

Stanford



Fu-Kuo Chang

Professor of Aeronautics and Astronautics

CONTACT INFORMATION

- **Administrator**

Renee Quiroz - Administrative Associate

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Bio

BIO

Professor Chang's primary research interest is in the areas of multi-functional materials and intelligent structures with particular emphases on structural health monitoring, intelligent self-sensing diagnostics, and multifunctional energy storage composites for transportation vehicles as well as safety-critical assets and medical devices. His specialties include embedded sensors and stretchable sensor networks with built-in self-diagnostics, integrated diagnostics and prognostics, damage tolerance and failure analysis for composite materials, and advanced multi-physics computational methods for multi-functional structures. Most of his work involves system integration and multi-disciplinary engineering in structural mechanics, electrical engineering, signal processing, and multi-scale fabrication of materials. His recent research topics include: Multifunctional energy storage composites, Integrated health management for aircraft structures, bio-inspired intelligent sensory materials for fly-by-feel autonomous vehicles, active sensing diagnostics for composite structures, self-diagnostics for high-temperature materials, etc.

ACADEMIC APPOINTMENTS

- Professor, Aeronautics and Astronautics
- Member, Bio-X

HONORS AND AWARDS

- Life-Time Achievement Award, Society of Prognostic Health Management (2018)
- Life-Time Achievement Award, SPIE NDE/SHM (2010)
- Best Paper Award, 7th International National Workshop on Structural Health Monitoring (2009)
- Best Paper Award, 3rd European Workshop on Structural Health Monitoring (2006)
- Structural Health Monitoring (SHM) Lifetime Achievement Award, The Boeing Company (2004)
- Presidential Young Investigator Award, National Science Foundation (1988)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Editor-in-Chief, Int. J. of Structural Health Monitoring (2012 - present)
- Fellow, American Institute of Aeronautics and Astronautics (2013 - present)
- Fellow, American Society of Mechanical Engineers (2013 - present)

PROFESSIONAL EDUCATION

- PhD, Michigan (1983)

LINKS

- Structures and Composites (SACL) laboratory: <https://sacl88.sites.stanford.edu/>

Teaching

COURSES

2022-23

- Analysis of Structures: AA 240 (Win)
- Mechanics of Composites: AA 256 (Aut)
- Structural Health Monitoring: AA 257 (Spr)

2021-22

- Introduction to Mechanics of Composite Materials: AA 156 (Aut)
- Mechanics of Composites: AA 256 (Win)

2020-21

- Analysis of Structures: AA 240 (Aut)
- Mechanics of Composites: AA 256 (Win)
- Structural Health Monitoring: AA 257 (Spr)

2019-20

- Analysis of Structures: AA 240 (Aut)
- Design of Multifunctional Composites: AA 257 (Spr)
- Mechanics of Composites: AA 256 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Gift Nyikayaramba

Postdoctoral Faculty Sponsor

Shabbir Ahmed, Samuel Carlstedt, Saman Farhangdoust

Doctoral Dissertation Advisor (AC)

Tanay Topac

Master's Program Advisor

Jacob Benheim, Ethan Clemmitt

Publications

PUBLICATIONS

- **Enabling self-shape estimation of composite structures using distributed microfabricated strain gauge networks** *JOURNAL OF COMPOSITE MATERIALS*
Chen, X., Nasrollahi, A., Ransom, E., Topac, T., Chang, F.
2022

- **Si-based self-programming neuromorphic integrated circuits for intelligent morphing wings** *JOURNAL OF COMPOSITE MATERIALS*
Nathan, D., Deo, A., Haughn, K., Yi, S., Lee, J., Gao, D., Shenoy, R., Xu, M., Tran, I. C., Zheng, J., Rong, Z., Wang, M., Shaffer, et al
2022
- **Hybrid Models for Situational Awareness of an Aerial Vehicle from Multimodal Sensing** *AIAA JOURNAL*
Topac, O., Ha, S., Chen, X., Gamble, L., Inman, D., Chang, F.
2022
- **Warped Gaussian processes for predicting the degradation of aerospace structures** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Pfingstl, S., Braun, C., Nasrollahi, A., Chang, F., Zimmermann, M.
2022
- **A systematic approach to resolve high impedance of multifunctional energy storage composites** *JOURNAL OF ENERGY STORAGE*
Bombik, A., Ha, S., Nasrollahi, A., Chang, F.
2022; 54
- **Design of a Robust Tool for Deploying Large-Area Stretchable Sensor Networks from Microscale to Macroscale.** *Sensors (Basel, Switzerland)*
Ransom, E., Chen, X., Chang, F.
2022; 22 (13)
- **Numerical and experimental evaluation of mechanical performance of the multifunctional energy storage composites** *JOURNAL OF COMPOSITE MATERIALS*
Wang, Y., Chang, F.
2021
- **Kirigami auxetic structure for high efficiency power harvesting in self-powered and wireless structural health monitoring systems** *SMART MATERIALS AND STRUCTURES*
Farhangdoust, S., Georgeson, G., Ihn, J., Chang, F.
2021; 30 (1)
- **MECHANICAL-ELECTRICAL BEHAVIOR OF MULTIFUNCTIONAL ENERGY STORAGE COMPOSITES**
Bombik, A., Ha, S., Nasrollahi, A., Haider, M., Chang, F., Amer Soc Mech Engineers
AMER SOC MECHANICAL ENGINEERS.2021
- **Li-ion Battery Health Estimation Using Ultrasonic Guided Wave Data and an Extended Kalman Filter**
Bombik, A., Ha, S., Haider, M., Nasrollahi, A., Chang, F., IEEE
IEEE.2021: 962-966
- **Reliability of crack quantification via acousto-ultrasound active-sensing structural health monitoring using surface-mounted PZT actuators/sensors** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Yadav, S., Mishra, S., Kopsaftopoulos, F., Chang, F.
2020
- **Design and Integration of a Wireless Stretchable Multimodal Sensor Network in a Composite Wing.** *Sensors (Basel, Switzerland)*
Chen, X., Maxwell, L., Li, F., Kumar, A., Ransom, E., Topac, T., Lee, S., Faisal Haider, M., Dardona, S., Chang, F.
2020; 20 (9)
- **Static Tactile Sensing for a Robotic Electronic Skin via an Electromechanical Impedance-Based Approach.** *Sensors (Basel, Switzerland)*
Liu, C. n., Zhuang, Y. n., Nasrollahi, A. n., Lu, L. n., Haider, M. F., Chang, F. K.
2020; 20 (10)
- **Multifunctional energy storage composite structures with embedded lithium-ion batteries** *JOURNAL OF POWER SOURCES*
Ladpli, P., Nardari, R., Kopsaftopoulos, F., Chang, F.
2019; 414: 517–29
- **A Self-Adaptive 1D Convolutional Neural Network for Flight-State Identification.** *Sensors (Basel, Switzerland)*
Chen, X., Kopsaftopoulos, F., Wu, Q., Ren, H., Chang, F.
2019; 19 (2)

- **A Self-Adaptive 1D Convolutional Neural Network for Flight-State Identification** *SENSORS*
Chen, X., Kopsaftopoulos, F., Wu, Q., Ren, H., Chang, F.
2019; 19 (2)
- **Active Sensing for Measuring Contact of Thin Film Gecko-Inspired Adhesives** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Tae Myung Huh, Liu, C., Hashizume, J., Chen, T. G., Suresh, S. A., Chang, F., Cutkosky, M. R.
2018; 3 (4): 3263–70
- **Characterization of Distributed Microfabricated Strain Gauges on Stretchable Sensor Networks for Structural Applications** *SENSORS*
Chen, X., Topac, T., Smith, W., Ladpli, P., Liu, C., Chang, F.
2018; 18 (10)
- **Characterization of Distributed Microfabricated Strain Gauges on Stretchable Sensor Networks for Structural Applications.** *Sensors (Basel, Switzerland)*
Chen, X., Topac, T., Smith, W., Ladpli, P., Liu, C., Chang, F.
2018; 18 (10)
- **Integrity monitoring of adhesively bonded joints via an electromechanical impedance-based approach** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Zhuang, Y., Kopsaftopoulos, F., Dugnani, R., Chang, F.
2018; 17 (5): 1031–45
- **Functionalization of stretchable networks with sensors and switches for composite materials** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Guo, Z., Kim, K., Salowitz, N., Lanzara, G., Wang, Y., Peumans, P., Chang, F.
2018; 17 (3): 598–623
- **Estimating state of charge and health of lithium-ion batteries with guided waves using built-in piezoelectric sensors/actuators** *JOURNAL OF POWER SOURCES*
Ladpli, P., Kopsaftopoulos, F., Chang, F.
2018; 384: 342–54
- **Flight State Identification of a Self-Sensing Wing via an Improved Feature Selection Method and Machine Learning Approaches.** *Sensors (Basel, Switzerland)*
Chen, X., Kopsaftopoulos, F., Wu, Q., Ren, H., Chang, F.
2018; 18 (5)
- **Design and analysis of radially polarized screen-printed piezoelectric transducers** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Salowitz, N. P., Kim, S., Kopsaftopoulos, F., Li, Y., Chang, F.
2017; 28 (7): 934-946
- **Analytical model of lap-joint adhesive with embedded piezoelectric transducer for weak bond detection** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Dugnani, R., Chang, F.
2017; 28 (1): 124-140
- **Adhesive bond-line degradation detection via a cross-correlation electromechanical impedance-based approach** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Dugnani, R., Zhuang, Y., Kopsaftopoulos, F., Chang, F.
2016; 15 (6): 650-667
- **A Super Stretchable Organic Thin-Film Diodes Network That Can Be Embedded Into Carbon Fiber Composite Materials for Sensor Network Applications** *JOURNAL OF MICROELECTROMECHANICAL SYSTEMS*
Guo, Z., Aboudi, U., Peumans, P., Howe, R. T., Chang, F.
2016; 25 (3): 524-532
- **Monitoring fatigue-induced transverse matrix cracks in laminated composites using built-in acousto-ultrasonic techniques** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Wilson, C. L., Chang, F. K.
2016; 15 (3): 335-350

- **Damage detection sensitivity characterization of acousto-ultrasound-based structural health monitoring techniques** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Janapati, V., Kopsaftopoulos, F., Li, F., Lee, S. J., Chang, F.
2016; 15 (2): 143-161
- **Bio-Inspired Stretchable Absolute Pressure Sensor Network.** *Sensors*
Guo, Y., Li, Y., Guo, Z., Kim, K., Chang, F., Wang, S. X.
2016; 16 (1)
- **Electromagnetic Navigation Linear Displacement Transducer Based on Magnetic Field Gradient Technique** *IEEE TRANSACTIONS ON MAGNETICS*
Zhang, M., Or, S. W., Wang, S., Chang, F.
2015; 51 (11)
- **Load monitoring and compensation strategies for guided-waves based structural health monitoring using piezoelectric transducers** *JOURNAL OF SOUND AND VIBRATION*
Roy, S., Ladpli, P., Chang, F.
2015; 351: 206-220
- **Ultrasonic guided wave active sensing for monitoring of split failures in reinforced concrete** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Wu, F., Chan, H., Chang, F.
2015; 14 (5): 439-448
- **Linearly dispersive signal construction of Lamb waves with measured relative wavenumber curves** *SENSORS AND ACTUATORS A-PHYSICAL*
Cai, J., Yuan, S., Qing, X. P., Chang, F., Shi, L., Qiu, L.
2015; 221: 41-52
- **On-line updating Gaussian mixture model for aircraft wing spar damage evaluation under time-varying boundary condition** *SMART MATERIALS AND STRUCTURES*
Qiu, L., Yuan, S., Chang, F., Bao, Q., Mei, H.
2014; 23 (12)
- **Recent advancements and vision toward stretchable bio-inspired networks for intelligent structures** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Salowitz, N., Guo, Z., Roy, S., Nardari, R., Li, Y., Kim, S., Kopsaftopoulos, F., Chang, F.
2014; 13 (6): 609-620
- **Microfabricated Expandable Sensor Networks for Intelligent Sensing Materials** *IEEE SENSORS JOURNAL*
Salowitz, N. P., Guo, Z., Kim, S., Li, Y., Lanzara, G., Chang, F.
2014; 14 (7): 2138-2144
- **A novel physics-based temperature compensation model for structural health monitoring using ultrasonic guided waves** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Roy, S., Lonkar, K., Janapati, V., Chang, F.
2014; 13 (3): 321-342
- **In situ damage classification for composite laminates using Gaussian discriminant analysis** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Larrosa, C., Lonkar, K., Chang, F.
2014; 13 (2): 190-204
- **Modeling of piezo-induced ultrasonic wave propagation in composite structures using layered solid spectral element** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Lonkar, K., Chang, F.
2014; 13 (1): 50-67
- **Bio-inspired stretchable network-based intelligent composites** *JOURNAL OF COMPOSITE MATERIALS*
Salowitz, N., Guo, Z., Li, Y., Kim, K., Lanzara, G., Chang, F.
2013; 47 (1): 97-105
- **Sensor Network Configuration Effect on Detection Sensitivity of an Acousto-Ultrasound-based Active SHM System**

Janapati, V., Kopsaftopoulos, F., Roy, S., Mueller, I., Lee, S., J., Ladpli, P., Chang, F.

2013

● **Development of High Performance BS-PT Based Piezoelectric Transducer for Structural Health Monitoring of High-Temperature Polymer-Matrix Composite Structures**

Li, Y. -H., Kim, S. -J., Nardari, R., Oropeza, D., Chang, F. -K

2013

● **Screen Printed Piezoceramic Actuators/Sensors Microfabricated on Organic Films and Stretchable Networks**

Salowitz, N., Guo, Z., Kim, S. -J., Li, Y. -H, Lanzara, G., Chang, F. -K

2013

● **Monitoring Transverse Matrix Cracking in Composite Laminates Using Ultrasonic Guided Waves**

Larrosa, C., Chang, F. -K

2013

● **Structural damage detection using ultrasonic guided waves under varying ambient temperature and loading environments**

Roy, S., Ladpli, P., Lonkar, P., Chang, F. -K

2013

● **A vision on stretchable bio-inspired networks for intelligent structures**

Salowitz, N., Guo, Z., Roy, S., Nardari, R., Li, Y. -H, Kopsaftopoulos, F., Chang, F.

2013

● **A structural health monitoring fastener for tracking fatigue crack growth in bolted metallic joints** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*

Rakow, A., Chang, F.

2012; 11 (3): 253-267

● **Bio-inspired intelligent sensing materials for fly-by-feel autonomous vehicles** *11th IEEE Sensors Conference*

Salowitz, N., Guo, Z., Kim, S., Li, Y., Lanzara, G., Chang, F.

IEEE.2012: 363-365

● **Real-time prediction of impact-induced damage for composite structures based on failure analysis and efficient database methods**

Roy, S., Mueller, I., Janapati, V., Das, S., Chang, F. -K

2012

● **A Model-assisted Integrated Diagnostics for Structural Health Monitoring**

Lonkar, K., Janapati, V., Roy, S., Chang, F. -K

2012

● **Bio-inspired intelligent sensing materials for fly-by-feel autonomous vehicles**

Salowitz, N., Guo, Z., Kim, S., J., Li, Y. -H, Lanzara, G., Chang, F. -K

2012

● **Real time in-situ damage classification, quantification and diagnosis for composite structures**

Larrosa, C., Chang, F. -K

2012

● **Strain/Elongation Sensitive Metal-Coated Polyimide Microwires for Micro-Scaled Highly Expandable Sensor Networks**

Lanzara, G., Guo, Z., Salowitz, N., Chang, F. -K

2012

● **Design of Optimal Layout of Active Sensing Diagnostic Network for Achieving Highest Damage Detection Capability in Structures**

Janapati, V., Lonkar, K., Chang, F., K.

2012

● **STRUCTURAL HEALTH MONITORING OF HIGH TEMPERATURE COMPOSITES** *ASME International Mechanical Engineering Congress and Exposition (IMECE)*

Salowitz, N., Li, Y., Kim, S., Roy, S., Chang, F.

AMER SOC MECHANICAL ENGINEERS.2012: 273-280

- **Real-time prediction of impact-induced damage for composite structures based on failure analysis and efficient database methods** *Conference on Health Monitoring of Structural and Biological Systems*
Roy, S., Mueller, I., Janapati, V., Das, S., Chang, F.
SPIE-INT SOC OPTICAL ENGINEERING.2012
- **A dynamic crash model for energy absorption in braided composite materials - Part II: Implementation and verification** *JOURNAL OF COMPOSITE MATERIALS*
Flesher, N. D., Chang, F., Janapala, N. R., Starbuck, J. M.
2011; 45 (8): 867-882
- **A dynamic crash model for energy absorption in braided composite materials. Part I: Viscoplastic material model** *JOURNAL OF COMPOSITE MATERIALS*
Flesher, N. D., Chang, F., Janapala, N. R.
2011; 45 (8): 853-865
- **Bio-Inspired Smart Skin Based on Expandable Network**
Guo, Z., Kim, K., Lanzara, G., Salowitz, N., Peumans, P., Chang, F. -K
2011
- **Micro-Fabricated, Expandable Temperature Sensor Network for Macro-Scale Deployment in Composite Structures**
Guo, Z., Kim, K., Lanzara, G., Salowitz, N., Peumans, P., Chang, F. -K
2011
- **Physics Based Temperature Compensation Strategy for Structural Health Monitoring** *8th International Workshop on Structural Health Monitoring*
Roy, S., Lonkar, K., JANAPATI, V., Chang, F.
DESTECH PUBLICATIONS, INC.2011: 1139–1149
- **A Robust Impact Force Determination Technique for Complex Structures**
Mueller, I., Vonnieda, K., Das, S., Chang, F. -K
2011
- **Accelerated aging experiments for prognostics of damage growth in composite materials**
Saxena, A., Goebel, K., Larrosa, C., Janapati, V., Roy, S., Chang, F. -K
2011
- **Development of a bio-inspired stretchable network for intelligent composites**
Salowitz, N., Guo, Z., Li, Y. -H, Kim, K., Lanzara, G., Chen, Y., Chang, F.
2011
- **On the Performance Quantification of Active Sensing SHM Systems using Model-assisted POD Methods**
Mueller, I., Janapati, V., Banerjee, S., Lonkar, K., Roy, S., Chang, F. -K
2011
- **Characterization of temperature, load and damage effects using piezo-electric transducer patches based on fuzzy clustering**
Lopes, V., Gonzalez, C., da Silva, S., Roy, S., Kode, K., Sunor, F., Chang, F.
2011
- **Development of SEM-based PESEA Code for Modeling PZT Induced Acousto-ultrasonic Waves Propagating in Metallic & Composite Structures**
Lonkar, K., Chang, F. -K
2011
- **High Temperature Intelligent Composites**
Li, Y. -H., Kim, S. -J., Salowitz, N., Roy, S., Larrosa, C., Janapati, V., Chang, F.
2011
- **Damage classification in composite laminates, matrix micro-cracking and delamination**
Larrosa, C., Lonkar, K., Shankar, S., Chang, F. -K
2011
- **In-situ damage assessment of composite laminates via active sensor networks**

-
- Larrosa, C., Janapati, V., Roy, S., Chang, F. -K
2011
- **A Spider-Web-Like Highly Expandable Sensor Network for Multifunctional Materials** *ADVANCED MATERIALS*
Lanzara, G., Salowitz, N., Guo, Z., Chang, F.
2010; 22 (41): 4643-4648
 - **Editorial-2009 Technology Review and Update: Selected Highlights from IWSHM 2009** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Chang, F., Guemes, A.
2010; 9 (3): 197-198
 - **Adhesive Layer Effects on PZT-induced Lamb Waves at Elevated Temperatures** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Ha, S., Lonkar, K., Mittal, A., Chang, F.
2010; 9 (3): 247-256
 - **Prediction of Progressive Damage State at the Hot Spots using Statistical Estimation** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Banerjee, S., Qing, X. P., Beard, S., Chang, F.
2010; 21 (6): 595-605
 - **Design of micro-scale highly expandable networks of polymer-based substrates for macro-scale applications** *SMART MATERIALS AND STRUCTURES*
Lanzara, G., Feng, J., Chang, F.
2010; 19 (4)
 - **Adhesive interface layer effects in PZT-induced Lamb wave propagation** *SMART MATERIALS AND STRUCTURES*
Ha, S., Chang, F.
2010; 19 (2)
 - **Sensor Network Optimization for a Passive Sensing Impact Detection Technique** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Markmiller, J. F., Chang, F.
2010; 9 (1): 25-39
 - **The Needs for SHM Technology Classification**
Mueller, I., Chang, F. -K
2010
 - **A Spider Web-Like Highly Expandable Sensor Network** *Advanced Materials*
Lanzara, G., Salowitz, N., Guo, Z., Chang, F. -K
2010; 41 (22): 44643-4648.
 - **An Integrated Health Management System for Real-Time Impact Monitoring and Prediction of Impact-Induced Damage on Composite Structures**
Mueller, I., Das, S., Roy, S., Janapati, V., Vonnieda, K., Zhang, D., Chang, F.
2010
 - **An Integrated Health Management System for Real-time Impact Monitoring and Prediction of Impact-Induced Damage on Composite Structures** *Conference on Health Monitoring of Structural and Biological Systems 2010*
Mueller, I., Das, S., Roy, S., Janapati, V., Vonnieda, K., Zhang, D., Chang, F.
SPIE-INT SOC OPTICAL ENGINEERING.2010
 - **Optimizing a spectral element for modeling PZT-induced Lamb wave propagation in thin plates** *SMART MATERIALS & STRUCTURES*
Ha, S., Chang, F.
2010; 19 (1)
 - **Design and characterization of a carbon-nanotube-reinforced adhesive coating for piezoelectric ceramic discs** *SMART MATERIALS & STRUCTURES*
Lanzara, G., Chang, F.
2009; 18 (12)
 - **Development of a real-time active pipeline integrity detection system** *SMART MATERIALS & STRUCTURES*
Qing, X. P., Beard, S., Shen, S. B., Banerjee, S., Bradley, I., Salama, M. M., Chang, F.
2009; 18 (11)

- **Influence of Interface Degradation on the Performance of Piezoelectric Actuators** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Lanzara, G., Yoon, Y., Kim, Y., Chang, F.
2009; 20 (14): 1699-1710
- **Monitoring Impact Events Using a System-Identification Method** *AIAA JOURNAL*
Park, J., Ha, S., Chang, F.
2009; 47 (9): 2011-2021
- **Optimal placement of sensors for sub-surface fatigue crack monitoring** *THEORETICAL AND APPLIED FRACTURE MECHANICS*
Teo, Y. H., Chiu, W. K., Chang, F. K., Rajic, N.
2009; 52 (1): 40-49
- **Damage Detection for Composite Laminate Plates with A Distributed Hybrid PZT/FBG Sensor Network** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Wu, Z., Qing, X. P., Chang, F.
2009; 20 (9): 1069-1077
- **A new type of plasma wakefield accelerator driven by magnetowaves** *PLASMA PHYSICS AND CONTROLLED FUSION*
Chen, P., Chang, F., Lin, G., Noble, R. J., Sydora, R.
2009; 51 (2)
- **The effects of structural variations on the health monitoring of composite structures** *International Workshop on Structural Assessment of Composite Structures*
Chiu, W. K., Tian, T., Chang, F. K.
ELSEVIER SCI LTD.2009: 121-40
- **An integrated health management and prognostic technology for composites airframe structures**
Mueller, I., Larrosa, C., Roy, S., Mittal, A., Lonkar, K., Chang, F. -K
2009
- **A robust structural health monitoring technique for airframe structures**
Mueller, I., Chang, F. -K, Roy, S., Mittal, A., Lonkar, K., Larrosa, C.
2009
- **An integrated diagnostic to prognostic SHM technology for structural health management**
Mueller, I., Larrosa, C., Roy, S., Chang, F. -K
2009
- **Model-Based Impact Monitoring by Inverse Methods using Particle Swarm Optimization**
Mueller, I., Chang, F. -K
2009
- **Adhesive Layer Effects on Temperature-sensitive Lamb Waves Induced by Surface-mounted PZT Acutators**
Ha, S., Mittal, A., Lonkar, K., Chang, F. -K
2009
- **SACL Activities in Structural Health Monitoring**
Guo, Z., Mueller, I., Lanzara, G., Janapala, N., Lonkar, K., Mittal, A., Chang, F.
2009
- **Design of Planar Electrodes for Multifunctional Piezoelectric Sensors**
Salowitz, N., Lanzara, G., Guo, Z., Rose, J., Chang, F. -K
2009
- **Multifunctional Sensor Nodes in Stretchable Network for Structural Health Monitoring**
Lanzara, G., Salowitz, N., Guo, Z., Chatterjee, D., Kim, K., Peumans, P., Chang, F.
2009
- **Health monitoring of bonded composite repair in bridge rehabilitation** *SMART MATERIALS AND STRUCTURES*
Wu, Z., Qing, X. P., Ghosh, K., Karbhar, V., Chang, F.

2008; 17 (4)

- **In vitro atherosclerotic plaque characterization by acoustic impedance monitoring, Part I: Sensor modeling, design, and fabrication** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Dugnani, R., Chang, F. K.
2008; 19 (7): 815-826
- **In vitro atherosclerotic plaque characterization by acoustic impedance monitoring, Part II: Experimentation and validation** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Dugnani, R., Chang, F. K.
2008; 19 (7): 827-835
- **Time-domain spectral element method for built-in piezoelectric-actuator-induced lamb wave propagation analysis** *AIAA JOURNAL*
Kim, Y., Ha, S., Chang, F.
2008; 46 (3): 591-600
- **Pitch-catch active sensing methods in structural health monitoring for aircraft structures** *STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL*
Ihn, J., Chang, F.
2008; 7 (1): 5-19
- **A large area flexible expandable network for structural health monitoring** *Conference on Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems*
Lanzara, G., Feng, J., Chang, F.
SPIE-INT SOC OPTICAL ENGINEERING.2008
- **Design and experimental validation of a structural health monitoring fastener** *ASME International Mechanical Engineering Congress and Exposition*
Rakow, A., Chang, F.
AMER SOC MECHANICAL ENGINEERS.2008: 707-713
- **A potential link from damage diagnostics to health prognostics of composites through built-in sensors** *JOURNAL OF VIBRATION AND ACOUSTICS-TRANSACTIONS OF THE ASME*
Chang, F., Markmiller, J. F., Ihn, J., Cheng, K. Y.
2007; 129 (6): 718-729
- **Energy absorption features of 3-D braided rectangular composite under different strain rates compressive loading** *AEROSPACE SCIENCE AND TECHNOLOGY*
Gu, B., Chang, F.
2007; 11 (7-8): 535-545
- **Built-in sensor network for structural health monitoring of composite structure** *JOURNAL OF INTELLIGENT MATERIAL SYSTEMS AND STRUCTURES*
Qing, X. P., Beard, S. J., Kumar, A., Ooi, T. K., Chang, F.
2007; 18 (1): 39-49
- **An approach to cost-effective, robust, large-area electronics using monolithic silicon** *IEEE International Electron Devices Meeting*
Huang, K., Dinyari, R., Lanzara, G., Kim, J. Y., Feng, J., Vancura, C., Chang, F., Peumans, P.
IEEE.2007: 217-220
- **Detection of bolt loosening in C-C composite thermal protection panels: I. Diagnostic principle** *SMART MATERIALS AND STRUCTURES*
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