

# TECHNICAL PROGRAM

## Overview

Update: 2011-08-21

Monday, September 12 <sup>th</sup>										
14:00 ~ 17:00	Early Registration								Location: Crowne Plaza Hotel Cabana, Palo Alto	
17:00 ~ 19:00	Reception								Location: Crowne Plaza Hotel Cabana, Palo Alto	

Tuesday, September 13 <sup>th</sup>												
	Room: HC 200-002	Room: HC 200-030	Room: HC 200-034	Room: HC 200-203	Room: HC 200-205	Room: HC 200-303	Room: HC 200-305	Room: ART 2	Room: ART 4			
07:00 ~ 08:00	Registration								Light Continental Breakfast		Location: Dohmann Grove	
08:00 ~ 08:10	Opening Remarks								Speaker: Curtis W. Frank [Stanford University, USA]		Location: Memorial Auditorium	
08:10 ~ 08:40	Keynote 1								Speaker: Matthias Buderath [Cassidian, Germany]		Location: Memorial Auditorium	
08:40 ~ 09:10	Keynote 2								Speaker: Jim Cycon [Sikorsky, USA]		Location: Memorial Auditorium	
09:10 ~ 09:40	Keynote 3								Speaker: H. Felix Wu [NIST, USA]		Location: Memorial Auditorium	
09:40 ~ 10:00	Coffee Break										Location: Dohmann Grove	
10:00 ~ 12:00	Aerospace Structures: Field Evaluation and Validation - I	Sensors and Actuators Development - I	<b>SPECIAL SESSION</b> Bio-inspired Sensing and Actuation Technology - I Chairs: J. Lynch, K. Loh	Prognostics and Data Mining for Health Management - I	Advanced Diagnostics for Damage Assessment - I	<b>SPECIAL SESSION</b> Wind Turbines Monitoring - I Chair: W. Staszewski	Operational Effects Consideration in SHM - I	Civil Infrastructures: Laboratory Demonstration - I	<b>SPECIAL SESSION</b> Monitoring of Civil Engineering Structures with MEMS - I Chairs: C. Grosse, J. Lynch			
11:00 ~ 14:05	Poster Sessions								Poster Session, Special Poster Session: NIST Technology Innovation Program (TIP)		Location: Dohmann Grove	
12:00 ~ 13:00	Lunch at the Oval										Location: The Oval	
13:00 ~ 14:05	Poster Sessions: Q & A										Location: Dohmann Grove	
14:05 ~ 15:45	Aerospace Structures: Field Evaluation and Validation - II	Sensors and Actuators Development - II	<b>SPECIAL SESSION</b> Bio-inspired Sensing and Actuation Technology - II Chairs: J. Lynch, K. Loh	<b>SPECIAL SESSION</b> Hot Spot Monitoring - I Chairs: H. Sohn, J.-B. Ihn, M. Leonard	Advanced Diagnostics for Damage Assessment - II	<b>SPECIAL SESSION</b> Wind Turbines Monitoring - II Chair: W. Staszewski	Operational Effects Consideration in SHM - II	Civil Infrastructures: Laboratory Demonstration - II	<b>SPECIAL SESSION</b> Monitoring of Civil Engineering Structures with MEMS - II Chairs: C. Grosse, J. Lynch			
15:45 ~ 16:00	Coffee Break										Location: Dohmann Grove	
16:00 ~ 17:15	Panel Discussion: Aerospace								Chair: D. Inman		Location: TBA	
18:30 ~ 22:00	SHM Networking Welcome Night										Location: Frost Amphitheater	

Wednesday, September 14 <sup>th</sup>												
	Room: HC 200-002	Room: HC 200-030	Room: HC 200-034	Room: HC 200-203	Room: HC 200-205	Room: HC 200-303	Room: HC 200-305	Room: ART 2	Room: ART 4			
08:30 ~ 09:00	Keynote 4								Speaker: Les Lee [AFOSR, USA]		Location: Memorial Auditorium	
09:00 ~ 09:30	Keynote 5								Speaker: Luis G. dos Santos [Embraer, Brazil]		Location: Memorial Auditorium	
09:30 ~ 10:00	Keynote 6								Speaker: Peter Foote [BAE Systems, UK], Grant Gordon [Honeywell, USA], Mark Derriso [AFRL, USA]		Location: Memorial Auditorium	
10:00 ~ 10:20	Coffee Break										Location: Dohmann Grove	
10:20 ~ 12:00	Aerospace Structures: Field Evaluation and Validation - III & AISC-Guidebook Development Panel Session (30 min)	Sensors and Actuators Development - III	<b>SPECIAL SESSION</b> Hot Spot Monitoring - II Chairs: H. Sohn, J.-B. Ihn, M. Leonard	<b>SPECIAL SESSION</b> Verification and Validation of Damage Sensing - I Chair: E. Medina	Advanced Diagnostics for Damage Assessment - III	Prognostics and Data Mining for Health Management - II	Novel Signal Processing Techniques - I	Civil Infrastructures: Field Evaluation and Validation - I	<b>SPECIAL SESSION</b> Advanced SHM for Ship Structures Chair: L. Salvino			
12:00 ~ 13:00	Lunch at the Oval										Location: The Oval	
13:00 ~ 14:20	Aerospace Structures: Laboratory Demonstration - I	Sensors and Actuators Development - IV	<b>SPECIAL SESSION</b> Hot Spot Monitoring - III Chairs: H. Sohn, J.-B. Ihn, M. Leonard	<b>SPECIAL SESSION</b> Verification and Validation of Damage Sensing - II Chair: E. Medina	<b>SPECIAL SESSION</b> Intelligent Sensor Networks for SHM - I Chairs: J. Lynch, A. Swartz	Prognostics and Data Mining for Health Management - III	Novel Signal Processing Techniques - II	Civil Infrastructures: Field Evaluation and Validation - II	Advanced Monitoring for Load / Environments			
14:20 ~ 14:40	Coffee Break										Location: Dohmann Grove	
14:40 ~ 17:00	SHM in Action								Chair: TBA		Location: Memorial Auditorium	
18:30 ~ 22:00	Banquet and Award Night										Location: Crowne Plaza Hotel Cabana, Palo Alto	

Thursday, September 15 <sup>th</sup>												
	Room: HC 200-002	Room: HC 200-030	Room: HC 200-034	Room: HC 200-203	Room: HC 200-205	Room: HC 200-303	Room: HC 200-305	Room: ART 2	Room: ART 4			
08:30 ~ 09:00	Keynote 7								Speaker: Anne S. Kiremidjian [Stanford University, USA]		Location: Memorial Auditorium	
09:00 ~ 09:30	Keynote 8								Speaker: Dennis Roach [Sandia National Laboratories, USA]		Location: Memorial Auditorium	
09:30 ~ 10:00	Coffee Break										Location: Dohmann Grove	
10:00 ~ 12:00	Aerospace Structures: Laboratory Demonstration - II	<b>SPECIAL SESSION</b> Structural Health Monitoring of Wind Turbines Chair: J. R. White	<b>SPECIAL SESSION</b> Intelligent Sensor Networks for SHM - II Chairs: J. Lynch, A. Swartz	<b>SPECIAL SESSION</b> Wave Propagation Simulation - I Chairs: W. Staszewski, W. Ostachowicz	Advanced Diagnostics for Damage Assessment - IV	<b>SPECIAL SESSION</b> Decision Making in Structural Health Monitoring - I Chairs: D. Zonta, M. Todd	Novel Signal Processing Techniques - III	<b>SPECIAL SESSION</b> SHM Benchmark for High-rise Structures - I Chair: Y.Q. Ni	<b>SPECIAL SESSION</b> Non-contact Sensing Technologies - I Chair: H. Sohn			
12:00 ~ 13:20	Lunch at the Oval										Location: The Oval	
12:00 ~ 13:20	Faculty / Student Panel								Chair: C. Farrar		Location: TBA	
13:20 ~ 15:20	Aerospace Structures: Laboratory Demonstration - III	Quantification / Validation / Certification	<b>SPECIAL SESSION</b> Intelligent Sensor Networks for SHM - III Chairs: J. Lynch, A. Swartz	<b>SPECIAL SESSION</b> Wave Propagation Simulation - II Chairs: W. Staszewski, W. Ostachowicz	Advanced Diagnostics for Damage Assessment - V	<b>SPECIAL SESSION</b> Decision Making in Structural Health Monitoring - II Chairs: D. Zonta, M. Todd	Modeling / Simulation	<b>SPECIAL SESSION</b> SHM Benchmark for High-rise Structures - II Chair: Y.Q. Ni	<b>SPECIAL SESSION</b> Non-contact Sensing Technologies - II Chair: H. Sohn			
15:20 ~ 15:35	Coffee Break										Location: Dohmann Grove	
15:35 ~ 17:00	Panel Discussion: Civil & Mech. Systems								Chair: TBA		Location: TBA	

# TECHNICAL PROGRAM

Tuesday, September 13<sup>th</sup>

07:00 ~ 08:00	<b>Registration</b> Light Continental Breakfast <i>Location: Dohrmann Grove</i>	
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## Opening Remarks

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
08:00 ~ 08:10	<b>Curtis W. Frank</b> Acting Dean of School of Engineering at Stanford University <i>Location: Memorial Auditorium</i>	

## Keynotes

**Chair:** A. Srivastava (NASA Ames, USA) **Location:** Memorial Auditorium

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
08:10 ~ 08:40	<b>Integration of Structural Health Monitoring Systems into Unmanned Aerial Systems - Challenges and Opportunities</b> Matthias Buderath [Cassidian, Germany]	
08:40 ~ 09:10	<b>The Journey to Incorporate Health Monitoring and Condition Based Maintenance</b> Jim Cycon [Sikorsky, USA]	
09:10 ~ 09:40	<b>The Challenges of Structural Health Monitoring Technologies in Civil Infrastructure</b> H. Felix Wu [NIST, USA]	

09:40 ~ 10:00	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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## Poster Sessions

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
09:40 ~ 14:05	<b>Poster Session &amp; Special Poster Session: NIST Technology Innovation Program (TIP)</b> <i>Location: Dohrmann Grove</i>	

## Aerospace Structures: Field Evaluation and Validation - I

**Chair:** C. Stolz (Cassidian, Germany), J. Miller (NASA Marshall, USA) **Location:** HC 200-002

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<b>Real-Time Micro-Explosive Damage Detection in an Unmanned Rotorcraft Vehicle Using Embedded Sensing</b> H. Edge <sup>1</sup> , H. Chung <sup>2</sup> , M. Coatney <sup>1</sup> , B. Mary <sup>1</sup> , P. Tibbits <sup>1</sup> , M. Murugan <sup>1</sup> , A. Ghoshal <sup>1</sup> , D. Le <sup>1</sup> , M. Pappakostas <sup>2</sup> [1] Army Research Laboratory, USA; 2) Acellent Technologies, Inc., USA]	
10:20 ~ 10:40	<b>Comparisons of SHM Sensor Models with Test Data for Sandwich Composite Structures</b> V. Hafiychuk <sup>1</sup> , D. G. Luchinsky <sup>1</sup> , V. N. Smelyanskiy <sup>1</sup> , R. Tyson <sup>2</sup> , J. Miller <sup>3</sup> , C. Banks <sup>3</sup> [1] NASA Ames Research Center, USA; 2) University of Alabama, USA; 3) NASA Marshall Space Flight Center, USA]	
10:40 ~ 11:00	<b>Large Sensor Network Architectures for Monitoring Large-Scale Structures</b> D. Zhang, B. Zheng, H. Chung, S. Banerjee, S. Beard, I. Li [Acellent Technologies Inc., USA]	

11:00 ~ 11:20	<b>Overview of CVM Technology Tests Performed by Embraer</b> R. P. Rulli, P. A. da Silva [Embraer S.A. Lima, Brazil]	
11:20 ~ 11:40	<b>Advanced System-Level Reliability Analysis and Prediction with Field Data Integration</b> T. Meyer <sup>1</sup> , J. Berg <sup>1</sup> , A. Palladino <sup>1</sup> , Avinash Sarlashkar <sup>1</sup> , S. Hussain <sup>2</sup> , D. Lamb <sup>2</sup> [1) Impact Technologies, USA; 2) US Army RDECOM-TARDEC, USA]	
11:40 ~ 12:00	<b>Development and Testing of an Ultrasonic Phased Array System Based on Piezo Actuators and Fiber Optic Sensors</b> M. Scheerer <sup>1</sup> , C. Bockenheimer <sup>2</sup> , A. Dantele <sup>3</sup> , Z. Djinic <sup>4</sup> , F. Graf <sup>5</sup> , T. Natschläger <sup>6</sup> , A. Peldszus <sup>7</sup> , M. Reiterer <sup>8</sup> , T. Sauter <sup>9</sup> , R. Stössel <sup>10</sup> [1) Aerospace & Advanced Composites GmbH, Austria; 2) Airbus, USA; 3) Profactor, Austria; 4) Integrated Microsystems Austria GmbH, Austria; 5) Joanneum research, Austria; 6) Software Competence Center Hagenberg, Austria; 7) FACC, Austria; 8) RED Bernard, Austria; 9) ÖAW, Austria; 10) EADS Innovation Works, Germany]	

<b>Sensors and Actuators Development - I</b>		
<b>Chair:</b> I. Oppenheim (Carnegie Mellon University, USA), P. Qing (Acellent Technologies Inc., USA)	<b>Location:</b> HC 200-030	

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<b>Flexible Integration Techniques for Wireless Sensors Network Deployment: Application to Aircraft Structure Health Monitoring</b> D. Dragomirescu, M. M. Jatlaoui, S. Charlot, T. Beluch, P. Pons, H. Aubert, R. Plana [University of Toulouse, France]	
10:20 ~ 10:40	<b>On-Board Structural Health Monitoring (OBSHM) Smart Tag</b> N. Agianniotis <sup>1</sup> , C. Papadas <sup>1</sup> , P. Anagnostopoulos <sup>1</sup> , V. Rouet <sup>2</sup> , B. Foucher <sup>2</sup> [1) Integrated Systems Development ISD S.A., Maroussi, Greece; 2) EADS France]	
10:40 ~ 11:00	<b>Highly Nonlinear Granular Crystal Sensor and Actuator for Delamination Detection in Composite Structures</b> J. Yang <sup>1</sup> , F. Restuccia <sup>2</sup> , C. Daraio <sup>3</sup> [1) University of South Carolina, USA; 2) University of Edinburgh, UK; 3) California Institute of Technology, USA]	
11:00 ~ 11:20	<b>The Implementation of Piezoelectric Wafer Sensors for Acoustic Emission Sensing in Aluminum</b> D. Ozevin <sup>1</sup> , Z. Li <sup>2</sup> [1) University of Illinois at Chicago, USA; 2) Xi'an Aircraft Strength Institute, China]	
11:20 ~ 11:40	<b>Diagnosis of Internal Defect of a Pipe by Mechanoluminescent Sensor</b> S. Guo <sup>1</sup> , C.-N. Xu <sup>1,2</sup> , D. Ono <sup>1</sup> [1) National Institute of Advanced Industrial Science and Technology, Japan; 2) Japan Science and Technology Agency, Japan]	
11:40 ~ 12:00	<b>Development of an Integrated Fiber Bragg Grating Contact Pressure and Temperature Sensor for Composite Smart Manufacturing</b> L. Maurin <sup>1</sup> , P. Ferdinand <sup>1</sup> , L. Robert <sup>2</sup> , J.-J. Orteu <sup>2</sup> [1) CEA, LIST, France; 2) Université de Toulouse, France]	

<b>SPECIAL SESSION</b>		
<b>Bio-inspired Sensing and Actuation Technology - I</b>		
Chairs: J. Lynch (Univ. of Michigan, USA), K. Loh (UC Davis, USA)		
<b>Chair:</b> J. Lynch (University of Michigan, USA), K. Loh (UC Davis, USA)	<b>Location:</b> HC 200-034	

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<b>Cochlea-Based Spectral Decomposition of Sensor Signals for Resource-Constrained Sensor Networks</b> C. A. Peckens, J. P. Lynch [University of Michigan, USA]	
10:20 ~ 10:40	<b>Bio-inspired Smart Skin based on Expandable Network</b> Z. Guo, K. Kim, G. Lanzara, N. Salowitz, P. Peumans, and F.-K. Chang [Stanford University, USA]	
10:40 ~ 11:00	<b>Integrated Piezo-Element Drive Electronics for Structural Health Monitoring</b> Y. Guo, B. Murmann [Stanford University]	
11:00 ~ 11:20	<b>Micropillar Sensing Element for Bio-Inspired Flow Sensors</b> J. Tao, X. Yu, J. Berilla [Case Western Reserve University, USA]	
11:20 ~ 11:40	<b>A Bio-Inspired Nanocomposite for Photocurrent-based Strain Sensing</b> D. Ryu, K. J. Loh [University of California, Davis, USA]	
11:40 ~ 12:00	<b>Improving the Reliability of Sensor Skins for Structural Health Monitoring</b> I. Mohammad, H. Huang [University of Texas at Arlington, USA]	

## Prognostics and Data Mining for Health Management - I

**Chair:**

C. Farrar (Los Alamos National Laboratory, USA)

**Location:**

HC 200-203

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p style="text-align: center;"><b>Prognostic Modeling and Experimental Techniques for Electrolytic Capacitor Health Monitoring</b> C. Kulkarni<sup>1</sup>, J. Celaya<sup>2</sup>, G. Biswas<sup>1</sup>, K. Goebel<sup>2</sup> [1] Vanderbilt University, USA; 2) NASA Ames, USA]</p>	
10:20 ~ 10:40	<p style="text-align: center;"><b>Improving the Accuracy of Structural Fatigue Life Tracking Through Dynamic Strain Sensor Calibration</b> H. Lee<sup>1</sup>, J. Sheldon<sup>1</sup>, M. Watson<sup>1</sup>, C. Palmer<sup>1</sup>, T. Fallon<sup>2</sup> [1] Impact Technologies, LLC., USA; 2) Naval Air Systems Command, USA]</p>	
10:40 ~ 11:00	<p style="text-align: center;"><b>A 9-Step Process for Developing a Structural Health Monitoring System</b> S. Graves<sup>1</sup>, K. Rens<sup>2</sup>, F. Rutz<sup>2</sup> [1] Structure Inspection and Monitoring, Inc., USA; 2) University of Colorado Denver, USA]</p>	
11:00 ~ 11:20	<p style="text-align: center;"><b>Combined and I Indices Based on Principal Component Analysis for Damage Detection and Localization</b> D. A. Tibaduiza, L. E. Mujica, M. Anaya, J. Rodellar [Universitat Politècnica de Catalunya, Spain]</p>	
11:20 ~ 11:40	<p style="text-align: center;"><b>An Experimental and Numerical Investigation of Damage Detection in a Mistuned Bladed Disc</b> A. U. Rehman, K. Worden, J. A. Rongong [University of Sheffield, UK]</p>	
11:40 ~ 12:00	<p style="text-align: center;"><b>Fatigue Evaluation and Prognosis for Steel Bridges with Remote Acoustic Emission Monitoring</b> J. Yu, P. Ziehl [University of South Carolina, USA]</p>	

## Advanced Diagnostics for Damage Assessment - I

**Chair:**

M. Bach (EADS Innovation Works, Germany), T. Stepinski (Uppsala University, Sweden)

**Location:**

HC 200-205

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p style="text-align: center;"><b>Damage Diagnosis Algorithm for Civil Structures Using a Sequential Change Point Detection Method and Time-Series Analysis</b> H. Y. Noh, R. Rajagopal, A. S. Kiremidjian [Stanford University, USA]</p>	
10:20 ~ 10:40	<p style="text-align: center;"><b>Cointegration and SHM of Bridges</b> E. J. Cross, K. Worden, K.-Y. Koo, J. M. W. Brownjohn [University of Sheffield, UK]</p>	
10:40 ~ 11:00	<p style="text-align: center;"><b>Piezoceramic-Based 2-D Spiral Phased Array for Damage Detection of Thin Orthotropic Composite Laminates</b> B. Yoo, D. J. Pines [University of Maryland, USA]</p>	
11:00 ~ 11:20	<p style="text-align: center;"><b>Guided Wave and Probability Based Diagnostic Imaging for Detection of Multiple Welding Damages in Welded Tubular Steel Structures</b> X. Lu<sup>1</sup>, M. Lu<sup>2</sup>, L. Zhou<sup>2</sup>, Z. Su<sup>2</sup>, L. Cheng<sup>2</sup>, L. Ye<sup>3</sup>, G. Meng<sup>1</sup> [1] Shanghai Jiao Tong University, China; 2) Hong Kong Polytechnic University, Hong Kong SAR; 3) University of Sydney, Australia]</p>	
11:20 ~ 11:40	<p style="text-align: center;"><b>Nonlinear Cointegration as a Combinatorial Optimisation Problem</b> E. J. Cross, K. Worden [University of Sheffield, UK]</p>	
11:40 ~ 12:00	<p style="text-align: center;"><b>Characterizing Damage Based on Locally Perturbed Dynamic Equilibrium</b> H. Xu, L. Cheng and Z. Su [The Hong Kong Polytechnic University, Hong Kong]</p>	

### SPECIAL SESSION

## Wind Turbines Monitoring - I

Chair: W. Staszewski (Sheffield University, UK)

**Chair:**

W. Staszewski (Sheffield University, UK), M. Wang (Northeastern University, USA)

**Location:**

HC 200-303

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p style="text-align: center;"><b>Coupling Sensor-Based Structural Health Monitoring with Finite Element Model Updating for Probabilistic Lifetime Estimation of Wind Energy Converter Structures</b> D. Hartmann<sup>1</sup>, K. Smarsly<sup>2</sup>, K. H. Law<sup>2</sup> [1] Ruhr-University Bochum, Germany; 2) Stanford University, USA]</p>	
10:20 ~ 10:40	<p style="text-align: center;"><b>Aspects of Automatization of Wind Farm Monitoring on the Example of a Diagnostic Center</b> T. Barszcz, A. Jablonski [AGH University of Science and Technology, Poland]</p>	
10:40 ~ 11:00	<p style="text-align: center;"><b>In-Operation Identification of a Wind Turbine Structure via Non-Stationary Parametric Models</b> L. D. Avendaño-Valencia, M. D. Spiridonakos, S. D. Fassois [University of Patras, Greece]</p>	

11:00 ~ 11:20	<p align="center"><b>Structural Integrity Monitoring of the Critical Zones in the Wind Turbine Composite Blades with the use of Integrated Sensors - SESS Project</b></p> <p align="center">A. Hanc<sup>1</sup>, K. Dragan<sup>2</sup>, M. McGugan<sup>3</sup>, T. Uhl<sup>4</sup> [1) EC Electronics, Poland; 2) Air Force Institute of Technology, Poland; 3) Materials Research Division, Risø National Laboratory for Sustainable Energy, Technical University of Denmark, Denmark; 4) AGH University of Science and Technology, Poland]</p>	
11:20 ~ 11:40	<p align="center"><b>Lightning Protected Monitoring System for Wind Turbine Rotor Blades</b></p> <p align="center">B. Frankenstein<sup>1</sup>, L. Schubert<sup>1</sup>, E. Schulze<sup>1</sup>, D. Fischer<sup>1</sup>, B. Weihnacht<sup>1</sup>, R. Rieske<sup>2</sup> [1) Fraunhofer IZFP-Dresden, Germany; 2) Technical University Dresden, IAVT, Germany]</p>	
11:40 ~ 12:00	<p align="center"><b>Appropriate Rigid Body Correction for Analyzing the Dynamics of Rotating Structures using 3D Digital Photogrammetry</b></p> <p align="center">T. Lundstrom, C. Niezrecki, P. Avitabile [The University of Massachusetts, USA]</p>	

<b>Operational Effects Consideration in SHM - I</b>		
<b>Chair:</b> R. Brennan (US Army Research Laboratory, USA), A. del Grosso (University of Genoa, Italy)		<b>Location:</b> HC 200-305
TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p align="center"><b>A View into Baseline Free Guided Wave Approaches for Structural Health Monitoring</b></p> <p align="center">U. Lieske, C. Boller [Fraunhofer Institute for Non-Destructive-Testing, Dresden, Germany]</p>	
10:20 ~ 10:40	<p align="center"><b>Physics Based Temperature Compensation Strategy for Structural Health Monitoring</b></p> <p align="center">S. Roy, K. Lonkar, V. Janapati, F.-K. Chang [Stanford University, USA]</p>	
10:40 ~ 11:00	<p align="center"><b>Load-Enhanced Imaging of Fatigue Cracks via Sparse Guided Wave Arrays</b></p> <p align="center">J. E. Michaels, S. J. Lee, X. Chen, T. E. Michaels [Georgia Institute of Technology, USA]</p>	
11:00 ~ 11:20	<p align="center"><b>An Efficient Temperature Compensation Technique for Guided Wave Ultrasonic Inspection</b></p> <p align="center">J.B. Harley, J.M.F. Moura [Carnegie Mellon University, USA]</p>	
11:20 ~ 11:40	<p align="center"><b>Mystery Revealed on Natural Frequency Change of a Structure During Rainstorms</b></p> <p align="center">M. H. Cheng, V. Heckman, T. Heaton [California Institute of Technology, USA]</p>	
11:40 ~ 12:00	<p align="center"><b>Influence of Environment Condition on the Group Velocity of the Lamb Wave for SHM System</b></p> <p align="center">K. Takahashi<sup>1</sup>, H. Soejima<sup>1</sup>, T. Ogisu<sup>1</sup>, Y. Okabe<sup>2</sup>, N. Takeda<sup>2</sup>, Y. Koshioka<sup>3</sup> [1) Fuji Heavy Industries Ltd., Aerospace Company, Japan; 2) University of Tokyo, Japan; 3) RIMCOF Research Center of Advanced Materials and Composites, Japan]</p>	

<b>Civil Infrastructures: Laboratory Demonstration - I</b>		
<b>Chair:</b> F. Casciati (University of Pavia, Italy), A. Holst (TU Braunschweig, Germany)		<b>Location:</b> ART 2
TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p align="center"><b>Sensing Resolution and Measurement Range of a Passive Wireless Strain Sensor</b></p> <p align="center">X. Yi, T. Wu, G. Lantz, J. Cooper, C. Cho, Y. Wang, M. M. Tentzeris, R. T. Leon [Georgia Institute of Technology, USA]</p>	
10:20 ~ 10:40	<p align="center"><b>Ultrasonic Wall Thickness Monitoring at High Temperature (&gt;500 °C)</b></p> <p align="center">F. Cegla<sup>1</sup>, P. Cawley<sup>1</sup>, J. Allin<sup>2</sup>, J. Davies<sup>2</sup> [1) Imperial College, UK; 2) Permasense Ltd, UK]</p>	
10:40 ~ 11:00	<p align="center"><b>Early Detection of Fatigue Damage in Notched and Welded Steel Structures Using Active Thermography</b></p> <p align="center">R. Plum, T. Ummenhofer [Karlsruhe Institute of Technology, Germany]</p>	
11:00 ~ 11:20	<p align="center"><b>A Wavelet Based Methodology for Damage Detection and Severity Assessment on the ASCE Benchmark Structure Using Phase II Experimental Data</b></p> <p align="center">M. Jamal-Ahmad, J. Carter [Imperial College, UK]</p>	
11:20 ~ 11:40	<p align="center"><b>Integrate On-line RSSA and RSSI-COV Algorithms for Operational Modal Analysis of Bridge Structures</b></p> <p align="center">C.-H. Loh, Y.-C. Liu, F.-M. Wu [National Taiwan University, Taiwan]</p>	
11:40 ~ 12:00	<p align="center"><b>Crack Growth Monitoring System for Concrete Structures Based on Non-contact Displacement Measurements</b></p> <p align="center">T. Kusaka, Y. Nomura, T. Sakamoto, T. Fujii [Ritsumeikan University, Japan]</p>	

**SPECIAL SESSION**

**Monitoring of Civil Engineering Structures with MEMS - I**

Chairs: C. Grosse (TU Munich, Germany), J. Lynch (Univ. of Michigan, USA)

**Chair:**

C. Grosse (TU Munich, Germany)

**Location:**

ART 4

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
10:00 ~ 10:20	<p align="center"><b>Fiber Optic Method for Buried Pipelines Health Assessment after Earthquake-Induced Ground Movement</b> B. Glisic, Y. Yao, K. Oberste-Ufer [Princeton University, USA]</p>	
10:20 ~ 10:40	<p align="center"><b>Decentralized Fault Detection in Wireless Sensor Networks</b> C. Lo, M. Liu, J. P. Lynch [University of Michigan, USA]</p>	
10:40 ~ 11:00	<p align="center"><b>Framework for Comparison Study of Stochastic Modal Identification Considering Accuracy and Efficiency</b> M. Chang, S. N. Pakzad, C. Schanck [Lehigh University, USA]</p>	
11:00 ~ 11:20	<p align="center"><b>Automated System Identification and Validation of Numerical Models of Offshore Wind Turbines as Basis for SHM-Analysis</b> M. W. Häckell, G. Haake, R. Rolfes [University of Hannover, Germany]</p>	
11:20 ~ 11:40	<p align="center"><b>Novel Sensor Concept for Monitoring of Wind Turbine Blades</b> S. Zerst<sup>1</sup>, R. Rolfes<sup>1</sup>, K. H. Haase<sup>2</sup>, M. Knops<sup>3</sup> [1) University of Hannover, Germany; 2) HBM - Hottinger Baldwin Messtechnik GmbH, Germany. 3) REpower Systems AG, Germany]</p>	
11:40 ~ 12:00	<p align="center"><b>Laboratory Validation of MEMS-Based Sensors for Post-Earthquake Damage Assessment</b> D. Zonta<sup>1</sup>, D. Trapani<sup>1</sup>, F. Larcher<sup>1</sup>, A. Amditis<sup>2</sup>, M. Bimpas<sup>2</sup>, N. Bertsch<sup>3</sup>, A. Garetos<sup>4</sup>, Y. Stratakos<sup>4</sup>, N. Saillen<sup>5</sup>, J. Santana<sup>6</sup>, T. Sterken<sup>7</sup>, T. Torfs<sup>8</sup>, D. Ulieru<sup>9</sup> [1) University of Trento, Italy; 2) National Technical University of Athens, Greece; 3) Memscap SA, France; 4) Advanced Microwave Systems Ltd., Greece; 5) Thermo Fisher Scientific, The Netherlands; 6) IMEC-NL, The Netherlands; 7) IMEC Ghent, Center for Microsystem Technology, Belgium; 8) IMEC, Belgium; 9) SITEX 45 SRL, Romania]</p>	

12:00 ~ 13:00	<p><b>Lunch at the Oval</b> <i>Location: The Oval</i></p>	
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**Poster Sessions: Q & A**

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
13:00 ~ 14:05	<p align="center"><b>Poster Session &amp; Special Poster Session: NIST Technology Innovation Program (TIP)</b> <i>Location: Dohrmann Grove</i></p>	

**Aerospace Structures: Field Evaluation and Validation - II**

**Chair:**

R. Ross (NASA Langley, USA)

**Location:**

HC 200-002

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p align="center"><b>Damage Detection Method for CFRP Bolted Joints using Embedded BOCDA Optical Fiber Sensor</b> N. Saito<sup>1</sup>, T. Yari<sup>1</sup>, K. Nagai<sup>1</sup>, K. Enomoto<sup>2</sup> [1) Mitsubishi Heavy Industries, LTD., Japan; 2) RIMCOF Research Center of Advanced Metals and Composites, The Material Process Technology Center, Japan]</p>	
14:25 ~ 14:45	<p align="center"><b>Development of the Simultaneous Measurement System for Strain and Acoustic Emission using a Fiber Bragg Grating Sensor and a Fiber Ring Laser</b> T. Nakajima<sup>1</sup>, E. Sato<sup>2</sup>, H. Tsuda<sup>3</sup>, A. Sato<sup>4</sup>, N. Kawai<sup>2</sup>, H. Kawasaki<sup>1</sup> [1) IHI Inspection &amp; Instrumentation Co., Ltd, Japan; 2) Institute of Space and Astronautical Science, JAXA, Japan; 3) National Institute of Advanced Industrial Science &amp; Technology, Japan; 4) IHI Aerospace Co. Ltd, Japan]</p>	
14:45 ~ 15:05	<p align="center"><b>Wireless and Batteryless Accelerometry for Aircraft Structural Health Monitoring</b> R. Monthéard<sup>1,2</sup>, C. Escriba<sup>1,2</sup>, J.-Y. Fourniols<sup>1,2</sup>, M. Lastapis<sup>1,2</sup>, J.-M. Prunet<sup>3</sup>, M. Bafleur<sup>1,2</sup>, J.-M. Dilhac<sup>1,2</sup> [1) CNRS, France; 2) Université de Toulouse, France; 3) Tag Technologies, France]</p>	

15:05 ~ 15:25	<p align="center"><b>Flight Data from an Airworthy Structural Health Monitoring System for an Unmanned Air Vehicle using Integrally Embedded Fiber Optic Sensors</b></p> <p align="center">N. Gupta<sup>1</sup>, Augustin M. J.<sup>1</sup>, S. Sathya<sup>1</sup>, R. Sundaram<sup>1</sup>; M. H. Prasad<sup>2</sup>, A. C. R. Pillai<sup>3</sup>; S. Gali<sup>4</sup>; J. Balter, P. Guedj<sup>4</sup>, I. Kressel<sup>4</sup>; A. Hendleman<sup>5</sup>, Y. Botsev<sup>5</sup>, N. Gorbatov<sup>5</sup>, M. Tur<sup>5</sup>          [1) National Aerospace Laboratories, India; 2) Aeronautical Development Establishment, India; 3) Consultant, Israel; 4) AI Engineering Division Ben Gurion International Airport, Israel; 5) Tel-Aviv University, Israel]</p>	
15:25 ~ 15:45	<p align="center"><b>Algorithms to Monitor Damaging Events on a Plane Blade with an Autonomous Embedded Microsystem</b></p> <p align="center">M. Lastapis<sup>1,2</sup>, C. Escriba<sup>1,2</sup>, J.-Y. Fourniols<sup>1,2</sup> [1) CNRS, France; 2) Université de Toulouse, France]</p>	

<h2>Sensors and Actuators Development - II</h2>		
<b>Chair:</b> V. Smelyanskiy (NASA Ames, USA)		<b>Location:</b> HC 200-030

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p align="center"><b>Development and Qualification of FBG-based Strain Patches and Rosettes</b></p> <p align="center">N. Kusche, V. G. Schukar, C. Schilder, E. Köppe, W. R. Habel          [Federal Institute for Materials Research and Testing BAM, Germany]</p>	
14:25 ~ 14:45	<p align="center"><b>Characterization of Ultrasound Detection Using a Strain-Insensitive FBG Sensing System Incorporating Fiber Ring Laser</b></p> <p align="center">H. Tsuda [National Institute of Advanced Industrial Science and Technology, Japan]</p>	
14:45 ~ 15:05	<p align="center"><b>Improved Sensor Concepts for Durability Monitoring of Reinforced Concrete Structures</b></p> <p align="center">A. Holst, H. Budelmann, H.-J. Wichmann [University of Braunschweig, Germany]</p>	
15:05 ~ 15:25	<p align="center"><b>Photoacoustic Ultrasound Generation on an Optical Fiber Tip Using Gold Nanoparticles as the Target Material</b></p> <p align="center">N. Wu, Y. Tian, X. Zou, X. Wang [University of Massachusetts Lowell, USA]</p>	
15:25 ~ 15:45	<p align="center"><b>Properties of Interdigital Transducers for Lamb-wave Based SHM Systems</b></p> <p align="center">M. Manka<sup>1</sup>, M. Rosiek<sup>1</sup>, A. Martowicz<sup>1</sup>, T. Uhl<sup>1</sup>, T. Stepinski<sup>2</sup> [1) AGH University of Science and Technology, Poland; 2) Uppsala University, Sweden]</p>	

<h2>SPECIAL SESSION</h2> <h3>Bio-inspired Sensing and Actuation Technology - II</h3> <p align="center">Chairs: J. Lynch (Univ. of Michigan, USA), K. Loh (UC Davis, USA)</p>		
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<b>Chair:</b> K. Loh (UC Davis, USA)		<b>Location:</b> HC 200-034
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TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p align="center"><b>Bio-inspired Computing Algorithms for Adaptive Structural Health Monitoring</b></p> <p align="center">W. Liu, B. Chen [Michigan Technological University, USA]</p>	
14:25 ~ 14:45	<p align="center"><b>Field Validation of Flexure-Based Mobile Sensing Nodes on a Space Frame Bridge</b></p> <p align="center">D. Zhu, J. Guo, Y. Wang, K. M. Lee [Georgia Institute of Technology, USA]</p>	
14:45 ~ 15:05	<p align="center"><b>Development of a Bio-inspired Bridge Health Monitoring System</b></p> <p align="center">T. K. Lin<sup>1</sup>, C. A. Tsai<sup>2</sup>, M. Y. Shen<sup>2</sup>, K. C. Chang<sup>2</sup>, C. S. Lin<sup>1</sup>          [1) National Center for Research on Earthquake Engineering, Taiwan; 2) National Taiwan University, Taiwan]</p>	
15:05 ~ 15:25	<p align="center"><b>Towards Autonomous Wireless Sensors Systems in Civil Engineering. Paving the Way to an "Energy Oriented Design Method"</b></p> <p align="center">V. L. Cam<sup>1</sup>, M. Lossec<sup>2</sup>, R. L. Maulf<sup>1</sup>, L. Lemarchand<sup>1</sup>, W. Martin<sup>1</sup>, M. Le Pen<sup>1</sup>          [1) IFSTTAR, France; 2) ENS-Cachan/Bretagne, France]</p>	
15:25 ~ 15:45	<p align="center"><b>Radar Sensor based Accurate Tumor Tracking for Respiratory-Gated Lung Cancer Radiotherapy</b></p> <p align="center">C. Gu<sup>1</sup>, R. Li<sup>2</sup>, X. Yang<sup>3</sup>, C. Li<sup>1</sup>, S. B. Jiang<sup>4</sup> [1) Texas Tech University, USA; 2) Stanford University, USA; 3) University of Florida, USA; 4) University of California San Diego, USA]</p>	

## SPECIAL SESSION

**Hot Spot Monitoring - I**

Chairs: H. Sohn (KAIST, Korea), J.-B. Ihn (Boeing, USA), M. Leonard (AFRL, USA)

**Chair:**

H. Sohn (KAIST, Korea), J.-B. Ihn (Boeing, USA)

**Location:**

HC 200-203

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p><b>Development and Performance Quantification of an Ultrasonic Structural Health Monitoring System for Monitoring Fatigue Cracks on a Complex Aircraft Structure</b></p> <p>J.-B. Ihn<sup>1</sup>, L. Pado<sup>2</sup>, M. S. Leonard<sup>3</sup>, M. P. DeSimio<sup>4</sup>, S. E. Olson<sup>4</sup>            [1] Boeing Research &amp; Technology, USA; 2) Information Technology, USA; 3) Air Force Research Laboratory, Wright-Patterson AFB, USA; 4) University of Dayton Research Institute, USA]</p>	
14:25 ~ 14:45	<p><b>Hot-Spot Fatigue and Impact Damage Detection on a Helicopter Tailboom</b></p> <p>P. Qing<sup>1</sup>, H. Wilson<sup>2</sup>, A. G. Baines<sup>2</sup>, N. Bordick<sup>3</sup>, S. Banerjee<sup>1</sup>, H. Chung<sup>1</sup>, S. Beard<sup>1</sup>, M. Pappakostas<sup>1</sup>            [1] Acellent Technologies, Inc., USA; 2) Bell Helicopters Textron Inc., USA; 3) Aviation Applied Technology Directorate, USA]</p>	
14:45 ~ 15:05	<p><b>Damage Identification in Structural Components using Vibration and Wave Propagation Data</b></p> <p>S. Banerjee<sup>1</sup>, F. Ricci<sup>2</sup>, E. Monaco<sup>2</sup>, A. Mal<sup>3</sup> [1] Indian Institute of Technology Bombay, India; 2) University of Naples, Italy; 3) University of California Los Angeles, USA]</p>	
15:05 ~ 15:25	<p><b>Damage Detection Techniques in Composite Structures Using Ultrasonic Guided Waves</b></p> <p>F. Ricci<sup>1</sup>, E. Monaco<sup>1</sup>, L. Lecce<sup>1</sup>, S. Banerjee<sup>2</sup>, A. K. Mal<sup>3</sup> [1] University of Naples Federico II, Italy; 2) Indian Institute of Technology Bombay, India; 3) University of California Los Angeles, USA]</p>	
15:25 ~ 15:45		

**Advanced Diagnostics for Damage Assessment - II****Chair:**

H. Weiland (Alcoa, USA)

**Location:**

HC 200-205

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p><b>Robust Diagnostics for Bayesian Compressive Sensing Technique in Structural Health Monitoring</b></p> <p>Y. Huang<sup>1</sup>, J. L. Beck<sup>1</sup>, S. Wu<sup>2</sup>, H. Li<sup>2</sup>            [1] Harbin Institute of Technology, P.R.China; 2) California Institute of Technology, USA]</p>	
14:25 ~ 14:45	<p><b>Damage Monitoring and Evaluation for Building Structures Based on Measurement of Relative Story Displacements by Noncontact-Type Sensors</b></p> <p>T. Hatada<sup>1</sup>, M. Takahashi<sup>1</sup>, R. Katamura<sup>1</sup>, H. Hagiwara<sup>1</sup>, I. Matsuya<sup>2</sup>, K. Kanekawa<sup>2</sup>, Y. Nitta<sup>3</sup>, A. Nishitani<sup>2</sup>            [1] Kajima Corporation, Japan; 2) Waseda University, Japan; 3) Ashikaga Institute of Technology, Japan]</p>	
14:45 ~ 15:05	<p><b>Joint Condition Identification with Partially Measured Frequency Response Function</b></p> <p>M. Wang, G. Zheng [Tsinghua University, China]</p>	
15:05 ~ 15:25	<p><b>Multi-classifier Fusion Method Based on the Reliability of the Individual Classifiers</b></p> <p>L. Al-Shrouf, D. Soeffker [University of Duisburg-Essen, Germany]</p>	
15:25 ~ 15:45	<p><b>Validation of a Hybrid Automated Modal Identification Algorithm for Structural Health Monitoring Applications</b></p> <p>C. Rainieri, G. Fabbrocino [University of Molise, Italy]</p>	

## SPECIAL SESSION

**Wind Turbines Monitoring - II**

Chair: W. Staszewski (Sheffield University, UK)

**Chair:**

M. Wang (Northeastern University, USA), W. Staszewski (Sheffield University, UK)

**Location:**

HC 200-303

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<p><b>Integrated Sensor System for Structural Integrity and Load Monitoring of Wind Turbines</b></p> <p>T. Arsenault<sup>1</sup>, A. Achuthan<sup>1</sup>, P. Marzocca<sup>1</sup>, D. Anguiano<sup>2</sup>, D. Cardenas<sup>2</sup>, H. Elizalde<sup>2</sup>, O. Probst<sup>2</sup>, G. Coppotelli<sup>3</sup>            [1] Clarkson University, USA; 2) Tecnológico de Monterrey, México; 3) University of Rome, Italy]</p>	
14:25 ~ 14:45	<p><b>A Full-scale Fatigue Test of 9-m CX-100 Wind Turbine Blades</b></p> <p>G. Park, K. M. Farinholt, S. G. Taylor, C. R. Farrar [Los Alamos National Laboratory, USA]</p>	
14:45 ~ 15:05	<p><b>Assessment of Structural Monitoring Techniques for a Small Wind Turbine Test Stand</b></p> <p>S. Manzato<sup>1</sup>, M. Luczak<sup>2</sup>, M. Firla<sup>1</sup>, B. Peeters<sup>1</sup> [1] LMS International, Belgium; 2) Polish Academy of Sciences, Poland]</p>	

15:05 ~ 15:25	<b>Structural Health Monitoring: An End User's Point of View</b> S. Pierre, M. Gautier, B. Sylvain [EDF R&D, France]	
15:25 ~ 15:45	<b>PZT Active Frequency Based Wind Blade Fatigue to Failure Testing Results for Various Blade Designs</b> R. J. Werlink [NASA Kennedy Space Center, USA]	

<b>Operational Effects Consideration in SHM - II</b>		
<b>Chair:</b> S. Galea (Defence Science and Technology Organisation, Australia)	<b>Location:</b> HC 200-305	

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<b>Measurement of Distributed Strain and Deformation and Load Identification using Optical Fiber Strain Sensors</b> K. Tachibana <sup>1</sup> , H. Murayama <sup>1</sup> , H. Igawa <sup>2</sup> , T. Nakamura <sup>2</sup> , J. Yokokawa <sup>2</sup> [1] The University of Tokyo, Tokyo, Japan; 2) Japan Aerospace Exploratory Agency, Tokyo, Japan]	
14:25 ~ 14:45	<b>Extension of the Generalized Unknown Input Kalman Filter for Online-Reconstruction of External Structural Loads</b> Y. Niu, M. Klinkov, C.-P. Fritzen [University of Siegen, Germany]	
14:45 ~ 15:05	<b>Characterization of the Temperature, Load and Damage Effects using Piezoelectric Transducer Patches Based on Fuzzy Clustering</b> V. Lopes Jr. <sup>1</sup> , C. G. Gonzalez <sup>1</sup> , S. da Silva <sup>2</sup> , S. Roy <sup>3</sup> , K. Kode <sup>4</sup> , F. Sunor <sup>4</sup> , F.-K. Chang <sup>3</sup> [1] Univ. Estadual Paulista - UNESP, Brazil; 2) Western Paraná State University, Brazil; 3) Dept. Aeronautics/Astronautics, Stanford University, USA; 4) Dept. Computational/Mathematical Engineering, Stanford University, USA]	
15:05 ~ 15:25	<b>Effect of Water Temperature on the Laser-based Ultrasonic Testing of Immersed Structures</b> P. Rizzo, E. Pistone [Department of Civil and Environmental Engineering, University of Pittsburgh, PA, USA]	
15:25 ~ 15:45	<b>Machine Learning for Pipeline Monitoring Under Environmental and Operational Variations</b> Y. Ying, J. H. Garrett, Jr., J. Harley, J. M. F. Moura, N. O'Donoghue, I. J. Oppenheim, J. Shi, L. Soibelman [Carnegie Mellon University, USA]	

<b>Civil Infrastructures: Laboratory Demonstration - II</b>		
<b>Chair:</b> F. Wu (Shanghai Jiao Tong University, China)	<b>Location:</b> ART 2	

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<b>Experimental Verification of Controlled Substructure Identification Using Control Devices: A Preliminary Simulation Study</b> C. DeVore <sup>1</sup> , E. A. Johnson <sup>1</sup> , R. Christenson <sup>2</sup> [1) University of Southern California, USA; 2) University of Connecticut, USA]	
14:25 ~ 14:45	<b>High Frequency Axle Box Acceleration for Early Detection of Squats: Numerical Simulation, Prototype Development and Testing</b> Z. Li <sup>1</sup> , M. Molodova <sup>1</sup> , R. Dollevoet <sup>2</sup> [1) Delft University of Technology, The Netherlands; 2) ProRail, The Netherlands]	
14:45 ~ 15:05	<b>A Comparison of Experimental Characterization Results for Multiple Bridge Spans of the Same Design</b> R. Maestri, T. Wank, K. A. Grimmelsman [University of Arkansas, USA]	
15:05 ~ 15:25	<b>Damage Assessment with Time Series Analysis using a Wireless Sensors</b> M. Gul, T. Terrell, MJ Levy, F. N. Catbas [University of Central Florida, USA]	
15:25 ~ 15:45	<b>An Ultrasonic Guided Wave Sensor for Gas Accumulation Detection in Nuclear Emergency Core Cooling Systems</b> L. Yu, Y. J. Shin, J. Wang, Y. Shen [University of South Carolina, USA]	

**SPECIAL SESSION**

**Monitoring of Civil Engineering Structures with MEMS - II**

Chairs: C. Grosse (TU Munich, Germany), J. Lynch (Univ. of Michigan, USA)

**Chair:**

J. Lynch (University of Michigan, USA), C. Grosse (TU Munich, Germany)

**Location:**

ART 4

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
14:05 ~ 14:25	<b>Modal Identification of Steel Bridges Using Wireless Sensor Network</b> S. Dorvash, S. N. Pakzad, R. C. Knorr, L. M. Horwath [Lehigh University, USA]	
14:25 ~ 14:45	<b>Challenges and Possibilities of WSNs in the Dynamic Monitoring of Existent Structures</b> R. Aguilar <sup>1</sup> , L. F. Ramos <sup>2</sup> , P. B. Lourenço <sup>2</sup> , R. Severino <sup>3</sup> , R. Gomes <sup>3</sup> , P. Gandra <sup>3</sup> , M. Alves <sup>3</sup> , E. Tovar <sup>3</sup> [1) Pontifical Catholic University of Perú, Perú; 2) University of Minho, Portugal; 3) Polytechnic Institute of Porto, Portugal]	
14:45 ~ 15:05	<b>Acoustic Emission Sensors Circular Array for Concrete Structure Damaging Source DOA Estimation</b> Q. Wang, X. Liu [China Jiliang University, P.R. China]	
15:05 ~ 15:25	<b>Towards a Digital Image Correlation Based Strain Sensor</b> M. Dutton, N. A. Hault, W. A. Take [Queen's University, Canada]	
15:25 ~ 15:45	<b>An Innovative Non-Contact ECG and Biopotential Sensor</b> Y. Sun, J. Berilla, X. (Bill) Yu [Case Western Reserve University, USA]	

15:45 ~ 16:00	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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**Panel Discussion: Aerospace**

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
16:00 ~ 17:15	<b>SHM for CBM and Intelligent Structures: Where Shall be the Efforts for the Next 5 Years?</b>  Chair: D. Inman (Virginia Tech, USA) Panelists: TBA  <i>Location: TBA</i>	

18:30 ~ 22:00	<b>SHM Networking Welcome Night</b> <i>Location: Frost Amphitheater</i>	
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# TECHNICAL PROGRAM

## - POSTER SESSIONS -

Tuesday, September 13<sup>th</sup>

<b>Poster Session</b> (Display starts at 11:00, Q&A Session : 13:00 ~ 14:05) Location: Dohrmann Grove		
TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
11:00 ~ 14:05	<b>RAPID System for Hot Spot Corrosion Monitoring of Gas Pipelines</b> F. Li <sup>1</sup> , S. Banerjee <sup>1</sup> , M. Pappakostas <sup>1</sup> , H. Chung <sup>1</sup> , S. Beard <sup>1</sup> , G. Chang <sup>2</sup> [1] Acellent Technologies, Inc., Sunnyvale CA, USA; 2) Acellent Intern from the King's Academy, Sunnyvale CA, USA]	
11:00 ~ 14:05	<b>Mission and Scale Analysis on SHM of UAV's</b> M. Celebi [Turkish Air Force Academy, Turkey]	
11:00 ~ 14:05	<b>Damage Monitoring Based on Wave Illumination of Structures</b> Y. Liu, N. Mechbal, M. Vergé [Arts et Métiers ParisTech, France]	
11:00 ~ 14:05	<b>Structural Health Monitoring During Progressive Damage Test of S101 Bridge</b> M. Döhler <sup>1</sup> , F. Hille <sup>2</sup> , L. Mevel <sup>1</sup> , W. Rücker <sup>2</sup> [1] INRIA, Campus de Beaulieu, Rennes, France; 2) BAM, Division Buildings and Structures, Berlin, Germany]	
11:00 ~ 14:05	<b>Fatigue Crack Detection Using Guided Waves and Probability-based Imaging Approach</b> M. Lu <sup>1</sup> , X. Lu <sup>2</sup> , L. Zhou <sup>1</sup> , Z. Su <sup>1</sup> , L. Ye <sup>3</sup> , F. Li <sup>2</sup> [1] The Hong Kong Polytechnic University, Kowloon, Hong Kong SAR; 2) Shanghai Jiao Tong University, Shanghai, China 3) University of Sydney, Australia]	
11:00 ~ 14:05	<b>Experimental Investigation of the Excitation Level in System Identification of Frame Structures Using Linear Shakers</b> N. Nakata, K. Coleman [Johns Hopkins University, USA]	
11:00 ~ 14:05	<b>Simulation Method of Selection of Diagnostic Parameters in the Process of Monitoring the Rail Vehicle's Conditions</b> A. Chudzikiewicz, B. Sowinski [Warsaw University of Technology, Poland]	
11:00 ~ 14:05	<b>Identifying Foundation Impedance Properties from Seismic Records</b> A. Irizarry <sup>1</sup> , D. Bernal <sup>2</sup> , L. Suárez <sup>1</sup> [1] University of Puerto Rico at Mayaguez, Puerto Rico; 2) Northeastern University at Boston, USA]	
11:00 ~ 14:05	<b>Self Focusing of 2D Arrays for SHM of Plate-Like Structures Using Time Reversal Operator</b> L. Ambrozinski <sup>1</sup> , T. Stepinski <sup>2</sup> , T. Uhl <sup>1</sup> [1] AGH University of Science and Technology, Poland; 2) Uppsala University, Sweden]	
11:00 ~ 14:05	<b>Understanding The Effects of a Breathing Crack on the Dynamic Response of Cantilever-type Structures for Damage Detection</b> A.U. Rehman, K. Worden, J. A. Rongong [University of Sheffield, UK]	
11:00 ~ 14:05	<b>Finite Element Driven Damage Detection of a Skewed Highway Bridge with Pin and Hanger Assemblies</b> A. A. Mosavi, H. Sedarat, A. Emami-Naeini, V. Jacob, A. Krimotat, J. Lynch [SC Solutions, Inc, USA]	
11:00 ~ 14:05	<b>A System for Static and Dynamic Monitoring of Ice-Sport Arena</b> G. Boldyrev, A. Zhivaev [NPP Geotek Ltd, Russia]	
11:00 ~ 14:05	<b>Wireless, Batteryless Distributed Strain Sensing for Structural Health Monitoring</b> C. Palmer <sup>1</sup> , A. Gutterman <sup>1</sup> , G. Argenna <sup>1</sup> , V. Inclan <sup>2</sup> , A. Zyuzin <sup>2</sup> [1] Impact Technologies LLC, USA; 2) Illionix LLC, USA]	
11:00 ~ 14:05	<b>High Sampling Rate Fiber-Optic Extensometry for Ultrasonic Wave Detection</b> C. E. García, J. A. Güemes, A. Fernández [Polytechnic University of Madrid, Spain]	
11:00 ~ 14:05	<b>Application of Polarization-maintaining Fiber Bragg Grating to Optical Frequency Domain Reflectometry for Simultaneous Measurements of Strain and Temperature Distributions</b> D. Wada, H. Murayama, H. Igawa, K. Omichi and K. Kageyama [The University of Tokyo, Japan]	
11:00 ~ 14:05	<b>Simulation Platform for UWB Impulse Radio Wireless Sensor Networks Dedicated to Aeronautic Applications</b> D. Dragomirescu <sup>1</sup> , A. Thain <sup>2</sup> , F. Camps <sup>1</sup> , F. Perget <sup>1</sup> , A. Lecointre <sup>1</sup> , A. Berthe <sup>1</sup> , R. Plana <sup>1</sup> [1] University of Toulouse, France; 2) EADS Innovation Work, Austria]	

11:00 ~ 14:05	<p align="center"><b>Versatile and Easy-to-Assemble Measurement System for Impedance-Based Structural Health Monitoring</b></p> <p align="center">F.G. Baptista<sup>1</sup>, J.V. Filho<sup>1</sup>, N. Oki<sup>1</sup>, A.E. Turra<sup>1</sup>, V. Lopes Jr.<sup>1</sup>, D.J. Inman<sup>2</sup>  [1] Sao Paulo State University, Brazil; 2) Virginia Tech, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Fiber-Optic Extensometer Array in a Small Alcove at 1.25-km Depth in the Sanford Laboratory at Homestake, Lead, South Dakota</b></p> <p align="center">H. F. Wang<sup>1</sup>, J.R. Gage<sup>1</sup>, D. O. Fratta<sup>1</sup>, M. M. MacLaughlin<sup>2</sup>, A. Turner<sup>3</sup>  [1] University of Wisconsin-Madison, USA; 2) Montana Tech, USA; 3) Micron Optics Inc, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Overview of the European FP 7 Project "Aircraft Integrated Structural Health Assessment II" with Focus on the Detection of Corrosive and Hydraulic Liquids by Gauges on the Collapse of Percolation Conductivity</b></p> <p align="center">H. Pfeiffer, M. Wevers [Katholieke Universiteit Leuven, Belgium]</p>	
11:00 ~ 14:05	<p align="center"><b>Inherently Conductive Polymer Based Structure Health Monitoring Sensor for Composite</b></p> <p align="center">H. Yang, A. K. Singh, B. W. Pitts, G. J. Tregre, P. J. Kinlen [Crosslink, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Inter-digitized Transducers (IDTs) for Structural Health Monitoring (SHM) Applications</b></p> <p align="center">J. K. Na<sup>1</sup>, S. Kuhr<sup>2</sup>, Carl Druffner<sup>3</sup> [1] Edison Welding Institute, USA;  2) University of Dayton Research Institute, USA; 3) Mound Laser and Photonics Center, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Acoustic Emission Evaluation of Cavitation Erosion in Hydraulic Turbines</b></p> <p align="center">F. R. Queiroz<sup>1</sup>, E. B. Medeiros<sup>2</sup>, L. V. Donadon<sup>2</sup>, M. T. Corrêa de Faria<sup>2</sup>  [1] CTE.O Furnas Centrais Elétricas, Brazil; 2) UFMG, Brazil]</p>	
11:00 ~ 14:05	<p align="center"><b>Anomalous Wave Propagation Imaging with Adjacent Wave Subtraction: Composite Wing Application</b></p> <p align="center">C. C. Chia<sup>1</sup>, J. R. Lee<sup>1</sup>, C. Y. Park<sup>1</sup>, He. J. Shin<sup>2</sup> [1] Chonbuk National University, Korea;  2) Aeronautical Technology Directorate, Agency for Defense Development, Korea]</p>	
11:00 ~ 14:05	<p align="center"><b>Application of Fuzzy Set Theory in Structural Health Monitoring to Pattern Different States of an RC Bridge at Interstate 40</b></p> <p align="center">M. Azarbayejani<sup>1</sup>, M. R. Taha<sup>2</sup> [1] University of Texas-Pan American, USA; 2) University of New Mexico, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Experimental Broadband Estimation of Guided Waves Group Velocity with High Signal to Noise Ratio</b></p> <p align="center">N. Quaegebeur, P. Masson, P. Micheau, N. Mrad [Universite de Sherbrooke, Canada]</p>	
11:00 ~ 14:05	<p align="center"><b>Image Processing Technique for Vibrothermographic Field Tests</b></p> <p align="center">M. Szwedo, L. Pieczonka, T. Uhl [AGH University of Science and Technology, Poland]</p>	
11:00 ~ 14:05	<p align="center"><b>A Time Domain Spectral Element for Coupled Piezoelectric Actuator/Sensor with Complex Thin-walled Assembly Structures</b></p> <p align="center">R. Mohamed, P. Masson [Univeristé de Sherbrooke, Canada]</p>	
11:00 ~ 14:05	<p align="center"><b>Structural Health Monitoring System Based on Electromechanical Impedance Measurements</b></p> <p align="center">M. Rosiek, A. Martowicz, T. Uhl [AGH University of Science and Technology, Poland]</p>	
11:00 ~ 14:05	<p align="center"><b>Monitoring of 3D Composite Structures Using Fiber Optic Bragg Grating Sensors</b></p> <p align="center">M. Dvořák, J. Had, M. Růžička, Z. Pošvář [Czech Technical University in Prague, Czech Republic]</p>	
11:00 ~ 14:05	<p align="center"><b>Wavelet-based SVM System for Evaluation of Wear States and Remaining Life Time</b></p> <p align="center">M.-S. Saadawia, G. Li, D. Söffker [University of Duisburg-Essen, Germany]</p>	
11:00 ~ 14:05	<p align="center"><b>Adaptive Fuzzy-based Approach for Classification of System's States</b></p> <p align="center">H. Aljoumaa, D. Söffker [University of Duisburg-Essen, Germany]</p>	
11:00 ~ 14:05	<p align="center"><b>Uncertainty Assessment in Structural Health Monitoring</b></p> <p align="center">S.Sankararaman, S. Mahadevan [Vanderbilt University, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>Characterization of an Elastomer Based Autonomous Sensing-Actuating System</b></p> <p align="center">S. Raghavan, M. B. Subbanna [Hindustan Aeronautics Limited, India]</p>	
11:00 ~ 14:05	<p align="center"><b>Analysis of Bearing Damage Using a Multibody Model and a Test Rig for Validation Purposes</b></p> <p align="center">W. Jacobs<sup>1</sup>, M. Malago<sup>2</sup>, R. Boonen<sup>1</sup>, D. Moens<sup>1</sup>, P. Sas<sup>1</sup>  [1] Catholic University of Leuven, Belgium; 2) Università degli studi di Ferrara, Italy]</p>	
11:00 ~ 14:05	<p align="center"><b>Design of a Wheeled Climbing Robot for Automatic Inspection of Hydraulic Turbine Blade with Curved Surface</b></p> <p align="center">Z. Wu<sup>1,2</sup>, Q. Chen<sup>1</sup>, Z. Sun<sup>1</sup>, W. Zhang<sup>1</sup> [1] Tsinghua University, China; 2) University of California, Berkeley, USA]</p>	
11:00 ~ 14:05	<p align="center"><b>An Optimal Image-based Method for Identification of AE Sources on Plate Structure</b></p> <p align="center">G. Yan, L. Zhou [Nanjing University of Aeronautics and Astronautics, China]</p>	
11:00 ~ 14:05	<p align="center"><b>Residual Life Prediction of Steel I-beams Using Acoustic Emission and Back Propagation Neural Networks</b></p> <p align="center">Y. Zhang, F. Barsoum, E. Hill, Y. Kwan, A. Korcak [Embry-Riddle Aeronautical University, Florida, USA]</p>	

11:00 ~ 14:05	<b>Optical Fiber Sensors as a Tool for Structural Health Monitoring of Smart Composite Materials: From Fabrication to Mechanical Characterization</b> X. Chapeleau, M. Drissi-Habti [LUNAM, IFSTTAR, Dept. MACS, France]	
11:00 ~ 14:05	<b>Energy Harvesting and Structural Health Monitoring of Membranes</b> M. R. Sunny, R. Singh, C. Sultan, R. K. Kapania [Virginia Tech, USA]	
11:00 ~ 14:05	<b>Fatigue Damage Evolution Monitoring of Basalt Fiber Reinforced Polymer Plates using PZT Acoustic Emission Combining with Scanned Electronic Microstructure Technique</b> H. Li, W. Wang, Z. Qu, W. Zhou [Harbin Institute of Technology, China]	
11:00 ~ 14:05	<b>1000+ FBG Sensor Interrogator System using High Power Swept Laser</b> H. Hung, Y. Anjan [Optilab, USA]	

**Special Poster Session:**  
**National Institute of Standards & Technology (NIST) - Technology Innovation Program**  
(Display starts at 11:00, Q&A Session : 13:00 ~ 14:05)  
Location: Dohrmann Grove

TIME	TUESDAY, SEPTEMBER 13	PAGE NO.
11:00 ~ 14:05	<b>Early Concrete Bridge Deck Deterioration Detection and Rehabilitation by ANDERS</b> N. Gucunski [Rutgers University, USA]	
11:00 ~ 14:05	<b>Detection and Characterization of Chloride Induced Corrosion on Steel Reinforcement by Acoustic Emission</b> M. Gonzalez-Nunez, S. Momeni, A. Pollock, R. Gostautas [Mistras Group Inc., USA]	
11:00 ~ 14:05	<b>Development of a Mobile Acoustic Air-coupled Subsurface Sensing System for Pavement Property Detection</b> Y. Lu, Y. Cao, Y. Zhang, G. McDaniel, M. L. Wang [Northeastern University, USA]	
11:00 ~ 14:05	<b>Improving the Acquisition Speed of Ground Penetrating Radar Systems</b> R. Birken, C. Oden, D. Huston, T. Xia [Northeastern University, USA]	
11:00 ~ 14:05	<b>Use of Parabolic Reflectors for Signal Amplification in Air-coupled Impact-Echo Testing</b> J. Zhu [University of Texas at Austin, USA]	
11:00 ~ 14:05	<b>Simulation of In-air Waves Generated by the Zero-Group-Velocity S1 Lamb Mode</b> J. Zhu [University of Texas at Austin, USA]	
11:00 ~ 14:05	<b>Damage Tracking on a Fracture Critical Bridge</b> J. Fasl, A. A. Yousef [University of Texas at Austin, USA]	
11:00 ~ 14:05	<b>Passive, Wireless Corrosion Sensors for Reinforced Concrete Structures</b> J. Fasl, A. A. Yousef [University of Texas at Austin, USA]	
11:00 ~ 14:05	<b>Distributed Multi-parameter Fiber-optic Sensor for Water Infrastructure Monitoring</b> Y. Zadorozhny [Optellios, Inc., USA]	
11:00 ~ 14:05	<b>Development of a Multiscale Monitoring and Health Assessment Framework for Effective Management of Levees and Flood-Control Infrastructure Systems</b> M. Zeghal [Rensselaer Polytechnic Institute, USA; Geocomp, USA]	
11:00 ~ 14:05	<b>Wireless Monitoring of the New Carquinez Bridge</b> J. Lynch [University of Michigan, USA]	
11:00 ~ 14:05	<b>Finite-Element Driven Damage Detection of the Telegraph Road Bridge</b> A. Mosavi [SC Solutions, USA]	
11:00 ~ 14:05	<b>Characterization of AE Source Mechanisms for Fatigue Crack Growth in Steel Bridges</b> M. Hossain, J. Yu, P. Ziehl [University of South Carolina, USA]	
11:00 ~ 14:05	<b>Wind Harvesting for Running SHM Systems</b> M. A. Karami, J. Farmer, D. J. Inman [Virginia Tech, USA]	
11:00 ~ 14:05	<b>Advanced Health Management of Civil Infrastructures using SCANSn System</b> S. Banerjee <sup>1</sup> , H. Chung <sup>1</sup> , D. Zhang <sup>1</sup> , S. Beard <sup>1</sup> , F.-K. Chang <sup>2</sup> , I. Li <sup>1</sup> [1] Acellent Technologies Inc., USA; 2) Stanford University, USA]	

# TECHNICAL PROGRAM

Wednesday, September 14<sup>th</sup>

<b>Keynotes</b>		
<b>Chair:</b> H. Speckmann (Airbus, Germany)		<b>Location:</b> Memorial Auditorium

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
08:30 ~ 09:00	<b>Multifunctional Design Perspective for Bio-inspired Systems Allowing Autonomic Response</b> Les Lee [AFOSR, USA]	
09:00 ~ 09:30	<b>Embraer Perspective on the Introduction of SHM into Current and Future Commercial Aviation Programs</b> Luis G. dos Santos [Embraer, Brazil]	
09:30 ~ 10:00	<b>The Aerospace Industry Steering Committee on Structural Health Monitoring and Management (AISC-SHM): Progress on SHM Guidelines for Aerospace</b> Peter Foote [BAE Systems, UK], Grant Gordon [Honeywell, USA], Mark Derriso [USAF AFRL, USA]	

10:00 ~ 10:20	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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<b>Aerospace Structures: Field Evaluation and Validation - III</b>		
<b>Chair:</b> B. Glass (Lockheed Martin, USA)		<b>Location:</b> HC 200-002

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Numerical Predictions of Elastic Wave Scattering from a Sub-surface Defect in an F-111 Wing Skin</b> W. H. Ong <sup>1</sup> , W. K. Chiu <sup>1</sup> , S. C. Rosalie <sup>2</sup> , N. Rajic <sup>2</sup> [1] Department of Mechanical & Aerospace Engineering, Monash University, Australia; 2) Defence Science & Technology Organisation, Air Vehicles Division, Australia]	
10:40 ~ 11:00	<b>Real-Time Condition Assessment of RAPTOR Telescope Systems</b> C. J. Stull, S. G. Taylor, J. Wren, D. L. Mascareñas, C. R. Farrar [Los Alamos National Laboratory, USA]	
11:00 ~ 11:20	<b>Autonomous Battery-less Wireless Strain Gage for Structural Health Monitoring</b> V. Olariu <sup>1</sup> , A. Gnadinger <sup>1</sup> , J. Bao <sup>2</sup> , V. Giurgiutiu <sup>2</sup> [1] Albido Corporation, USA; 2) University of South Carolina, USA]	

<b>AISC-Guidebook Development Panel Session</b>		
TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
11:20 ~ 11:50	<b>Chair: P. Foote (BAE Systems, UK)</b> <i>Location: HC 200-002</i>	

<b>Sensors and Actuators Development - III</b>		
<b>Chair:</b> P. Hagedorn (TU Darmstadt, Germany)		<b>Location:</b> HC 200-030

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Piezoelectric Paint as Spatially Distributed Modal Sensors</b> C. Yang, C.-P. Fritzen [University of Siegen, Germany]	
10:40 ~ 11:00	<b>Towards Smart Sonar Transducers Polarimetric Sensing for Sonar Array Compensation</b> S. G. Pierce, G. M. H. Flockhart, M. McGuire, A. Bennecer, G. Hayward, G. Thursby, G. Stewart, B. Culshaw [University of Strathclyde, UK]	
11:00 ~ 11:20	<b>RF-powered Wireless Strain Sensor</b> Y. Hew, A. Yu, H. Huang [University of Texas at Arlington, USA]	

11:20 ~ 11:40	<b>Very Dense Arrays of Sensors for SHM Based on Large Area Electronics</b> B. Glisic, N. Verma [Princeton University, USA]	
11:40 ~ 12:00	<b>Detecting the Debonding of Adhesively Mounted Sensors in an Optimally Designed Structural Health Monitoring System</b> M. K. Jones, D. L. Parker [Miltec Research & Technology, USA]	

**SPECIAL SESSION**  
**Hot Spot Monitoring - II**  
Chairs: H. Sohn (KAIST, Korea), J.-B. Ihn (Boeing, USA), M. Leonard (AFRL, USA)

**Chair:** J.-B. Ihn (Boeing, USA), M. Leonard (AFRL, USA) **Location:** HC 200-034

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Reference-free Structural Health Monitoring for Detecting Delamination in Composite Plates</b> C. M. Yeum <sup>1</sup> , H. Sohn <sup>1</sup> , J.-B. Ihn <sup>2</sup> , H. J. Lim <sup>1</sup> [1] Korea Advanced Institute of Science and Technology, Korea; 2) Boeing Research & Technology, USA]	
10:40 ~ 11:00	<b>Ultrasonic Guided Wave SHM for Probabilistic Fatigue Crack Growth Prognostics</b> C. J. Lissenden, W. L. McGill, S. Li [Pennsylvania State University, USA]	
11:00 ~ 11:20	<b>Guided Wave Based SHM Approach using SAFT-Algorithm for Impact Detection in Composite Materials</b> L. Schubert <sup>1</sup> , R. Scherz <sup>1</sup> , M. Leibowitz <sup>2</sup> , U. Lieske <sup>1</sup> , B. Frankenstein <sup>1</sup> [1] Fraunhofer Institute for Non-Destructive Testing, Dresden, Germany; 2) RAFAEL, Israel]	
11:20 ~ 11:40	<b>Baseline-free Crack Detection in Nuclear Power Plants</b> H. Lee, H. Sohn [Korea Advanced Institute of Science and Technology, Korea]	
11:40 ~ 12:00	<b>Ultrasonic Structural Health Monitoring of Overhead Transmission Lines</b> H. Sprenger, L. Gaul [University of Stuttgart, Germany]	

**SPECIAL SESSION**  
**Verification and Validation of Damage Sensing - I**  
Chair: E. Medina (AFRL, USA)

**Chair:** E. Medina (AFRL, USA), S. Beard (Acellent Technologies Inc., USA) **Location:** HC 200-203

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>On the Performance Quantification of Active Sensing SHM Systems using Model-assisted POD Methods</b> I. Mueller <sup>1</sup> , V. Janapati <sup>1</sup> , S. Banerjee <sup>2</sup> , K. Lonkar <sup>1</sup> , S. Roy <sup>1</sup> , F.-K. Chang <sup>1</sup> [1] Stanford University, USA; 2) Acellent Technologies Inc., USA]	
10:40 ~ 11:00	<b>Certification in Structural Health Monitoring Systems</b> C. M. Schubert Kabban <sup>1</sup> , Mark Derriso <sup>2</sup> [1] Air Force Institute of Technology and Air Force Research Lab, USA; 2) Air Force Research Laboratory, USA]	
11:00 ~ 11:20	<b>Model Assisted Probability of Detection Evaluation of a Health Monitoring System by using CUDA Technology</b> A. Gallina <sup>1</sup> , P. Packo <sup>1</sup> , L. Ambrozinski <sup>1</sup> , T. Uhl <sup>1</sup> , W.J. Staszewski <sup>2</sup> [1] AGH-UST, Poland; 2) Sheffield University, UK]	
11:20 ~ 11:40	<b>The Need and Requirements for Validating Damage Detection Capability</b> E. A. Lindgren, C. F. Buynak [Air Force Research Laboratory, USA]	
11:40 ~ 12:00	<b>Protocol for Reliability Assessment of Structural Health Monitoring Systems Incorporating Model-assisted Probability of Detection (MAPOD) Approach</b> J. C. Aldrin <sup>1</sup> , E. A. Medina <sup>2</sup> , E. A. Lindgren <sup>2</sup> , C. F. Buynak <sup>2</sup> , J. S. Knopp <sup>2</sup> [1] Computational Tools, Gurnee, USA; 2) Air Force Research Laboratory, Wright-Patterson AFB, USA]	

## Advanced Diagnostics for Damage Assessment - III

**Chair:**

J. Huang (Boeing, USA)

**Location:**

HC 200-205

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Power Losses in PZT Disk Actuators' Adhesive</b> R. Dugnani [Exponent Failure Analysis Associates, USA]	
10:40 ~ 11:00	<b>Sensitivity of the Excitelet Imaging Algorithm on Material Properties for Isotropic Structures</b> P.-C. Ostiguy, P. Masson, N. Quaegebeur, S. Elkoun [Universite de Sherbrooke, Canada]	
11:00 ~ 11:20	<b>Damage Detection Index Based on Statistical Inference and PCA</b> L. E. Mujica, M. Ruiz, F. Pozo and J. Rodellar [Universitat Politècnica de Catalunya, Spain]	
11:20 ~ 11:40	<b>Effective Damage Sensitive Feature Extraction Methods for Crack Detection using Flaw Scattered Ultrasonic Wave Field Signal</b> S. K. Yadav <sup>1</sup> , S. Banerjee <sup>2</sup> , T. Kundu <sup>1</sup> [1] University of Arizona, USA; 2) Acellent Technologies Inc, USA]	
11:40 ~ 12:00	<b>Time-Domain Localized Structural Damage Identification with Incomplete Excitation Measurements</b> J. He, B. Xu [Hunan University, China]	

## Prognostics and Data Mining for Health Management - II

**Chair:**

K. Goebel (NASA Ames, USA)

**Location:**

HC 200-303

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Impact Damage Characterisation using a Statistical Approach</b> M.T.H. Sultan <sup>1</sup> , K. Worden <sup>2</sup> , W.J. Staszewski <sup>2</sup> [1] University Putra Malaysia, Malaysia; 2) University of Sheffield, UK]	
10:40 ~ 11:00	<b>Accelerated Aging Experiments for Prognostics of Damage Growth in Composite Materials</b> A. Saxena <sup>1</sup> , K. Goebel <sup>1</sup> , C. C. Larrosa <sup>2</sup> , V. Janapati <sup>2</sup> , S. Roy <sup>2</sup> , F.-K. Chang <sup>2</sup> [1] NASA Ames Research Center, USA; 2) Stanford University, USA]	
11:00 ~ 11:20	<b>Prognostics and Diagnostics of Rotorcraft Bearings</b> M. Haile, A. Ghoshal, D. Le [US Army Research Laboratory, USA]	
11:20 ~ 11:40	<b>Bayesian Sensitivity Analysis of Numerical Models for Structural Health Monitoring</b> R. J. Barthorpe [The University of Sheffield, U.K.]	
11:40 ~ 12:00	<b>Adaptive Classification Based on Multisensor Decision</b> L. Al-Shrouf <sup>1</sup> , M. S. Saadawia <sup>1</sup> , N. Szczepanski <sup>2</sup> , D. Söffker <sup>1</sup> [1] University of Duisburg-Essen, Germany; 2) Mines Engineering Centre, Germany]	

## Novel Signal Processing Techniques - I

**Chair:**

C. Palmer (Impact-Technologies, LLC., USA)

**Location:**

HC 200-305

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<b>Real-Time Characterization of Aerospace Structures using Onboard Strain Measurement Technologies and Inverse Finite Element Method</b> A. Tessler <sup>1</sup> , J. L. Spangler <sup>2</sup> , M. Mattoni <sup>3</sup> , M. Gherlone <sup>3</sup> , M. Di Sciuva <sup>3</sup> [1] NASA Langley Research Center, USA; 2) Lockheed Martin Aeronautics Company, USA; 3) Politecnico di Torino, Italy]	
10:40 ~ 11:00	<b>Impact Echo Signal Interpretation using Ensemble Empirical Mode Decomposition</b> Z. Xie, X. Wei, Y. Zhang [Georgia Institute of Technology, USA]	
11:00 ~ 11:20	<b>Mode Conversion Estimation of Filleted T-Joint using FEM and 3D Laser Vibrometry</b> J. T. Ayers <sup>1</sup> , E. Swenson <sup>2</sup> , M. Ruzzene <sup>3</sup> , A. Ghoshal <sup>1</sup> [1] Army Research Laboratory, USA; 2) AFIT/ENY, USA; 3) Georgia Institute of Technology, USA]	
11:20 ~ 11:40	<b>Detection of Impact Strain Waves in Composites by High-Speed FBG Sensor System with AWG Filter</b> Y. Okabe <sup>1</sup> , N. Watanabe <sup>1</sup> , M. Shimazaki <sup>1</sup> , H. Soejima <sup>2</sup> , T. Ogisu <sup>2</sup> [1] The University of Tokyo, Japan; 2) Fuji Heavy Industries Ltd., Japan]	
11:40 ~ 12:00	<b>The Application of Compressed Sensing to Detecting Damage in Structures</b> D. Mascarenas, D. Hush, J. Theiler, C. Farrar [Los Alamos National Laboratory, USA]	

## Civil Infrastructures: Field Evaluation and Validation - I

**Chair:**

H. Wenzel (Vienna Consulting Engineers, Austria)

**Location:**

ART 2

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<p style="text-align: center;"><b>Self Powered Wireless Sensor Network for Structural Bridge Health Prognosis: Achievements in the First Two Years</b></p> <p style="text-align: center;">V. Godinez<sup>1</sup>, A. Pollock<sup>1</sup>, M. Gonzalez<sup>1</sup>, S. Momeni<sup>1</sup>, R. Gostautas<sup>1</sup>, R. Fustos<sup>1</sup>, B. Newlin<sup>1</sup>, D. Inman<sup>2</sup>, J. Farmer<sup>2</sup>, S. Priya<sup>2</sup>, P. Zielh<sup>3</sup>, J. Caicedo<sup>3</sup>, B. Zarate<sup>3</sup>, L. Yu<sup>3</sup>, V. Giurgiutiu<sup>3</sup>, A. Nanni<sup>4</sup>                      [1] Mistras Group Inc., USA; 2) Virginia Tech, USA; 3) University of South Carolina, USA; 4) University of Miami, USA]</p>	
10:40 ~ 11:00	<p style="text-align: center;"><b>Fatigue Crack Monitoring with an Ultrasonic Sparse Array on a Real Steel Structure Component</b></p> <p style="text-align: center;">M. Vospernig<sup>1</sup>, R. Heuer<sup>2</sup>, M. Reiterer<sup>1</sup> [1] RED BERNARD GmbH, Austria; 2) Vienna University of Technology, Austria]</p>	
11:00 ~ 11:20	<p style="text-align: center;"><b>Challenges and Strategies in Remote Sensing Implementation for Bridge Monitoring</b></p> <p style="text-align: center;">S-E Chen<sup>1</sup>, E. Hauser<sup>1</sup>, K. Rehm<sup>2</sup> and C. Boyle<sup>3</sup>                      [1] University of North Carolina at Charlotte, USA; 2) AASHTO, USA; 3) Boyle Consulting Inc., USA]</p>	
11:20 ~ 11:40	<p style="text-align: center;"><b>An Innovative Method to Measure Bridge Deflection using Simple Telecom Fiber</b></p> <p style="text-align: center;">P. Kung, L. Wang [QPS Photonics Inc., Canada]</p>	
11:40 ~ 12:00	<p style="text-align: center;"><b>Diagnostic Performance Indication through Field Testing of a Bridge Superstructure</b></p> <p style="text-align: center;">M. V. Gangone<sup>1</sup>, M. J. Whelan<sup>2</sup>, K. D. Janoyan<sup>1</sup>                      [1] Clarkson University, USA; 2) University of North Carolina at Charlotte, USA]</p>	

### SPECIAL SESSION

## Advanced SHM for Ship Structures

Chair: L. Salvino (US Navy, USA)

**Chair:**

L. Salvino (US Navy, USA), R. Kuo (Exxon Mobile Upstream Research, USA)

**Location:**

ART 4

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
10:20 ~ 10:40	<p style="text-align: center;"><b>Compressive Sensing Approach for Structural Health Monitoring of Ship Hulls</b></p> <p style="text-align: center;">S. M. O'Connor, J. P. Lynch, A. C. Gilbert [University of Michigan, USA]</p>	
10:40 ~ 11:00	<p style="text-align: center;"><b>Structural Damage Identification in Stiffened Plate Fatigue Specimens using Piezoelectric Active Sensing</b></p> <p style="text-align: center;">B. L. Grisso<sup>1</sup>, G. Park<sup>2</sup>, L. W. Salvino<sup>1</sup>, C. R. Farrar<sup>2</sup>                      [1] Naval Surface Warfare Center, Carderock Division, USA; 2) Los Alamos National Laboratory, USA]</p>	
11:00 ~ 11:20	<p style="text-align: center;"><b>Health Monitoring of Aluminum Weldings with the Surface Response to Excitation (SuRE) Approach</b></p> <p style="text-align: center;">I. N. Tansel<sup>1</sup>, B. L. Grisso<sup>2</sup>, G. Singh<sup>1</sup>, G. Singh<sup>1</sup>, S. Korla<sup>1</sup>, L. W. Salvino<sup>2</sup>                      [1] Florida International University, USA; 2) NSWC Carderock Div., USA]</p>	
11:20 ~ 11:40	<p style="text-align: center;"><b>Distributed Sensor Network for Structural Health Monitoring of Ships</b></p> <p style="text-align: center;">B. W. Roeder, R. R. Klug [McQ Inc., USA]</p>	
11:40 ~ 12:00		

12:00 ~ 13:00

### Lunch at the Oval

*Location: The Oval*

## Aerospace Structures: Laboratory Demonstration - I

**Chair:**

S. Lee (Hong Kong University of Science &amp; Technology, Hong Kong)

**Location:**

HC 200-002

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<p style="text-align: center;"><b>Monitoring the Degradation by Fire of Composite Laminates by Embedded FBG Sensors</b></p> <p style="text-align: center;">A. Güemes, C. E. Garcia-Gonzalez, I. Gonzalez-Requena, C. De Miguel-Giraldo [Technical University of Madrid, Spain]</p>	
13:20 ~ 13:40	<p style="text-align: center;"><b>Nonlinear Ultrasonic Techniques for Nondestructive Damage Assessment in Metallic Materials</b></p> <p style="text-align: center;">J.-Y. Kim<sup>1</sup>, L. J. Jacobs<sup>1</sup>, J. Qu<sup>2</sup> [1] Georgia Institute of Technology, USA; 2) Northwestern University, USA]</p>	

13:40 ~ 14:00	<b>Hierarchical Sensing System Combining a Fiber-Optic Network and Distributed Built-In Capillary Sensors for Impact Damage Monitoring of CFRP Structures</b> H. Banshoya, S. Minakuchi, N. Takeda [The University of Tokyo, Japan]	
14:00 ~ 14:20	<b>Waveguided and Noncontacting Thermoacoustic Sensing of Thermal Protection Systems</b> D. Huston, D. Hurley, D. Fletcher, W. Owens [University of Vermont, USA]	

<b>Sensors and Actuators Development - IV</b>		
<b>Chair:</b> T. Uhl (AGH University of Science and Technology, Poland)		<b>Location:</b> HC 200-030

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<b>Power Management in a Wireless Sensor for Structural Monitoring Application</b> S. Casciati <sup>1</sup> , L. Faravelli <sup>2</sup> , Z. Chen <sup>2</sup> [1] University of Catania at Syracuse, Italy; 2) University of Pavia, Italy]	
13:20 ~ 13:40	<b>Integrating Diamond Sensors in Silicon Technology Integrated Circuits</b> T. Sanders <sup>1</sup> , G. Hess <sup>1</sup> , J. Davidson <sup>2</sup> [1] AET Inc., USA; 2) Vanderbilt University, USA]	
13:40 ~ 14:00	<b>Development of a Bi-Axial Accelerometer Based on Intensity Modulated Plastic Optical Fiber for Wind Turbine Monitoring</b> Y. Ge, S.T. Quek, K.S.C. Kuang [National University of Singapore, Singapore]	
14:00 ~ 14:20	<b>Intelligent Structural Health Monitoring Using Carbon Nanomaterial Networks</b> S.W. Kim, S. H. Hwang, Y. B. Park [Ulsan National Institute of Science and Technology (UNIST), Republic of Korea]	

<b>SPECIAL SESSION</b>		
<b>Hot Spot Monitoring - III</b>		
Chairs: H. Sohn (KAIST, Korea), J.-B. Ihn (Boeing, USA), M. Leonard (AFRL, USA)		
<b>Chair:</b> M. Leonard (AFRL, USA), H. Sohn (KAIST, Korea)		<b>Location:</b> HC 200-034

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<b>Strain Monitoring and Damage Detection of Single-Lap Joint with Embedded FBGs</b> H. Murayama <sup>1</sup> , D. Wada <sup>1</sup> , K. Kageyama <sup>1</sup> , K. Uzawa <sup>1</sup> , H. Igawa <sup>2</sup> [1] School of Engineering, The University of Tokyo, Japan; 2) Japan Aerospace Exploration Agency, Japan]	
13:20 ~ 13:40	<b>Health Monitoring of Composite Structures Using Carbon Nanotube and Acoustic Sensors</b> G. J. Gallo <sup>1</sup> , L. Gao <sup>1</sup> , E. T. Thostenson <sup>1</sup> , T.-W. Chou <sup>1</sup> , S. Das <sup>2</sup> , C. Cheung <sup>2</sup> , B. Shen <sup>2</sup> , S. Banerjee <sup>2</sup> [1] University of Delaware, USA; 2) Acellent Technologies Inc. USA]	
13:40 ~ 14:00	<b>Acousto-Ultrasonic In Situ Monitoring of Fatigue Cracking in an Aircraft Wing Skin Specimen</b> S. Galea, C. Rosalie, N. Rajic [Defence Science and Technology Organisation, Australia]	
14:00 ~ 14:20	<b>Crack Detection using Combinations of Acoustic Emission and Guided Wave Signals from Bonded Piezoelectric Transducers</b> M. M. Derriso <sup>1</sup> , J. E. Little II <sup>1</sup> , K. A. Vehorn <sup>1</sup> , M. J. Davies <sup>2</sup> , M. P. DeSimio <sup>2</sup> [1] AFRL/RBSA, USA; 2) University of Dayton Research Institute, USA]	

<b>SPECIAL SESSION</b>		
<b>Verification and Validation of Damage Sensing - II</b>		
Chair: E. Medina (AFRL, USA)		
<b>Chair:</b> S. Beard (Acellent Technologies Inc., USA), E. Medina (AFRL, USA)		<b>Location:</b> HC 200-203

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<b>Demonstration of Model Assisted Reliability Assessment Protocol on a Proposed Low Frequency Vibration Based Damage Sensing Case</b> E. A. Medina <sup>1</sup> , J. C. Aldrin <sup>2</sup> , J. Santiago <sup>3</sup> , E. A. Lindgren <sup>1</sup> , C. F. Buynak <sup>1</sup> , J. S. Knopp <sup>1</sup> [1] Air Force Research Laboratory, USA; 2) Computational Tools, USA; 3) Consultant Aventura, USA]	
13:20 ~ 13:40	<b>Challenges and Approach for SHM Technology Transition</b> S. Beard, S. Banerjee [Acellent Technologies, Inc., USA]	
13:40 ~ 14:00	<b>FAA Research &amp; Development Efforts in SHM</b> P. Swindell, D. Roach, I. Won [FAA, USA]	
14:00 ~ 14:20	<b>Condition-Based Maintenance Plus and Maintenance Credit Validation</b> D. D. Le <sup>1</sup> , A. Ghoshal <sup>1</sup> , E. Cuevas <sup>2</sup> [1] US Army Research Laboratory, USA; 2) Federal Aviation Administration, USA]	

**SPECIAL SESSION**

**Intelligent Sensor Networks for SHM - I**

Chairs: J. Lynch (Univ. of Michigan, USA), A. Swartz (Michigan Techn. Univ., USA)

**Chair:**

J. Lynch (University of Michigan, USA), A. Swartz (Michigan Technological University, USA)

**Location:**

HC 200-205

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<p align="center"><b>Autonomous Structural Condition Monitoring Based on Dynamic Code Migration and Cooperative Information Processing in Wireless Sensor Networks</b></p> <p align="center">K. Smarsly<sup>1</sup>, K. H. Law<sup>1</sup>, M. König<sup>1</sup> [1] Stanford University, USA; 2) Ruhr-University Bochum, Germany]</p>	
13:20 ~ 13:40	<p align="center"><b>An Intelligent Wireless Structural Health Monitoring Solution for Urban Search and Rescue</b></p> <p align="center">A. Zimmerman<sup>1</sup>, J. Lynch<sup>2</sup>, G. Zussman<sup>3</sup>, D. Rubenstein<sup>3</sup> [1] Civionics, LLC, USA; 2) University of Michigan, USA; 3) Columbia University, USA]</p>	
13:40 ~ 14:00	<p align="center"><b>Towards Low-Cost Structural Health Monitoring with Sensor Networks in Earthquake Damage Detection</b></p> <p align="center">T. Fujiwara<sup>1</sup>, H. S. Ulusoy<sup>2</sup>, M. Q. Feng<sup>2</sup> [1] Hakodate National College of Technology, Japan; 2) University of California Irvine, USA]</p>	
14:00 ~ 14:20	<p align="center"><b>Novel Optical-Fiber-Based Cure Monitoring Technique for Large-scale Composite Structures by Hybrid Brillouin-Rayleigh System</b></p> <p align="center">Y. Ito, K. Fujimoto, S. Minakuchi, T. Mizutani, N. Takeda [University of Tokyo, Japan]</p>	

**Prognostics and Data Mining for Health Management - III**

**Chair:**

T. Kundu (University of Arizona, USA)

**Location:**

HC 200-303

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<p align="center"><b>Artificial Neural Network Based Damage Detection From Lamb Wave Response</b></p> <p align="center">A. Baranwal, M. Mitra [IIT Bombay, India]</p>	
13:20 ~ 13:40	<p align="center"><b>Integration of Data Mining Operations for Structural Health Monitoring</b></p> <p align="center">E. Sonnleitner<sup>1</sup>, H. Kosorus<sup>1</sup>, S. Anderlik<sup>1</sup>, R. Stumptner<sup>1</sup>, B. Freudenthaler<sup>2</sup>, H. Allmer<sup>3</sup>, J. Kung<sup>1</sup> [1] Johannes Kepler University, Linz, Austria; 2) Software Competence Center, Hagenberg, Austria; 3) VCE Holding GmbH, Wien Austria]</p>	
13:40 ~ 14:00	<p align="center"><b>Multiple Information Agents for Real-Time ISHM: Architectures for Real-Time Warfighter Support</b></p> <p align="center">J. A. Crowder [Raytheon Intelligence and Information Systems, USA]</p>	
14:00 ~ 14:20	<p align="center"><b>Integration of Structural Health Monitoring and Fatigue Damage Prognosis</b></p> <p align="center">Y. Ling, S. Mahadevan [Vanderbilt University, USA]</p>	

**Novel Signal Processing Techniques - II**

**Chair:**

C.-P. Fritzen (University of Siegen, Germany)

**Location:**

HC 200-305

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<p align="center"><b>Measuring the Average Thickness of a Plate using a Bayesian Method and Free Vibration Data</b></p> <p align="center">E. Z. Moore<sup>1</sup>, K. D. Murphy<sup>1</sup>, J. M. Nichols<sup>2</sup> [1] University of Connecticut, USA; 2) U.S. Naval Research Lab, USA]</p>	
13:20 ~ 13:40	<p align="center"><b>Morphological Filtering of SHM Datasets</b></p> <p align="center">D. K. McNeill<sup>1</sup>, M. Soiferman<sup>2</sup> [1] University of Manitoba, Canada; 2) YRT Ltd., Canada]</p>	
13:40 ~ 14:00	<p align="center"><b>Examination of Wear Phenomena by using Filtering Techniques for FDI Purposes</b></p> <p align="center">K.-U. Dettmann, D. Baccar, D. Soeffker [University of Duisburg-Essen, Germany]</p>	
14:00 ~ 14:20	<p align="center"><b>Automated Data Interpretation for Modal Identification of a Truss Bridge</b></p> <p align="center">J. Zhang<sup>1</sup>, F.L. Moon<sup>2</sup>, E.M. Aktan<sup>2</sup> [1] Southeast University, China; 2) Drexel University, USA]</p>	

## Civil Infrastructures: Field Evaluation and Validation - II

**Chair:**

N. Nakata (Johns Hopkins University, USA)

**Location:**

ART 2

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<b>Development of Reliable and Low-Power Wireless Health Monitoring Systems for Highway Bridges</b> D. Potter <sup>1</sup> , J. Fas <sup>2</sup> , V. Samaras <sup>2</sup> , T. Helwig <sup>2</sup> , S. Wood <sup>2</sup> , R. Lindenberg <sup>3</sup> , K. Frank <sup>4</sup> [1] National Instruments, USA; 2) University of Texas at Austin, USA; 3) Wiss, Janney, Elstner Associates, Inc., USA; 4) Hirschfeld Industries, USA]	
13:20 ~ 13:40	<b>Design and Application of a Wireless Sensor Network for Vibration-Based Performance Assessment of a Tied Arch Bridge</b> M. J. Whelan [UNC Charlotte, USA]	
13:40 ~ 14:00	<b>Risk Based Civil SHM and Life Cycle Management</b> H. Wenzel, R. Veit-Egerer, M. Widmann [Vienna Consulting Engineers, Austria]	
14:00 ~ 14:20	<b>Integration of SHM into Bridge Management Systems: Case Study – Z24 Bridge</b> E. Figueiredo <sup>1</sup> , L. Radu <sup>1</sup> , G. Park <sup>2</sup> , C. Farrar <sup>2</sup> [1] Catholic University of Portugal, Portugal; 2) Los Alamos National Laboratory, USA]	

## Advanced Monitoring for Load / Environments

**Chair:**

D. Huston (University of Vermont, USA)

**Location:**

ART 4

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
13:00 ~ 13:20	<b>Design of a Self-powered Load Monitoring System for Hot Spot Applications</b> Y. Y. Lin <sup>1</sup> , M. Taya <sup>1</sup> , J.-B. Ihn <sup>2</sup> [1] University of Washington, USA; 2) Boeing Research & Technology, USA]	
13:20 ~ 13:40	<b>A Robust Impact-force Determination Technique for Complex Structures</b> I. Mueller <sup>1</sup> , K. Vonnieda <sup>1</sup> , S. Das <sup>2</sup> , F.-K. Chang <sup>1</sup> [1] Stanford University, USA; 2) Acellent Technologies Inc., USA]	
13:40 ~ 14:00	<b>Analytical Formulation for the Determination of Torsional Forces and Shear Stresses in Hydraulic Steel Structures From Field Experiments</b> A. J. Alicea <sup>1</sup> , G. Riveros <sup>2</sup> [1] University of Puerto Rico at Mayaguez, USA; 2) U.S. Army Corps of Engineers - Engineer Research and Development Center, USA]	
14:00 ~ 14:20	<b>Experimental Evaluation of a Wavelet-Based FEM and its Application to Load History Identification</b> M. M. Mota, L. Pahlavan, C. Kassapoglou [Delft University of Technology, The Netherlands]	

14:20 ~ 14:40	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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## SHM in Action

TIME	WEDNESDAY, SEPTEMBER 14	PAGE NO.
14:40 ~ 17:00	Chair: TBA <i>Location: Memorial Auditorium</i>	

18:30 ~ 22:00	<b>Banquet and Award Night</b> <i>Location: Crowne Plaza Hotel Cabana, Palo Alto</i>	
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# TECHNICAL PROGRAM

Thursday, September 15<sup>th</sup>

<b>Keynotes</b>		
<b>Chair:</b> J. Michaels [Georgia Tech, USA]		<b>Location:</b> Memorial Auditorium
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
08:30 ~ 09:00	<b>Structural Health Monitoring for Civil Infrastructure - From Instrumentation to Decision Support</b> Anne S. Kiremidjian [Stanford University, USA]	
09:00 ~ 09:30	<b>Does the Maturity of Structural Health Monitoring Technology Match User Readiness?</b> Dennis Roach [Sandia National Laboratories, USA]	

09:30 ~ 10:00	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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<b>Aerospace Structures: Laboratory Demonstration - II</b>		
<b>Chair:</b> S.-R. Lin (The Aerospace Corporation, USA), J. McFeat (BAE Systems, UK)		<b>Location:</b> HC 200-002
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Piezoelectric Wafer Active Sensor Network for Aircraft Structures Damage Localisation: Pitch-Catch Method</b> H. Boukabache, M. Matmat, S. Ksouri, C. Escriba, J.-Y. Fourniols [French National Centre for Scientific Research & Toulouse University, France]	
10:20 ~ 10:40	<b>Detecting the Point of Impact on an Anisotropic Cylindrical Surface using only Four Acoustic Sensors</b> T. Hajzargarbashi <sup>1</sup> , H. Nakatani <sup>2</sup> , T. Kundu <sup>1</sup> , N. Takeda <sup>2</sup> [1] University of Arizona, USA; 2) University of Tokyo, Japan]	
10:40 ~ 11:00	<b>Impact Damage Assessment by Sensor Signal Analysis</b> R. John <sup>1</sup> , I. Read <sup>1</sup> , W. MacPherson <sup>2</sup> [1] BAE Systems, UK; 2) Heriot-Watt University, UK]	
11:00 ~ 11:20	<b>Beam Shape Sensing using Inverse Finite Element Method: Theory and Experimental Validation</b> M. Gherlone <sup>1</sup> , P. Cerracchio <sup>1</sup> , M. Mattone <sup>1</sup> , M. D. Sciuva <sup>1</sup> , A. Tessler <sup>2</sup> [1] Politecnico di Torino, Italy; 2) NASA Langley Research Center, USA]	
11:20 ~ 11:40	<b>Integrated Optical Fibers into Aluminium Extrusions Enabling Structural Health Monitoring of Aerospace Structures</b> G. Pouget <sup>1</sup> , A. Fernandez-Lopez <sup>2</sup> , A. Güemes <sup>2</sup> , J.C. Ehrström <sup>1</sup> [1] Constellium CRV, France; 2) Polytechnic University of Madrid, Spain]	
11:40 ~ 12:00	<b>Early Results of Lamb Waves Approach to Assess Corrosion Damage using Direct Image Path in an Aeronautical Aluminum Alloy</b> F. Dotta, F. S. da Silva, A. B. da Silva [Embraer S.A., Brazil]	

<b>SPECIAL SESSION</b>		
<b>Structural Health Monitoring of Wind Turbines</b>		
<b>Chair:</b> J. R. White (Sandia National Laboratories, USA)		<b>Location:</b> HC 200-030
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Inertial Energy Harvester for Monitoring Wind Turbine Blades</b> B. Joyce, J. Farmer, D. J. Inman [Virginia Tech, USA]	
10:20 ~ 10:40	<b>Load Shaping for Maximizing Energy Capture and Structural Health in a HAWT using Rotor-Mounted Inertial Sensors</b> J. Yutzy, D. E. Adams [Purdue Center for Systems Integrity, USA]	
10:40 ~ 11:00	<b>Passive Damage Monitoring of Wind Turbine Rotor Blades using Cyclic Signal Processing</b> J. R. White [Sandia National Laboratories, USA]	

11:00 ~ 11:20	<b>Vibration Based Damage Detection for Structures of Offshore Wind Energy Plants</b> C. Fritzen, P. Kraemer [University of Siegen, Germany]	
11:20 ~ 11:40	<b>Investigation of Various Condition Monitoring Techniques Based on a Damaged Wind Turbine Gearbox</b> S. Sheng [NREL, USA]	
11:40 ~ 12:00	<b>Distributed Optical Fiber Sensing for Wind Blade Strain Monitoring and Defect Detection</b> A. M. Kaplan, S. M. Klute, D. K. Gifford, A. D. Heaney [Luna Innovations Incorporated]	

**SPECIAL SESSION**  
**Intelligent Sensor Networks for SHM - II**  
Chairs: J. Lynch (Univ. of Michigan, USA), A. Swartz (Michigan Techn. Univ., USA)

**Chair:** A. Swartz (Michigan Technological University, USA), W. K. Chiu (Monash University, Australia) **Location:** HC 200-034

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Wireless Sensor Network for Guided Wave Propagation with Piezoelectric Transducers</b> C. Dürager <sup>1</sup> , A. Heinzemann <sup>2</sup> , D. Riederer <sup>2</sup> [1] Swiss Federal Laboratories of Materials Science and Technology, Switzerland; 2) Interstate University of Applied Sciences of Technology, Switzerland]	
10:20 ~ 10:40	<b>Architecture of a Remote Impedance-Based Structural Health Monitoring System used in Aircrafts</b> L. G. A. Martins <sup>1</sup> , R. M. Finzi Neto <sup>2</sup> , C. A. Gallo <sup>3</sup> , L. V. Palomino <sup>3</sup> , P. Moneda <sup>3</sup> , D. A. Rade <sup>3</sup> , V. Steffen Jr. <sup>3</sup> [1] School of Computations, Federal University of Uberlandia, Brazil; 2) Federal University of Goias, Brazil; 3) School of Mechanical Engineering, Federal University of Uberlandia, Brazil]	
10:40 ~ 11:00	<b>Implementation of a Receptance-based SHM Algorithm on Wireless Smart Sensors</b> S. Jang <sup>1</sup> , S. H. Sim <sup>2</sup> , B. F. Spencer Jr. <sup>3</sup> [1] University of Connecticut, USA; 2) Ulsan Institute of Science and Technology, South Korea; 3) University of Illinois at Urbana-Champaign, USA]	
11:00 ~ 11:20	<b>Distributed Optical Fiber Smart Sensors for Structural Health Monitoring</b> G. Wild, S. Hinckley [Centre for Communications Engineering Research, Australia]	
11:20 ~ 11:40	<b>Deformation Monitoring of Shield Tunnel Based on Distributed Optical Fiber Strain Sensing Technology</b> S. Song, Z. Wu, C. Yang, C. Wan, S. Shen [International Institute for Urban System Engineering, Southeast University, China]	
11:40 ~ 12:00	<b>Efficient Guided Wave SHM Baseline Capture and Selection</b> A. J. Croxford, O. Putikis, P. D. Wilcox [University of Bristol, UK]	

**SPECIAL SESSION**  
**Wave Propagation Simulation - I**  
Chairs: W. Staszewski (Sheffield University, UK), W. Ostachowicz (PAS, Poland)

**Chair:** W. Ostachowicz (PAS, Poland), W. Staszewski (Sheffield University, UK) **Location:** HC 200-033

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>A Wavelet-Based Spectral Finite Element Method for Simulating Elastic Wave Propagation</b> L. Pahlavan, C. Kassapoglou, Z. Gürdal [Delft University of Technology, The Netherlands]	
10:20 ~ 10:40	<b>A Method to Detect Structural Damage Using High-Frequency Seismograms</b> V. M. Heckman, M. D. Kohler, T. H. Heaton [California Institute of Technology, USA]	
10:40 ~ 11:00	<b>Development of SEM-based PESEA Code for Modeling PZT Induced Acousto-ultrasonic Waves Propagating in Metallic &amp; Composite Structures</b> K. Lonkar, F.-K. Chang [Stanford University, USA]	
11:00 ~ 11:20	<b>Nonlinear Guided Waves: Theoretical Considerations and Applications to Thermal Stress Measurement in Continuous Welded Rails</b> C. Nucera, F. L. di Scalea [University of California San Diego, USA]	
11:20 ~ 11:40	<b>Local Interaction Simulation of Guided-wave Propagation in Composite Plates using CLoVER Transducer</b> K. S. Nadella, C. E. S. Cesnik [University of Michigan, USA]	
11:40 ~ 12:00	<b>Predictive Modeling of Ultrasonics SHM with PWAS Transducers</b> M. Gresil, Y. Shen, V. Giurgiutiu [University of South Carolina, USA]	

## Advanced Diagnostics for Damage Assessment - IV

**Chair:**

M. Scheerer (Aerospace &amp; Advanced Composites GmbH, Austria), D. Dragomirescu (LAAS-CNRS, France)

**Location:**

HC 200-205

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>A Novel Damage Sensitive Feature Based on State-Space Representation</b> A. Clement <sup>1</sup> , S. Laurens <sup>1</sup> , S. Girard <sup>2</sup> [1] Université de Toulouse, France; 2) LJK & INRIA Rhône-Alpes, France]	
10:20 ~ 10:40	<b>Damage Classification in Composite Laminates; Matrix Micro-Cracking and Delamination</b> C. Larrosa, K. Lonkar, S. Shankar, F.-K. Chang [Stanford University, USA]	
10:40 ~ 11:00	<b>Identifying Scatter Targets in 2D Space using In Situ Phased-Arrays for Guided Wave Structural Health Monitoring</b> E. B. Flynn <sup>1</sup> , M. D. Todd <sup>2</sup> , S. S. Kessler <sup>1</sup> , C. T. Dunn <sup>1</sup> [1] Metis Design Corporation, USA; 2) University of California San Diego, USA]	
11:00 ~ 11:20	<b>Reference-Free Damage Identification using Statistical Modeling</b> A. Medda <sup>1</sup> , V. DeBrunner <sup>2</sup> [1] US Army Aeromedical Research Laboratory, USA; 2) Florida State University, USA]	
11:20 ~ 11:40	<b>Infrared Thermography and Piezoelectric Patches for Impact Damage Detection in Composite Structures</b> G. M. Carlomagno, C. Meola, F. Ricci [University of Naples Federico II, Italy]	
11:40 ~ 12:00	<b>An Integrated Structural Intensity based Damage Detection Approach for Nonlinear behaving Damage</b> F. Semperlotti <sup>1</sup> , S. C. Conlon <sup>2</sup> , E. C. Smith <sup>2</sup> [1] University of Michigan, USA; 2) The Pennsylvania State University, USA]	

### SPECIAL SESSION

## Decision Making in Structural Health Monitoring - I

Chairs: D. Zonta (Univ. of Trento, Italy), M. Todd (UC San Diego, USA)

**Chair:**

D. Zonta (University of Trento, Italy), M. Todd (UC San Diego, USA)

**Location:**

HC 200-303

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Computation of Lifetime Value of Information for Monitoring Systems</b> M. Pozzi, A. D. Kiureghian [University of California, Berkeley, USA]	
10:20 ~ 10:40	<b>Carbon Nanotube (CNT) Enhancements for Aerosurface State Awareness</b> S. S. Kessler <sup>1</sup> , C. T. Dunn <sup>1</sup> , S. S. Wicks <sup>2</sup> , R. G. de Villoria <sup>2</sup> , B. L. Wardle <sup>2</sup> [1] Metis Design Corporation, USA; 2) Massachusetts Institute of Technology, USA]	
10:40 ~ 11:00	<b>Optimal Sensor Placement and Weighted Residual Method in Loads Estimation Supporting Structural Health Monitoring</b> C. Haynes, M. Todd, K. Napolitano, H. Matt [University of California San Diego, USA]	
11:00 ~ 11:20	<b>Uncertainty Quantification in Transmissibility-Derived Features Used for Fault Detection</b> Z. Mao, M. D. Todd [University of California San Diego, USA]	
11:20 ~ 11:40	<b>Comparing Measured Response Uncertainty for a Composite Steel Girder Bridge to Damage Obtained in Finite Element Analysis</b> S. Plude <sup>1</sup> , R. Christenson <sup>1</sup> , J. DeWolf <sup>1</sup> , A. Jamalipour <sup>2</sup> [1] University of Connecticut, USA; 2) Connecticut Department of Transportation, USA]	
11:40 ~ 12:00	<b>Hybrid Coherent/Incoherent Beam Forming Diagnostic Approach to Naval Assets</b> S. S. Kessler <sup>1</sup> , E. B. Flynn <sup>1</sup> , M. D. Todd <sup>2</sup> [1] Metis Design Corporation, USA; 2) University of California San Diego, USA]	

## Novel Signal Processing Techniques - III

**Chair:**

J.-M. Dilhac (LAAS-CNRS, France)

**Location:**

HC 200-305

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Structural Health Monitoring of an Advanced Composite Aircraft Structure using a Modal Approach</b> T. H. Ooijevaar, R. Loendersloot, L. L. Warnet, R. Akkerman, A. de Boer [University of Twente, The Netherlands]	
10:20 ~ 10:40	<b>On the Application of Bayesian Analysis and Advanced Signal Processing Techniques for the Impact Monitoring of Smart Structures</b> M. A. Torres-Arredondo, C. Yang, C.-P. Fritzen [University of Siegen, Germany]	

10:40 ~ 11:00	<b>Comparison of Damage Localization based on Modal Filters using Strain Measurements and Acceleration Measurements</b> A. Deraemaeker, G. Tondreau [Université Libre de Bruxelles, Belgium]	
11:00 ~ 11:20	<b>Multi-source Acoustic Emission Signals Analysis Based on Blind Source Separation using Macro Fiber Composite</b> H. Nasser <sup>1</sup> , W. Zhou <sup>2</sup> [1) Centre de Recherche Public Henri Tudor, Luxembourg; 2) Harbin Institute of Technology, China]	
11:20 ~ 11:40	<b>Finite Element Model Based State Estimation in Mechanical and Structural Systems</b> E. M. Hernandez [University of Vermont, USA]	
11:40 ~ 12:00	<b>Hybrid Immune Algorithm for Structural Health Monitoring Using Acceleration Data</b> R. Li, A. Mita [Keio University, Japan]	

SPECIAL SESSION		
<b>SHM Benchmark for High-rise Structures - I</b>		
Chair: Y.Q. Ni (HKPU, Hong Kong)		
<b>Chair:</b>	<b>Location:</b>	
Y.Q. Ni (Hong Kong Polytechnic University, Hong Kong), T. Hatada (Kajima, Japan)		ART 2
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>An Integrated MATLAB Toolbox for Optimal Sensor Placement Based on Multiple Optimization Strategies</b> T. H. Yi, H. N. Li, M. Gu [Dalian University of Technology, China]	
10:20 ~ 10:40	<b>Experimental Verification of Substructure Damage Detection Method using ARX and ARMAX</b> L. Mei, A. Mita, Z. Xing [Keio University, Yokohama, Japan]	
10:40 ~ 11:00	<b>Application of Distributed Optical Fiber Strain Measurement into Geotechnical Engineering Monitoring</b> B. Shi, D. Zhang, H. H. Zhu, C. Liu [Nanjing University, China]	
11:00 ~ 11:20	<b>Structural Safety Monitoring During Construction of Shanghai Expo Puxi Entertainment Hall</b> Z. Ming <sup>1</sup> , L. Jun <sup>2</sup> [1) Tongji University, P.R.China; 2) Shanghai Geotechnical Investigations & Design Institute Co., Ltd, China]	
11:20 ~ 11:40	<b>Proactive Condition Assessment in Civil Engineering using Automated Multi-Sensor Systems</b> M. Stoppel <sup>1</sup> , J. H. Kurz <sup>2</sup> , A. Taffe <sup>1</sup> , C. Boller <sup>2</sup> [1) Federal Institute for Materials Research and Testing, Germany, 2) Fraunhofer Institute for Nondestructive Testing, Germany]	
11:40 ~ 12:00		

SPECIAL SESSION		
<b>Non-contact Sensing Technologies - I</b>		
Chair: H. Sohn (KAIST, Korea)		
<b>Chair:</b>	<b>Location:</b>	
H. Sohn (KAIST, Korea), J. Yang (University of South Carolina, USA)		ART 4
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
10:00 ~ 10:20	<b>Detection and Sizing of Subsurface Impedance Discontinuities using Acoustic Wavefield Images</b> T. E. Michaels, J. E. Michaels, M. Ruzzene [Georgia Institute of Technology, USA]	
10:20 ~ 10:40	<b>Terahertz Phonon Amplification and Sasing in Semiconductor Superlattice Structures</b> R. P. Beardsley, A. J. Kent [University of Nottingham, UK]	
10:40 ~ 11:00	<b>Lamb Wave Interaction with a T-Joint</b> C. Allen, C. T. Owens, E. D. Swenson [Air Force Institute of Technology, USA]	
11:00 ~ 11:20	<b>The Search for Optimal Sensor Network in Lamb Wave-based SHM Method</b> P. Malinowski, T. Wandowski, W. Ostachowicz [Polish Academy of Sciences, Poland]	
11:20 ~ 11:40	<b>Experimental Studies of Structure Inspection and Damage Detection Based on Elastic Waves Energy Distribution</b> M. Radzienski, W. Ostachowicz [Polish Academy of Sciences, Poland]	
11:40 ~ 12:00	<b>Robust Vision-Based Approaches for Structural Health Monitoring</b> M. R. Jahanshahi, S. F. Masri [University of Southern California, USA]	

12:00 ~ 13:20	<b>Lunch at the Oval</b> <i>Location: The Oval</i>	
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<b>Faculty / Student Panel</b>		
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TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
12:00 ~ 13:20	<b>Chair: C. Farrar (Los Alamos National Laboratory, USA)</b> Panelists: TBA  <i>Location: TBA</i>	

<b>Aerospace Structures: Laboratory Demonstration - III</b>		
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<b>Chair:</b> S. Huang (NASA Ames, USA), A. Kumar (Florida State University, USA)	<b>Location:</b> HC 200-002
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TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Contact Pressure and Ultrasonic Damage Feature(s) in Health Monitoring of L-shaped Bolted Joints in Aerospace Structures</b> M. Jalalpour <sup>1</sup> , A. El-Osery <sup>2</sup> , E. Austin <sup>3</sup> , M. R. Taha <sup>1</sup> [1] University of New Mexico, USA; 2) New Mexico Tech., Socorro, USA; 3) Moog CSA Engineering, USA]	
13:40 ~ 14:00	<b>Application of Unscented Kalman Filters, Wavelet Packet Transforms and Feedback Control to Monitoring and Compensate Damaged Aircraft Structures</b> R. Vepa [University of London, UK]	
14:00 ~ 14:20	<b>Bond Graph Model of a Thin SHM Piezoelectric Energy Harvester</b> T. Sainthuille <sup>1</sup> , C. Delebarre <sup>1</sup> , S. Grondell <sup>1</sup> , C. Paget <sup>2</sup> [1] University of Valenciennes and Hainaut-Cambresis, France; 2) Airbus, UK]	
14:20 ~ 14:40	<b>Impact Location Based on Multi-agent Coordination and Fusion for Large Structures</b> D. Liang, S.-F. Yuan [Nanjing University of Aeronautics and Astronautics, China]	
14:40 ~ 15:00	<b>An Integrated Monitoring System for Damage Detection by Carbon Fibers and Optical Fibers</b> H. Huang <sup>1</sup> , Z. S. Wu <sup>1</sup> , C. Q. Yang <sup>2</sup> [1] Ibaraki University, Japan; 2) Southeast University, China]	
15:00 ~ 15:20	<b>Advanced Approach for Multi-Site Damage Monitoring on Aircraft Fuselage Panel using Sparse PZT Actuator/Sensor Arrays</b> R. Hedl <sup>1</sup> , J. Finda <sup>1</sup> , G. Parthasarathy <sup>2</sup> [1] Honeywell International, Czech Republic; 2) Honeywell International, USA]	

<b>Quantification / Validation / Certification</b>		
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<b>Chair:</b> C. Buynak (AFRL, USA)	<b>Location:</b> HC 200-030
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TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Sensor Location Analysis for Fatigue Crack Detection using Nonlinear Acoustics</b> R. B. Jenal <sup>1</sup> , W. J. Staszewski <sup>1,2</sup> , A. Klepka <sup>2</sup> and T. Uhl <sup>2</sup> [1] Sheffield University, UK; 2) AGH University of Science and Technology, Poland]	
13:40 ~ 14:00	<b>Uncertainty Quantification and Validation of Finite Element Models of Bridge Structures</b> J. Marin, M. Nishio, Y. Fujino [The University of Tokyo, Japan]	
14:00 ~ 14:20	<b>Identification of the Stiffness Distribution using BOTDR</b> Y. Goldfeld, A. Klar [Technion - Israel Institute of Technology, Israel]	
14:20 ~ 14:40	<b>Co-bonding of Piezoelectric Sensors on CFRP Structures</b> M. Bach <sup>1</sup> , B. Eckstein <sup>1</sup> , N. Jacquiel <sup>2</sup> , R. Bertrand <sup>2</sup> , C. Stolz <sup>3</sup> [1] EADS Innovation Works, Germany; 2) Airbus Operations GmbH, Germany; 3) Cassidian, Germany]	
14:40 ~ 15:00	<b>Development of Probability of Detection Data for Structural Health Monitoring Damage Detection Techniques Based on Acoustic Emission</b> D. O. Gagar <sup>1</sup> , P. E. Irving <sup>1</sup> , I. Jennions <sup>1</sup> , P. Foote <sup>2</sup> , I. Read <sup>2</sup> , J. McFeat <sup>3</sup> [1] Cranfield IVHM Centre, BAE Systems, UK; 2) BAE Systems, ATC Sowerby, Bristol, UK; 3) BAE Systems, Warton Aerrodrome, Lancashire, UK]	
15:00 ~ 15:20		

## SPECIAL SESSION

**Intelligent Sensor Networks for SHM - III**

Chairs: J. Lynch (Univ. of Michigan, USA), A. Swartz (Michigan Techn. Univ., USA)

**Chair:**

J. Lynch (University of Michigan, USA), A. Swartz (Michigan Technological University, USA)

**Location:**

HC 200-034

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Use of Carbon Nanotubes for Strain Sensing of Epoxy Based Composites</b> J. Rams, M. Sánchez, M. Campo, A. Jimenez, A. Ureña [Rey Juan Carlos University, Spain]	
13:40 ~ 14:00	<b>Wireless Links for Global Positioning System Receivers</b> F. Casciati, L. Wu [University of Pavia, Italy]	
14:00 ~ 14:20	<b>Automatic Wireless Transfer of Acquired Usage Monitoring Data</b> N. Cranley, S. Wilmot [ACRA CONTROL, Ireland]	
14:20 ~ 14:40	<b>Sandwich Node Architecture for Task Preemption in Wireless Sensor Networks for Structural Health Monitoring Applications</b> Z. Wang, S. N. Pakzad, L. Cheng [Lehigh University, USA]	
14:40 ~ 15:00	<b>Smart Battery-Free Wireless Sensor Networks for Structural Health Monitoring</b> A. Abedi, A. Razi, F. Afghah [Univeristy of Maine, USA]	
15:00 ~ 15:20	<b>Military-Standard Sensor Nodes for the SmartBrick Structural Health Monitoring Platform</b> A. Gunasekaran, P. N. Chulick, S. Sedigh, A. R. Hurson [Department of Electrical and Computer Engineering, Missouri University of Science and Technology, USA]	

## SPECIAL SESSION

**Wave Propagation Simulation - II**

Chairs: W. Staszewski (Sheffield University, UK), W. Ostachowicz (PAS, Poland)

**Chair:**

W. Staszewski (Sheffield University, UK), W. Ostachowicz (PAS, Poland)

**Location:**

HC 200-203

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Lamb Wave Techniques for Damage Detection in CFRP-Components - Is This Really Possible?</b> W. Hillger, A. Szewieczek, D. Schmidt, M. Sinapius [German Aerospace Center (DLR), Germany]	
13:40 ~ 14:00	<b>System Identification with Generalized Impulse and Frequency Response Function</b> R. R. Zhang, L. Gargab [Colorado School of Mines, USA]	
14:00 ~ 14:20	<b>Propagation of Guided Elastic Waves in Aircraft Structural Elements by the Spectral Finite Element Method</b> A. Zak, W. Ostachowicz [Polish Academy of Sciences, Poland]	
14:20 ~ 14:40	<b>SHM of Structural Materials by Means of Highly Nonlinear Solitary Waves</b> X. Ni, P. Rizzo [University of Pittsburgh, PA, USA]	
14:40 ~ 15:00	<b>Interaction of Elastic Waves with Delaminations in CFRP Structures: A Numerical Study using the Spectral Element Method</b> H. Jung, R. T. Schulte, C.-P. Fritzen [University of Siegen, Germany]	
15:00 ~ 15:20	<b>Combining Guided Waves and Electromechanical Impedance Method for SHM Applications</b> X. Zhu, P. Rizzo [University of Pittsburgh, USA]	

**Advanced Diagnostics for Damage Assessment - V****Chair:**

L. Gaul (University of Stuttgart, Germany)

**Location:**

HC 200-205

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Experimentation and Detection Characters of Lamb Wave Phase Array on a Large Thin aluminium Plate</b> D. Y. Gao, Z. J. Wu, M. J. Liu, Z. Wang [Dalian University of Technology, China]	
13:40 ~ 14:00	<b>Damage Detection of Composite Structure Using Independent Component Analysis</b> R. Hajrya, N. Mechbal, M. Verge [Process and Engineering in Mechanics and Materials Laboratory (PIMM), France]	
14:00 ~ 14:20	<b>Rapid Localization and Ultrasonic Imaging of Multiple Damages in Structural Panel with Piezoelectric Sensor-Actuator Network</b> G. Kolappan Geetha, V.T. Rathod, N. Chakraborty, D. Roy Mahapatra, S. Gopalakrishnan [Indian Institute of Science, India]	

14:20 ~ 14:40	<b>Damage Assessment of CFRP Stiffened Panels by Electro-mechanical Impedance Method</b> N.J. Ferreira, J.M. Silva, R.J. Guimaraes, P.J. Antunes, M.A. Baptista, J.C. Viana, G.R. Dias [Critical Materials, Lda, Portugal]	
14:40 ~ 15:00	<b>Optimal Sensor Fusion for Structural Health Monitoring of Aircraft Composite Components</b> W. Costiner <sup>1</sup> , H. A. Winston <sup>1</sup> , M. R. Gurvich <sup>1</sup> , A. Ghoshal <sup>2</sup> , G. S. Welsh <sup>1</sup> , S. L. Butler <sup>1</sup> , M. R. Urban <sup>3</sup> , N. Bordick <sup>4</sup> (1) United Technologies Research Center, USA; 2) Army Research Laboratory, USA; 3) Sikorsky Aircraft Corporation, USA; 4) Army Aviation Applied Technology Directorate, USA]	
15:00 ~ 15:20	<b>Impact Location Identification and Damage Detection on Plate-like Structures using Time-reversal Method</b> C. Chen <sup>1</sup> , Y. Li <sup>2</sup> , F-G Yuan <sup>3</sup> [1) Northwestern Polytechnical University, USA; 2) North Carolina State University, USA]	

<b>SPECIAL SESSION</b>		
<b>Decision Making in Structural Health Monitoring - II</b>		
Chairs: D. Zonta (Univ. of Trento, Italy), M. Todd (UC San Diego, USA)		
<b>Chair:</b> M. Todd (UC San Diego, USA), D. Zonta (University of Trento, Italy)		<b>Location:</b> HC 200-303
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Streicker Bridge: The Impact of Monitoring on Decision Making</b> D. Zonta <sup>1</sup> , B. Glisic <sup>2</sup> , S. Adriaenssens <sup>3</sup> [1) University of Trento, Italy; 2) Princeton University, USA]	
13:40 ~ 14:00	<b>Advanced Sensing, Degradation Detection, Diagnostic and Prognostic Capabilities for Structural Health Management</b> R. Clements <sup>1</sup> , D. Darr <sup>1</sup> , J. Morse <sup>1</sup> , B. C. Laskowski <sup>1</sup> , R. Betti <sup>2</sup> , T. K. Ooi <sup>3</sup> , A. Corder <sup>3</sup> [1) Analatom Incorporated, USA; 2) Columbia University, USA; 3) Missile Defense Agency, USA]	
14:00 ~ 14:20	<b>Acousto-optic Measurements in CFRP Laminates using Fiber Bragg Grating Sensors</b> H. Toutanji <sup>1</sup> , N. Mabry <sup>1</sup> , C. Banks <sup>2</sup> [1) University of Alabama in Huntsville, USA; 2) NASA Marshall Space Flight Center, USA]	
14:20 ~ 14:40	<b>Uncertainties in Damage Identification and Lifetime Functions of Ageing Concrete Structures</b> A. Del Grosso <sup>1</sup> , F. Lanata <sup>2</sup> [1) University of Genoa, Italy; 2) University of Nantes, France]	
14:40 ~ 15:00	<b>A Multi-Non-Linear Civil SHM Model for Decision Support</b> H. Allmer, H. Wenzel, H. Allmer [Vienna Consulting Engineers, Austria]	
15:00 ~ 15:20	<b>Research on Software Platform of Bridge Health Monitoring System Based on Java EE &amp; Scientific Computing Engine</b> D.-H. Dan <sup>1</sup> , Y. Zhao <sup>1</sup> , X. Yan <sup>2</sup> [1) Tongji University, P.R.China; 2) Shanghai Urban Construction Design and Research Institute, China]	

<b>Modeling / Simulation</b>		
<b>Chair:</b> K. Worden (Sheffield University, UK), P. Masson (Université de Sherbrooke, Canada)		<b>Location:</b> HC 200-305
TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Verification of Unified Framework for Plate Structures Using Kirchhoff's Plate Theory</b> A. Dixit, S. Hanagud [Georgia Institute of Technology, USA]	
13:40 ~ 14:00	<b>Finite Element Simulation of Compensation for Temperature Influence on Lamb Wave Propagation</b> W. Z. Qu <sup>1</sup> , D. J. Inman <sup>2</sup> [1) Wuhan University, China; 2) Virginia Tech., USA]	
14:00 ~ 14:20	<b>Experimental Validation of Algorithms for Wave Propagation Modeling in 2D and 3D Structures based on the Spectral Element Method</b> W. Ostachowicz <sup>1,2</sup> , P. Kudela <sup>1</sup> , M. Radzieński <sup>1</sup> [1) Polish Academy of Sciences, Poland; 2) Gdynia Maritime University, Poland]	
14:20 ~ 14:40	<b>Damage Assessment Using Hyperchaotic Excitation and Nonlinear Prediction Error</b> S. Torkamani <sup>1</sup> , E. A. Butcher <sup>1</sup> , M. D. Todd <sup>2</sup> , G. Park <sup>3</sup> [1) New Mexico State University, USA; 2) University of California San Diego, USA; 3) Los Alamos National Laboratory, USA]	
14:40 ~ 15:00	<b>Wave Propagation in Anisotropic Layered 2D Structures Using Spectral Finite Elements</b> B. Hennings, R. Lammering [Helmut Schmidt University, Germany]	
15:00 ~ 15:20	<b>1-D and 2-D Modeling of Power and Energy Transduction of Piezoelectric Wafer Active Sensors for Structural Health Monitoring</b> B. Lin, V. Giurgiutiu [University of South Carolina, USA]	

**SPECIAL SESSION**  
**SHM Benchmark for High-rise Structures - II**  
 Chair: Y.Q. Ni (HKPU, Hong Kong)

**Chair:** T. Hatada (Kajima, Japan), Y.Q. Ni (Hong Kong Polytechnic University, Hong Kong) **Location:** ART 2

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Operational Modal Analysis for a Benchmark High-rise Structure</b> Y. Niu, P. Kraemer, C.-P. Fritzen [University of Siegen, Germany]	
13:40 ~ 14:00	<b>An Efficient Sensor Placement Method for High-rise Structures - A Case Study: The Canton Tower, China</b> T. H. Yi, H. N. Li, M. Gu [Dalian University of Technology, China]	
14:00 ~ 14:20	<b>Information Entropy-based Algorithm of Sensor Placement Optimization for Structural Damage Detection</b> S.-Q. Ye, Y.-Q. Ni [The Hong Kong Polytechnic University, Hong Kong]	
14:20 ~ 14:40	<b>SSA-Based Stochastic Subspace Identification of Structures from Output-only Vibration Measurements</b> C.-H. Loh <sup>1</sup> , Y.-C. Liu <sup>1</sup> , Y.-Q. Ni <sup>2</sup> [1) National Taiwan University, Taiwan; 2) The Hong Kong Polytechnic University, Hong Kong]	
14:40 ~ 15:00	<b>SHM Benchmark for High-rise Structures: Description of Host Structure and Measurement Data</b> Y.-Q. Ni, Y. Xia, W. Lin, J.-M. Ko [The Hong Kong Polytechnic University, Hong Kong]	
15:00 ~ 15:20		

**SPECIAL SESSION**  
**Non-contact Sensing Technologies - II**  
 Chair: H. Sohn (KAIST, Korea)

**Chair:** K. Law (Stanford University, USA), H. Sohn (KAIST, Korea) **Location:** ART 4

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
13:20 ~ 13:40	<b>Visualization of Lamb Wave Interaction with a 5 mm Fatigue Crack using 1D Ultra High Frequency Laser Doppler Vibrometry</b> C. T. Owens, E. D. Swenson, C. Allen [United States Air Force Institute of Technology, USA]	
13:40 ~ 14:00	<b>Developing a Wireless Two-dimensional Image-based Crack Sensor for Concrete Structures</b> S. H. Man, C. Z. Ng, H. Muhammad, C. C. Chang, A. Bermak [Hong Kong University of Science and Technology, Hong Kong]	
14:00 ~ 14:20	<b>Interaction of Lamb Waves with Fatigue Cracks in Aluminum Plates</b> E. D. Swenson, C. T. Owens, C. Allen [Air Force Institute of Technology, USA]	
14:20 ~ 14:40	<b>Localization of Crack Initiation in a Pipe Structure using a Laser Based Acoustic Emission Technique</b> B. Park, H. Sohn [Department of Civil and Environmental Engineering, KAIST, Korea]	
14:40 ~ 15:00	<b>Applications of the Vision-based Monitoring System using a Digital Image Correlation Technique to Long-span Bridge Cables</b> S.-W. Kim, N.-S. Kim [Pusan National University, Korea]	
15:00 ~ 15:20	<b>Damage Detection using Andrew Plots</b> F. Gharibnezhad, L. E. Muijca, J. Rodellar [Technical University of Catalonia, Spain]	

15:20 ~ 15:35	<b>Coffee Break</b> <i>Location: Dohrmann Grove</i>	
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**Panel Discussion: Civil and Mechanical Systems**

TIME	THURSDAY, SEPTEMBER 15	PAGE NO.
15:35 ~ 17:00	<b>SHM for Life Cycle Management: Where are the Gaps &amp; How can we get there?</b>  Chair: TBA Panelists: TBA  <i>Location: TBA</i>	