Acellent Technologies, Inc.,

Professor Fu-kuo Chang,
Stanford University,
(Invited Speaker)

Dr. Harish Surendranath,
3DS Dassault Systems,

Dr. Surajit Roy
*California State University
Long Beach*
(Invited Speaker)

Course Description:

Structural Health Monitoring (SHM) technology is an innovative approach for providing Structural health information in real-time or on-demand through distributed sensor networks built onto the structures. The main challenge with SHM is identifying sensors used in the process are permanently mounted on the structure; therefore, it is desirable to have the optimal sensor location to provide the highest SHM performance before deploying the SHM system for real time monitoring of the structures. Digital Structural health monitoring (DGSHM) involves integration of Finite Element Modeling and Spectral Element Analysis for wave propagations with an SHM diagnostic system in order to evaluate the performance of the SHM system through simulated environments. Therefore, the implementation of DGSHM requires the involvement of three components: 1) A physical model that can produce sensor signals from simulating structural responses, 2) An SHM diagnostic system that can take simulated data and predict the performance of the SHM system, and 3) A sensitivity analysis that would optimize the performance of the proposed SHM system.

Course Goals:

Digital Structural Health Monitoring (DGSHM) uses a complete simulation environment for SHM sensor design, sensor compatibility verification and pre-production sensor performance assessment by employing advanced computer aided design (CAD) tools and computer-aided engineering (CAE) methods, such as Catia, Solidworks, multi-physics FEA Abaqus, and Spectral Element Methods. The method can enhance the system quality and reliability of sensor design, manufacturing, installation and deployment with minimum costs in experimental evaluation.

This course will introduce the principles of using CAD for sensor design and using CAE tools, such as Abaqus and FEM/SEM, to verify the detection performance. Examples of exercising digital SHM methods will be demonstrated

Who Should Attend:

Engineers, Researchers
working in the field of SHM

Topics covered

1) Concept of Digital SHM

- Concept & functions
- Tools for DGSHM
- Concept of operations

2) Physical models

- Physics based models
- SHM diagnostics
- Sensitivity assessment

3) Demonstrations of Digital SHM

- What is involved in SHM diagnostics and relationship to Digital SHM
- Demonstrations on SHM Diagnostics for metal and composite structures with the Digital SHM

4) Creation of Digital SHM tools for SHM design

- How to create a DGSHM
- Training for usage of tools

5) Q&A on Digital SHM

Digital SHM Instructors

Instructors for the course are well-known in the field of SHM & FEM

Dr. Howard Chung, Dr. Spandan Mishra, Dr. Amrita Kumar, *Acellent Technologies Inc.*
Acellent Technologies Inc. is a world leader in Structural Health Monitoring systems

Acellent's products including SMART Layer, ScanGenie brand diagnostic hardware and SHM Patch and SHM Composite software suites. Acellent specialties include sensors and sensor network development, built-in self-diagnostics, and integrated diagnostics and prognostics, damage tolerance and failure analysis for composite materials, and advanced multi-physics computational methods for multi-functional structures. The speakers for this season jointly have more than 20 years of experience in the field of SHM.

Harish Surendernath, *SIMULIA Hi-Tech Solutions*
Director at Dassault Systemes Simulia Corp.
Dassault Systèmes, provides the best in class product development software applications, delivered on the 3DEXPERIENCE platform, enabling 3D Design, Engineering, 3D CAD, Modeling, Simulation, Data Management and Process Management.

Prof. Fu-Kuo Chang, *Stanford University*
Professor Chang's research focus is in the areas of multi-functional materials and intelligent structures with particular emphases on structural health monitoring, intelligent self-sensing diagnostics, and integrated health management for space and aircraft structures as well safety-critical assets and medical devices. His specialties include sensors and sensor network development, integrated diagnostics and prognostics, damage tolerance and failure analysis for composite materials, and advanced multi-physics computational methods for multi-functional structures.

Dr. Surajit Roy, *California State University LB*
Dr. Surajit Roy is an Assistant Professor in the Department of Mechanical and Aerospace Engineering at California State University, Long Beach with research interests in prognostic models for material ageing under harsh environments, modeling for structural wave propagation and data-driven algorithms for structural health monitoring.

Venue information:

Location:
Crowne Plaza
4290 El Camino Real, Palo Alto, CA 94306

Date:
September 11, 2017

Time:
9:00 am - 4:00 pm



Registration information:

Registration is mandatory in order to prepare material, receipts, certificates, lunch and refreshments.

Cost of attending the training: \$300

Registration Form:

Please fill the registration form and e-mail it to the contact address below:

<i>Short course on Structural Health Monitoring using DGSHM, Registration Form:</i>	
Name:	
Affiliation	
Street	
City/State/ZIP	
Phone	
Email	
Signature	

Contact information:

Please email either of the team members melissac@acellent.com or akumar@acellent.com.