

GUIRONG (GRACE) YAN

CURRICULUM VITAE

Assistant Professor, Ph.D.
Department of Civil Engineering
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EDUCATION

- ◆ **Ph.D. in Engineering Mechanics** (Sept. 2002-Nov. 2006)
Harbin Institute of Technology, Harbin, P.R. China
- ◆ **M.E. in Structural Engineering** (Sept. 2000-Aug. 2002)
Harbin Institute of Technology, Harbin, P.R. China

RESEARCH INTERESTS

- ◆ Structural health monitoring and damage detection
- ◆ Wireless sensor networks
- ◆ Advanced signal processing techniques
- ◆ Nonlinear system identification and damage detection
- ◆ Model updating of structural FEMs
- ◆ Smart materials and structures

PROFESSIONAL EXPERIENCE

- ◆ **Assistant Professor** (Aug. 2012-present)
Department of Civil Engineering, **University of Texas at El Paso**
- ◆ **Lecturer** (Feb. 2010-Aug. 2012)
School of Engineering, **University of Western Sydney, Australia**
- ◆ **Postdoctoral Research Associate** (Oct. 2009-Feb. 2010)
School of Civil Engineering, **Purdue University**
- ◆ **Postdoctoral Research Associate** (Jun. 2008-Aug. 2009)
Dept. of Mechanical, Aerospace and Structural Engineering, **Washington**

University in St. Louis

- ◆ **Postdoctoral Research Associate** (Jun. 2007-May 2008)
Dept. of Structural and Geotechnical Engineering, **Polytechnic University of Turin, Italy**

GRANTS AND PAST RESEARCH WORK

Project Title: Understanding multi-scale reinforcement of carbon fibre composites

Budget AU\$381,000

Agency: Australian Research Council Discovery Project

Researchers: PI: Liyong Tong; **PI: Guirong Yan**

Year(s): Jan. 2013-Dec. 2015

Project Title: Highly efficient model updating for structural condition assessment of large-scale bridges

Budget \$45,000

Agency: Tier I University Transportation Center Consortium

Researchers: **PI: Guirong Yan**

Year(s): Jan. 2013-Dec. 2013

Project Title: Innovative Condition Assessment of Bulk Storage Structures Using Comprehensive Monitoring Approaches

Budget \$5,000

Agency: University Research Institute Grant (UTEP)

Researchers: **PI: Guirong Yan**

Year(s): Sept. 2012-Aug. 2013

Project Title: Australian-Chinese Research Collaboration on Structural Health Monitoring and Damage Detection for Steel-concrete Composite Structures Using Fibre Optical Sensing

Budget AU\$17,000

Agency: International Research Initiatives Scheme (UWS)

Researchers: **PI: Guirong Yan**

Year(s): Jul. 2010-Jul. 2011

Project Title: Wireless Sensor Networks for Structural Health Monitoring and Damage

Budget AU\$90,000

Agency: Internal Research Funds (UWS)

Researchers: **PI: Guirong Yan**

Year(s): Aug. 2010-Aug. 2012

Project Title: Damage Identification Methods of Non-linear Structures and Their

- Applications on Detecting Damage Caused by Earthquake
Budget US\$35,000
Agency: National Natural Science Foundation of China
Researchers: **PI: Guirong Yan**
Year(s): Jan. 2008-Dec. 2010
- Project Title:** Damage Detection Methods for Civil Engineering Structures under Strong Earthquake
Budget \$5,000
Agency: Post-doc Science Foundation of China
Researchers: **PI: Guirong Yan**
Year(s): Sept. 2007-Sept. 2008
- Project Title:** Structural Damage Detection Methods and Condition Assessment Theory Based on Strong-motion Records
Budget \$15,000
Agency: Post-doc Starting Foundation of China
Researchers: **PI: Guirong Yan**
Year(s): Nov. 2006-Nov. 2008

TEACHING

CE 3343 Structural Analysis I

PUBLICATIONS

Journal Publications

- [1] **Guirong Yan**, Alessandro De Stefano, Emiliano Matta, Ruoqiang Feng (2012), “A Novel Approach to Detecting Breathing-fatigue Cracks based on Dynamic Characteristics”, *Journal of Sound and Vibration*, 332 (2), 407-422.
- [2] **Guirong Yan**, Alessandro De Stefano and Ge Ou (2012), “A General Nonlinear System Identification Method Based upon the Time-varying Trend of the Instantaneous Vibration Frequency and Amplitude,” *Advances in Structural Engineering*, 15(5), 781-792.
- [3] Linren Zhou, **Guirong Yan** and Jinping Ou (2012), “Response Surface Method based on Radial Basis Functions for Modeling large-scale structures in model updating”, *Computer-Aided Civil and Infrastructure Engineering*. Accepted.
- [4] Ruoqiang Feng, Jihong Ye and **Guirong Yan** (2012), Geometric nonlinearity and single-degree of freedom model of cable net glazing” *ASCE Journal of Engineering Mechanics* (In press)
- [5] Ruoqiang Feng, Jihong Ye, **Guirong Yan** (2012), “Dynamic nonlinearity and nonlinear single-degree-of-freedom model for cable net glazing,” *ASCE Journal of Engineering Mechanics*. (In press)

- [6] Ruoqiang Feng, **Guirong Yan**, and Jinming Ge (2012), “Effects of high modes on the wind-induced response of super high-rise buildings”, *Earthquake Engineering and Engineering Vibration*, (11), 427-434.
- [7] Lanhui Guo, Ran Li, Sumei Zhang and **Guirong Yan** (2012), “Hysteretic Analysis of Steel Plate Shear Walls (SPSWs) and A modified Strip Model for SPSWs”, *Advances in Structural Engineerin* (In press).
- [8] **Guirong Yan**, Shirley J. Dyke and Ayhan Irfanoglu (2011), “Experimental Validation of a Damage Detection Approach on a Full-Scale Highway Sign Support Truss,” *Mechanical Systems and Signal Processing*, (28), 195-211.
- [9] Ruo-qiang Feng, Jihong Ye, **Guirong Yan**, Qing-xiang Li and Bin Yao (2011), “Wind-induced torsion vibration of the super high-rise building of Shenzhen Energy Center,” *The Structural Design of Tall and Special Buildings*, 2012, 32(1):71-86.
- [10] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2010), “Damage Detection for Beam Structures Using an Angle-between-String-and-Horizon Flexibility Matrix,” *Structural Engineering and Mechanics, An International Journal*, 36(5): 643-667.
- [11] **Guirong Yan** and Shirley J. Dyke (2010), “Structural Damage Detection Robust Against Time Synchronization Errors”, *Smart Materials and Structures*. 19 (2010) 065001.
- [12] **Guirong Yan**, Weijun Guo, Shirley Dyke, Gregory Hackmann and Chenyang Lu (2010), “Experimental Validation of a Multi-level Damage Localization Technique with Distributed Computation”, *Smart Structures and Systems*, 6(5), 561-578.
- [13] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2010), “Structural Damage Detection Using Residual Forces Based on Wavelet Transform,” *Mechanical Systems and Signal Processing*, (24): 224-239.
- [14] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2009), “Damage Detection for Truss or Frame Structures Using an Axial Strain Flexibility,” *Smart Structures and Systems, an Int. Journal*, 5(3): 291-316.
- [15] Zhongdong Duan, **Guirong Yan** and Jinping Ou (2008), “Challenges in applying the vibration-based damage detection to civil structures,” *Journal of Harbin Institute of Technology*, 40(4): 505-513.
- [16] Zhongdong Duan, **Guirong Yan**, Jinping Ou (2007), “Damage Detection in Ambient Vibration Using Proportional Flexibility Matrix with Incomplete Measured DOFs,” *Structural Control and Health Monitoring*, 14(2): 186-196.
- [17] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2007), “Application of genetic algorithm on structural finite element model updating,” *Journal of Harbin Institute of Technology*, 39(2): 181-186.
- [18] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2007), “Review on Structural Damage Detection Based on Vibration Data,” *Earthquake Engineering and Engineering Vibration*, 27(3): 95-103.
- [19] Zhongdong Duan, **Guirong Yan**, Jinping Ou, and B.F. Spencer (2006), “Proportional Flexibility Matrix of Structures,” *Journal of Harbin Institute of Technology*, 38(8): 1237-1242.
- [20] Zhongdong Duan, **Guirong Yan**, Jinping Ou, Spencer BF (2005), “Damage Localization in Ambient Vibration by Constructing Proportional Flexibility Matrix,” *Journal of Sound and Vibration*, 284(1-2): 455-466.

- [21] Zhongdong Duan, B.F. Spencer, **Guirong Yan** and Jinping Ou (2004), “An Improved Optimal Elemental Method for Finite Element Model Updating,” *Earthquake Engineering and Engineering Vibration*, 3(1): 67-74.

Publications in Conference Proceedings (Peer Reviewed)

- [1] Z. S. Liu, L. Y. Tong and **G. R. Yan** (2012), “A novel system identification approach for bilinear systems”, Australian Structural Engineering Conference, 11-13 July, Perth, Australia.
- [2] Z. S. Liu, L. Y. Tong, **G. R. Yan** and K. Kaja (2012), “A multi-level damage localization approach for effectively using energy in wireless sensor networks: an experimental validation”, Australian Structural Engineering Conference, 11-13 July, Perth, Australia.
- [3] **Guirong Yan** Xuelin Peng, Hong Hao, (2011), “Localization of Free-spanning Damage Using Mode Shape Curvature”, DAMAS2011, Oxford University, England. Journal of Physics: Conference Series, 305 (1).
- [4] Krishnan S.S., Sun Z., Irfanoglu A., Dyke S.J.,and **Yan G.** (2011), "Evaluating the performance of distributed approaches for modal identification", *Conference on Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2011. Proceedings of SPIE Volume: 7981 Article Number: 79814M DOI: 10.1117/12.882143*. San Diego, California, USA
- [5] **G.R. Yan**, Z.S. Liu, and Z.D. Duan(2010), “Structural damage detection using dynamic redsidue based on wavelet transform”, International Symposium on Structural Engineering, 18-20 December 2010, Guangzhou, China.
- [6] **G.R. Yan**, Z.S. Liu, and Z.D. Duan(2010), “Dynamic redsidue based on wavelet transform for Damage localization”, Civionics Research Centre Annual Conference at the UWS, 25-26 November 2010.
- [7] **G.R. Yan**, Z.S. Liu, Z.D. Duan (2010), “A novel damage indicator based on wavelet transform for damage localization”, Proceedings in Handling Exceptions in Structural Engineering: Structural Systems, Accidental Scenarios, Design Complexity, July 2010, Rome Italy.
- [8] G. Wang, Z.S. Liu, **Guirong Yan**(2010), “A New Damage Feature based on Wavelet Packet Transform for Damage Detection under Ambient Vibration,” ACMSM21, December 7-10, Melbourne, Australia.
- [9] **Guirong Yan**, Z.S. Liu, A.D. Stefano (2010), “A Novel Nonlinear System Identification Based upon Hilbert Transform,” ACMSM21, December 7-10, Melbourne, Australia. (book chapter)
- [10] **Guirong Yan**, Shirley Dyke (2010), “Structural Damage Localization for Truss Structures Robust against Time Synchronization Errors in a Wireless Sensor Network,” Fifth European Workshop in Structural Health Monitoring, June 29-July 2, Stockholm, Italy.
- [11] Gregory Hackmann, Weijun Guo, **Guirong Yan**, Chenyang Lu, Shirley Dyke (2010), "Cyber-Physical Codesign of Distributed Structural Health Monitoring With Wireless Sensor Networks", First International Conference on Cyber-Physical Systems, April 13-14, Stockholm, Sweden.

- [12] **Guirong Yan** and Shirley J. Dyke (2009), "A Multi-level Damage Localization Strategy with Distributed Computation for Effectively Using Energy in WSN," *The 7th International Workshop on Structural Health Monitoring*, September 9-11, 2009, Stanford, CA.
- [13] **Guirong Yan**, Weijun Guo, Shirley J. Dyke, Gregory Hackmann and Chenyang Lu (2009), "Novel solutions to critical issues on the application of WSNs in SHM," *The 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials*, June 24-27, 2009, Blacksburg, VA, USA.
- [14] Nestor E. Castaneda, **Guirong Yan** and Shirley Dyke (2009), "Evaluation of the performance of a distributed structural health monitoring algorithm for wireless sensing," *The 7th International Workshop on Structural Health Monitoring*, September 9-11, 2009, Stanford, CA.
- [15] **Guirong Yan**, Shirley J. Dyke, Wei Song, Gregory Hackmann and Chenyang Lu (2009), "Structural Damage Localization with Tolerance to Large Time Synchronization Errors in WSNs," *American Control Conference*, June 10-12, 2009, St. Louis, MO, USA.
- [16] Gregory Hackmann, Fei Sun, Nestor Castaneda, **Guirong Yan**, Chenyang Lu, Shirley Dyke (2009), "Towards Robust Decentralized Structural Damage Localization Using Wireless Sensor Networks," NSF CPS Forum, April 13, 2009, San Francisco, CA, USA.
- [17] **Guirong Yan**, Zhongdong Duan, Jinping Ou (2006), "Damage detection of truss structures," *Proceedings of the 3rd International Conference on Bridge Maintenance, Safety and Management - Bridge Maintenance, Safety, Management, Life-Cycle Performance and Cost* Pp 679-681, Jul. 16-19, 2006, Porto-Portugal.
- [18] Duan, ZD, Yan, GR (2005), An Angle-between-String-and-Horizon Flexibility for structural damage detection, 2nd International Conference on Structural Health Monitoring and Intelligent Infrastructure, Vols 1 and 2, ED, Ou, JP; Li, H; Duan, ZD, Nov. 16-18, 2005
- [19] **Guirong Yan**, Zhongdong Duan (2005), "Damage Localization Based on the Residual Wavelet Force," *The 2nd Conference on Structural Health Monitoring of Intelligent Infrastructure*, Nov. 16-18, 2005, Shenzhen, Guangdong, China.
- [20] **Guirong Yan**, Zhongdong Duan, Jinping Ou (2005), "An Axial Strain Flexibility for Damage Detection of Truss Structure," *International Workshop on Smart Materials and Structures*, October 13-14, 2005, Toronto, Ontario, Canada.
- [21] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2005), "Damage Detection Based on Wavelet Transform Function (In Chinese)," *2005 Doctoral Forum of China*, August 2005, Nanjing, China.
- [22] **Guirong Yan**, Zhongdong Duan, Jinping Ou (2005), "Structural Damage Detection by Wavelet Transform and Probabilistic Neural Network," *SPIE's Smart Structures & Materials and Nondestructive Evaluation for Health Monitoring & Diagnostics Symposium*, March 6-10, 2005, San Diego, CA.
- [23] **Guirong Yan**, Zhongdong Duan, Jinping Ou (2004), "A Novel Damage Index Using Wavelet Packet Components Energies," *The 3rd International Conference on Earthquake Engineering*, October 19-20, 2004, Nanjing, China.
- [24] Zhongdong Duan, **Guirong Yan**, Jinping Ou (2004), "Structural Damage Localization based on Rotational Flexibility Matrix," *Proceedings of the Third International Conference on Earthquake Engineering*, ED, Liu, WQ; Yuan, FG; Chang, PC, October 19-20, 2004,

Nanjing, China.

- [25] **Guirong Yan**, Zhongdong Duan, Jinping Ou (2004), “Structural Damage Detection Based on the Correlation Analysis between the Wavelet Packet Component Energies,” *The Eighth International Symposium on Structural Engineering for Young Exports*, August 20-23, 2004, Xi’an, China.
- [26] Zhongdong Duan, **Guirong Yan**, Jinping Ou and B.F. Spencer (2004), “Construction of Proportional Flexibility Matrix at Sensor Locations in Ambient Vibration for Damage Localization,” *The Second International Conference on Structural Engineering, Mechanics and Computation*, July 5-7, 2004, Cape Town, South Africa.
- [27] Z.D. Duan, **G.R. Yan**, and J.P. Ou (2004), “A wavelet packet transform and probabilistic neural network approach for structural damage detection.” *Proceedings of the 18th Australasian Conference on Mechanics of Structures and Materials: Developments in Mechanics of Structures and Materials*, A.A. Balkema Publishers, (ed. A.J. Deeks & H. Hao), Vol.2, 1197-1202, Perth, Australia, December 1-3, 2004.
- [28] Z.D. Duan, **G.R. Yan**, and J.P. Ou, “Structural damage detection in ambient vibration using wavelet packet transform and probabilistic neural network.” *Proceedings of Structural Health Monitoring, ISIS 2004 Workshop*, 477-488, Winnipeg, Manitoba, Canada, September 22-23, 2004.
- [29] Z.D. Duan, **G.R. Yan**, and J.P. Ou, “Structural damage location based on rotational flexibility matrix.” *Proceedings of the third China-Japan-US Symposium on Structural Health Monitoring and Control*, Dalian, October 14-15, 2004.
- [30] Z.D. Duan, **G.R. Yan**, J.P. Ou, and B.F. Spencer, “Damage localization in ambient vibration by constructing proportional flexibility matrix.” *China-U.S.A. Workshop on Protection of Urban Infrastructure and Public Buildings against Earthquakes and Manmade Disasters*, Beijing, February 2003.
- [31] Duan, ZD, **Yan, GR**, Ou, JP, Spencer, BE, Damage localization by constructing proportional flexibility matrix, *The first workshop on Structural Health Monitoring and Intelligent Structures*, Tokyo, , JAPAN, TOKYO. November 13-15, 2003., *ED*, Wu, ZS; Abe, M. (1-2), 561-565.
- [32] **Guirong Yan**, Zhongdong Duan and Jinping Ou (2003), “Structural Model Updating Using Genetic Algorithms (in Chinese),” *The 8th national vibration theory and application symposium*, 2003, Shanghai, China.

PROFESSIONAL ACITIVIES

◆ **Journal Reviewer**

Mechanical Systems and Signal Processing
Journal of Sound and Vibration
Smart Materials and Structures
Structural Health Monitoring
Vibration and Shocks
Structural Control and Health Monitoring
Smart Structures and Systems, an Int. Journal
Advances in Structural Engineering

IEEE Sensors Journal
Computer-Aided Civil and Infrastructure Engineering

- ◆ **Funding Application Reviewer**
NSF of China

- ◆ **Technical Committee Member for CISP'10-BMEI'10, Yantai, China, 2010.**
- ◆ **Technical Committee Member for ACMSM21, Melbourne, Australia, 2010**

PROFESSIONAL AFFILIATION

- ◆ ASCE-Dynamics Committee Member in Engineering Mechanics Institute
- ◆ Member of Engineers Australia
- ◆ Member of Australian Network on SHM