

Education	<p><i>Ph.D.</i>, Civil Engineering, University of Wisconsin-Madison</p> <p><i>MS</i>, Engineering Mechanics, University of Wisconsin-Madison</p> <p><i>MS</i>, Civil (Structural) Engineering, Tongji University, Shanghai, P.R. of China</p> <p><i>BS</i>, Civil (Structural) Engineering, Tongji University, Shanghai, P.R. of China</p>
Certificate	<p>STEM Faculty Leadership Development</p> <p>2016 STEM Leadership Institute organized by the Association of American Colleges & Universities, Adamstown, Maryland</p>
Registration	<p>Professional Engineer, License No. 33146-006, Wisconsin</p>
Employment History	<p>8/2017-Current</p> <ul style="list-style-type: none"> ▪ Professor (tenured), Department of Civil and Environmental Engineering, Jackson State University, Jackson, Mississippi <p>8/2011-8/2017</p> <ul style="list-style-type: none"> ▪ Associate Professor (tenured), Department of Civil and Environmental Engineering, Jackson State University, Jackson, Mississippi <p>8/2005-8/2011</p> <ul style="list-style-type: none"> ▪ Assistant Professor, Department of Civil and Environmental Engineering, Jackson State University, Jackson, Mississippi <p>4/2000-8/2005</p> <ul style="list-style-type: none"> ▪ Senior Structural Engineer, Flad & Associates, Madison, Wisconsin <p>9/1998-4/2000</p> <ul style="list-style-type: none"> ▪ Senior Structural Engineer, A. Epstein and Sons International, Inc., Chicago, Illinois
Current Research Interest	<ul style="list-style-type: none"> ▪ Large language models for natural language processing tasks, e.g., automated writing assessment, feedback generation, and conversational tutoring systems, as well as agent for processing time series sensor data for optimization of operation and maintenance. ▪ Self-supervised learning methods like masked language modeling, contrastive learning to pretrain models on large unlabeled datasets for downstream infrastructure and education applications and quantification of associated uncertainties. ▪ Reinforcement learning techniques including deep Q-learning, policy gradients and inverse reinforcement learning to optimize inspection and maintenance processes with human domain experts in the training loop and quantification of associated uncertainties . ▪ Bayesian optimization and multi-task learning to efficiently expand the capabilities of AI models through transfer learning across related problems involving structural health monitoring, reliability analysis, and personalized learning. ▪ Human-centered AI methodologies to ensure models are transparent, trustworthy and able to explain their decisions through techniques like attention mechanisms, counterfactual explanations and interactive model debugging. ▪ Leveraging synthetic and real-world sensor data from physical infrastructure alongside large-scale educational datasets to advance self-supervised and reinforcement learning for reliable asset management and pedagogy.

**Funded
Projects and
Collaboration**

- 09/01/2023-08/31/2026, **Principle Investigator**
Grant#: NSF/CNS-2302686, Exploring Effectiveness of Automatic Assessment of Cognitive and Metacognitive Processes in Engineering Learning through Natural Language Processing Models, **\$600,000** funded by National Science Foundation, **co-PIs:** Frances Dancer (Dept. of Computer Engineering and Science, JSU), and Ke Jie (School of Lifelong Learning, JSU), and **SPs:** Jeffrey Ge (Dept. of Mechanical Engineering, Stony Brook University), Blair McDonald (School of Engineering and Technology, Western Illinois University), and Emmanuel U. Nzewi (Dept. of Civil and Environmental Engineering, Prairie View A&M University).
- 09/01/2023-08/31/2026, **Principle Investigator**
Grant#: NSF/EES-2306566, Targeted Infusion Project: Innovating Writing-To-Learning Pedagogy to Promote and Assess Deep Conceptual Understanding and Mindful Learning across Authentic STEM Education Settings, **\$399,982** funded by National Science Foundation, **co-PI:** Doreen N. Myrie (Dept. of Special Education), Joon Young Lee (Dept. of Educational Psychology), Yonghua Yan (Dept. of Math), Jie Ke (School of Lifelong Learning).
- 08/01/2014-07/31/2020, **Principle Investigator**
Grant #: NSF/HRD-1436343, “Prompting Effective Active Learning through Implementing Self-Regulated Learning Assessment in Diverse STEM Learning Settings,” **\$399,996** funded by National Science Foundation, **co-PIs:** Gordon Skelton (Dept. of Computer Engineering, JSU), and Jianjun Yin (College of Education, JSU).
- 08/01/2014-07/31/2016, **Principle Investigator**
Grant#: MarTREC, “In-Situ Monitoring and Assessment of Post Barge-Bridge Collision Damage for Minimizing Traffic Delay and Detour,” **\$50,000** funded by Maritime Transportation Research and Education Center at the University of Arkansas.
- 09/01/2013-08/31/2019, **Principle Investigator**
Grant#: NSF/HRD-1332591, “Effects of Scaffolding Cyber-Enabled Collaborative Learning in Authentic STEM Education Settings,” **\$349,999** funded by National Science Foundation, **co-PIs:** Zhenbu Zhang (Dept. of Mathematics, JSU), Sungbum Hong (Dept. of Computer Science, JSU), and Jianjun Yin (College of Education, JSU).
- 10/01/2010-09/30/2018, **Principle Investigator**
Grant#: NSF/HRD-1036328, “Investigation of Effects of Scaffolding Creative Problem Solving Through Question Prompts in Project-Based Service Learning,” **\$499,677** funded by National Science, **co-PIs:** Valerie Shelby (JSU Community Service Learning Center), Justin Allusion (Division of Online Learning, JSU), and Jianjun Yin (College of Education, JSU).
- 10/01/2009-09/30/2011, **Principle Investigator**
Grant #: MDOT/State Study-229, “Instrumentation and Computational Modeling for Evaluation of Bridge Substructures Across Waterways,” **\$150,000** funded by *FHWA through Mississippi Department of Transportation (MDOT)*.
- 07/01/2009-06/30/2011, **Principle Investigator**
Grant #: DTRT06-G-0049, “Phase I Project for Integrating Intelligent Structure Technology for Refining Bridge Inspection in Mississippi,” **\$32,000** funded by *FHWA through the Institute for Multimodal Transportation*.

- 03/01/2009-02/29/2016, **Principle Investigator**
Award #: NSF/DUE-0837395, “NUE: Novel Development of Lab and Course Modules: Integrate Intelligent Structure Technology and Self-Regulated Learning to Inspire Motivated and Strategic Learners in STEM,” **\$149,999** funded by *NSF*. **Co-PIs:** Gordon Skelton (Dept. of Computer Engineering, JSU), Tzusheng Pei (Dept. of Computer Science, JSU), Evelyn Leggette (Division of Undergraduate Studies, JSU), and Hui-Ru Shih (Dept. of Technology, JSU).
- 01/01/2007-06/30/2015, **Principle Investigator**
Award #: NSF/EEC-0634279, “New Vision for Built Environment-Integration of Nanotechnology into Civil Engineering Undergraduate Curriculum,” **\$199,962** funded by *NSF*. **Co-PIs:** Y.L. Mo (University of Houston), Karen Lozano (University of Texas-Pan American), and Xinqing Ma (Inframat Corporation).
- 09/15/2006-09/30/2010, **Senior Personnel**
Award #: NSF/DUE-0618605, “Deployment and Integration of Instructional Shake Tables Using the NEES (Network for Earthquake Engineering Simulation) Cyberinfrastructure,” **\$10,000** funded by *NSF through Washington University*. **PI:** Shirley Dyke (Washington University).

**Refereed
Journal
Publications**

1. **Zheng, W.**, Qian, F., Shen, J.L. and Xiao F. (2020). “Mitigating Effects of Temperature Variations through Probabilistic-Based Machine Learning for Vibration-Based Bridge Scour Detection,” *Journal of Civil Structural Health Monitoring* volume 10, p 957–972.
2. **Zheng, W.**, and Qian, F. (2017). “Promptly assessing probability of barge–bridge collision damage of piers through probabilistic-based classification of machine learning.” *Journal of Civil Structural Health Monitoring*, Volume 7, Issue 1, pp 57–78.
3. **Zheng, W.**, Yin, J., Shi, H., and Skelton, G. (2017). "Prompted Self-Regulated Learning Assessment and Its Effect for Achieving ASCE Vision 2025." *ASCE's Journal of Professional Issues in Engineering Education and Practice*, Vol. 143, Issue 2.
4. **Zheng, W.**, and Shen, J.L. (2016). “Adjustable Hybrid Resampling Approach to Computationally Efficient Probabilistic Inference of Structural Damage Based on Vibration Measurements.” *Journal of Civil Structural Health Monitoring*, Volume 6, Issue 1, pp 153–173.
5. **Zheng, W.**, and Yu, W. (2015). “Probabilistic Approach to Assessing Scoured Bridge Performance and Associated Uncertainties Based on Vibration Measurements.” *ASCE's Journal of Bridge Engineering*, Vol. 20, No. 6, pp 04014089-1 - 04014089-11.
6. **Zheng, W.**, Shen J.L., and Wang, J. G. (2014). “Improved Computational Framework for Efficient Bayesian Probabilistic Inference of Damage in Truss Structures Based on Vibration Measurements.” *Journal of the Transportation Research Board*, No. 2460, pp. 117–127.
7. **Zheng, W.**, and Chen, Y. T. (2014). “Novel probabilistic approach to assessing barge–bridge collision damage based on vibration measurements through transitional Markov chain Monte Carlo sampling.” *Journal of Civil Structural Health Monitoring*, Volume 4, Issue 2, pp 119–131.
8. Li, Y. B., Peng, B., **Zheng, W.**, Gu, R. L., and Wang, C. (2013). "Simulation Analysis of Scour Impacts on the Dynamic Properties of a Bridge Structure," *Advanced Materials Research*, Vol. 663, pp. 27-30.
9. **Zheng, W.**, and Yu, W. (2013). “Bayesian Probabilistic Framework for Damage Identification of Steel Truss Bridges under Joint Uncertainties,” *Journal of Advances in Civil Engineering*, Volume 2013, Article ID 307171, 13 pages.
10. **Zheng, W.**, Shih, H., Lozano, K., and Mo, Y.L., (2011). “Impact of Nanotechnology on Future Civil Engineering Practice and Its Reflection in Current Civil Engineering Education,” *ASCE's Journal of Professional Issues in Engineering Education and Practice*, 137(3), 162–173.

11. Yu, H., Lu, B. T., Presuel-Moreno, F. J., and **Zheng, W.** (2011). "Concrete Mix Affects Reinforcement Corrosion Initiation and Chloride Threshold Level." *Journal of the Transportation Research Board*, No. 2220, Transportation Research Board of the National Academies, Washington, D.C., 2011, pp. 75–81.
12. Skelton, G., Pang, Q., Yin, J., Williams, B. J., and **Zheng, W.** (2010). "Introducing Engineering Concepts to Public School Students and Teachers: Peer-based Learning through Robotics Summer Camp." *Review of Higher Education and Self-Learning*, Vol. 3, Issue 7.
13. **Zheng, W.**, Yin, J., Skelton, G., Shih, H., Pei, T. & Leggette, E., (2010) "An Integrated Approach of Intelligent Structure Technology and Self-Regulated Learning for Enhancing Students' Motivation, Confidence, and Strategies in Science and Engineering Studies," *Journal of Information Systems Technology and Planning*, Vol.2, Issue 3, pp 85-95.
14. **Zheng, W.**, Yin, J., Skelton, G., (2010) "Synergizing Creativity, Self-Regulated Learning, and Motivation through Cyber-infrastructure-Enabled Problem/Project-Based Learning," *American Education Science Review*, Vol.1, No 1, pp 1-17.
15. **Zheng, W.**, Shih, H., Lozano, K., Pei, J., Kiefer, K., and Ma, X., (2009). "A Practical Approach to Integrating Nanotechnology Education and Research into Civil Engineering Undergraduate Curriculum," *Journal of Nanotechnology Education*, Vol. 1, No. 1, pp 22-33.
16. Shih, H., Rushon, D., Tzou H., **Zheng, W.**, and Uchion, K., (2008). "Photostriction and Its Use in Actuation of Flexible Structures," *Journal of Engineering Technology*, Vol.25, No.1, pp 26-31.
17. **Zheng, W.**, and Oliva, M.G. (2007). "Analytical Method to Determine the Elastic In-Plane Behaviors of Pretopped, Precast Untopped Double-tee Diaphragm with Discrete Connections under Seismic Loads," *PCI Journal*, V. 52, No. 5, September–October, pp. 106–123.
18. Pincheira, J.A., Oliva, M.G., and **Zheng, W.** (2005). "Tests on Double-Tee Connectors Subjected to Monotonic and Reversed Cyclic Loading of In-Plane and Out-plane," *PCI Journal*, V.50, No.6, November-December, pp. 32-54.
19. **Zheng, W.** and Oliva, M.G., (2005) "Practical Method to Estimate Deformation of Precast Untopped Double-tee Diaphragms," *PCI Journal* V.50, No.2, March-April, pp.44-55
20. Zhou, B. Z., **Zheng, W.**, Guan, Q.X. , and Liu, T.H. (2000). "Experimental Study on Aseismic Behavior of Six-story Masonry Building with Small-size Hollow Concrete Blocks," *Journal of Building Structures, Chinese Association of Architectural Engineering*, Vol.21, No.4, pp2-12.

Peer-Reviewed Conference and Research Paper

1. **Zheng, W.** (2019). "Data-driven Civil Engineering Informatics and its Potential Impacts on Artificial Intelligence Application for Civil Engineering Practice," Presentation at 2019 Southeast Symposium on Contemporary Engineering Topics and University of New Orleans Engineering Forum, University of New Orleans, New Orleans, Louisiana, September 13, 2019
2. **Zheng, W.**, Yuan, Y., Yan, J., Allison, J., and Yin, J.J. (2018) "Exploring Follow-up Effect of Scaffolding for Creative Problem Solving through Question Prompts in Project-based Community Service Learning," *Proceedings of 2018 ASEE Annual Conference & Exposition*, Paper ID # 22019, June 24 - 27, 2018, Salt Lake City, Utah
3. **Zheng, W.**, Yan, J., Allison, J., Zhang, Z.B., and Shih, H.R. (2018) "Effects of Online Collaborative Learning with Scaffolding in Multiple STEM Courses Based on Results from Three-Consecutive-Year Implementation," *Proceedings of 2018 ASEE Annual Conference & Exposition*, Paper ID # 22021, June 24 - 27, 2018, Salt Lake City, Utah
4. Shih, H.R., **Zheng, W.**, Yuan P.C., and Ford, R.T. (2015). "Development of Self Regulated Skills and Academic Self-Efficacy Beliefs." *Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition*, Paper ID IMECE2015-50343, November 13-19, Houston, Texas.
5. **Zheng, W.**, Skelton, G., and Yin, J.J., (2015). "Teaching Community Approach to Prompting Effective Active Learning through Implementing Self-Regulated Learning Assessment in

- Multiple STEM Courses.” Proceedings of 2015 ASEE Annual Conference & Exposition, Paper ID #13955, June 14 - 17, 2015, Seattle, Washington.
6. **Zheng, W.**, Cao, Y. H., and Yin, J.J. (2015). “Implementation and Outcomes of Scaffolding Cyber-Enabled Collaborative Learning in Multiple STEM Courses.” Proceedings of 2015 ASEE Annual Conference & Exposition, Paper ID #13967, June 14 - 17, 2015, Seattle, Washington.
 7. **Zheng, W.**, Cao, Y. H., and Yin, J.J., (2015). “Effects of Scaffolding Creative Problem Solving through Question Prompts in Project-Based Community Service Learning.” Proceedings of 2015 ASEE Annual Conference & Exposition, Paper ID #13970, June 14 - 17, 2015, Seattle, Washington.
 8. **Zheng, W.**, Cao, Y.H., Das, H.S., and Yin, J.J. (2014). “Scaffolding Cyber-Enabled Collaborative Learning in Engineering Courses” Proceedings of the 2014 ASEE Annual Conference, Paper ID: #10681, June 15 – 18, 2014, Indianapolis, Indiana.
 9. **Zheng, W.**, Shen, J.L., and Wang, J.G. (2014). “Improved Computational Framework for Efficient Probabilistic Inference of Damage in Truss Structures Based on Vibration Measurements,” Proceedings of the Transportation Research Board 93rd Annual Meeting, paper number: Paper #14-3462, Washington, D.C., January 12-16, 2014
 10. **Zheng, W.**, Wang, W, and Yin, J.J., (2013). “Correlation Analysis of Scaffolding Creative Problem Solving through Question Prompts with Process and Outcomes of Project-Based Service Learning.” Proceedings of the 2013 ASEE Annual Conference, Paper ID #6169, June 23 – 26, 2013, Atlanta, Georgia.
 11. **Zheng, W.**, Chen, Y.T. (2013). “Novel Probabilistic Approach To Damage Identification Of Bridge Piers Post Vessel Collision Based On Vibration Measurements,” Proceedings of the Transportation Research Board 92nd Annual Meeting 2013, paper number: 13-3286, Washington, D.C., January 13-17, 2013
 12. **Zheng, W.**, and Yin, J.J. (2012). “Enhancing Students’ Higher-Order Skills through Community Service Learning Using Scaffolding for Creative Problem Solving,” Proceedings of 2012 ASEE Annual Conference, Paper ID AC 2012-5454, June 10 – 13, 2012, San Antonio, Texas
 13. **Zheng, W.**, Skelton, G., Shih, H., Pei, T. & Yin, J. (2012). “Implementing Self-Regulated Learning Process Model and Assessment for Facilitating Civil Engineering Students to Master Engineering Concepts,” Proceedings of 2012 ASEE Annual Conference, Paper ID AC 2012-5462, June 10 – 13, 2012, San Antonio, Texas
 14. **Zheng, W.**, Peng, B., and Zhang, Z. (2011). “Assessment of Performance Reliability of Scoured Bridges Based on Probabilistic Inference with In-Suit Monitoring Data,” Proceedings of the Transportation Research Board 90th Annual Meeting 2011, paper number: 11-3020, January 23-27,2011, Washington, D.C.
 15. Peng, B., **Zheng, W.** (2011). “An Alternative Approach to Detecting Scour at Bridge Foundation,” Proceedings of Transportation Research Board 90th Annual Meeting, paper number: 11-3012, January 23-27, Washington, D.C.
 16. Pei, T.S., **Zheng, W.**, and Shih, H. (2010). “Integrating Self-Regulated Learning with an Object-Oriented Programming Course,” Proceedings of 2010 ASEE Annual Conference & Exposition, Paper number: AC 2010-1294, June 20 - 23, 2010, Louisville, Kentucky
 17. Shih, H., **Zheng, W.**, Pei, T.S., Skelton, G., and Leggette, E. (2010). “Integrating Self-Regulated Learning Instruction in a Digital Logic Course,” Proceedings of 2010 ASEE Annual Conference & Exposition, Paper Number: AC 2010-158, June 20 - 23, 2010, Louisville, Kentucky
 18. **Zheng, W.**, Shih, H., and Mo, Y.L., (2009). “Integration of Cognitive Instructions and Problem/Project Based Learning into Civil Engineering Curriculum to Cultivate Creativity and Self-Directed Learning,” Proceedings of 2009 ASEE Annual Conference & Exposition, Paper

Number: AC 2009-1195, June 14 - 17, 2009 - Austin, TX

19. **Zheng, W.**, Skelton, G., and Shih, H. (2009). "Nurture Motivated, Confident, and Strategic Learners in Engineering through Cognitive and Psychological Instructions for an Entry-Level Course," Proceedings of 2009 ASEE Annual Conference & Exposition, Paper Number: AC 2009-1195, June 14 - 17, 2009 - Austin, TX
 20. Shih, H., **Zheng, W.**, and Walters, W. (2009). "Applications of Smart Materials In Structural Health Monitoring," Proceedings of the ASME 2009 International Mechanical Engineering Congress & Exposition, paper number: IMECE2009-10145, November 13-19, Lake Buena Vista, Florida
 21. **Zheng, W.**, Shih, H., Lozano, K., Kiefer, K., and Ma, X., 2008. "Enhancing Engineering Educational Outcomes through Integration of New Vision for Civil Infrastructures with Nanotechnology into Undergraduate Curriculum and Its Implementation Results." Proceedings of 2008 ASEE Annual Conference & Exposition, Paper Number: AC 2008-2543: June 22 - 25, 2008, Pittsburgh, PA
 22. Shih, H.R., Walters, W. L., and **Zheng, W.** (2008). "An Introduction to Smart Structure and Its Application in Nanotechnology," Proceedings of ASME 2008 International Mechanical Engineering Congress and Exposition, Volume 9: Engineering Education and Professional Development, Boston, Massachusetts, USA, October 31–November 6, 2008
 23. Shih, H., **Zheng, W.**, Walters, W., and Paradeshi, S. (2008). "Smart Materials and Structures Experiments for Undergraduate Students," Proceedings of 2008 ASEE Annual Conference & Exposition, Paper Number: AC 2008-2632, June 22 - 25, 2008, Pittsburgh, PA.
 24. **Zheng, W.**, Shih, H., Lozano, K., Pei, J., Kiefer, K., and Ma, X., (2007). "New Vision for Built Environment-Integration of Nanotechnology into Civil Engineering Undergraduate Curriculum," Proceeding of Engineering Education NSF Awardees' Conference, September 26-28, 2007, Arlington, Virginia
 25. **Zheng, W.**, Lozano, K., Pei, J., Kiefer, K., Ma, X., and Shih, H., (2007)., "Collaboration among Educational Institutions and Industries for Addressing New Challenge in Civil Engineering Undergraduate Education," Proceedings of the 2007 ASEE Gulf-Southwest Annual Conference, The University of Texas-Pan American, March, 2007, South Padre Island, Texas
 26. Shih, H, Tzou, H. S., and **Zheng, W.** (2007). "Photonic Control of a Free-Floating Parabolic Membrane Shell," Proceedings of 2007 ASME International Mechanical Engineering Congress and Exposition, Paper Number: IMECE2007-41141, November, 2007, Seattle, Washington
 27. **Zheng, W.** (2001). "Analytical Method for Assessment of Seismic Shear Capacity Demand for Untopped Precast Double-tee Diaphragms Joined by Mechanical Connectors Based on Experimental Tests on Connectors, " Ph.D. dissertation, University of Wisconsin-Madison, ProQuest Company, Ann Arbor, MI, pub. #3012457, pp 1-313
 28. **Zheng, W.**, Li, Y.L., Hua, Z.C., and He, L.Q. (1994). "Experiment Research on Behavior of Partially Unbound Post-tensioned Prestressed High-Performance Concrete ($f_c' > 80\text{MPa}$) Beams with a smaller depth-to-span ratio," Research Report of Beijing Institute of Architectural Design and Research
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