DR. MING L. WANG

COE Distinguished Professor
Department of Civil and Environmental Engineering
Director: VOTER Center-Funded by the National Institute of Science and Technology
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Ming Wang is a Distinguished Professor of Civil and Environmental Engineering at Northeastern University. He was formerly a Full Professor in the Department of Civil Engineering at The University of New Mexico (UNM) from 1985 to 1997 and a Full Professor of Civil and Materials Engineering at the University of Illinois at Chicago from 1997 to 2008. Before that, he taught as a visiting associate professor in the Departments of Civil Engineering at Princeton University in 1992 and as a Post-Doc at Northwestern University from 1983 to 1985**. He has completed the guidance of 30 Ph.D., 13 Post-Doc, 12 visiting professors and 42 MS students. 3 more Ph.D. students are graduating in 2019.**

Professor Wang currently is the Principal Investigator and Director for VOTERS Sensor Systems since March 2009. **VOTERS** (Versatile Onboard Traffic-Embedded Roaming Sensors) aims to provide a continuous stream of accurate, up-to-date information about the state of roadways and bridge decks gathered by sensor systems mounted on vehicles of opportunity, while also eliminating the hazardous, congestion-prone work zones that are often set up to gather this critical data. The VOTERS project is funded under the Technology Innovation Program (TIP) of NIST and will run for five years at a total cost of $16 million, including cost-sharing by the project participants. **The VOTERS team includes more than 40 members including faculty, research scientists, administrative staff, and graduate students from three universities as well as research engineers and consultants from several industrial partners.**

Professor Wang's group has had a large influence on the health monitoring of civil infrastructures and the development of new sensor technologies for civil infrastructure applications. Professor Wang has extensive research experience and knowledge in experimental mechanics and sensor technology for infrastructures. He has established and maintained a number of structural mechanics and sensor technology laboratories. He developed the following laboratories at UNM: the Structural Dynamics, Micromechanics, Mesomechanics, Material Processing, Material Response, and the Nondestructive Testing Laboratory. He also developed a Structural Dynamics and Monitoring Laboratory, a Sensor Technology Laboratory, and a Real-Time Health Monitoring Station for Long-span Bridges at UIC. The development of a modern Sensor Technology Laboratories for Infrastructures and Security is also completed at Northeastern. **VOTER's vehicle (van) equipped with updated and new developed technologies and sensors are in use without disrupting normal traffic to collect and process data for measuring the current condition of roadways and bridge decks.**

Professor Wang's extensive research experiences earlier have included work on the micromechanics of failure in quasi-brittle materials (concrete and ceramic composites), constitutive law and damage mechanics of quasi-brittle materials, monitoring and damage assessment of large structural systems, sensor technologies and experimental techniques for infrastructure applications, and probabilistic structural dynamics and vibration testing. **Since 1995, his research has evolved from focusing on applied mechanics and materials to focusing on experimental techniques and sensor technologies for health monitoring of large infrastructure systems such as roadways, bridges, and air and water systems. Emphasis is on interdisciplinary research agendas.**

Professor Wang's group had developed the electro-magnetic (EM) sensor to directly measure the stresses of large steel cables for civil infrastructure applications. Practical applications have been done in the United States, Europe, Canada, China, and Japan. These applications include the monitoring of cable stresses for Nanjing cable-stayed bridge, Zhanjiang cable-stayed bridge, Qianjiang steel arch bridge, Stonecutter cable-stayed bridge; other applications include stresses for external cables for a post-tensioning segmental bridge, a sport dome, and cable stresses for ground anchors in Japan and Canada and Waldo Bridge in Maine. **An exclusive licensing agreement has been awarded to a company for worldwide marketing and use. It has been used extensively for stress monitoring of steel cables during and after construction. It is one of the most effective ways of monitoring stresses for short and grouted steel cables. At least 50 projects have used this EM technology for cable stress monitoring in the world. DSI international is marketing this product in North America and Europe.**

Professor Wang's group has developed an excellent working relationship with end users for his developed technologies. His group has been providing valuable advice to the Illinois Department of Transportation in the context of bridge maintenance. He has been awarded multiyear contracts to showcase certain technological advances in the areas of structural health monitoring and rehabilitating of the Kissiwaukee Bridge in Illinois. **Professor Wang has a long history of working with industry in terms of joint research proposals that are supported by NIST, NSF, and DOT. He has also developed several research projects using Phase II SBIR funding with industries for sensor development. He is able to attract industrial supports and donations to his research group through in-depth understanding of the problem encountered by the stakeholders and the end users.**

Professor Wang's group has obtained a total of **20 million** dollars in funding from federal sources and private industries throughout his career as a professor and another **8 million** matching fund for the VOTERS Center. His focus is on the research and development of sensors and damage assessment techniques for infrastructures such as bridges and roadways. **Finally, Professor Wang was the recipient of Faculty Research Award, Lectureship Award, Best Teacher Award, Outstanding Research Award, and Best Paper Award during his career as a professor. Overall, he has published 100 journal papers, 200 refereed papers in proceedings and workshops, 6 edited books, 26 keynotes and 60 invited seminars and lectures. He has also chaired 7 international workshops and conferences.** Professor Wang was awarded a United States patent (number 5,254,857) on the "Fast Scanning Electron Microscope" in 1993. He has so far awarded 3 patents for VOTERS Sensor Systems and has licensed to StreetScan Inc to provide services to our national roadway and bridge infrastructures. He has also awarded a patent on "Saliva Glucose Sensing System" licensed for diabetes monitoring.

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Personal Data

- U.S. Citizen

Education

- ***Post-Doctoral Fellow,*** Northwestern University, Evanston, Illinois, USA, 1983-1985 (Research and Teaching), Experimental Mechanics and Cementitious Materials (with Professor S.P. Shah).
- ***Ph.D.,*** University of New Mexico, Albuquerque NM, USA, May 1983, Structural Dynamics and Random Vibration, Force Identification of Nonlinear Dynamic System (with Dr. Thomas L. Paez).
- ***MSCE***, South Dakota School of Mines and Technology, Rapid City SD, USA, May1980, Long term Durability of Fly Ash and Super Plasticizer concrete (with Dr. V. Ramakrishnan).

Research Experience and Interest

- ***Experimental Research and Analysis -*** Experience with emphasis on material properties and mechanics of materials; MTS (30 Kips) and Instron Biaxial Testing Machine (110 Kips, 50 in-Kips), data acquisition, and image processing; X-ray (160 Kev) and Laser holography interferometry for strain measurement; Scanning Electron Microscope (SEM), Environmental Scanning Electron Microscope (ESEM) and Transmission Electron Microscope (TEM) for micro-mechanics studies of quasi-brittle materials; TEM sample preparation; developed the first Fast Scanning Electron Microscope (FSEM).

- ***Structural Dynamics and Random Vibration*** - Experience with emphasis on random vibration testing, data acquisition and reduction, vibration qualification of equipment; shaker table instrumentation and testing; probability analysis of structures, system identification, nonlinear vibration analysis and adaptive filtering; numerical integration and filtering techniques, earthquake engineering and design, retrofitting of bridges, and system identification and modal analysis.

- ***Cementitious Materials, Rock Salt and Ceramic Composites*** - Experience in nonlinear reinforced concrete analysis, reinforced concrete design for earthquake and blast loadings; research on high strength cement based materials, fiber reinforced concrete and SIFCON; testing of R.C. beam-column joints; fracture of concrete and ceramics, micromechanics of quasi-brittle materials and micromechanics of ceramics; ceramic processing (Al_2O_3 and MgO), and cement hydration with fly ash; constitutive modeling and triaxial experiments for creep of crushed rock salt and intact rock salt for waste management. Testing and application of Recycled Plastic Composites.

- ***Nondestructive Testing for Concrete Structures*** - Experience with Impact Echo techniques for determination of concrete strength, defects, and reinforcement locations; Holographic Interferometer and Speckle Interferometry techniques for full field in-plane displacement

measurement and damage detection. Modal analysis of prototype highway bridges. Design health monitoring systems for long span bridges. Developed EM sensor for NDE assessment of steel cable force for pretensioning and post tensioning structures.

- ***Sensor Technology for Infrastructures*** - Develop Electro-magnetic(EM) Stress sensor for direct stress measurement of Ferro materials for steel cable sizes of 5mm to 200mm. Applications including stress measurements of prestressed strands and tendons, cables for cable- stayed bridge, cables for suspension bridges, and cables and rebars for dome. Develop wireless PVDF sensors for strain and displacement measurements for rapid inspection and road testing of bridges. Assess roadways and bridge decks for maintenance using vehicle of opportunity and advanced sensor technologies (VOTERS Sensing System). Patented 5 innovative sensing technology for NDE assessment of infrastructures.

- **Nano-Bio Sensor technology for Environment and Personal Health**
  Develop nano-sensors for air and water quality assessment. Use DNA decorated SWNT Nano sensor for chemical and explosive detection, patented saliva based nano-bio sensors for glucose monitoring and disease detection.

- ***Monitoring and Health Assessment of Bridges*** - Design and install a real time bridge monitoring system for Kissiwaukee Bridge, a PC box-girder bridge with extensive cracking during the construction due to unhardened epoxy in Illinois. This bridge was retrofitted in 2008 after 5 years of monitoring work. Other monitoring projects include “Stress monitoring of cables for Nanjing 2nd cable-stayed bridge in Nanjing”, Monitoring of Qianjiang Steel Arch Bridge in Hanzhou, China, design and install the Monitoring System for Zhangjiang Cable-Stayed in China and design a health monitoring system for Chung Mu steel truss arch bridge in Korea, etc.

Professional Background

- ***Distinguished Professor,*** Civil and Environmental Engineering, Northeastern University, since 2011.
- ***Professor*****,** Civil and Environmental Engineering, Northeastern University, 2008-2011.
- ***Professor,*** Civil and Material Engineering, University of Illinois at Chicago, 1997 - 2008.
- ***Professor,*** Civil Engineering, University of New Mexico, 1995 - December 1996.
- ***Visiting Associate Professor,*** Civil Engineering and Operations Research, Princeton University, New Jersey. Taught Structural Dynamics and performed analytical and experimental micromechanics research for ceramics composites, 1992.
- ***Associate Professor,*** Civil Engineering, University of New Mexico, 1990 - 1995
- ***Assistant Professor****,* Civil Engineering, University of New Mexico, 1985 - 1990.
- ***Post-Doctor***, in experimental research, development, and analysis with Professors Shah, Civil Engineering Department, Northwestern University, Evanston, Illinois. Wrote proposals on dynamic testing of reinforced concrete structures; developed, designed and set up vibration testing instruments including electromagnetic shaking table, measurement instrumentation and computer-based data acquisition system. Conducted analysis on nonlinear reinforced concrete constitutive modeling based on dynamic loading of beam-column joints; performed experiments and analyses to determine the dynamic response and damage diagnosis of model reinforced structures by using shaking table tests, R.C. design, experimental mechanics and scaling techniques. Taught Statics, Dynamics, and Earthquake Engineering and supervised graduate students. 1983 - 1985.
- ***Research Assistant***, in Vibration experiments and analysis to Dr. Thomas Paez, University of New Mexico, Albuquerque, New Mexico. Performed mathematical modeling of inelastic dynamic systems and testing of nonlinear hysteretic structures by using MTS testing systems and performing parameter identification of damaged structures. This investigation can be applied to estimate damage and structural response to buried protective structures, structures location in seismic zone and aerospace structures. 1980 -1983.

- ***Research Assistant***, in Material Engineering applications to Dr. V. Ramakrishnan, South Dakota School of Mining and Technology, Rapid City, SD. Performed experiments involving blended concrete, fiber-reinforced concrete, fly-ash concrete, and super-plasticized concrete with emphasis on testing of construction material properties, industrial application, and experimental techniques to assess fresh and harden concrete. 1978 - 1980.
- ***Engineering Officer,*** Civil Engineering and Construction Management, Naval Marine Corps, Taiwan, Republic of China. Supervised construction of Sunsan Rifle and Rocket Range, Kaoshiung, Taiwan. Directed rebuilding and redesign of damaged structures and entire drainage-sewerage system of a large military installation, after an extremely destructive typhoon struck Taiwan. Accomplished reconstruction of damaged facilities in a record of six months. 1976 - 1978.

Honors and Awards

- ***Jefferson Goblet Paper Award****,* Simulation of Random Vibration Using a Microcomputer in a Shaker Table, Paper #87-0897-CP, presented at 28th AIAA (American Institute of Aeronautics and Astronautics) Structural Dynamics and Materials Conference, Monterey, California, 1987.
- ***Halliburton Lectureship Award****,* University of New Mexico, 1989 - 1992.
- ***College of Engineering Research Award,*** University of Illinois-Chicago, 2001.
- ***College of Engineering Outstanding Teacher Award****,* Northeastern University, 2011.
- ***College of Engineering Distinguished Professor,*** Northeastern University, 2011.
- ***COE Soren Buus Outstanding Research Award****, Northeastern University, 2014*
- ***SPIE elected Fellow, January 2015.***
- ***American Society for Nondestructive Testing, 2017 ASNT Outstanding Paper Award.***

Chairman of Major International Conferences:

- ***Chairman and Organizer***, ASCE Engineering Mechanics Institute Annual Meeting, June 1-4, 2011. Northeastern University, Boston, USA. 450 participants from 22 countries. http://www.neu.edu/emi2011/
- ***Organizer and Chairman*****,** (ANCRISST) on Advanced Smart Materials and Smart Structures Technology. July, 2009. Northeastern University, Boston, USA. 140 participants from 10 countries. http://www.neu.edu/ancrisst2009
- ***Co-chair*** with C. H. Loh of National Taiwan University.US-Taiwan Workshop on Bio-inspired Sensor and Actuating Technology, April 2009. 95 participants from 10 countries. http://nuweb7.neu.edu/us_taiwan_workshop/index.php, Taipei, Taiwan.
- ***Organizer and Chairman***, the Sino-US Symposium on Multi-Scale Analysis in Material Science and Engineering, June 17-20, 2005, Beijing, China.
- ***Organizer and chairman,*** 14th Biennial conference on mechanical vibration and noise, Albuquerque, NM. Sep. 19-22, 1993.
- ***Chairman****,* International Conference on Micromechanics of Failure of Quasi-Brittle Materials, Albuquerque, NM. Jun 6-8 1990.
- ***Program Chairman****.* Society of Experimental Mechanics Spring Conference, Albuquerque, NM. Jun 2-6 1990.

Research Grants and Contracts at Northeastern (2008-Present)

Total funding from all sources at NEU is about $19 million.

- ***Principal Investigator, Carecom Biotechnology CO, LTD.*** Beijing, China. Saliva Based Sensing System for Point-of-Care Disease Diagnosis and Monitoring. January 1, 2016 to December 31, 2018. $1,750,000.
- ***Principal Investigator & Director*, NIST Technology Innovation Program.** Versatile Onboard Traffic Embedded Roaming Sensors, FY 2008 TIP Competition. March 1, 2009 – June 31, 2014. Joint Venture with two Industries and two Universities. Total $16 million over five years; $7.5 million from NIST and $8.5 million from matching funds by joint venture participants. Expenditure in average of 3.2 million/year.
- ***Principal Investigator,* Keyghobad Joint Venture and Nano-Bio Systems.** Nano-Bio Saliva Glucose Sensing Systems, July 1 2012 to Aug., 2014, 450K.
- **Principal Investigator** with Co-PIs, Steven Cranford, Ralf Birken, Edgar Goluch, and Veronica Godoy-Carter, Breath and Saliva Based Nano-Bio Sensing System for Disease Diagnosis and Monitoring. FY15, **TIER 1 Research Award**, Northeastern University, $50K, July 1, 2014 to June 30, 2015.
- ***Co-Principal Investigator*** with Professor Indacochea, **NSF.** Development of a Nano-structured-based Sensor System for Reliable Detection of Improvised Explosive Devices, September 1, 2007 – August 31, 2011. $560,000.
- ***Principal Investigator,* NSF**. Bio-inspired Sensing and Actuation Technologies for Civil and Mechanical Systems - A Bilateral US - Taiwan Workshop. February 18, 2009 – March 31, 2011. $43,000.
- ***Principal Investigator,* NSF.** Turning the Civil and Mechanical Infrastructures into a Smart Structures and Systems through the Adoption of Bio-inspired Sensing and Actuation Technologies. September 2008 – August 2010. $15,000.
- ***Principal Investigator,* NSF.** Collaborative Research: Sensor Fusion for Comprehensive Health Monitoring of Complex Infrastructure Systems - An International Testbed Opportunity. September 1, 2007 – August 31, 2011. $130,000 /$350,000. Co-PIs: Jerry Lynch (Michigan) and Y. Zhang (Maryland).

Research Grants and Contracts at UIC (1997 - 2008)

Total funding at UIC is over $5.5 million.

- ***Principal Investigator,* NSF.** Advanced Monitoring System for Long-Span Bridges. $361,497. Plus NSF funded equipment valued at $130K that was transferred from UNM to UIC. March 1997 - February 2000.
- ***Principal Investigator,* NSF.** Magneto-Elastic Stress Sensor- An international Cooperative Research Program. September 1997 – May 2001. $50,000.
- ***Faculty*** Start-up Equipment Grant, **UIC**, $130,000.
- ***Principal Investigator*, the University of Illinois at Chicago** (**UIC**). Damage Assessment of Kishwaukee Bridge. Office of Vice Chancellor, Research Center Seed Grant Initiative, PI, $100,000.
- ***Principal Investigator,* NSF.** Magneto-Elastic Sensors for Post Earthquake Damage Detection in Steel Structures, April 1998 - March 2001. $258,000.
- ***Co-Principal Investigator,* NSF-SBIR Phase I.** A Wireless PVDF Strain Sensor for Infrastructural Monitoring, Infratech Inc. January - June 1998. $99,000.

- ***Principal Investigator*, UIC**. Bridge Research Center, Office of Vice Chancellor of Research Center Seed Grant Initiative. June 1999 - July 2000. $90,000.
- ***Co-Principal Investigator,* NSF-SBIR Phase II.** A Wireless PVDF Strain Sensor for Infrastructural Monitoring. Infratech Inc. August 1999 - July 30, 2001. $400,000. Subcontract to UIC, $99,800.
- ***Principal Investigator*, IDOT.** Monitoring & Damage Assessment of the Kishwaukee Bridge. August 1999 - December 2000. $270,000.
- ***Principal Investigator*, Shanghai Ship and Shipping Research Institute**. Stress Monitoring of Cables for Nanjing Second Yangtze River Bridge, Nanjing China. October 1, 2000 - December 2001. $62,000.
- ***Co-Principal Investigator*** with Arif Masud, **NSF**. Stabilized Methods with Embedded Multiscales: A Framework for Computational Solid Mechanics. November 15, 2000 - September 30, 2001. Funded as a pilot project $41,000.
- ***Principal Investigator,* IDOT.** Advanced Monitoring System for a Post-tensioning Segmental Concrete Box Girder Bridge Kishwaukee Bridge, IL. January 1, 2001 – December 31, 2002. $260,000.
- ***Principal Investigator*, NSF SBIR Phase I** with **Infratech Inc**. A New Magnetoelastic Force/Corrosion Sensor for Cable-stays in Bridges Using Measurement of the Anhysteresis Curve**.** July 2001 - December 2001. $99,000.
- ***Co-Principal Investigator*** with S. McNeil and F. Ansari, **IDOT-ITRC Project**. Evaluation of Bridge Inspection and Assessment in Illinois. September 2001 - August 2003. $180,000.
- ***Co-Principal Investigator*** with Arif Masud, **NSF.** US-China Symposium on Multi-scale Modeling of Materials. June 2001 - August 2003. $20,000.
- ***Principal Investigator,* Smart Structures Inc.** Development of Sensor Technologies and Monitoring System for Bridges, February 1, 2002 - December 31, 2006. $547,000.
- ***Principal Investigator,* IDOT**. South-Bound Kishwaukee Bridge Monitoring Station Follow-on Maintenance and Analysis. July 1, 2003 - June 2006. $150,000.
- ***Principal Investigator,* NSF.** Development of a Remote Coil Magnetoelastic Stress Sensor for Monitoring Steel Cables and Tendons. December 2000 - December 2004. $276,000.
- ***Principal Investigator*, NSF.** An Interdigitated PVDF Guided Wave Transducer for Large Array Condition Monitoring of Steel Structures. September 2002 - August 2005. $230,000. Equipment Matching from UIC, $12,000.
- ***Co-Principal Investigator*** with E. Indacochea, **NSF.** Magneto Elastic and Electrochemical Techniques for Detection of Early Corrosion in Steel Cable and Reinforcement. September 2002 – August 2006. $270,000. Equipment matching from UIC $19,000.
- ***Principal Investigator***, **NSF US-China Protocol** for Scientific and Technical Cooperative Research in Earthquake Studies. Wireless Dense Array for Infrastructure Monitoring. A Joint Proposal with Infratech Inc and Institute of Mechanics in China. $312,000. Subcontract to UIC $90,000. March 2002 - September 2005.
- ***Principal Investigator,* NSF REU** supplement grant for undergraduate research. March 2003 - September 2004. $12,000,
- ***Principal Investigator,* Qingjing 4th Bridge in Hangzhou**, PRC. Installation 36 EM sensors to Measure Stresses of Cables. $65,000, Feb. 2003- March. 2005.
- ***Principal Investigator,* Zhenjing Bay Bridge** Monitoring System Design, Sensor Integration, Software Design, and Installation. Jan. 2005- Nov. 2006. $260,000.
- ***Principal Investigator,* NSF**. An Interdigitated PVDF Guided Wave Transducer for Large Array Condition Monitoring of Steel Structures. Supplement Award for cooperative research with Nanjing University of Aeronautics and Astronautics. September 2004 - September 2005. $59,445.

- ***Co-Principal Investigator*** with Prof. Indacochea, **NSF**. Creep Damage Analysis and Remaining Life Assessment of Ferromagnetic Materials Exposed to High Temperatures. July 2004 - June 2007. $200,000. Equipment matching from UIC $9,000.
- ***Principal Investigator*** , Health Monitoring of Cables for Waldo Cable-Stayed Bridge in Maine, USA. **DSI International**, $80,000. August 2005 - December 2006.
- ***Principal Investigator***, Hurudin Box Girder PC Bridge Health Monitoring System; Naning, China, $100,000. April 2006 – May 2007. **New West Development Co.** China.
- ***Principal Investigator.*** Zhenjing Bay Bridge Monitoring System Design, Sensor Integration, and Software Design. Intelligent Instrument System. January 2005 - December 2007. $100,000.
- ***Principal Investigator,*** **NSF.** US-China Cooperative Program in Integrated Structural Health Monitoring with Emphasis on Earthquake and Natural Hazard Applications. September 2004 – August 2008. $120,000.
- ***Principal Investigator,*** **IDOT.** South-Bound Kishwaukee Bridge Monitoring Station Follow-on Maintenance and Analysis. July 2007 – July 2008. $135,000.
- ***Principal Investigator,*** **NSF.** Nanostructured Sensors for Detecting Low Levels of Hydrogen at Low Temperatures. September 1, 2005 - August 2008. $220,000.

Research Grants and Contracts at UNM (1985-1996)

Total funding at UNM is about $3.5 million.

- ***Principal Investigator,*** **NSF.** Advanced Monitoring System for Long-Span Bridges. $ 150,000. May 15 1996- Dec 1996,
- ***Principal Investigator,*** **SsangYong Cement Industrial Inc. Seoul, South Korea**. Monitoring and Health Assessment of Sung San Bridge, $120,000. Aug.1995-Aug. 1996.
- ***Co-Principal Investigator,*** **AFOSR.** Experimental and Numerical Investigations on Failure Mechanisms in Fiber-reinforced Ceramic. $ 210,000; Apr. 1995- Apr. 1998. H. Schreyer, ACC#3-43681.
- ***Principal Investigator,*** Experimental and Theoretical Investigations of Removal of Waste from a Waste Repository Caused by Drilling, **DOE**, $60,000, **Funded**; July 1, 1996 - Jul. 1997.
- ***Principal Investigator,*** **Innovative Recycling Corporation**. Mechanical Properties and Durabilities of Recycled Plastic Composites for Highway Guardrail Post, $ 10,000, April 1996-Dec. 1996.
- ***Principal Investigator.*** Advanced Monitoring System for Highway Bridges, Alliance Transportation Research and **New Mexico State Highway Department,** $ 20,000; Feb. 1996-June 1996. Acc# 3-46131.
- ***Co-Principal Investigator*** with A. Maji, **NSF**. Electronic Shearography for Structural Testing -- Nondestructive Testing for Bridges. $143 K, Jan 1993-Jun 1996. ACC# 3-26841.
- ***Co-Principal Investigator*** with H. Schreyer, **NSF.** The Correlation of Bifurcations with Failure Modes in Quasi-Brittle Materials. $155K, Feb 1993-Jun 1996, ACC# 3-26921.
- ***Co-Investigator*** with Walter Gerstle, **NSF.** Undergraduate Research Experience. $40 K, Mar-Aug 1996.
- ***Principal Investigator,*** **DOE.** Mechanical Properties of WIPP Waste Surrogate Materials for Drill Cutting. WERC, $66K, May 1994-Jan. 1996, ACC# 3-28471.
- ***Principal Investigator,*** **Sandia National Labs**. Constitutive Properties of Consolidated Wet Crushed Rock Salt for Drill Cuttings. $50 K (1993), $50 K (1994), 20K (1995). (Additional Funds were provided by NMERI to develop a Material Response Laboratory including an INSTRON quarter-million pound computer controlled machine ($250K); a 10,000 lb Triaxial Cell ($45K), and a budget for laboratory remodeling and a technician). ACC# 31550-03.

- ***Co-Principal Investigator*** with Z. Chen, **DOE.** A Micro- and Macro-Mechanical Investigation of Creep Mechanisms for Rock Salt. WERC, $75K, Apr 1993-May 1994; $65K, May 1994-Jan. 1996. ACC# 3-28321 and 8-31110.
- ***Principal Investigator,* DOE.** Healing Mechanisms of Crushed Rock Salt with Water. WERC, $70K, Apr 1993-Aug 1994. ACC# 3-28211.
- ***Co-Principal Investigator*** with H. Schreyer, Air Force Office of Scientific Research (**AFOSR**). Interaction Effects of Cracks, Flaws and Damage in Quasi-Brittle Materials, $100 K, Oct 1991-May 1994, ACC# 3-23841.
- ***Co-Principal Investigator*** with Z. Chen, **DOE**. A Micro- and Macro-Mechanical Investigation of Creep Mechanisms for Rock Salt. WERC, $75 K, Apr 1993-May 1994.
- ***Co-Principal Investigator*** with Z. Chen, **DOE.** A Micro- and Macro-Mechanical Investigation of Creep Mechanisms for Rock Salt, WERC, $40K, 1992.
- ***Principal Investigator,* DOE.** Deformation Mechanisms of Crushed Rock Salt, WERC, $115 K, May 1991-Feb 1993 (This project is also part of a DOE Equipment Grant to purchase a new Environmental Scanning Electron Microscope in collaboration with 5 other Waste Management related studies, $300 K, 1992, **DOE**).
- ***Principal Investigator and Co-Principal Investigator*** with Dr. Tim Ross of ISI Corp., Air Force Office of Scientific Research (**AFOSR**), Development of a High-Imaging-Speed Scanning Electron Microscope for Dynamically Loaded Materials. $460 K, 1987-1990.
- ***Principal Investigator,* NRC** and **Sandia National Labs**. Effects of Nonlinear Structural Responses on Nuclear Power Plant Risk, $80K, 1989-1990,
- ***Co-Principal Investigator*** with Professor H.L. Schreyer. Shock Phenomenon of Concrete, Soils, and Interface, **AFOSR**, Total $430 K plus $30 K Equipment Matching Fund (UNM), and $55 K Labs Remodeling (UNM), 1988-1990,
- ***Principal Investigator,* Sandia National Labs**. Force Identification from Linear and Nonlinear Structural Responses, $60K, 1986-1988.
- ***Co-Investigator*** with Walter Gerstle. **NSF.** Undergraduate Research Experience, $40 K, Mar-Aug 1993,
- ***Co-Principal Investigator*** with Dr. Tim Ross, **NSF**. Undergraduate Research Experience, $100K, 1990-1992. Contract #EID-9200117, EID-9100822, EID-9000744.
- ***Principal Investigator,* Sandia National Labs**. Microstructural Studies of Ionic Polymeric Gel Muscles Using Environmental Scanning Electron Microscope. $8 K, 1992.
- ***Principal Investigator,* Los Alamos** Technical Associates. Properties of Geosafe Offgas Hood Fabric, $16K, 1991,
- ***Principal Investigator,* NSF.** International Micromechanics Conference, $10 K, **Sandia National Labs**, $5 K, 1990.
- ***Principal Investigator,* NMERI and Air Force Weapons Labs**. Equipment Qualification for Protective Structures, $10K, 1989.
- ***Principal Investigator*** Stochastic Analysis of Reinforced Concrete Buried Structures, **Air Force Weapons Lab, Albuquerque NM**, $15K, 1986.

Publications:

Published Edited Books and Proceedings

- Sensor technologies for civil infrastructures, Volume 1: “Sensing Hardware and Data Collection Methods for Performance Assessment”. Edited by Ming L. Wang, Northeastern University, USA; Jerome P. Lynch, University of Michigan, USA; Hoon Sohn, Korea Advanced

Institute of Science and Technology, Korea. **Woodhead Publishing** Series in Electronic and Optical Materials, UK. Completed in 2013, May 2014. 535 pages.

- Sensor technologies for civil infrastructures, Volume 2: "Applications in Structural Health Monitoring". Edited by Ming L. Wang, Northeastern University, USA; Jerome P. Lynch, University of Michigan, USA; Hoon Sohn, Korea Advanced Institute of Science and Technology, Korea. **Woodhead Publishing Limited, UK**. Completed in 2013, May 2014. 665 pages.
- Micromechanics of Failure of Quasi-Brittle Materials. Editor and Co-Editor with S.P. Shah and S. Swartz. **Elsevier Applied Science Publisher**, UK, June 1990. 650 pages.
- Vibrations of Mechanical Systems and the History of Mechanical Design, DE-Vol. 63. Co-Editor with R. Echempati, J. Roger, and D. Morrison. **ASME Publication.** September 1993. 150 pages.
- Adavanced Smart Materials and Smart Structures Technology. Edited by Ming L. Wang, B.F. Spencer, and Yinghong Cao. Proceedings of the Fifth International Workshop, ANCRiSST 2009. June 2010. ISBN 978-89-89693-27-7. **Techno-Press**, 700 pages.
- American Society of Civil Engineers, **Engineering Mechanics Institute** Annual Conference, Proceedings in CD; Boston, MA June 2-4, 2011, 1200 pages. Co-editors with Hajjar and Bernal.
- US-Taiwan Workshop on **Bio-inspired Sensor and Actuating Technology**, Proceedings in CD; April, 2009, Taipei, Taiwan. Co-editors with C. H. Loh of NTU.

Patent and Patent Pending:

- Fast SEM Dynamic Microscopy, US Serious #07/ 708, 505. October 19, 1993. **Patent # 5,254,857**. With Dr. T. Ross.
- EM sensor Technology developed at UIC, Trade Secret and Trade Mark of "PowerStress" technology has been licensed to Intelligent Instrument System Inc. in Illinois since 2006. This technology has been used worldwide for cabling systems.
- Real-Time Wireless Dynamic Tire Pressure Sensors and Energy Harvesting System. Filed in May 21, 2012. With Qi Wang and Greg McDaniel. **Awarded in 2016, PCT/US2012/038842.**
- Real Time Pavement Profile Sensing System Using Air-coupled Surface Wave, With Yinghong Cao, File in January 20, 2012, **US No. 61/434,522**.
- Roaming Mobile Sensor Platform Collection Geo-Referenced Sensor Data and Creating Thematic Maps, With S. Wadia-Fascetti, and R. Birken., Greg. McDaniel, **US No. 61/315,571**, **Awarded in March 2016**.
- Conformal and configurable millimeter-wave integrated array radar in a compact package for non-destructive testing and remote sensing, with Dan Busuioc and Ralf Birken. March 23, 2013. Appl. No. **PCT/US13/33538**.
- Wireless SWNT Sensor Integrated with Micro fluidic System for Various Liquid Sensing Applications, with Yu Liu and M. Dokmeci, Jan. 10, 2013. US **No. 61/584,857**. **PCT/US2012/022016.**
- Wenjun, Z.; Ming, Wang; Saliva Glucose Monitoring System. *January 11, 2014, **PCT/US14/011262 and US patent no. 14/153,647. Patent awarded Sep 22, 2015, Patent # 9244035.***

Provisional Patent Disclosures:

- Real Time Pavement Profile Sensing System Using Air-coupled Surface Wave, With Yinghong Cao, Sep., 2010, No**. 61/434,522**.
- Real Time DGPS Correction Approach Through Cellular Network, With Y. Zhang, J. Zhang and R. Birken, Sep., 2010, No. **61/434,548**.
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- Kyle Anstey, Dan Busuioc, Carey Rappaport, Ralf Birken, Jeffrey Doughty, Ming Wang, "Novel, Low-Cost Millimeter-wave System for Road Surface Characterization". Conference 7649: Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security IV, 7 - 11 March 2011, San Diego, CA.
- Tian Xia, Ken Ngai, Dryver Huston, Khabat Ebnabbasi, Ralf Birken, Dan Busuioc, Ming Wang, "Compact, Programmable Ground Penetrating Radar System for Roadway and Bridge Deck Characterization". Conference 7649: Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security IV, 7 - 11 March 2011, San Diego, CA.
- Y. Liu, C.-L. Chen, V. Agarwal, S. Sonkusale, M. L. Wang, M. R. Dokmeci, "Single Chip Nanotube Sensors for Chemical Agent Monitoring", Proceedings of the 16th international Conference on Solid-State Sensors, Actuators and Microsystems (Transducers '11), Beijing, China, 02-116, June 5-9, 2011.
- Y. Liu, M. Chen, M. L. Wang, M. R. Dokmeci, "Sensing Characteristics of RNA Oligomer Coated SWNT Gas Sensors", Proceedings of the 16th international Conference on Solid-State Sensors, Actuators and Microsystems (Transducers '11), Beijing, China, 02-117, June 5-9, 2011.
- Y. Liu, M. Chen, M. Mohebbi, M. L. Wang, M. R. Dokmeci, "The Effect of Sequence Length on DNA Decorated CNT Gas Sensors", Proceedings of the 16th international Conference on Solid-State Sensors, Actuators and Microsystems (Transducers '11), Beijing, China, 03-158, June 5-9, 2011.
- V. Saykin, Y. Cao and M. L. Wang, "MTD Monitoring through the Noise Generated by Tire-Pavement Interaction", Symposium of Subsurface Imaging, Feature Identification and Damage Detection, engineering Mechanics Conference (EMI2011), June 2-4, 2011.
- Y. Cao, Y. Zhang, Y. Lu, G. McDaniel, and M. L. Wang, "Air-coupled SASW in Pavement Profile Detection, Symposium of Subsurface Imaging, Feature Identification and Damage Detection, engineering Mechanics Conference (EMI2011), June 2-4, 2011.
- Y. Lu, Y. Cao, G. McDaniel, and M. L. Wang, " Tire Noise in Pavement Debonding Identification using HHT", Symposium of Subsurface Imaging, Feature Identification and Damage Detection, engineering Mechanics Conference (EMI2011), June 2-4, 2011.

- A. Stuer, Sara Wadia-Fascetti, and M. L. Wang, “Unifying Roadway Defect and Deterioration Models, Symposium of Subsurface Imaging, Feature Identification and Damage Detection, Engineering Mechanics Conference (EMI2011), June 2-4, 2011.
- C.B. Yun, S. W. Shin, S. Cho, J. Yim and M. L. Wang, “Comparative Study of Cable Tension Measurement Methods by Field Testing under Construction”. Engineering Mechanics Conference (EMI2011), June 2-4, 2011.
- Y. Liu, Y. Zhang, M. R. Dokmeci, M. L. Wang, “Direct (DEP) Assembly of Single-Walled Carbon Nanotubes as Sensor Array for Wireless Gas Monitoring Applications”, Proceedings of the 2011 World Congress on Advances in Structural Engineering and Mechanics (ASEM11 plus), Seoul, South Korean, Sep. 18-22, 2011.
- M. Wang, “Sensor Enriched Secured Infrastructure Systems”, International Forum on Mechanoluminescence and Novel Structural Health Diagnosis 2011, AIST, Fukuoka, Japan. Nov. 11-12, 2011.
- Yiying Zhang, Xin Ma, J. Gregory McDaniel, Ming L. Wang, “Statistical Analysis of Acoustic Measurement for Assessing Pavement Surface Condition”, 2012 SPIE Smart Structures and Materials / NDE Conference. San Diego, CA. March 12-15, 2012. Volume 8347.
- Yu Liu, Yi Zhang, Mehmet R. Dokmeci, Ming Wang, “Wireless sensor array based on DNA decorated single-walled carbon nanotubes for gas monitoring”, SPIE Smart Structures and Materials / NDE Conference. San Diego, CA. March 12-15. 2012. Volume 8345.
- Daniele Zonta, P. Espositon Daniele Inaudi, and M. Wang. “Monitoring load redistribution in a cable-stayed bridge”. In the Proceedings of EACS 2012 European Conference on Structural Control, Genoa, Italy June 18-20 2012.
- Daniele Zonta, Paolo Esposito, Marco Molignoni, Riccardo Zandonini, Univ. degli Studi di Trento (Italy); Daniele Inaudi, Daniele Posenato, Smartec S.A. (Switzerland); Yang Zhao, Jinsuk Yim, Intelligent Instrument System, Inc.; Ming Wang, Northeastern Univ.; Matteo Pozzi, Univ. degli Studi di Trento (Italy). “Estimation of load redistribution on a cable-stayed bridge using a combination of sensing techniques”, SPIE Smart Structures and Materials / NDE Conference. San Diego, CA. March 12-15, 2012. Volume 8345.
- Hao Liu, Tzu-Yang Yu, U.; Ming L. Wang. “Condition assessment of rebar corrosion in concrete bridge decks using ground-penetrating radar”, SPIE Smart Structures and Materials / NDE Conference. San Diego, CA. March 12-15, 2012. Volume 8347.
- Qi Wang, Yi Zhang, Nian Sun, J. Gregory McDaniel, Jr., Ming Wang, “High power density energy harvester with high permeability magnetic material embedded in a rotating wheel”, SPIE Smart Structures and Materials / NDE Conference. San Diego, CA. March 12-15, 2012. Volume 8347.
- Birken, R., Wang, M., and Wadia-Fascetti, S., “Framework for continuous network-wide health monitoring of roadways and bridge decks,” In the Proceedings of Transportation Systems Workshop 2012, March 5-8, 2012 in Austin, TX, CD-ROM.
- Birken, R., Schirner, G., and Wang, M., “VOTERS: Design of a mobile multi-modal multi-sensor system” Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, SensorKDD'12, Beijing, China, 2012, pp. 8-15.
- Birken, R., Wadia-Fascetti, S., and Wang, M., “Framework for continuous network-wide health monitoring of roadways and bridge decks,” Proceedings of ANCRiSST 2012, Bangalore, India, 2012, CD-ROM.
- Cao, Y., Lu, Y., Zhang, Y., McDaniel, G., Wang, M., and Birken, R., “Mobile acoustic subsurface sensing (MASS) for subsurface properties of pavement,” Proceedings of SAGEEP 2012, Tucson, AZ, March 25-29, 2012, CD-ROM, Poster.
- Vines-Cavanaugh, D., Busuioc, D., Birken, R., and Ming W., “Millimeter-wave non-destructive evaluation of pavement conditions,” Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2012, Proc. of SPIE, Vol. 8347, 11-15 March 2012, San Diego, CD-ROM. Volume 8347.

- Li, M., Vilbig, R., Birken, R., Busuioc, D., Oden, C., Sun, N., and Wang, M., "Air-Coupled Ground Penetrating Radar system for Road Subsurface Detection and Assessment," Poster for Research, innovation and scholarship expo (RISE 2012) at Northeastern University.
- M. Wang, "Mobile acoustic sensing for the subsurface profile of pavement", Proceedings of MEMSCON Workshop 2012 on Towards Intelligent Civil Infrastructure, March 29, 2012. Athens, Greece.
- D. Zonta, M. Wang, D. Inaudi and B. Glisic, "Monitoring Load Redistribution in a Cable-Stayed Bridge", Proceedings of 5th European Conference on Structural Control (EACS 2012, Genova, 18-20 Jun 2012); Genoa Italy, 18-20, June 2012.
- Y. Zhao, F. Wu, G. McDaniel, and M. Wang, "Evaluating Road Surface Conditions Using Tire Generated Noise", SPIE Smart Structures and Materials / NDE Conference. Proceedings of Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2013, San Diego, CA. March 10-13, 2012.
- D. Vines-Cavanaugh, M. Wang and G. McDaniel, "Real-World Application and Validation of Vehicle-Mounted Pavement Inspection System, SPIE Smart Structures and Materials / NDE Conference. Proceedings of Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2013, San Diego, CA. March 10-14, 2013. Pp. 83472-83472.
- Q. Wang, G. McDaniel, N. Sun and M. Wang, "Road Profile estimation of City roads Using DTPS, SPIE Smart Structures and Materials / NDE Conference. Proceedings of Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2013, San Diego, CA. March 10-14, 2013.
- D. Zonta, F. Bruschetta, R.Zandonini, M. Wang, B. Glisic, etc., "Analysis of monitoring data from cable-stayed bridge using sensor fusion techniques", SPIE Smart Structures and Materials / NDE Conference. Proceedings of Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2013, San Diego, CA. March 10-14, 2013.
- M. Li, R. Vilbig, D. Busuioc, R. Birken, and Ming L. Wang, "Novel Antenna Design for Compact Ground Penetrating Radar Systems and In-Traffic Air-Coupled Applications", SAGEEP 2013, Denver, CO, May 2013.
- N. Martino, K. Maser, R. Birken, and M. L. Wang, "Determine Ground Penetrating Radar Amplitude Thresholds for the Corrosion State of Reinforced Concrete Bridge Decks", SAGEEP 2013, Denver, CO, May 2013. Nominated as the third best paper overall.
- Y. Liu, Q. Sheng, S. Muftu, A. Khademhosseini, M. Wang, and M. Dokmeci, "A Stretchable and Transparent SWNT Strain Sensor Encapsulated in Thin PDMS Films, Transducer13, June 16-20, 2013, Barcelona. Spain.
- Y. Zhang, G. McDaniel, R. Birken, and M.L. Wang, "Qualification of Pavement Condition by Tire/Road Noise Measurement", IWSHM2013, Stanford, CA, Sep 2013.
- Q. Wang, G. McDaniel, R. Birken, and M.L. Wang, "Pavement Assessment Using a Dynamic Pressure Sensor System", IWSHM2013, Stanford, CA, Sep 2013.
- D. Zonta, C. Cappello, R. Zandonini, D. Inaudi, M. Pozzi, M. L. Wang, G. Glisic, and Y. Zhao, " Fusion of Monitoring Data from Cable-Stayed Bridge", EESMS 2013, IEEE Sensor conference.
- Martino, N., Birken, R., Maser, K., and Wang, M. "Developing a Deterioration Threshold Model for the Assessment of Concrete Bridge Decks Using Ground Penetrating Radar," For presentation at the 93rd Annual Meeting of the Transportation Research Board, Washington, DC, January 12-16, 2014, TRB, Washington, DC, August 1st, 2013.
- Martino, N., Birken, R., Maser, K., and Wang, M. "Quantification of Corrosion of Bridge Decks Using GPR," Presenting at the R N Raikar Memorial International Conference & Dr. Suru Shah Symposium on Advances in Science and Technology of Concrete, Mumbai, India, December 20-21st, 2013, India Chapter of ACI, Mumbai, India.

- Martino,N., Maser, K., Birken, R., and Wang, M., (2013). “Quantifying Bridge Deck Corrosion with Ground Penetrating Radar,” In the proceeding of 9th International Workshop on Structural Health Monitoring 2013, Stanford, California, September 10-12, 2013, Volume 1, pp. 637-644.
- Wang, Q., J. G. McDaniel, R. Birken, and M. L. Wang. “Pavement Assessment Using a Dynamic Pressure Sensor System”, Structural Health Monitoring 2013, Volume 1, Edited by Fu-Kuo Chang, pp. 645652.
- Zhang, Y., J. G. McDaniel, R. Birken, and M. L. Wang. “Quantification of Pavement Condition by Tire/Road Noise Measurement”. Structural Health Monitoring 2013, Volume 2, Edited by Fu-Kuo Chang, pp. 2712-2719.
- Vine-Cavanaugh, D., R. Birken, and M.L. Wang. “In Field Application of Rapid Roadway Inspection System Using Vehicle-Mounted Multi-Modal Sensing”. Structural Health Monitoring 2013, Volume 1, Edited by Fu-Kuo Chang, pp. 611-619.
- Y. Zhang, G. McDaniel, and M. Wang, “Pavement Macrotexture Estimation Using Principal Component Analysis on Tire Noise”, The 6th International Conference on Structural Health Monitoring of Intelligent Infrastructure , Hong Kong, Dec. 9-11, 2013. SHMII-6, MS04-11, 2013. Invited Paper.
- R. Birken, D. Vines-Cavanaugh, and M. Wang, “Framework and Preliminary Application for Continuous Network-Wide Health Monitoring of Roadways”, The 6th International Conference on Structural Health Monitoring of Intelligent Infrastructure, Hong Kong, Dec. 9-11, 2013. SHMII-6, PS06-17, 2013.
- Shahini Shamsabadi, Salar, Wang, Ming L., and Birken, Ralf, 2014, PAVEMON: A GIS-based data management system for pavement monitoring based on large amounts of near-surface geophysical sensor data: Proceedings of SAGEEP 2014, Boston, MA, March 16-20, 2014. **Best paper award** from the conference.
- Martino, Nicole, Maser Kenneth, Birken, Ralf, and Wang, Ming, 2014, Comparing experimental and simulated GPR amplitudes from rebar in healthy and corroded Reinforced Concrete Bridge Decks: Proceedings of SAGEEP 2014, Boston, MA, March 16-20 2014.
- Wang, M. L., Birken, R. and Shamsabadi, S. S., “Framework and implementation of a continuous network-wide health monitoring system for roadways,” Proc. SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security, Vol. 9063, pp. 9063H-1 ~ 9063H-12, California, March 2014. **(Keynote Lecture)**
- Zhao, Y., Wu, H. F., McDaniel, J. G., and Wang, M. L., “Evaluating Road Surface Conditions Using Dynamic Tire Pressure Sensor,” Proc. SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security, Vol. 9063, San Diego, California, March 9-12, 2014, pp. 90630J-1 ~ 90630J-7.
- Yiying Zhang, J. Gregory McDaniel, and Ming L. Wang, “Pavement Macrotexture Estimation using Principal Component Analysis of Tire/Road Noise,” Proc. SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security, Vol. 9063, San Diego, California, March 9-12, 2014, pp. 90630K-1~90630K-9.
- Lu, Yifeng, Liu, Hao, Wang, Ming L., and Birken, Ralf, 2014, Complementary Pavement Subsurface Assessment Using Mobile Acoustic Subsurface Sensing and Ground Penetrating Radar Systems: Proceedings of SAGEEP 2014, Boston, MA, March16-20, 2014.
- Shahini Shamsabadi S., Birken R., Wang M., "Pavement Condition Monitoring by Fusing Data from a Mobile Multi-sensor System", 6th World Conference on Structural Control and Monitoring, Barcelona, Spain, July 2014.
- Shahini Shamsabadi S., Hashemi Tari Y., Wang M., Birken R., "Deterioration Forecasting in Flexible Pavements Due to Floods and Snowstorms", 7th Workshop on Structural Health Monitoring, Nantes, France, July 2014.

- Reddy Aleti, Tarun, Birken, Ralf, and Wang, Ming, 2014, Physical Based Regression Approach for Assessment of Pavement Condition: Proceedings of the 6th World Conference of the International Association for Structural Control and Monitoring (6WCSCM), Barcelona, Spain, July 15-17, 2014
- Birken, Ralf, Schirner, Gunar, Ghanta, Sindhu, Liu, Hao, Qiu, Hanjiao, Shahini Shamsabadi, Salar, Vines-Cavanaugh, David, Zhang, Jiaxing, Zhao, Yubo, Zhang, Yiying, Wadia-Fascetti, Sara, and Wang, Ming, 2014, Implementation of a multi-modal mobile sensor system for surface and subsurface assessment of roadways: Proceedings of the National Pavement Evaluation Conference, September, 15-18, 2014.
- Shahini Shamsabadi S., Wang M., Birken R., "Design and Implementation of a GIS Web-based Pavement Monitoring System", TRB Annual Meeting, January 2015.
- Shahini Shamsabadi S., Reddy T., Birken R., Wang M., "PAVEMAN: A Data Driven Customizable PAVEment MANagement System", TRB Annual Meeting, January 2015.
- Ghanta S., Shahini Shamsabadi S., Wang M., Dy J., Birken R., "A Hessian-based Methodology for Automatic Surface Crack Detection and Classification from Pavement Images", Proceeding of SPIE, Nondestructive Characterization for Materials, Aerospace, Infrastructure, and Security, March 8-12, 2015. Proc. Of SPIE, San Diego.
- Wang, Ming, Birken, Ralf, and Shahini Shamsabadi, Salar, 2015, Implementation and Validation of a Multi-modal Mobile Sensor System for Surface and Subsurface Assessment of Roadways: Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2015, Proc. of SPIE, March 8-12, 2015, San Diego.
- Vines-Cavanaugh, Birken, Ralf, MacIntosh, Scott, and Wang, Ming, 2015, Road Profile and Asset Collection Using K-Band FMCW Radar Array: Proceedings of the 7th International Conference on Structural Health Monitoring of Intelligent Infrastructure, Torino, Italy, July 1—3.
- Vines-Cavanaugh, David, Shahini Shamsabadi, Salar, Zhao, Yubo, Huang, Guoqiang, Wadia-Fascetti, Sara, Schirner, Gunar, Birken, Ralf, and Wang, Ming, 2015, City-Wide Application of a Vehicle-Mounted Multi-Sensor Pavement Monitoring System: Proceedings of the International Symposium for Non-destructive testing in civil engineering (NDT-CE), Berlin, Germany, September, 15-17, 2015.
- Hao Liu ; Ralf Birken and Ming L. Wang " Detecting subsurface features and distresses of roadways and bridge decks with ground penetrating radar at traffic speed ", Proc. SPIE 10168, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2017, 1016812 (April 12, 2017); doi:10.1117/12.2272735; http://dx.doi.org/10.1117/12.2272735.

Invited Lectures, Keynote Lectures and Plenary Lectures (Trip Paid by Sponsors)

- Structural Monitoring Systems for High-Speed Vibrations, Workshop on effect of high-speed vibration on structure and equipment, April 30-May 1, 1998, Taiwan, Taiwan. **Keynote Lecture**.
- Monitoring of Cable Forces Using Magneto-Elastic Sensors, 2nd U. S. -China Symposium workshop on Recent Developments and Future trends of computational mechanics in structural engineering, May 25-28, 1998, Dalian, PRC. **Keynote Lecture**.
- Numerical Simulation of Failures of Quasi-Brittle Materials, International Workshop on Fracture Mechanics and Acoustical Emission in Concrete, Oct. 18-19, 1998, Kumamoto, Japan. **Keynote Lecture**.
- Advanced Monitoring Systems for Large Structural Systems, NATO Advanced workshop on smart Structures-requirements and Potential Applications in Mechanical and Civil Engineering, June 16-19, 1998, Poland. **Keynote Lecture**.

- Wireless Sensor Technology for Infrastructure Monitoring, Keisoku Research Consultant Co. Jan. 29, 1999, Tokyo, Japan. **Invited Seminar**.
- Monitoring and Modeling of a Prestressed Segmental Box Bridges, Workshop on Failure Prevention and Nondestructive Evaluation of Infrastructure, Korea Research Institute of Standards and Science, Jan. 22-23, 1999, Seoul, Korea. **Keynote Lecture**.
- Advanced Monitoring Systems for Long Span Bridges, Hyundai Information Technology Co. Industrial Automation R & D Team, Jan. 23, 1999, Seoul, Korea. **Invited Lecture**.
- NSF-CERF Joint Collaborations Forum, Nov 10-11, 1998, The Development of a Wireless PVDF Strain Sensor. **Invited Inventor and lecture**.
- Monitoring Systems for Long Span Bridges, Illinois Institute of Technology, Chicago, IL, Feb. 26, 1999. **Invited Seminar.**
- Asymptotic Bias Correction for a Probabilistic Neural Network for Structural Health Monitoring, The Second Workshop on Structural Health Monitoring, Stanford University, CA, USA, Sep. 8-10, 1999. **Invited Lecture**.
- Monitoring and Modeling of a Prestressed segmental Box Girder Bridge, US-Korea Joint Workshop on Infrastructure and Seismic Engineering, Seoul, Korea. Aug. 24-26, 1999. **Invited Lecture**.
- Damage Assessment of a Post-tensioned Segmental Concrete Bridge Using Modal Testing Data, International Workshop on Advanced Technology in Structural Engineering, Oct. 18-20, 1999, Kunming, P. R. China. **Invited Lecture**.
- The Monitoring and Damage Assessment of Concrete Structures, Korea Electric Power Research Institute, Chounju, Korea, Aug. 27, 1999, **Invited Lecture**.
- Advancement in Bridge Technology, Transportation Research Institute, Nanjing, China, Oct. 21-23,199. **Invited Lecture**.
- Monitoring of Cable Force Using Magneto Elastic Sensor Technology, Keisoku Research Consultant Co. Tokyo, Japan, Invited Lecture, Aug. 16-19. 1999. **Invited Lecture**.
- Sensor Technology for Infrastruture Monitoring, Workshop on Smart Structures in Tsukuba, Japan, 6-8 January, 2000. **Invited Lecture**.
- Stress Monitoring of Cables Using EM Sensor, Department of Civil Engineering, University of Tokyo, Jan. 11, 2000. **Invited Seminar**.
- Application of EM Sensor on the Stress Measurement of Nanjing Second Yungtze River Cable-Stayed Bridge. Jan.13, 2000. Nanjing, China. **Invited Presentation**.
- A New Magnetoelastic Stress/ Corrosion Sensor for Cables in Cable-Stayed Bridges Using Measurement of the Anhysteresis Curve. The Second Workshop on Advanced Technologies in Urban Earthquake Disaster Mitigation, DPRI, Kyoto University, Japan. July 11-13, 2000. **Invited Lecture**.
- Health Monitoring of Long Span Bridges, Desirable/Novel Technologies, **Invited Speaker**, Session Chair and Moderator; University of California, Irvine, 9-10 March 2001.
- Health Assessment and Monitoring of Large Structures, Daejeon Disaster Prevention Institute. Daejeon, S. Korea. **Invited Lecture**. Nov. 2001.
- EM Sensor Technology & Applications in Steel Cables. Korea Research Institute of Standards and Science, Daejeon, S. Korea. **Invited Lecture**. Nov. 2001
- Stress and Corrosion Sensors for Large Steel Cables, Korea Concrete Institute & ICES Co. Ltd. Seoul, S. Korea. **Invited Lecture**. Nov. 2001.
- PVDF Sensor for Infrastructure Monitoring, Beijing Polytechnic University, Beijing, China. Dec. 2001. **Invited Lecture**.
- Measurements of stress for Cables in Nanjing Cable-Stayed Bridge, Institute of Earthquake Engineering, China Academy of Building Research, Beijing, China, Dec. 2001. **Invited Lecture**.

- Sensor Technology and Monitoring System for Large Structures, Hong Kong Highways Department Structures Division, Kowloon, Hong Kong. Dec. 2001. **Invited Lecture**.
- Monitoring of Cable Force Using Magneto Elastic Sensor Technology, Keisoku Research Consultant Co. Hiroshima, Japan, Invited Lecture, Jan.14-17. 2002. **Invited Lecture**.
- Advanced Monitoring Systems for Large Structures. Workshop on Cooperative US-Europe Research in Sensors and Smart Structures, Somma Lombardo, Italy, April 12-13, 2002. **Invited Lecture**.
- Failure Mechanisms of Quasi-Brittle Materials- Experimental Observations and Computer Simulations. The Sino-US Joint Symposium on Multi-Scale Analysis in Material Sciences and Engineering, June 17-20, 2002; Beijing, China. Workshop Chairman. **Keynote Lecture**.
- National Workshop on Future Sensing Systems, Lake Tahoe, CA. Aug. 26-28, 2003.
- The US-Korea Workshop on Smart Structural systems, Busan, Korea, 23-24 August, 2002. **Invited Lecture and Session Chair**.
- Smart Health Monitoring System of a Prestressed Box Girder Bridge. ICANCEER 2002, Hong Kong, Aug. 17-18. 2002. **Invited Lecture**.
- Sensor Technology and Damage Assessment of Concrete Structures. FIB Congress, Osaka, Japan, 13-19, Oct. 2002. **Keynote Speaker**.
- Magnetoelastic Corrosion Sensing of Steel Cables. Workshop on Smart Structural Systems- US-Japan Cooperative Research Programs on Smart Structural Systems and Urban Earthquake Disaster Mitigation. Invited Lecture, Oct. 18, 2002. BRI, Tsukuba, Japan.
- Recommendations for Intelligent Bridge Monitoring Systems. Proceedings of International Symposium on Diagnosis, Treatment and regeneration for Sustainable Urban Systems, **Invited Lectures**, March 13-14,2003, Ibaraki, Japan.
- Intelligent Bridge Monitoring Systems Workshop, Monitoring System Architecture and Temperature Compensated Bootstrap Analysis, **Invited Lecture**, March 7-8, 2003. San Diego, CA.
- Magnetoelastic Method of Stress and Corrosion Monitoring in Steel Tendons and Cable. **Invited Seminar** April 4, 2003. University of California, Irvine. CA.
- Magnetoelastic Method of Stress and Corrosion Monitoring in Steel Tendons and Cable. **Invited Lecture**. May 9.2003. University of Notre Dame. South Bent, IN.
- Measurement of stresses of very large cables. First International Conference on Structural Health Monitoring and Intelligent Infrastructure (SHMII-1'2003), Tokyo, Japan, November 13-15, 2003. **Invited speaker**.
- Residual Stresses and Failure of Silicon Nitride-to-Stainless Steel Braze Joints. AIT-NSF Workshop on Nano, Material, Continuum and Computational Mechanics, 11-12 Dec. 2003, AIT Thailand. **Invited speaker**.
- Application of EM Stress Sensors in Large Steel Cables. The US-Korea Joint Workshop on Smart Structures Technologies, Sep. 2-4, 2004 Seoul Korea. **Invited speaker**.
- Application of EM Stress Sensors in Large Steel Cables. The International Conference on Earthquake Engineering. 19-20 Oct. 2004, Nanjing, China. **Invited speaker**.
- Application of EM stress sensors in Large Steel Cables, North American Euro-Pacific Workshop on Sensing Issues in Civil Structural Health Monitoring, Nov. 10-13, 2004, **Invited Speaker**.
- Structural Health Monitoring System Application in Japan, North American Euro-Pacific Workshop on Sensing Issues in Civil Structural Health Monitoring, Nov.10-13, 2004. **Invited speaker.**
- Advanced Sensor Technologies for Civil Infrastructure Application, US-India Workshop on Smart Structure Technologies. Dec. 19-22, Bombay, India. **Invited speaker**.

- Health Monitoring of Box Girder PC bridge. March 30, 2005. College of Engineering, Florida State University. **Invited speaker.**
- Health Monitoring and Advanced Sensor Technology for Civil Infrastructures. April 5, 2005; Civil and Environmental Engineering, Central Florida University. **Invited Speaker**.
- Damage Assessment and Monitoring of Post-Tensioning Box Girder Bridges. April 15, 2005; Civil Engineering, University of Maryland, **Invited Speaker**.
- Health Monitoring for Design, Construction, and Maintenance of Civil Infrastructures. Sep. 12-14, 2005, Stanford, CA. **Keynote Speaker**.
- US-China Collaborative research in Health monitoring and Smart Structures Technologies. Nov. 16-18, 2005; Shenzhen, China. **Keynote Speaker.**
- Health Monitoring of Large Steel-Cable Systems. **Seminar** at University of Illinois at Urbana-Champaign, November 28, 2005.
- Health Monitoring of Large Structural Systems. **Keynote Speaker** at the Second International Conference on Structural Health Monitoring of Intelligent Infrastructure, Shenzhen, China, November 17, 2005.
- Damage Assessment and Monitoring of Long-Span Bridges. **Plenary Speaker** at US-China Workshop on Smart Structures & Smart Systems in Jinan, China, October 17, 2005.
- Health Monitoring for Design, Construction, and Maintenance of Civil Infrastructures. **Keynote Speaker** at International Workshop on Structural Health Monitoring, Stanford, CA, September 12 - 14, 2005.
- Health Monitoring of a Box Girder Bridge. **Keynote Speaker** at the Second International Workshop on Advanced Smart Materials and Smart Structures Technology. Gyeongju, Korea, July 21, 2005.
- Damage Assessment and Health Monitoring of a Box Girder PC Bridge. **Invited Speaker**, International Symposium on Innovation and Sustainability of Structures in Civil Engineering. Nanjing, November 20, 2005.
- Health Monitoring of Large Steel-Cable Systems. **Invited Seminar** Speaker at University of California-San Diego, March 2006.
- A Sensor for Monitoring Large Cable Systems for Ground and Slope Anchors. **Dinner Speaker** at Association of Environmental and Engineering Geologists, May 16, 2006.
- Advancement in Real-Time Health Monitoring Technology for Bridges, Lehigh University, October 2006.
- Joint US-Japan Workshop on Bridge Maintenance, FHWA. **Invited Speaker**, Seattle, November 2006.
- FHWA Long Term Bridge Performance Program Meeting**. Invited Panelist and Speaker**, Las Vegas, January 2007.
- Long-term Health Monitoring for Bridges, South Carolina DOT. **Invited Speaker,** Columbia, SC, November 2006.
- Sensor Enriched Infrastructure System. **Invited Speaker,** Northeastern University, July 6, 2007.
- EM Sensor Technology for Stress Measurement of Steel Cables. **Invited Speaker,** University of Virginia, April 23, 2007.
- Bridge Health Monitoring Technology, Headquarters of Hangzhou Bay Bridge. **Invited Speaker,** Ninbo, P.R.China, May 21, 2007..
- Long term Health Monitoring for Bridges. **Invited Speaker**, Hawaii Department of Transportation, May 2007.

- Sensor Technology for Infrastructure Applications. **Invited Speaker**, University of Hawaii, May 10, 2007.
- Sensor Enriched Infrastructure System, US-Japan Workshop on Advanced Sensor Technologies for Safe and Secure Societies and Better Quality of Life. **Keynote Speaker,** Tokyo, Japan, July 20 - 23, 2007.
- Long Term Bridge Health Monitoring System for Kissiwaukee Bridge. **Invited Speaker,** Illinois Department of Transportation, Maintenance Meeting, August 9, 2007.
- Health Monitoring of Large Structural Systems. **Keynote Speaker**, The 11th Biennial ASCE Aerospace Division International Conference on Engineering, Science, Construction, and Operations in Challenging Environments (Earth & Space 2008), Long Beach, California, March 3 – 5, 2008.
- Sensor Protocol Made of DNA Assembled Carbon Nanotube on CMOS Chip for Environmental Monitoring," The US-Korea Workshop on Multi-scale Mechanics and Multi-functional Materials for Smart Sensing and Actuation, Jeju, Korea, May 30-June 3, 2010, **invited lecture**.
- Roadway Monitoring Using Traffic Embedded Sensing. NDE Workshop, **Invited Plenary Lecture**; Transportation Research Board 90th Annual Meeting, January 23-27, 2011, Washington, DC
- Nano-sensors for Environmental Monitoring, Shanghai Jiaotong University, **Seminar**; July 18, 2011, Shanghai, China.
- Advanced Technology for Roadway Maintenance Using Vehicle of Opportunities, International Forum on Mechanoluminescence and Novel Structural Health Diagnosis 2011, Fukuoka, Japan. Nov. 11-12, 2011. **Invited Plenary Speaker**.
- Sensor Enriched Secured Infrastructure Systems, International Forum on Mechanoluminescence and Novel Structural Health Diagnosis 2011, AIST, Fukuoka, Japan. Nov. 11-12, 2011. **Invited Lecture**.
- Sensor Technology for Infrastructure Applications, 2nd Workshop on China-US collaboration for Disaster Evolution/Resilience of Civil Infrastructure and Urban Environment. Shanghai, China, December 9-10, 2011. **Invited Panel Member.**
- US/Japan Workshop on Bio-inspired Engineering of Next-Generation Sensors and Actuators.

  Berkeley, CA, November 11-13, 2011. **Invited Panel Member**.
- Future Directions in Mechanical and Civil Engineering for DOD; Northwestern University, April 2012. Sponsored by Office of the Assistant Secretary of Defense for Research and Engineering, Basic Science Office. Produced a document for future research agendas for DOD for the next 5 years. **Invited panel member and presenter**.
- 6th international workshop on structural control and monitoring, Dec. 2012, Decision on future research direction and international collaboration- developed multi-national joint research agendas. Invited Panel member.
- Workshop on the “Use of Vehicle Noise for Roadways, Bridge, and Infrastructure Health Monitoring”, FHWA Exploratory Advanced Research (EAR) Program. August 20, 2013, McLean VA. **Panel member and invited speaker**.
- Network-wide Roadway Condition Assessment and Maintenance, National Taiwan University of Science and Technology, December 3, 2013. **Invited Seminar**
- Sensor Enriched Health Monitoring of Civil Infrastructures”, May 10, 2013. Hong Kong Polytechnic University, Hong Kong. China. **Invited Seminar**
- Network-wide health monitoring system for roadways. NIST Civil Infrastructure Showcase, March 13-14, 2014. **Invited Speaker**
- Framework and implementation of a continuous network-wide health monitoring system for roadways. SPIE Smart Structures and Materials / NDE Conference. Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and

Homeland Security 2014, San Diego, CA. March 10-14, 2014. **Keynote Lecture**, March 11, 2014

Teaching

New Courses Taught at Northeastern

- Advanced Bridge Engineering and Design (13 students, 2010, 17 students 2012)
- Senior Capstone Design/ Structures (20 students, 2009; 38 students, 2011)
- Short Course on Sensor Technology for Practical Health Monitoring of Bridges (one day short course), 20 students.
- Structural Dynamics

Courses Taught at University of Illinois at Chicago

- Structural Dynamics (CEMM544)
- Random Vibration (CEMM596)
- Prestressed Concrete Design (CEMM410)
- Structural Analysis (CEMM205)
- Advanced Prestressed Concrete Design (CEMM 510)

Course Taught at Princeton University (Princeton, NJ)

- Structural Dynamics (5.2/6.0), 1992; 9 students

Courses taught at Northwestern University (Evanston, Illinois)

- Statics and Dynamics (3.8/4.0) 1984, 32 students
- Design of Reinforced Concrete Structures Subjected to Dynamic Loads (13), 1985

Summary of Courses Taught

- Structural Dynamics (UNM, Princeton, UIC, NEU)
- Statics and Dynamics (Northwestern, UNM)
- Design of Structures under Dynamic Loadings (UNM, Northwestern)
- Random Vibrations (UNM)
- Design of Reinforced Concrete Structures (UNM)
- Prestressed Concrete Design (UNM, UIC)
- Mechanics of Materials (UNM)
- Material Science (UNM)
- Probability and Statistics in Civil Engineering (UNM)
- Vibration of Elastic Systems (UNM)
- Advanced Random Vibration (UNM, UIC)
- Construction Materials and Laboratory (UNM)
- Advanced Prestressed Concrete Design (UIC)
- Structural Analysis (UIC)
- Capstone Design (NEU)
- Advanced Bridge Design (NEU)

Graduate Students:

Current Graduate Students at NEU:

Ph. D

Yu Liu	RA	PhD(ECE)	2012 (graduated)
Yifeng Lu	RA	PhD(interdisciplinary)	2015(graduated)
Yubo Zhao	RA	PhD(interdisciplinary)	2015(graduated)
David Vines-Cavanau	RA	PhD(CEE)	2016(graduated)
Yiying Zhang	RA	PhD(CEE)	2014(graduated
Nicole Martino	RA	PhD(CEE)	2013 (graduated)
Wenjun Zhang	RA	PhD(interdisciplinary)	2016(graduated)

Qi Wang	RA	PhD(ECE)	2013 (graduated)
Ming Li	RA	PhD(ECE)	2013 (graduated)
Du Yunqing	RA	PhD(interdisciplinary)	2016(graduated)
Hao Liu	RA	PhD(interdisciplinary)	2016(graduated)
Salar Shahini Shamsabadi	RA	PhD(CEE)	2018
Sheyda Nazarian	RA	PhD(interdisciplinary)	2019
Christian Grenier	RA	PhD(interdisciplinary)	2019
Wenjin Zhang	RA	PhD(CEE)	2018
MS			
Sara Nikdel	RA	MSCE	2016
Wenjin Zhang	RA	MSCE	2016
MS Graduated			
Tarun Reddy	RA	MSCE	2014
Yasamin Hashemi Tari	RA	MSCE	2014
Salar Shahini Shamsabadi	RA	MSCE	2014
Jason Durant	RA	MS	2010
Vitaliy Saykin	RA	MSCE	2011
David Vines-Cavanau	RA	MSCE	2011

Research Scientists and Research Professor (3)

- ***Dr. Yinghong Cao***- Assistant Research Professor, Northeastern University
- ***Dr. Ralf Birken*** – Research Assistant Professor, Northeastern University
- ***Dr. Yi Zhang*** – Research Scientist, Northeastern University

Former students in teaching institutions:

- ***Professor Ying Zhang*** - Associate Professor, Georgia Institute of Technology, Smart Materials and Energy Harvesting. EECE. Georgia, USA.
- ***Professor Jin-Huang Huang*** - Professor, Feng Chia University, Taichung, Taiwan, ROC. Smart Materials, Micro-Actuator and Sensor.
- ***Professor Li-Zhe Tan*** - Professor, Purdue University-North/Central, Electrical and Computer Engineering. Digital Signal Processing.
- ***Professor Sung Woo Shin*** – Professor, Pukyong National University, Busan South Korea. Health Monitoring of Bridges and NDE techniques.
- ***Professor G. Heo***, Civil Engineering, Professor, Chungbuk National University, Chungbuk, South Korea. Health Monitoring and Structural Engineering.
- ***Professor Z. Chen,*** Professor, Civil and Environmental Engineering, University of Missouri at Columbia, Missouri. Computational Mechanics.
- ***Professor Fan Wu*** – Associate Professor, Shanghai Jiatong University, Shanghai, China.
- ***Professor Nicole Martino*** – Assistant Professor, Roger Williams University in Rhode Island. Pavement and Bridge deck evaluation, Radar Technology

Former students in National Laboratories:

- ***Dr. Timothy Kreitinger*** – Defense Threat Reduction Agency, Kirtland Air Force Base, Albuquerque NM
- ***Dr. Craig Rutland*** – Air Force Civil Engineering Support Agency, Tyndall AFB, Fla.
- ***Sam R. Subia*** – Sandia National Laboratories, Albuquerque, NM.

- ***Dr. Monica Starnes***- Senior Program Officer, Strategic Highway Research Program, TRB. Washington DC.

Former students in Industry:

- ***Dr. Yu Liu-*** Applied Materials, Device Group, Santa Clara, CA
- ***Dr. Yiying Zhang-*** (CEE PhD, 2014) China Merchants Chongqing Communications Technology Research & Design Institute Co., LTD. ("CMCT") Chongqing , PRC; Senior Research Engineer
- ***Dr. Yifeng Lu-*** Caterpillar, INC, Peoria, IL, System Engineer
- ***Dr. Yubo Zhao-*** Street Scan INC, Burlington, MA
- ***Dr. David Vines Cavanau-*** Street Scan INC, Burlington, MA
- ***Dr. Wenjun Zhang-*** Northeastern University, Senior Research Scientist
- ***Dr. Du Yunqing-*** Northeastern University, Senior Research Scientist
- ***Dr. Hao Liu-*** China Merchants Chongqing Communications Technology Research & Design Institute Co., LTD. ("CMCT") Chongqing, PRC; Research Engineer.
- ***Dr. Ming Li***- Texas Instrument, Packaging Engineer, Dollas,Texas.
- ***Dr. Qi Wang-*** Bingham McCutchen LLP, Patent Specialist, Boston, MA
- ***Dr. Ondrej Hovorka*** – National Research Laboratories in Portugal.
- ***Dr. Xuan Wang*** – Sargent and Lundy, Dynamic Group, Chicago. IL
- ***Dr. Fanli Xu*** – Tecknip USA, Inc. Principal Specialist.
- ***Dr. Hua Gu*** – Caterpillar, Large Structure Group, Senior Engineer, Peoria Illinois.
- ***Dr. Varsha Singh*** – Construction Technology Laboratories, Skokie, IL. NDE Group.
- ***Dr. Guodong Wang*** - Methode Electronics, Inc. Harwood Heights, IL.
- ***Dr. Suke Miao***- Design and Construction Company, California.
- ***Dr. Jinsuk Yim*** – Technical Director, Intelligent Instrument System, Illinois
- ***Dr. Debashi Satpathi-*** Consultant for Defense industry. Albuquerque, NM
- ***Dr. Jian Gao*** – Chief Structural Engineer, Ocean Dynamics LLC, Houston, TX
- ***Dr. Zhenlei Chen***- Ford Corp. Detroit, MI
- ***Dr. Jinlu Wang***- Helicopter Manufacturing Company in Connecticut.

Post-Doctor and Research Scientist:

- ***Dr. Yinghong Cao***- Parson, Senior Engineer, Chicago Illinois
- ***Dr. Ralf Birken*** – Research Assistant Professor, Northeastern University
- ***Dr. Yi Zhang*** – Research Scientist, Ford Research lab, MI
- ***Dr. Yang Zhao*** – Research Scientist, President of IIS, Illinois
- ***Dr. C. L. Huang***, Chair and Professor of Construction Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan.
- ***Professor H.Y. Yang,*** Professor, Tianjin University, China
- ***Dr. George Lloyd*** – Consultant for JPL, California.
- ***Dr. Debashi Satpathi*** – Consultant for Defense industry. Albuquerque, NM

- ***Professor Andrej Jarosevic*** – Professor, Comenius University, Bratislava, Slovakia
- ***Dr. J. Halvonik –*** Professor, Comenius University, Bratislava, Slovakia
- ***Dr. Ruolin Wang***- Associate Professor, Civil Engineering, Wuhan University, China.

Professional Services (2008-2011)

Services-Northeastern University:

- Steinberg Endowed Chair Professorship Search Committee
- ALERT faculty Search Committee (2009)
- CEE Graduate Committee (2009)
- CEE Merit Review Committee 2009, 2011)
- CEE Promotion Committee /Secretary (2010)
- CEE Faculty Search Committee /Chair (2010-2011)
- CEE Faculty Search Committee/ Chair (2011-2012)
- Cross College Search Committee/Sustainability and Smart City (2011-2012)
- Cross College Search Committee/ Costal Engineering (2011-2012, 2012-2013)
- College of Engineering Faculty Council (2011-2013)

Services- NSF reviewer and Journal reviewer:

- NSF Division of Engineering, Sensor and Actuation Review Panel (2009)
- NSF Divisional of Engineering, Interdisciplinary Research Panel (2010)
- NSF Divisional of Engineering, EPRI Initiatives/Preliminary (2009)
- NSF Divisional of Engineering, EPRI Initiatives/Final (2010)
- NSF CMMI, Sensor Review Panel, 2011
- NSF US/ China collaborative Research on Bio-inspired Technology (ASBIT, 2011)
- Reviewed 10 papers for 4 Journals (2008-2011)
- IEEE sensor journal

Services- Organization of Domestic Meetings (attendants):

- VOTER Kick-off Meeting (25)
- VOTER Annual Review Meeting (35)
- VOTER Bi-annual Review meeting (42)
- RICC Meeting/infrastructure track (70-80)
- Northeastern University/ Mueller Water System Collaboration Meeting (20)
- VOTERS/City of Boston Collaboration Meeting (10)

Management and Outreach at NEU:

- Organization of VOTERS since its inception
- Solicitation of industrial partners for VOTERS (15 companies)
- Outreach for Industrial Collaboration (20 members)
- VOTERS and its team achievements have appeared three times in international science magazines and several times in local newspapers and journals
- Personal and telephone interviews on behalf of VOTERS 6 times
- Lectures at Private Sectors 3 Times near Boston Area

Professional Services (1997-2007)

- NSF, Civil and Mechanical Systems, Proposal Reviewer. 1997,1998,1999.
- Journal of Cement and Concrete Composites, Editorial Board Member, Paper Reviewer. 1998,1999.
- The Second International Workshop on Structural Health Monitoring, Committee Member. 1998.

- NSF Research Planning Workshop for Auto-adaptive Media in Civil Engineering System, Committee member. 8-9 Jan., 1999. West Lafayette, IN.
- NSF US-JAPAN Collaborative Research on Auto-adaptive Media in Civil Engineering- Application to Structures, Committee Member May 16-17, 1998, Sonoma, CA.
- International Journal of Damage Mechanics, Paper Reviewer. 1998.
- Experimental Mechanics, SEM Journal, Paper Reviewer. 1998,1999.
- Transportation Research Board, Committee A2E05, Admixtures and Cementitious Material for Concrete, Member and Paper Reviewer.1998, 1999.
- International Workshop on Fractures and Acoustic Emission in Concrete, Committee Member.
- International Conference on Fracture Mechanics of Concrete and Concrete Structures, Oct. 12-16, 1998, Gifu, Japan. Committee Member and Paper reviewer.
- Monitoring and Damage Assessment of Concrete structures, Guest Editor, Cement and Concrete Composites, Elsevier. 1999.
- Illinois Mathematics and Science Academy (IMSA), Mentorship Dep., Mentor. 1998, 1999.
- NSF, International Program, Proposal Reviewer. 1999.
- Journal of Intelligent Material Systems and Structures, Paper Reviewer. 1998,1999.
- Hong Kong University Research Council, Proposal reviewer. 1998,1999.
- Smart Systems for Bridges, SPIE Conference, Program Committee Member. 1999,2000.
- Intelligent Systems, Infrastructure and Sensors Panel, NSF CAREER program, Panel Reviewer. 1998.
- International Journal on Structural Engineering and Mechanics, Reviewer.
- Forum on Health Monitoring of Kissiwaukee Bridge, Organizer, Nov. 12, 1999, UIC
- Intelligent Systems, Infrastructure and Sensors Panel, NSF CAREER program, Panel Reviewer. 1999.
- Journal of Structural Engineering, ASCE, paper reviewer.1999.
- Us-Japan workshop on Smart Structures and Materials, Committee Co-chairman on Health Monitoring and Damage Assessment. 2000.
- Journal of Engineering Mechanics, ASCE, Paper reviewer. 2000.
- Hong Kong Research Grants Council, Proposal Reviewer. 2000.
- **Forum on Health Monitoring of Kissiwaukee Bridge at UIC**, **Organizer and Chair**, Nov. 1999.
- NSF, SBIR Proposal Reviewer, 2000.
- NSF, Earthquake Center, Panel reviewer, 2000.
- Smart Systems for Bridges, 8th Annual SPIE Conference, Program Committee Member. Session Chair.
- Health Monitoring and Management of Civil Infrastructure Systems, 8th Annual SPIE Conference, Program Committee Member. Session Chair.
- NSF, CMS, Panel Reviewer, 2001.
- NSF, CMS, Panel Reviewer, 2002.
- ASCE, Journal of Structural Engineering, Paper Reviewer. 2001.
- The Sino-US Symposium on Multi-Scale Analysis in Material Science and Engineering, June 17-20, 2005, Beijing China. Co-Organizer. **Chairman**.

- Smart Systems for Bridges, SPIE Conference, Program Committee Member. 2001, 2002, 2003, 2004, 2005, 2006 and 2007.
- City University of Hong Kong, Research Office, Proposal Reviewer, 2002, 2003,2004,2005,2006 and 2007.
- NSF, CMS, Panel Reviewer, 2003, 2004, 2005, and 2006.
- External Examiner for PhD Candidate, The Hong Kong Polytechnic University, 2002, 2004, and 2006.
- Workshop on Structural Health Monitoring, 2003, 2005, and 2007. Stanford, CA. Committee Member.

University Services

- **Laboratory Director**, Chairman of Labs Committee, supervising two technicians, managing expenses for laboratories. Assessed maintenance and replacement needs and remodeling of 5 labs at UIC (2008-2011)
- **Graduate Committee**, Member.
- **Advisory Committee,** Member.
- **Material Engineering Committee,** Member.
- **Undergraduate Curriculum** Committee, Chair.
- **Director, Graduate Studies, 2001-2003.**
- **Executive Committee Member**, College of Engineering, 2000-2002.
- EECE Chairman Search Committee Member 2001.
- **Director of instructional and research labora**tories (1999-2003)
- **Graduate Director** (2001-2003)
- **Executive Committee Member** for the College of Engineering.

Society Membership

- American Society of Civil Engineers
- Society of Experimental Mechanics
- British Society of Strain Measurement
- American Institute of Aeronautics and Astronautics
- Material Research Society
- SPIE member
- ANCRiST Member
- American Society of Non-destructive Testing
- Modal Analysis/Dynamic Systems, Society of Experimental Mechanics
- Structural Testing Division, Society of Experimental Mechanics
- Transportation Research Board- A2E05 (Chemical Additions and Admixtures for Concrete)
- Associated Editor, Journal of Cement and Concrete Composites
- Member, Scientific Committee of FRAMCO-3, Association of Fracture Mechanics for Concrete and Concrete Structures

NSF Proposal Review Panels, Journal Reviewer

- National Science Foundation, Division of Engineering Infrastructure Development, Instrumentation and Laboratory Improvement Program, 1986, 1988, 1990, 1992.
- National Science Foundation, Structural Systems, 1992, 1993, 1994.
- Reviewer--Journal of Earthquake Engineering and Structural Dynamics
- Reviewer--Journal of Soil Dynamics and Earthquake Engineering
- Reviewer--Transportation Research Board Record
- Reviewer--Journal of Modal Analysis
- Reviewer--Journal of Cement and Concrete Composites 1995-1005.
- Reviewer--Journal of Experimental Mechanics 2000-2005.
- Reviewer--National Science Foundation, Earthquake Mitigation, 1994, 1995.
- 10 Reviewer--National Science Foundation, Division of International Program, 1995.
- Reviewer-- Journal of Damage Mechanics
- Reviewer-- Journal of Structural Engineering and Mechanics, 2000-2005.
- Reviewer—NSF, Sensor Technology, CMS 2003-2006.

University Committees

- Research Committee, College of Engineering, 1985-1987.
- Student Service Committee, College of Engineering, 1986-1988.
- Chinese Student Association, Advisor, 1986-1988.
- Public Relation Committee, College of Engineering, 1989-1993
- Association of Chinese American Scientist and Engineer of NM, **President**, 1994-1996.

Consulting

- New Mexico Engineering Research Institute. Performed research on the measurement of soil concrete interaction stresses. Developed techniques to measure the localization phenomena, Summer, 1986.
- Helionetics, Inc. Performed experimental research on determination of dynamic response characteristics of laser-guided communication system, Summer 1986.
- New Mexico Engineering Research Institute. Performed equipment fragility analysis for protective structures, Summer, 1987.
- Sandia National Laboratories. Performed research on effects of nonlinear structural response on nuclear power plant risk, December 1987.
- Los Alamos Reseach Associates. Performed research on Mechanical and Thermal Properties of Geosafe Offgas Hood Fabric, 1991
- Boyle Engineering Inc. Performed the Retrofit Analysis of Highway Bridges for Earthquake Resistence. 1991
- Sandia National Labs. Performed the Microstructural Study of Ionic Polymeric Gel Muscles,1993.
- SSangYong Cement Co., Safety Technology Group, South Korea, Technical Advisor, Nondestructive Testing, Damage Assessment, Modal Analysis, Monitoring System for Long-Span Bridges. 1996.
- Alliance for Transportation Research, Evaluation of Current Damage Assessment Technologies for Bridges, 1996