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Ben Franklin Technology PArtners
Central and Northern Pennsylvania

Center of Excellence in Structural Health Monitoring

Inaugural Meeting

April 12–13 2007

Nittany Lion Inn

University Park, Pennsylvania

Keynote Speakers

Professor Fu-Kuo Chang, Stanford University, Aeronautics and Astronautics, is Editor-in-Chief of the *Structural Health Monitoring* international journal and the organizer of the *International Workshops on Structural Health Monitoring*. His research interests include structural health monitoring, design of integrated structures, smart structures, design and damage tolerance of composites structures, and multi-functional materials.

Richard Ross is in the Durability, Damage Tolerance, and Reliability Branch in NASA Langley's Structures and Materials group within the Research and Technology Directorate. He is the Associate Principal Investigator for the Airframe Health Management element of NASA's Integrated Vehicle Health Monitoring project within the Aviation Safety Program. His research interests are in probabilistic and computational methods for damage detection and fault isolation. He is currently working on inverse methods using finite element models and neural networks to locate and characterize incipient structural damage.

Professor Aditi Chattopadhyay, Arizona State University, Mechanical and Aerospace Engineering, is the Principal Investigator of the Air Force Office of Scientific Research (AFOSR) Multidisciplinary University Research Initiative (MURI) on structural health monitoring ($8.6M). She is also the director of the Center for Adaptive, Intelligent, Materials and Systems. Her research interests include smart structures, mechanics of composites, structural health monitoring, multidisciplinary design optimization, sensitivity analyses, as well as dynamics and aeroelasticity.

Purpose of Meeting: 1) Introduce the new Center, 2) showcase ongoing projects at Penn State, 3) provide membership information, 4) give attendees an opportunity to learn about the state of the art, recent breakthroughs, future directions, and technology needs for SHM.

Center Mission: Improve public safety by advancing the state of the art in structural health monitoring and providing engineering technology for member companies.

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Announcing the formation of the

Ben Franklin Center of Excellence In Structural Health Monitoring

What is Structural Health Monitoring?

Structural health monitoring (SHM) is the act of assessing the well-being of a structure or system. It addresses whether the functionality of the structure or system has been diminished. Analysis of SHM data is used to determine fitness-for-service (diagnostics) and remaining useful life (prognostics). The name implies that these assessments can be performed upon demand by sensors that are built into or permanently affixed to the structure or system. SHM is an extension of periodic nondestructive evaluation and a replacement for schedule based maintenance. As such, it has the potential to improve the safety of the structure or system as well as to drastically reduce costs associated with maintenance. The goal of SHM is to keep the public as safe as practical using cost effective technologies. Advances in several technologies have positioned the multidisciplinary field on the verge of revolutionary improvements in public safety. Applications include civil structures, aerostructures, infrastructure, power generation, mechanical equipment, and even monitoring the health of biological structures such as the human body.

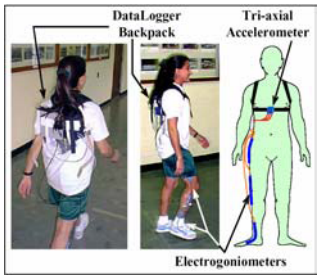
Center Mission: Improve public safety by advancing the state of the art in structural health monitoring and providing engineering technology for member companies.

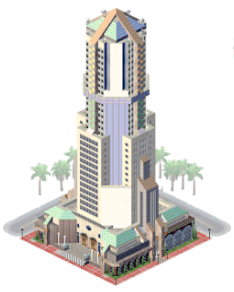
Center Goals:

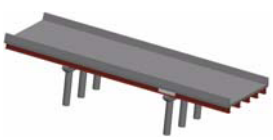
- Spur the research and development of new technologies that will improve public safety
- Transfer technology to member companies to give them a competitive advantage
- Make PA a hotspot for structural health monitoring, creating a new high tech job market that will provide jobs for residents and draw people to PA
- Train students to provide an outstanding workforce pool

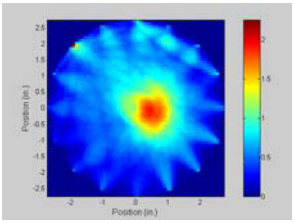
Penn State Participants:

Engineering Science and Mechanics – Cliff Lissenden, Judy Todd, Joe Rose, Joe Cusumano, Bernie Tittmann, Francesco Costanzo, Mirna Urquidi-Macdonald
Aerospace Engineering – Ed Smith
Civil Engineering – Ghassan Chehab, Maria Lopez de Murphy, Sunil Sinha
Applied Research Laboratory – Karl Reichard, Steve Conlon
Mechanical Engineering – Martin Trethewey
Electrical Engineering – Qiming Zhang
Food Science – John Coupland









For Information Please Contact:
Cliff Lissenden, Director or Ed Smith, Associate Director
Lissenden@psu.edu (814)863-5754 ecs5@engr.psu.edu (814)863-0966

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Center of Excellence in Structural Health Monitoring Inaugural Meeting

Nittany Lion Inn, University Park, PA

Thursday, 12 April 2007

8:00	Registration
8:30	**Welcome**, *Prof. Judith Todd*, P.B. Breneman Department Head, Penn State Engng Sci & Mech
8:40	**SHM and the Center**, *Prof. Cliff Lissenden*, Director, Ben Franklin CoE SHM, Penn State Engng Sci & Mech
	SESSION 1
8:55	**Welcome**, *Prof. Cliff Lissenden*
9:00	**KEYNOTE: Promises and Challenges in SHM**, *Prof. Fu-Kuo Chang*, Stanford University Aero & Astro
9:30	**Structural Health and Usage Monitoring for Naval Aviation Weapon Systems**, *Dr. Michael Yu*, Naval Air Systems Command, V-22 Science and Technology Manager
9:50	**Overview of Air Force Needs for SHM**, *Dr. James Blackshire*, Air Force Research Laboratory, Materials and Manufacturing Directorate, NDE Branch
10:10	Break
10:30	**Break Out Groups: Defining SHM Needs**
11:25	**Group Presentations**
11:40	**Piezoelectric Materials and Devices**, *Prof. Susan Trolier-McKinstry*, Director Ben Franklin CoE of Piezoelectric Materials and Devices, Penn State Matl Sci & Engng
12:00	Lunch
	SESSION 2
1:00	**Welcome**, *Prof. Cliff Lissenden*
1:10	**KEYNOTE: Improving the Safety of Current and Future Aircraft Through Integrated Health Monitoring**, *Richard Ross*, Senior Aerospace Engineer, NASA Langley Research Center, Durability, Damage Tolerance, and Reliability Branch
1:40	**Diagnostics and Prognostics for System Health Monitoring**, *Dr. Karl Reichard*, Penn State Applied Research Laboratory, Advanced Sensors and Controls Dept, Multisensor Processing Division
2:00	**Impact Tek SHM Developments**, *Carl Byington*, Director R&D, Impact Technologies LLC
2:20	**Evaluation of FRP Composite Repairs for Concrete Structures**, *Prof. Maria Lopez de Murphy*, Pennsylvania Transportation Institute, Penn State Civil Engng
2:40	Break
3:00	**Recent Research on Damage Detection Methods for Helicopter Rotor Systems**, *Prof. Edward Smith*, Director Penn State Rotorcraft Center of Excellence, Penn State Aerospace Engng
3:20	**Health Monitoring for Machines and People**, *Prof. Joseph Cusumano*, Penn State Engng Sci & Mech
3:40	**Neural Engineering for Seizure Disorders**, *Prof. Bruce Gluckman*, Penn State Engng Sci & Mech and Neurosurgury
4:00	Penn State Facilities
5:30	Reception and Poster Displays
6:30	Dinner

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Center of Excellence in Structural Health Monitoring Inaugural Meeting
Nittany Lion Inn, University Park, PA
Friday, 13 April 2007

8:00	Registration
8:30	**Welcome & Day 1 Highlights**, *Prof. Cliff Lissenden*, Director Ben Franklin CoE SHM, Penn State Engng Sci & Mech
8:45	**Ben Franklin Programs**, *Stephen McGregor*, Director of Research and Development, Ben Franklin Technology Partners
	SESSION 3
8:55	**Welcome**, *Prof. Edward Smith*, Penn State Aerospace Engng
9:00	**KEYNOTE: Air Force SHM MURI Project**, *Prof. Aditi Chattopadhyay*, Director Center for Adaptive, Intelligent, Materials and Systems, Arizona State University Mech & Astro Engng
9:30	**International Working Group for Structural Integrity Assessment**, *Dr. Markus Heinimann*, Senior Technical Specialist, Product Design & Analysis Div., Alcoa Technology Center
9:50	**Wireless Devices for CBM**, *Bill Nickerson*, Technology Director/Vice President, RLW Inc.
10:10	Break
10:30	**Monitoring Pavements**, *Prof. Ghassan Chehab*, Pennsylvania Transportation Institute, Penn State Civil Engng
10:50	**NDE Solutions at GE Inspection Technologies**, *Dr. Paul Meyer*, GE Inspection Technologies
11:10	**The Imminent Ultrasonic Guided Wave Revolution in SHM**, *Prof. Joseph Rose*, Paul Morrow Professor, Penn State Engng Sci & Mech
11:30	Working Lunch **Break Out Groups: Benefits of CoE SHM Participation**
1:00	**Group Presentations**
1:15	**Open Systems Architecture for Condition Based Maintenance**, *Mitchell Lebold*, Penn State Applied Research Laboratory, Advanced Sensors and Controls Dept, Multisensor Processing Division
1:35	**Health Monitoring of Rotating Equipment from Torsional Vibration Features**, *Prof. Martin Trethewey*, Penn State Mech Engng
1:55	**Wrap Up Session**, *Cliff Lissenden & Edward Smith*

Planned Corporate Membership Structure

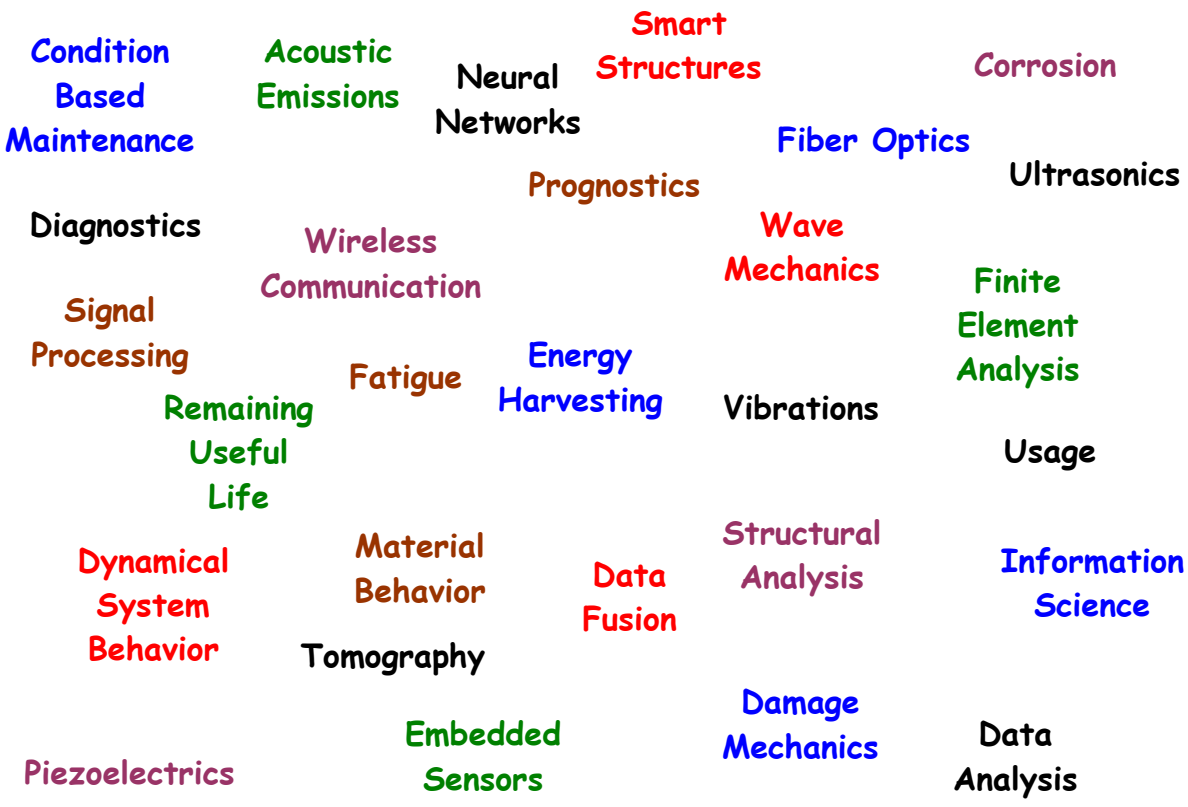
Full Membership - voting rights, 1 day consulting visit, visibility through corporate profile on website, short courses, newsletter, meetings:
$20,000 per year for large companies, $8,000 per year for small companies

Associate Membership - short courses, newsletter, meetings:
$10,000 per year for large companies, $4,000 per year for small companies

Benefits of Membership in the Ben Franklin CoE in SHM:

- Keep up with the latest developments and technologies in a fast growing multidisciplinary field through
  - Meetings
  - Newsletters
  - Website
- Guide investigators to solve problems important to your products
- Training (short courses)
- Consulting services (day visits)
- Interaction with students will give an inside track to hiring them upon graduation
- Corporate visibility through member profiles on website and in newsletters
- Collaborations for STTR and SBIR projects

Elements of SHM



Registration Form

Register me for the Structural Health Monitoring Inaugural Meeting, April 12–13, 2007, Nittany Lion Inn University Park, PA. Registrations will be accepted by e-mail, mail or fax through Friday, April 5th, 2007.

Name

Company

Address

City | State/Province | Country

Telephone | Fax Number | E Mail

Make checks payable to The Pennsylvania State University

Charge my: ❑ VISA ❑ Mastercard …in the amount of $90

Acccount Number | Exp. Date / | CVV2 Code

Name as it Appears on card | Signature

Fax or mail completed registration form by March 23rd 2007 to:

Cliff Lissenden—Director
Ben Franklin Center of Excellence
in Structural Health Monitoring
212 Earth-Engineering Sciences Bldg.
University Park, PA 16802

Phone: 814.863.5754
Fax: 814.865.9974
E Mail: lissenden@psu.edu

Accommodations available at:

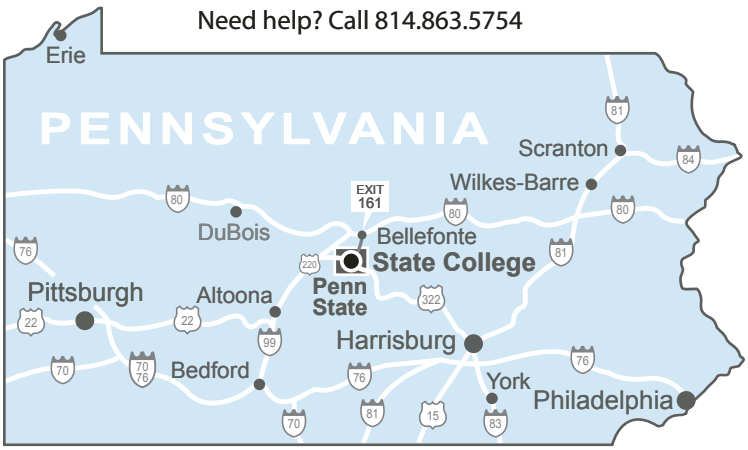
Nittany Lion Inn 800.233.7505
Res. code: BEN0412
$107 single occupancy
$117 double occupancy

The Penn Stater 800.233.7505
Res. code: BEN0412_001
$97 single occupancy
$107 double occupancy

Hilton Garden Inn 814.272.1221
Res. code: SHM
$95 single occupancy
$105 double occupancy

Map & Directions

Need help? Call 814.863.5754



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