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Professor, Mechanical and Aerospace Engineering  
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### **EDUCATION**

#### **Ph.D. in Civil Engineering**

Vanderbilt University, Nashville, TN May 2006  
Dissertation: Stochastic multiaxial fatigue and fracture modeling

#### **M.S. in Structural Engineering**

Tongji University, Shanghai, China May 2002  
Thesis: Fracture behavior of steel beam-column joints under earthquake loading

#### **B.S. in Structural Engineering**

Tongji University, Shanghai, China July 1999  
Thesis: Nonlinear dynamic response of steel frame structures

### **PROFESSIONAL EXPERIENCE**

**Founding Director**, Center for Complex System Safety, ASU-UA-NAU, 2019 – Present

**Professor**, School for Engineering of Matter, Transport & Energy, Arizona State University, 2017 – present

**Associate professor**, School for Engineering of Matter, Transport & Energy, Arizona State University, 2012 – 2017

**Associate professor**, Department of Civil and Environmental Engineering, Clarkson University, 2012

**Assistant Professor**, Department of Civil and Environmental Engineering, Clarkson University, 2007 - 2012

### **HONORS AND AWARDS**

- SwRI Best Student Paper Award, at 2019 AIAA SciTech, PhD advisor
- Best Paper (Theory) Award, PHM Society Annual Conference, 2018
- Exemplar faculty, School of Engineering, Arizona State University, 2018

- Harry H. and Lois G. Hilton Student Paper Award at 2016 AIAA SciTech, PhD advisor
- Best paper award, ASCE Journal of Aerospace Engineering, 2011
- AFOSR Young Investigator Award, 2011
- Million Dollar Club – research grant, Clarkson University, 2011
- Albert Merrill Award 2010-2011, Clarkson University CEE
- Excellent Reviewer Award, ASCE Journal of Bridge Engineering, 2010
- Teaching Excellence Award – Clarkson CSoE, 2008, 2011
- Best student paper award, 1<sup>st</sup> prize, School of Engineering, Vanderbilt University, 2006
- Harold Stirling Vanderbilt Graduate Scholarship, Vanderbilt University, 2002-2005
- Jinmen Scholarship, Tongji University, 2002

### **JOURNAL PUBLICATIONS**

(highlighted **Liu, Y/Yongming Liu** indicating the corresponding author; \* indicating my current/former students; \*\* indicating my current/former postdoc; \*\*\* indicating my current/former visiting scholars)

#### Submitted/under Revision Journal Article Drafts

1. Zhang, Z.\* & **Liu, Y.** Parsimony-Enhanced Sparse Bayesian Learning for Robust Discovery of Partial Differential Equations. arXiv Prepr. arXiv2107.07040 (2021) - Mechanical Systems and Signal Processing; first revision finished; under review).
2. Haoyang Wei\*, Houpu Yao\*, **Y. Liu.** Fracture Pattern Prediction with Random Microstructure using a Physics-Informed Deep Neural Networks. Eng. Fract. Mech. (2021) – first revision received; under review.
3. Yi Gao\*, Yang Jiao, **Y. Liu.** Ultraefficient reconstruction of disordered biphasic materials with effective hyperuniformity. Phys. Rev. B (2021) – first revision received; under revision.
4. Hu, J.\*, Xu, Z., Wang, W\*., Qu, G., Pang, Y.\* & **Liu, Y.** Decentralized Graph-Based Multi-Agent Reinforcement Learning Using Reward Machines. arXiv Prepr. arXiv2110.00096 (2021)-AAAI 2022; first abstract accepted, under revision.
5. Yang Yu\*\*, **Y. Liu.** Physics-guided generative adversarial network for probabilistic structural system identification. Expert Syst. Appl. (2021) - first revision received, under review.
6. Chen, J.\* & **Liu, Y.** Fatigue modeling using neural networks: a comprehensive review. Fatigue & Fracture of Engineering Materials (2021) – invited review article, first revision received, under review.
7. Chen, J\*, Gao, Y \* & **Liu, Y.** "Multi-fidelity data aggregation using convolutional neural networks." Computer Methods in Applied Mechanics and Engineering, (2021) – first revision finished, under review.
8. Meng, C.\* & **Liu, Y.** Nonlocal Damage-enhanced Plasticity Model for Ductile Fracture Analysis Using a Lattice Particle Method. arXiv Prepr. arXiv2108.01214 (2021) – Computational Mechanics, submitted.

9. Pang, Y.\* , Cheng, S., Hu, J.\* & **Liu, Y.** Evaluating the Robustness of Bayesian Neural Networks Against Different Types of Attacks. arXiv Prepr. arXiv2106.09223 (2021)-Neural Computing, submitted.
10. Nan Xu, **Y. Liu.** Smooth Orthogonal Projection on Uniform Riemannian Manifold. IEEE Trans. Pattern Anal. Mach. Intell. (2021) – submitted; under review.
11. Zhiming Zhang\*\*, Nan Xu\*, **Y. Liu.** Robust physics discovery via supervised and unsupervised pattern recognition using the Euler Characteristic. Nat. Commun. (2021) – submitted; under review.
12. Chen, Jie\*, and **Yongming Liu.** "Physics-guided mixture density networks for uncertainty quantification." Reliability Engineering & System Safety (2021) - submitted; under review.

#### Published Journal Articles

1. Zhang, Z.\*\* and **Liu, Y.**, 2021. A robust framework for identification of PDEs from noisy data. Journal of Computational Physics, 446, p.110657.
2. Chen, J.\* & **Liu, Y.** Fatigue property prediction of additively manufactured Ti-6Al-4V using probabilistic physics-guided learning. Addit. Manuf. 39, 101876 (2021).
3. Chen, J.\* & **Liu, Y.** Probabilistic physics-guided machine learning for fatigue data analysis. Expert Syst. Appl. 168, 114316 (2021).
4. Zhao, P.\*\* & **Liu, Y.** Physics Informed Deep Reinforcement Learning for Aircraft Conflict Resolution. IEEE Trans. Intell. Transp. Syst. (2021).
5. Tien, S-C\*, Wei, H\*, Chen, J\*, **Liu, Y.** Energy-based time derivative damage accumulation model under uniaxial and multiaxial random loadings. Fatigue Fract Eng Mater Struct. 2021; 1- 15. doi:10.1111/ffe.13591
6. Gao, Y.\* , Jiao, Y. & **Liu, Y.** Ultra-efficient reconstruction of 3D microstructure and distribution of properties of random heterogeneous materials containing multiple phases. Acta Mater. 204, 116526 (2021).
7. Gao, Y.\* , Jiao, Y. & **Liu, Y.** Efficient high-dimensional material reliability analysis with explicit voxel-level stochastic microstructure representation. Appl. Math. Model. 91, 1117–1140 (2021).
8. Gao, Y.\* & **Liu, Y.** Reliability-based topology optimization with stochastic heterogeneous microstructure properties. Mater. Des. 205, 109713 (2021).
9. Pang, Y.\* , Zhao, X., Yan, H. & **Liu, Y.** Data-driven trajectory prediction with weather uncertainties: A Bayesian deep learning approach. Transp. Res. Part C Emerg. Technol. 130, 103326 (2021).
10. Sharma, A.\* , Chen, J.\* , Diewald, E., Imanian, A., Beuth, J. & **Liu, Y.** Data-Driven Sensitivity Analysis for Static Mechanical Properties of Additively Manufactured Ti–6Al–4V. ASCE-ASME J. Risk Uncertain. Eng. Syst. Part B Mech. Eng. 8, 11108 (2021).
11. Yu, Y.\* , Cai, C. S. & **Liu, Y.** Probabilistic vehicle weight estimation using physics - constrained generative adversarial network. Comput. Civ. Infrastruct. Eng. (2021).

12. Yu, Y.\*\*, Kurian, B.\*, Zhang, W., Cai, C. S. & **Liu, Y.** Fatigue damage prognosis of steel bridges under traffic loading using a time-based crack growth method. *Eng. Struct.* 237, 112162 (2021).
13. Zhao, P.\*\*, Erzberger, H. & **Liu, Y.** Multiple-Aircraft-Conflict Resolution Under Uncertainties. *J. Guid. Control. Dyn.* 1–19 (2021).
14. Wang, Y.\*, Pang, Y.\*, Chen, O., Iyer, H. N., Dutta, P., Menon, P. K. & **Liu, Y.** Uncertainty quantification and reduction in aircraft trajectory prediction using Bayesian-Entropy information fusion. *Reliab. Eng. Syst. Saf.* 212, 107650 (2021).
15. Ke, L., Li, C., He, J., Lu, Y., Jiao, Y. & **Liu, Y.** Fatigue evaluation and CFRP strengthening of diaphragm cutouts in orthotropic steel decks. *Steel Compos. Struct.* 39, 453–469 (2021).
16. Dai, R., Chandrasekaran, G., Chen, J.\*, Jackson, C., Liu, Y., Nian, Q. & Kwon, B. Thermal conductivity of metal coated polymer foam: Integrated experimental and modeling study. *Int. J. Therm. Sci.* 169, 107045 (2021).
17. Wang, W.\*, Liu, Y., Srikant, R. & Ying, L. 3M-RL: Multi-Resolution, Multi-Agent, Mean-Field Reinforcement Learning for Autonomous UAV Routing. *IEEE Trans. Intell. Transp. Syst.* (2021).
18. Yousaf, A., Gilliam, M. S., Chang, S. L. Y., Augustin, M., Guo, Y., Tahir, F.\*, Wang, M., Schwindt, A., Chu, X. S. & Li, D. O. Exfoliation of Quasi-Two-Dimensional Nanosheets of Metal Diborides. *J. Phys. Chem. C* 125, 6787–6799 (2021).
19. Chen, J.\*, Ersoy, D. & **Liu, Y.** Probabilistic bulk property estimation using multimodality surface non-destructive measurements for vintage pipes. *Struct. Saf.* 87, 101995 (2020).
20. Chen, J.\*, Imanian, A., Wei, H., Iyyer, N. & **Liu, Y.** Piecewise stochastic rainflow counting for probabilistic linear and nonlinear damage accumulation considering loading and material uncertainties. *Int. J. Fatigue* 140, 105842 (2020).
21. Chen, J.\*, Liu, S.\*, Zhang, W.\* & **Liu, Y.** Uncertainty quantification of fatigue SN curves with sparse data using hierarchical Bayesian data augmentation. *Int. J. Fatigue* 134, 105511 (2020).
22. Hu, J.\*, Erzberger, H., Goebel, K. & **Liu, Y.** Probabilistic risk-based operational safety bound for rotary-wing unmanned aircraft systems traffic management. *J. Aerosp. Inf. Syst.* 17, 171–181 (2020).
23. Wang, Y.\* & **Liu, Y.** Bayesian entropy network for fusion of different types of information. *Reliab. Eng. Syst. Saf.* 195, 106747 (2020).
24. Wang, Y.\*, Peng, T.\*, Lever, E. & **Liu, Y.** An Equivalent Creep Crack Growth Model for Probabilistic Life Prediction of Plastic Pipe Materials. *J. Press. Vessel Technol.* 142, 31501 (2020).
25. Wei, H.\*, Carrion, P., Chen, J., Imanian, A., Shamsaei, N., Iyyer, N. & **Liu, Y.** Multiaxial high-cycle fatigue life prediction under random spectrum loadings. *Int. J. Fatigue* 134, 105462 (2020).
26. Wei, H.\*, Chen, H.\* & **Liu, Y.** A nonlocal lattice particle model for J2 plasticity. *Int. J. Numer. Methods Eng.* 121, 5469–5489 (2020).

27. Wei, H.\* & **Liu, Y.** An energy-based model to assess multiaxial fatigue damage under tension-torsion and tension-tension loadings. *Int. J. Fatigue* 141, 105858 (2020).
28. Yao, H.\*, Gao, Y.\* & **Liu, Y.** FEA-Net: A Physics-guided Data-driven Model for Efficient Mechanical Response Prediction. *Comput. Methods Appl. Mech. Eng.* Accepted, (2020).
29. Yu, Y.\*\*\*, Yao, H.\* & **Liu, Y.** Structural dynamics simulation using a novel physics-guided machine learning method. *Eng. Appl. Artif. Intell.* 96, 103947 (2020).
30. Zhao, P.\*\*\*, Joerger, M., Liang, X., Pervan, B. & **Liu, Y.** A New Method to Bound the Integrity Risk for Residual-Based ARAIM. *IEEE Trans. Aerosp. Electron. Syst.* 57, 1378–1385 (2020).
31. Zhao, P.\*, Wang, W., Ying, L., Sridhar, B. & **Liu, Y.** Online Multiple-Aircraft Collision Avoidance Method. *J. Guid. Control. Dyn.* 43, 1456–1472 (2020).
32. Ke, L., Li, C., He, J., Shen, Q., Liu, Y. & Jiao, Y. Enhancing fatigue performance of damaged metallic structures by bonded CFRP patches considering temperature effects. *Mater. Des.* 192, 108731 (2020).
33. Wang, D\*\*\*, Wang, L\*\*\*, Liu, Y., Tan, B. & **Liu, Y.** Failure mechanism investigation of bottom plate in concrete box girder bridges. *Eng. Fail. Anal.* 116, 104711 (2020).
34. Wei, Haoyang\*, Patricio Carrion, Jie Chen\*, Anahita Imanian, Nima Shamsaei, Nagaraja Iyyer, and **Yongming Liu.** "Multiaxial high-cycle fatigue life prediction under random spectrum loadings." *International Journal of Fatigue* (2019): 105462.
35. Wang, Yuhao\*, Tishun Peng\*, Ernest Lever, and **Yongming Liu.** "An equivalent creep crack growth model for probabilistic life prediction of plastic pipe materials." *ASME Journal of Pressure Vessel Technology* (2019).
36. Peng Zhao\*\*, **Yongming Liu.** "Separation Risk Evaluation Considering Positioning Uncertainties from the Automatic Dependent Surveillance-Broadcast (ADS-B) System". *Journal of Navigation, Vol 72, Issue 5, September 2019.*
37. Yang Yu\*\*, Houpu Yao\*, and **Yongming Liu.** "Aircraft Dynamics Simulation using a Novel Physics-based Learning Method", *Aerospace Science and Technology*, 87(2019), 254-264.
38. Yuan M\*\*\*, Liu Y, Yan D, Liu Y. Probabilistic fatigue life prediction for concrete bridges using Bayesian inference. *Advances in structural engineering.* 2019 Feb;22(3):765-78.
39. Ke L\*\*\*, Li C, Luo N, He J, Jiao Y, Liu Y. Enhanced comprehensive performance of bonding interface between CFRP and steel by a novel film adhesive. *Composite Structures.* 2019 Dec 1;229:111393.
40. Sun, Zhe, Cheng Zhang, Pingbo Tang, Yuhao Wang\*, and Yongming Liu. "Bayesian Network Modeling of Airport Runway Incursion Occurring Processes for Predictive Accident Control." In *Advances in Informatics and Computing in Civil and Construction Engineering*, pp. 669-676. Springer, Cham, 2019.

41. Chang, Qinan\*, Tishun Peng\*, and **Yongming Liu**, ‘Tomographic Damage Imaging Based on Inverse Acoustic Wave Propagation Using K-Space Method with Adjoint Method’, *Mechanical Systems and Signal Processing*, 109 (2018), 379–98
42. Chang, Qinan\*, Tishun Peng\*, and **Yongming Liu**, ‘Wave Propagation Simulation in Damaged Isotropic and Anisotropic Solids Using K-Space Method’, *Journal of Theoretical and Computational Acoustics*, 26 (2018), 1850023
43. Dahire, Sonam\*, Fraaz Tahir\*, Yang Jiao, and **Yongming Liu**, ‘Bayesian Network Inference for Probabilistic Strength Estimation of Aging Pipeline Systems’, *International Journal of Pressure Vessels and Piping*, 162 (2018), 30–39
44. **Liu, Yongming**, and Chao Zhang\*\*, ‘A Critical Plane-Based Model for Mixed-Mode Delamination Growth Rate Prediction under Fatigue Cyclic Loadings’, *Composites Part B: Engineering*, 139 (2018), 185–94
45. Luo, Guangen\*\*\*, and Yongming Liu, ‘Two Simplified Methods for Fatigue Crack Growth Prediction under Compression-Compression Cyclic Loading’, *Marine Structures*, 58 (2018), 367–81
46. Venkatesan, Karthik Rajan\*, and **Yongming Liu**, ‘Subcycle Fatigue Crack Growth Formulation under Positive and Negative Stress Ratios’, *Engineering Fracture Mechanics*, 189 (2018), 390–404
47. Wang, Da\*\*\*, Yang Deng, Yong-ming Liu, and Yang Liu, ‘Numerical Investigation of Temperature Gradient-Induced Thermal Stress for Steel–concrete Composite Bridge Deck in Suspension Bridges’, *Journal of Central South University*, 25 (2018), 185–95
48. Wang, Da\*\*\*, Yongming Liu, and Yang Liu, ‘3D Temperature Gradient Effect on a Steel–concrete Composite Deck in a Suspension Bridge with Field Monitoring Data’, *Structural Control and Health Monitoring*, 25 (2018), e2179
49. Wu, Jun, Jingrui He, and Yongming Liu, ‘ImVerde: Vertex-Diminished Random Walk for Learning Network Representation from Imbalanced Data’, *ArXiv Preprint ArXiv:1804.09222*, 2018
50. Yuan, Hao, Wei Zhang, Gustavo M Castelluccio, Jeongho Kim, and Yongming Liu, ‘Microstructure-Sensitive Estimation of Small Fatigue Crack Growth in Bridge Steel Welds’, *International Journal of Fatigue*, 112 (2018), 183–97
51. Yuan, Ming\*\*\*, Yun Liu\*\*\*, Donghuang Yan, and Yongming Liu, ‘Probabilistic Fatigue Life Prediction for Concrete Bridges Using Bayesian Inference’, *Advances in Structural Engineering*, 22 (2019), 765–78
52. H. Wei\*, **Y. Liu** (2017), A critical plane-energy model for multiaxial fatigue life prediction, *Fatigue and Fracture of Engineering Materials and Structures*, Volume 40, Issue 12, December 2017, Pages 1973–1983.
53. **Liu, Y.**, Venkatesan, K. R.\*, & Zhang, W.\* (2017). Time-based subcycle formulation for fatigue crack growth under arbitrary random variable loadings. *Engineering Fracture Mechanics*, 182, 1-18.
54. Cang, R., Xu, Y., Chen, S., Liu, Y., Jiao, Y., & Ren, M. Y. (2017). Microstructure Representation and Reconstruction of Heterogeneous Materials via Deep Belief Network for Computational Material Design. *Journal of Mechanical Design*, 139(7), 071404.

55. Chen Z, Li C, Ke L, Liu Y, Lin J. Study on fatigue damages and retrofit methods of steel box girder in a suspension bridge. *Tumu Gongcheng Xuebao/China Civil Engineering Journal*. 2017 Mar 1;50(3):91-100.
56. Yuan, H., Zhang, W., Kim, J., & Liu, Y. (2017). A nonlinear grain-based fatigue damage model for civil infrastructure under variable amplitude loads. *International Journal of Fatigue*, 104, 389-396.
57. Bridgeman, D., Tsow, F., Xian, X., Chang, Q., Liu, Y., & Forzani, E. (2017). Thermochemical Humidity Detection in Harsh or Non-Steady Environments. *Sensors*, 17(6), 1196.
58. Tahir, F.\*, Dahire, S.\*, & **Liu, Y.** (2017). Image-based creep-fatigue damage mechanism investigation of Alloy 617 at 950° C. *Materials Science and Engineering: A*, 679, 391-400.
59. Tahir F\*, **Liu Y.** A new experimental testing method for investigation of creep-dominant creep-fatigue interaction in Alloy 617 at 950° C. *International Journal of Pressure Vessels and Piping*. 2017 Jul 1;154:75-82.
60. Liu, Y.\*\*\*, Zhang, H., Liu, Y., Deng, Y., Jiang, N., & Lu, N. (2017). Fatigue reliability assessment for orthotropic steel deck details under traffic flow and temperature loading. *Engineering Failure Analysis*, 71, 179-194.
61. Wang, L.\*\*\*, Zhang, X.\*\*\*, Zhang, J., Dai, L., & Liu, Y. (2017). Failure analysis of corroded PC beams under flexural load considering bond degradation. *Engineering Failure Analysis*, 73, 11-24.
62. Zhang, X.\*\*\*, Wang, L.\*\*\*, Zhang, J., Ma, Y.\*\*\*, & Liu, Y. (2017). Flexural behavior of bonded post-tensioned concrete beams under strand corrosion. *Nuclear Engineering and Design*, 313, 414-424.
63. Zhang, X.\*\*\*, Wang, L.\*\*\*, Zhang, J., & Liu, Y. (2017). Corrosion-induced flexural behavior degradation of locally ungrouted post-tensioned concrete beams. *Construction and Building Materials*, 134, 7-17.
64. Ma, Y.\*\*\*, Guo, Z., Wang, L.\*\*\*, Zhang, J. and Liu, Y., 2017. Effects of Stress Ratio and Banded Microstructure on Fatigue Crack Growth Behavior of HRB400 Steel Bar. *Journal of Materials in Civil Engineering*, 30(3), p.04017314.
65. Yuan, M.\*\*\*, Yan, D., Zhong, H., & Liu, Y. (2017). Experimental investigation of high-cycle fatigue behavior for prestressed concrete box-girders. *Construction and Building Materials*, 157, 424-437.
66. Wang D\*\*\*, Liu Y, Kong B, Cai CS, Liu Y. Simple Analytical Model for Vibration Frequency Calculation of Anchor Span Strand in Suspension Bridges. *Journal of Engineering Mechanics*. 2017 Jul 20;143(10):04017115.
67. Chen, H.\*, Xu, Y., Jiao, Y., & **Liu, Y.** (2016). A novel discrete computational tool for microstructure-sensitive mechanical analysis of composite materials. *Materials Science and Engineering: A*, 659, 234-241.
68. H. Chen\*, Y. Jiao and **Y. Liu** (2016). A Nonlocal Lattice Particle Model for Fracture Simulation of Anisotropic Materials. *Composites Part B: Engineering*, Volume 90, 1 April 2016, Pages 141–151
69. H. Chen\*, and **Y. Liu** (2016). A Nonlocal 3D Lattice Particle Framework for Elastic Solids. *International Journal of Solids and Structures*. Volume 81, 1 March 2016, Pages 411–420.

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71. Peng, T.\*, & **Liu, Y.** (2016). 3D crack-like damage imaging using a novel inverse heat conduction framework. *International Journal of Heat and Mass Transfer*, 102, 426-434.
72. Chen, H.\*, Meng, L., Chen, S., Jiao, Y., & **Liu, Y.** (2016). Numerical investigation of microstructure effect on mechanical properties of bi-continuous and particulate reinforced composite materials. *Computational Materials Science*, 122, 288-294.
73. Yang, J., He, J.\*, Guan, X.\*, Wang, D., Chen, H., Zhang, W.\*, & **Liu, Y.** (2016). A probabilistic crack size quantification method using in-situ Lamb wave test and Bayesian updating. *Mechanical Systems and Signal Processing*, 78, 118-133.
74. He, J.\*, Zhou, Y., Guan, X.\*, Zhang, W.\*, Zhang, W., & **Liu, Y.** (2016). Time Domain Strain/Stress Reconstruction Based on Empirical Mode Decomposition: Numerical Study and Experimental Validation. *Sensors*, 16(8), 1290.
75. Wang, L.\*\*\*, Zhang, X.\*\*\*, Zhang, J., Yi, J., & **Liu, Y.** (2016). Simplified model for corrosion-induced bond degradation between steel strand and concrete. *Journal of Materials in Civil Engineering*, 04016257.
76. Zhang, X.\*\*\*, Wang, L.\*\*\*, Zhang, J., & **Liu, Y.** (2016). Model for Flexural Strength Calculation of Corroded RC Beams Considering Bond-Slip Behavior. *Journal of Engineering Mechanics*, 142(7), 04016038.
77. Zhang, X.\*\*\*, Wang, L.\*\*\*, Zhang, J., & **Liu, Y.** (2016). Bond Degradation-Induced Incompatible Strain between Steel Bars and Concrete in Corroded RC Beams. *Journal of Performance of Constructed Facilities*, 30(6), 04016058.
78. Wang, D.\*\*\*, Zhang, W., Liu, Y., & **Liu, Y.** (2016). Strand Tension Control in Anchor Span for Suspension Bridge Using Dynamic Balance Theory. *Latin American Journal of Solids and Structures*, 13(10), 1838-1850.
79. Xiang Y\*\*, **Liu Y.** Equivalent Stress Transformation for Efficient Probabilistic Fatigue-Crack Growth Analysis under Variable Amplitude Loadings. *Journal of Aerospace Engineering*. 2015 Sep 10:04015052.
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81. Peng, T.\*, **Liu, Y.**, Saxena, A., and Goebel, K., "In-situ fatigue life prognosis for composite laminates based on stiffness degradation," *Composite Structures*, Vol. 132, 2015, pp. 155-165.
82. Lin E\*\*, Chen H\*, **Liu Y.** Finite element implementation of a non-local particle method for elasticity and fracture analysis. *Finite Elements in Analysis and Design*. 2015 Jan 31;93:1-1.
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84. Yang J, He J\*, Guan X, Wang D, Chen H, Zhang W\*, Liu Y. A probabilistic crack size quantification method using in-situ Lamb wave test and Bayesian updating. *Mechanical Systems and Signal Processing*. 2015 Jul 7.
85. Ma Y\*\*\*, Wang L\*\*\*, Zhang J, Xiang Y\*, Liu Y. Closure to "Bridge Remaining Strength Prediction Integrated with Bayesian Network and In Situ Load Testing"



- by Yafei Ma, Lei Wang, Jianren Zhang, Yibing Xiang, and Yongming Liu. *Journal of Bridge Engineering*. 2015 Mar 12.
86. Xuhui Zhang\*\*\*, Lei Wang\*\*\*, Jianren Zhang, Yongming Liu. "Model for flexural strength calculation of corroded RC beams considering bond-slip behavior." *ASCE J. Eng. Mech.* , 10.1061/(ASCE)EM.1943-7889.0001079 , 04016038.
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  89. Lei Wang\*\*\*, Xuhui Zhang\*\*\*, Jianren Zhang, Yafei Ma\*\*\*, Yongming Liu. "Effects of stirrup and inclined bar corrosion on shear behavior of RC beams." *Construction and Building Materials*. 98 (2015): 537–546
  90. H. Chen\*, E. Lin\*\*, Y. Jiao and **Y. Liu** (2014). A Generalized 2D Non-local Lattice Spring Model for Fracture Simulation. *Computational Mechanics* 54(6), 1541-1558.
  91. H. Chen\*, E. Lin\*\* and **Y. Liu** (2014). A Novel Volume-Compensated Particle Method for 2D Elasticity and Plasticity Analysis. *International Journal of Solids and Structures* 51(9), 1819-1833.
  92. Xiang, Y\*; Liu, R\*; Peng, T\*; **Liu, Y.** "A Novel Subcycle Fatigue Delamination Growth Considering Stress Ratio Effect". *Composite Structures*.2014. 108(0): 31-40.
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  94. T. Peng\*, A. Saxena, K. Goebel, Y. Xiang\*, **Y. Liu**, Integrated experimental and numerical investigation for fatigue damage diagnosis in composite plates. *Structural Health Monitoring* , 2014. vol. 13 no. 5 537-547.
  95. Ma, Y.\*\*\*, Xiang, Y.\*\*, Wang, L.\*\*\*, Zhang, J., and **Liu, Y.** Fatigue life prediction for aging RC beams considering corrosive environments. *Eng. Struct.*, 2014, 79: 211-221.
  96. Ma, Y.\*\*\*, Wang, L.\*\*\*, Zhang, J., Xiang, Y.\*\*, and Liu, Y. Bridge remaining strength prediction integrated with Bayesian network and in situ load testing. *J. Bridge Eng.*, 2014, 19(10): 04014037.
  97. Ma, Y.\*\*\*, Wang, L.\*\*\*, Zhang, J., Xiang, Y.\*\*, Peng, T.\*, and Liu, Y. Hybrid uncertainty quantification for probabilistic corrosion damage prediction for aging RC bridges. *J. Mater. Civ. Eng.*, 2014, 10.1061/(ASCE)MT.1943-5533.0001096, 04014152.
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101. J He\*, X Guan\*, T Peng\*, **Y Liu**, A Saxena, J Celaya, and K Goebel, A multi-feature integration method for fatigue crack detection and crack length estimation in riveted lap joints using Lamb waves, *Smart Materials and Structures*, 2013 22(10), 105007.
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97. Jian yang\*, wei zhang\*, **yongming liu**, “A Multi-Resolution Experimental Methodology for Fatigue Mechanism Verification of Physics-Based Prognostics”, Annual Conference of the Prognostics and Health Management Society 2012. ISBN: 978-1-936263-05-9
98. **Liu, Y.** “Uncertainty management in prognostics”, Invited Tutorial Speaker, 2010 Annual Conference of the Prognostics and Health Management Society, Portland, OR, Oct. 10 – 16, 2010.
99. Xiang, Y.\*, **Liu, Y.**, Optimization of Fatigue Maintenance Strategies based on Prognosis Results, Prognostics and Health Management 2011, Montreal, Canada, September, 2011.
100. Guan, X.\*, Jha, R., **Liu, Y.** Bayesian Fatigue Damage and Reliability Analysis using Laplace Approximation and Inverse Reliability Method, Prognostics and Health Management 2011, Montreal, Canada, September, 2011.
101. Guan, X.\*, Jha, R., **Liu, Y.** Probabilistic multi-model Bayesian network for fatigue damage prognosis. 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, April 2011, Denver, Co.
102. He, J.\*, **Liu, Y.**, Fatigue prognosis integrating usage monitoring system. 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, April 2011, Denver, Co.
103. Zhang, W.\*, **Liu, Y.**, In-Situ Fatigue Crack Growth Testing of Al7075-T651 under Scanning Electron Microscopy. 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, April 2011, Denver, Co.
104. Xiang, Y.\*, **Liu, Y.**, An equivalent stress level model for efficient fatigue crack growth prediction. 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, April 2011, Denver, Co.
105. Zhang, W.\*, **Liu, Y.**, Hypotheses verification of a novel multi-scale fatigue damage prognosis model, IEEE Aerospace Conference, March 2011, Big Sky, MT.

- 10.1109/AERO.2011.5747568.
106. Lu, Z.\*, **Liu, Y.**, “A comparative study of small time scale fatigue crack growth model and the two parameter approach. International Conference on Fatigue Damage of Structural Materials VIII, 19-24 September 2010, Hyannis, MA.
  107. Zhang, W\*. and **Liu, Y.**, "In-Situ Optical Microscopy/SEM Fatigue Crack Growth Testing of Al7075-T6", Aircraft Airworthiness & Sustainment 2010. 11 May–14 May. Austin, TX.
  108. Zhang, W.\*, Lu, Z\* and **Liu, Y.**, " In-Situ Optical Microscopy Study on Plastic Zone Size Estimation of Aluminum Alloy 7075-T6 under Cyclic Loading", Materials Science & Technology 2010. October 17-21 , Houston, Texas.
  109. Zhang, W.\* and **Liu, Y.**, "In-situ fatigue testing and imaging analysis for forward and reversed plastic zone measurements", International Conference on Fatigue Damage of Structural Materials VIII, 19-24 September 2010, Hyannis, MA.
  110. He, J.\* and **Liu, Y.**, “Structural fatigue prognosis using limited sensor data”, 2010 Annual Conference of the Prognostics and Health Management Society, Portland, OR, Oct. 10 – 16, 2010.
  111. X. Guan\*, R. Jha, and **Y. Liu**, “Trans-dimensional MCMC for Fatigue Prognosis Model Determination, Updating, and Averaging,” 2010 Annual Conference of the Prognostics and Health Management Society, Portland, OR Oct. 10 – 16, 2010
  112. Lu, Z.\*, **Liu, Y.** “Concurrent fatigue crack growth simulation using XFEM and a small time scale crack growth model”, ASCE Engineering Mechanics Institute conference, 2010, LA, CA.
  113. Li, H.\*\*, Xiang, Y.\*, **Liu, Y.** “Efficient probabilistic methods for crack growth-based fatigue life prediction”, ASCE Engineering Mechanics Institute conference, 2010, LA, CA.
  114. He, J.\*, Lu, Z.\* and **Liu, Y.**, “A new method for concurrent structural fatigue damage prognosis”, International Symposium on Life-Cycle Performance of Bridges and Structures, Changsha, China, 2010.
  115. Guan, X.\*, Jha, R., and **Liu, Y.**, "Maximum entropy method for model and reliability updating using inspection data", SDM 2010. 12 April – 16 April 2010. Orlando, FL.
  116. He, J.\* and **Liu, Y.**, “Concurrent structural prognosis under random loading”, 2010 AIAA SDM conference, Orlando, FL, 2010.
  117. Xiang, Y.\* and **Liu, Y.**, “Inverse FORM method for probabilistic fatigue prognosis”, 51th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Orlando, April, 2010.
  118. Lu, Z.\* and **Liu, Y.**, “Small time scale fatigue crack growth analysis under variable amplitude loading”, 51th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Orlando, April, 2010.
  119. Xiang, Y.\* and **Liu, Y.**, “Probabilistic fatigue crack growth prediction under variable amplitude loading”, Aircraft Airworthiness & Sustainment Conference, 2010, Austin, Texas.
  120. He, J.\*, Lu, Z.\*, **Liu, Y.**, " A New Method for Concurrent Multi-scale Fatigue Damage Prognosis", The 7th International Workshop Structural Health Monitoring, Stanford University, CA, 2009.

121. Guan, X.\*, **Liu, Y.**, Saxena, A., Celaya, J., Goebel, K., "Entropy-based probabilistic fatigue damage prognosis and algorithmic performance comparison", annual conference of the prognostics and health management society, San Diego, CA, 2009.
122. He, J.\* and **Liu, Y.**, "A state-space model for multi-scale fatigue damage prognosis", annual conference of the prognostics and health management society, San Diego, CA, 2009.
123. Lu, Z.\* and **Liu, Y.**, "An Incremental Crack Growth Model for Multi-Scale Fatigue Analysis", 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, May, 2009.
124. Xiang, Y.\* and **Liu, Y.**, "Probabilistic damage tolerance analysis considering shot peening", 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, May, 2009.
125. Lu, Z.\* and **Liu, Y.**, "A new formulation for multi-scale fatigue damage modeling", Joint ASCE-ASME-SES conference on mechanics and materials, Blacksburg, VA, 2009.
126. Xiang, Y.\* and **Liu, Y.**, "Fatigue reliability of composite laminates under multiaxial loading", Joint ASCE-ASME-SES conference on mechanics and materials, Blacksburg, VA, 2009.
127. **Liu, Y.**, "Probabilistic fatigue life prediction considering short crack growth", 12<sup>th</sup> international conference on fracture, Ottawa, Canada, 2009.
128. Lu, Z.\*, **Liu, Y.**, "Crack growth-based multiaxial fatigue life prediction", 12<sup>th</sup> international conference on fracture, Ottawa, Canada, 2009.
129. Xiang, Y.\*, **Liu, Y.**, "Fatigue life prediction of corroded specimen", 12<sup>th</sup> international conference on fracture, Ottawa, Canada, 2009.
130. He, J.\*, Lu, Z.\* and **Liu, Y.**, "A new method for concurrent multi-scale fatigue damage prognosis", International workshop on structural health monitoring, San Francisco, CA, September, 2009.
131. **Liu, Y.**, Xiang, Y.\*, Shantz, C., Mahadevan, S. "A new EIFS methodology for fatigue life prediction of rotorcraft materials", 11th Aging Aircraft Conference, Phoenix, AZ, April, 2008.
132. **Liu, Y.**, Mahadevan, S., "An Efficient Method for Equivalent Initial Flaw Size (EIFS) Calculation", 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Chicago, IL, 2008.
133. **Liu, Y.**, Mahadevan, S., "CORRELATION EFFECT OF S-N CURVES ON FATIGUE RELIABILITY ANALYSIS", Inaugural International Conference of the Engineering Mechanics Institute (EM08), Minneapolis, Minnesota, May, 2008.
134. Shantz, C., Liu, L., Liu, Y., Mahadevan, S., "Mixed-Mode Crack Growth Under Variable Amplitude Loading", 11th Aging Aircraft Conference, Phenix, AZ, April, 2008.
135. Liu, L, Liu, Y., Mahadevan, S., "Mixed- Mode I+II Fatigue Crack Growth Prediction Using Local Stresses", 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Chicago, IL, 2008.
136. Liu, Y., Stratman, B., Liu, L., Mahadevan, S., Probabilistic fatigue life prediction of railroad wheels. SAE World Congress & Exhibition, April 16-19, 2007, Detroit, MI, USA.

137. F. Hernandez, V. Sura, L. Liu, Y., Liu, S. Mahadevan, D. H. Stone Investigation of the Effect of Defects on Wheel Fatigue Performance Life, 15th International Wheel Set Congress, September 23-27, 2007.
138. Liu, Y., Stratman, B., Liu, L., Mahadevan, S., Shattered rim failure analysis in railroad wheels. Proceedings of IMECE2006, ASME International Mechanical Engineering Congress and Exposition, Chicago, Illinois, USA, 2006.
139. Liu, Y., Mahadevan, S., Mixed-mode fatigue crack threshold and growth rate prediction. International Conference on Fatigue Damage of Structural Materials VI, Hyannis, MA, USA, 2006.
140. Liu, Y., Mahadevan, S., A Critical Plane Method for Multiaxial Fatigue Life Prediction. 9th International Congress of Fatigue, Atlanta, GA, May 2006.
141. Liu, Y., Mahadevan, S., Uncertainty Modeling in Fatigue Life Prediction. 9th International Congress of Fatigue, Atlanta, GA, May 2006.
142. Liu, Y., Mahadevan, S., Multiaxial High-Cycle Fatigue Life Prediction of Isotropic and Anisotropic Materials. 46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Austin, TX, April 2005.
143. Liu, Y., Mahadevan, S., Fatigue Damage Modeling of Composite Laminates. Proceedings of PMC'04, Albuquerque, New Mexico, USA, July 2004.
144. Liu, Y., Mahadevan, S., Probabilistic Fatigue Damage of Composite Laminates. ASC/ASTM-D30 Joint 19th Annual Technical Conference, Atlanta, GA, USA, October 2004.
145. Liu, Y., Stratman, B., Mahadevan, S., Stochastic Multiaxial Damage Modeling for Metal Fatigue. 9th International Conference on Structural Safety and Reliability, Rome, Italy, June 2005.
146. Chen, Y.Y., Liu, Y., Bian, R., Numerical Model for Partial Fracture Failure of Steel Beam-to-Column Joints. Proceedings of 13th World Conference on Earthquake Engineering, Vancouver, BC Canada, Aug 2004.
147. Liu, Y., Chen, Y.Y., Chen, Y.J. Earthquake response of steel tube frames under multi-directional seismic shock. 9th National Conference on Structural Engineering and Engineering Mechanics, Vol. 3, pp 152~157, 2000.

### **SYNERGISTIC ACTIVITIES**

- Guest Editor, " Integrated Design and Operation Of Engineering Systems With Predictive Modeling." ASME Journal of Mechanical Design, 2021
- Associated Editor, ASCE Journal of Bridge Engineering, 2010 – present; responsible for the submission on fatigue, fracture, and structural reliability
- Editorial board of ASCE/ASME Journal of Risk and Uncertainty Analysis, 2013~
- Guest Editor, "Fatigue Design, Assessment, and Retrofit of Bridges." ASCE Journal of Bridge Engineering, 2018
- Guest Editor for the Special Issue on “Physics-of-Failure based reliability and life prediction for critical components”, Advances in Mechanical Engineering, Springer, 2017.
- Editorial board of Journal of Chongqing University (English Edition); 2008~2011.
- Associate Fellow of AIAA, member of ASCE
- Vice Chair, Structures and Material Committee, ASME, 2021 (Elected)

- Student paper Chair of AIAA SciTech – NDA conference, 2015 (Elected)
- Deputy Technical Chair of AIAA SciTech – NDA conference, 2017 (Elected)
- Technical Chair of AIAA SciTech – NDA conference, 2018 (Elected)
- Scientific committee, 2016/2018 ASCE EMI & PMC
- Member of Nondeterministic Approach Technical Committee, AIAA
- Member of Probabilistic Methods committee, ASCE
- Member of advanced materials and structures committee, ASCE
- Member of SEI-ASCE Technical Council on Life-Cycle Performance, Safety, Reliability and Risk of Structural Systems.
- Conference session Chair and co-Chair: MS&T 2010, 49<sup>th</sup> ~ 51<sup>th</sup> Structures, Dynamics, and Materials Conference; 10<sup>th</sup> AIAA Non-Deterministic Approaches Conference; ASCE Engineering Mechanics 2008, ASCE.
- Proposal review for DOE, NSF, UTRC, Houston University
- Technical reviewer of many prestigious journals in engineering mechanics, including Nature Communication, International Journal of Fatigue, Reliability Engineering and System Safety, etc.
- Personnel committee, School of Engineering, Matter, and Transport, ASU, 2019-2022 (Elected)
- Chair, Personnel committee, School of Engineering, Matter, and Transport, ASU, 2020-2021 (Elected)
- University senator, ASU 2016-2021
- ASU task force group for improving the university facility services, 2015

## **TEACHING**

During the past years, Dr. Liu developed and/or significantly improved both undergraduate and graduate courses covering: solid mechanics, structural mechanics, computational mechanics, fracture mechanics, damage and fatigue, probabilistic methods, and reliability engineering.

A new graduate course (MAE 598 – Probabilistic Methods for Engineering Analysis and Design) was developed at ASU. The systematic teaching of probabilistic methods in engineering analysis and design was lacking in the current ASU curriculum, while is very important. The development of this course was extremely successful. The continued improvement is ongoing as this is a newly developed class.

A new course (CE 525 – Mechanical Damage of Materials) was developed during 2008-2010. There are no course on the mechanical damage and aging of structures, especially on metals and composite materials, at Clarkson. Various topics on the fundamental mechanism, engineering analysis, and reliability estimation were covered in this class. This course significantly improves the current curriculum of engineering school at Clarkson. CE 525 is also very successful. Evaluation score for the instructor is 4.8~5.0 (university mean is 4.2).

A list of taught courses and the evaluation scores is given below.  
Arizona State University



Term	Course Name	Course Evaluation (out of 5.00)	Instructor Evaluation (Out of 5.00)
2013 Spring	MAE 213 Solid Mechanics	4.38/5.00	4.43/5.00
2013 Fall	MAE 523 Fracture Mechanics	4.61/5.00	4.71/5.00
2014 Spring	MAE 213 Solid Mechanics	4.16/5.00	4.43/5.00
2014 Fall	MAE 598 Probabilistic Methods	4.34/5.00	4.38/5.00
2014 Fall	ASU 101-MEE	4.16/5.00	3.73/5.00
2015 Spring	MAE 213 Solid Mechanics	4.29/5.00	4.56/5.00
2015 Fall	ASU 101-MEE	4.44/5.00	4.83/5.00
2015 Fall	MAE 523 Fracture Mechanics	3.87/5.00	4.21/5.00
2016 Spring	MAE 213 Solid Mechanics	4.24/5.00	4.23/5.00
2016 Fall	MAE 598 Probabilistic Methods	4.67/5.00	4.66/5.00
2017 Spring	MAE 301 Experimental Statistics	4.04/5.00	4.12/5.00
2018 Spring	MAE 598 Probabilistic Methods	4.2/5.00	4.25/5.00
2019 Fall	ASU 101-AEE	3.88/5.00	4.47/5.00
2019 Fall	MAE 548 Probabilistic Methods	4.23/5.00	4.4/5.00
2020 Fall	MAE 548 Probabilistic Methods	4.53/5.00	4.73/5.00

Clarkson University

Term	Course Name	Instructor Evaluation (Out of 5.00)
2007 Fall	CE 320 Structural Analysis	3.6/5.00
2008 Spring	CE 420 Computer Methods	4.8*/5.00
2008 Spring	CE 520 Computer Methods	4.5/5.00
2008 Fall	CE 525 Mechanical Damage	4.8/5.00
2009 Spring	CE 420 Computer Methods	4.7/5.00
2009 Spring	CE 520 Computer Methods	5.0/5.00
2009 Fall	CE 525 Mechanical Damage	4.8/5.00
2010 Spring	CE 420 Computer Methods	4.3/5.00
2010 Spring	CE 520 Computer Methods	4.0/5.00
2010 Fall	CE 525 Mechanical Damage	5.0/5.00
2011 Spring	CE 420 Computer Methods	4.4/5.00

\*won the School for Engineering Teaching Excellence Award

**STUDENT MENTORING**

**Students graduated:**

PhD:

Zizi Lu (2011, Research Engineer, China Commercial Air Research Center, Beijing, China)  
Yibing Xiang (2011, Structural Engineer, UTC Aerospace, Dayton, Ohio)  
Xuefei Guan –co advised with Prof. Jha (2011, Research Engineer, Siemens, Princeton, NJ)  
Jingjing He (2012, Associate Professor, Beihang University, Beijing, China)  
Wei Zhang (2012, Associate Professor, Beihang University, Beijing China)  
Hailong Chen (2015, Assistant Professor, University of Kentucky)  
Tishun Peng (2016, research engineer at Gas Technology Institute)  
Fraaz Tahir (2017, Corning, research engineer)  
Qinan Chang (2018, Intel, engineer)  
Sonam Dahire (2019, Intel)  
Houpu Yao (co-advised, Fall 2019)  
Yuhao Wang (Fall, 2020; GTI)  
Haoyang Wei (Spring 2021)  
Weichang Wang (co-advised, summer 2021)

MS:

Yibing Xiang (2009), Runze Liu (2014), ROSHANBIR BHATIA (2014), Sahil Jain (2015), Rohan Cota(2015), Namitha Canapa (2015), Yuhao Wang(2015), Chen Liu (2016), Vishal Chandra (2016), Varun Desai (2016), Jayesh Zope (2016), Akshay Murkute (2017), Ankita Kardile (2017), Ivan Rodrigues (2017), Yutian Pang (2018) Dong Pan (2018), Bianca Kurian (2019); Venkateshwaran Ravi Narayanan (2019); Aryabhat Darnal (2019); MADHAVA REDDY VARAKANTHAM (2019); Yun Zhao (2019); Michael Tucker (2019); Antriksh Sharma (2020); Utkarsh Shridhar Pujar (2021); Kailing liu (2021) ; Kaushik Lakshmanan (2021) ; Jun An (2020) ; Darren Tian (2021); Sushant Shivankar (2021)

Undergraduate:

Bradley Sherman (2011), Andrew Ballas (2012); Alex Wenderlich (2018), Andrew Park (2018), Rylie Lodes (2018); Tony Shen (2018); Alyssa Nazareno (2018);

**Current students:**

PhD:

Yi Gao (expected graduation date: Fall 2021)  
Jie Chen (expected graduate date: Fall 2022)  
Yutian Pang (expected graduate date: Fall 2022)  
Jueming Hu (expected graduate date: Fall 2022)  
Changyu Meng (expected graduate date: Fall 2023)  
Qiongfang Zhang (expected graduate date: Fall 2023)  
Nan Xu (expected graduate date: Fall 2023)  
Rahul Rathnakumar (expected graduate date: Fall 2023)

Qihang Xu (expected graduate date: Fall 2024)  
Xiaoyun Fan (expected graduate date: Fall 2024)  
Yan Xue (expected graduate date: Fall 2024)

**MS:**

Kaushik Kethamukkala (2023); Rohith Kalyan Kavadapu (2023);

**Undergraduate:**

Luke Hase (2022)

**High school student:**

Ryan Stover (2023)

**Current postdocs:**

Zhiming Zhang

**Potdoctoral resarch associate:**

Hongshuang Li (2010-2011, Associate Professor at Nanhang University, China)

Chao Zhang (2011 -2012)

Yibign Xiang (2011 – 2014, Structural Engineer, UTC Aerosapce, Dayton, Ohio)

Wei Zhang (2012 – 2013, Associate Professor, Beihang University, China)

Enqiang Lin (2012- 2014, Potsdoc Research Associate, Virginia Tech)

Yang Yu (2017-2021, Research Assistan Professor, PSU)

Peng Zhao (2018-2021, Professor, Beihang University, China)

**Visiting Scholars:**

Kun Wang (2012-2013), Lei Wang (2013~ 2014), Yafei Ma (2013 -2014), Changsong Chen (2014 -2015), Wei Bao (2013- 2014), Ming Yuan (2014 2015), Yun Liu (2014 - 2015), Da Wang (2015-2016), Xuhui Zhang (2015-2017), Guangen Luo (2016-2017)

**Awards of mentored students/postdocs:**

Yi Gao, SwRI best student paper award, 2019 AIAA Scitech

Yang Yu, best paper award, PHM scocitety 2018 annual conference

Tishun Peng, Harry H. and Lois G. Hilton Student Paper Award at 2016 AIAA SciTech

Tishun Peng, Student Paper Competition Award Final list, AIAA NDA conference, 2015

Tishun Peng, 2014 UGF Block Grant for distinguished graduate students at Arizona State University

Hailong Chen, Student Paper Competition Award Final List. AIAA SciTech 2014.

Hailong Chen, 2013 UGF Block Grant for distinguished graduate students at Arizona State University

Tishun Peng, 2012 PHM Doctoral Consortium Award

Yibing Xiang, first author of the best paper award in ASCE Journal of Aerospace Engineering, 2011

Jingjing He, Yibing Xiang, 2010 PHM Doctoral Consortium Award

## **FUNDING HISTORY**

### ***Knowledge-guided Automation for Integrity Management of Aging Pipelines (KAI-MAP) for Hydrogen Transport***

Status: Active, 2021-2024; Amount: \$1,055,936; Sponsor: DOT CAAP; Role: PI

### ***Photovoltaic plant predictive maintenance optimization under uncertainties using probabilistic information fusion***

Status: Active, 2021-2024; Amount: \$1,200,000; Sponsor: DOE; Role: co-PI (50%)

### ***Information fusion for real-time national air transportation system prognostics under uncertainty***

Status: Active, 2017-2022; Amount: \$10,000,000; Sponsor: NASA; Role: PI

### ***Arizona Regent Innovation Fund: Center for Complex System Safety***

Status: Active, 2019-2021; Amount: \$375,000; Sponsor: State of Arizona; Role: PI

### ***AI-enabled Interactive Threats Detection using a Multi-camera Stereo Vision System***

Status: Active, 2019-2022; Amount: \$250,000; Sponsor: DOT CAAP; Role: PI

### ***A novel structured light based sensing and probabilistic diagnostic technique for pipe internal corrosion detection and localization***

Status: Active, 2018-2021; Amount: \$300,000; Sponsor: DOT CAAP; Role: institutional PI (40% share)

### ***Bayesian network-based data analytics for accurate pipe strength and toughness estimation***

Status: Active, 2018-2021; Amount: \$150,000; Sponsor: DOT through GTI; Role: PI

### ***Uncertainty quantification and reduction for pipeline assessment with interactive threats***

Status: Active, 2018-2021; Amount: \$210,000; Sponsor: DOT through GTI; Role: PI

### ***Systematic Fatigue Test Spectrum Editing Using Wavelet Transformations***

Status: Active, 2019-2022; Amount: \$300,000; Sponsor: NAVY through TDA, SBIR  
Role: PI

### ***Systematic Fatigue Test Spectrum Editing Using Wavelet Transformations***

Status: Finished, 2018-2019; Amount: \$37,500; Sponsor: NAVY through TDA, SBIR  
Role: PI

### ***Collaborative Research: Fatigue Damage Prognosis for Slender Coastal Bridges***

Status: Finished, 2015-2019; Amount: \$235,000; Sponsor: NSF; Role: PI

### ***Bayesian Network Inference and Information Fusion for Accurate Pipe Strength and Toughness Estimation***

Status: Finished, 2015 – 2018; Amount: \$300,000; Sponsor: Federal DOT; Program: PHMSA; Role: PI

***EAGER: Reconstruction and Optimal Design of Multi-scale Material Systems through Deep Networks***

Status: Finished, 2016-2017; Amount: \$ 171,255.00; Sponsor: NSF; Role: co-PI

***Slow Crack Growth Evaluation of Vintage Polyethylene Pipes***

Status: Finished, 2015 – 2017; Amount: \$190,000; Sponsor: Federal DOT through GTI; Program: PHMSA; Role: co-PI and Institutional PI

***Multi-resolution in-situ testing and multiscale simulation for creep fatigue damage analysis of Alloy 617***

Status: Finished, 2014 – 2017; Amount: \$800,000; Sponsor: DOE; Role: PI

***Optimized Diagnosis and Prognosis for Impingement Failure of PA and PE Piping Materials***

Status: Finished, 2014 – 2016; Amount: \$50,000; Sponsor: Federal DOT through University of Colorado Denver; Role: co-PI and institutional PI

***Proactive and Hybrid Sensing based Inline Plastic Pipeline Defects Diagnosis and Prognosis***

Status: Finished, 2013 – 2015; Amount: \$50,000; Sponsor: Federal DOT through University of Colorado Denver; Role: co-PI and institutional PI

***Probabilistic Remaining Useful Life Prediction of Composite Aircraft Components***

Status: Finished, 2013 – 2015; Amount: \$170,000; Sponsor: NASA through GEM  
Role: co-PI and institutional PI

***Concurrent structural fatigue damage prognosis under uncertainties***

Status: Finished, 2011-2014; Amount: \$363,941; Sponsor: AFOSR; Program: Young Investigator Program; Role: PI

***Validation and uncertainty management of prognostic algorithms***

Status: Finished, 2008 – 2011; Amount: \$600,000; Sponsor: NASA; Program: Integrated Vehicle Health Management (IVHM); Role: PI

***Probabilistic Fatigue Life Prediction and Risk Assessment of Aging Bridges in Cold Regions***

Status: Finished, 2009 – 2012; Amount: \$180,000; Sponsor: NSF; Program: CMMI; Role: PI

***Rotorcraft damage tolerance risk assessment and management***

Status: Finished, 2007 – 2011; Amount: \$356,500; Sponsor: Federal Aviation Administration; Program: Aging Aircraft Program; Role: co-PI and institutional PI

***IRES in China - Advanced Materials for a Sustainable Development***

Status: Finished, 2011~2014; Amount: \$148,947; Sponsor: NSF; Role: co-PI

***Self-healing of fatigue damage in metallic materials***

Status: Active, 2010~2011; Amount: \$5,500; Sponsor: Clarkson CSoE Seed Grant  
Role: PI

***Mesh Independent Probabilistic Residual Life Prediction of Metallic Airframe Structures***

Status: Finished, 2011; Amount: \$30,000 (Phase I) not through division of research  
Sponsor: NASA through GEM, Inc.; Role: Consultant

***Innovative approaches for improving progressive damage modeling and structural life prediction of airframes***

Status: Finished, 2009 – 2010; Amount: \$25,000 (Phase I) not through division of research  
Sponsor: NAVY- NAVAIR through GEM, Inc.; Role: Consultant