

GAOFENG JIA

Assistant Professor
Department of Civil & Environmental Engineering
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Education

- Ph.D. Civil Engineering, specializing in natural hazard risk assessment/mitigation, University of Notre Dame (05/2014)
Dissertation title: Kernel and Metamodel Based Methods for Analysis and Optimization of Systems under Uncertainty; *Advisor:* Alexandros A. Taflanidis
- M.S. Disaster Prevention and Mitigation, specializing in Earthquake Engineering, Beijing Jiaotong University (07/2009)
Thesis title: Finite Element Method to Calculate the Band Gap of Two-dimensional Periodic Structures; *Advisor:* Zhifei Shi
- B.Eng. Civil Engineering, Beijing Jiaotong University (07/2007)

Positions Held

- 07/2016-present Assistant Professor, Department of Civil & Environmental Engineering, Colorado State University
- 07/2015-07/2016 Postdoctoral Research Associate, Department of Civil & Environmental Engineering, University of Illinois at Urbana-Champaign
- 06/2014-06/2015 Postdoctoral Research Associate, Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame
- 08/2009-05/2014 Research Assistant, Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame
- 08/2009-12/2011 Teaching Assistant, Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame, Notre Dame, IN
- 02/2008-07/2008 Teaching Assistant, School of Civil Engineering, Beijing Jiaotong University, Beijing, China
- 10/2006-12/2006 Bridge Evaluation Engineer, Beijing Jiutongqu Road and Bridge Engineering Technology Company, Beijing, China

Research Interests

- Natural hazard risk assessment and mitigation, risk-informed decision making
- Surrogate modeling for efficient analysis and design of complex engineering systems
- Life-cycle cost analysis and design of high performance engineering systems
- Uncertainty quantification, advanced stochastic simulation, stochastic optimization
- Aging and deterioration of infrastructure systems
- Multi-hazard resilience of infrastructure systems
- Robust layout optimization of energy harvesting systems (wave farms, wind farms)
- Earthquake engineering, structural dynamics, seismic protective systems
- Bayesian approaches for model validation, condition assessment of critical infrastructure

Honors and Awards

- ASCE ExCEED Teaching Fellow, American Society of Civil Engineers, 2017
- Young Researcher Best Paper Award in the *Third International Conference on Soft Computing Technology in Civil, Structural and Environmental Engineering*, 2013, Cagliari, Italy, for the paper "Non-Parametric Stochastic Subset Optimization for System Design Optimization under Uncertainty".
- Best Student Paper Award in the *2012 Joint Conference of the Engineering Mechanics Institute and 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012)*, Notre Dame, IN, for the paper "Efficient Hurricane Risk Assessment using Kriging Metamodel".
- Beijing Jiaotong University, Outstanding Graduate Student Cadre (2008).
- Beijing Municipal Commission of Education, Outstanding Graduate in Beijing (2007) for Outstanding Overall Undergraduate Performance.
- Second Prize in the Fifth "Lizheng Cup" Architectural and Structural Design Contest in Beijing, 2006.

Scholarships and Fellowships

- University of Notre Dame, Professional Development Award Scholarship (2013).
- ICOSSAR 2013, Registration Scholarship (2013).
- University of Notre Dame, GSU Conference Presentation Grant (2013).
- University of Notre Dame, Tuition and Stipend Scholarship (2009-2014).
- Beijing Jiaotong University, Scholarships for Outstanding Academic Performance (2003-2006).
- Chinese Ministry of Education, National Scholarship for Outstanding Academic Performance (2004).

Journal Publications

1. Jia, G., and Gardoni, P. (2017). “Stochastic Life-Cycle Analysis: Renewal-Theory Life-Cycle Analysis with State-Dependent Stochastic Models for Deterioration.” *Reliability Engineering & System Safety* (under review).
2. Jia, G., and Gardoni, P. (2018). “Simulation-based approach for estimation of the stochastic performance of deteriorating engineering systems.” *Probabilistic Engineering Mechanics* (in-press).
3. Jia, G., and Gardoni, P. (2018). “State-dependent Stochastic Models: A general stochastic framework for modeling deteriorating engineering systems considering multiple deterioration processes and their interactions.” *Structural Safety*, 72, 99-110.
4. Jia, G., and Taflanidis, A. A. (2016) “Efficient evaluation of Sobol' indices utilizing samples from an auxiliary probability density function.” *Journal of Engineering Mechanics*, 142(5), 04016012:1-11.
5. Jia, G., Taflanidis, A. A., Nadal-Caraballo, N. C., Melby, J. A., Kennedy, A. B., and Smith, J. M. (2016) “Surrogate modeling for storm surge prediction using an existing database of synthetic storms and addressing output size and time-dependence.” *Natural Hazards*, 81(2), 909-938.
6. Jia, G., Taflanidis, A. A., and Beck, J. L. (2015) “Non-parametric stochastic subset optimization for design problems with reliability constraints.” *Structural and Multidisciplinary Optimization*, 52(6), 1185-1204.
7. Jia, G., Taflanidis, A. A., and Beck, J. L. (2015) “A new adaptive rejection sampling method using kernel density approximations and its application to Subset Simulation.” *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, <http://dx.doi.org/10.1061/AJRUA6.0000841>.
8. Jia, G., and Taflanidis, A. A. (2015) “Adaptive non-parametric stochastic subset optimization utilizing multivariate boundary kernels and adaptive stochastic sampling.” *Advances in Engineering Software*, 89, 3-16.
9. Jia, G., Gidaris, I., Taflanidis, A. A., and Mavroeidis, G. P. (2014). “Reliability-based assessment/design of floor isolation systems.” *Engineering Structures*, 78, 41-56.
10. Jia, G., and Taflanidis, A. A. (2014). “Sample-based evaluation of global probabilistic sensitivity measures.” *Computers & Structures*, 144, 103-118.
11. Jia, G., and Taflanidis, A. A. (2013). “Non-parametric stochastic subset optimization for optimal-reliability design problems.” *Computers & Structures*, 126, 86–99.
12. Jia, G., and Taflanidis, A. A. (2013). “Kriging metamodeling for approximation of high-dimensional wave and surge responses in real-time storm/hurricane risk assessment.” *Computer Methods in Applied Mechanics and Engineering*, 261–262, 24–38.
13. Lamprou, A., Jia, G., and Taflanidis, A. A. (2013). “Life-cycle seismic loss estimation and global sensitivity analysis based on stochastic ground motion modeling.” *Engineering Structures*, 54, 192–206.

14. Taflanidis, A. A., Jia, G., Kennedy, A. B., and Smith, J. M. (2013). "Implementation /optimization of moving least squares response surfaces for approximation of hurricane /storm surge and wave responses." *Natural Hazards*, 66(2), 955–983.
15. Taflanidis, A. A., and Jia, G. (2011). "A simulation-based framework for risk assessment and probabilistic sensitivity analysis of base-isolated structures." *Earthquake Engineering & Structural Dynamics*, 40(14), 1629–1651.
16. Jia, G., and Shi, Z. (2010). "A new seismic isolation system and its feasibility study." *Earthquake Engineering & Engineering Vibration*, 9(1), 75–82.

Book Chapters

1. Jia, G., and Gardoni, P. (2018) "Stochastic Life-Cycle Analysis and Optimization of Deteriorating Engineering Systems using State-Dependent Deterioration Stochastic Models." In: Paolo Gardoni P (Ed) *Handbook on Sustainable and Resilient Infrastructure*. Routledge.
2. Jia, G., Tabandeh, A., and Gardoni, P. (2017) "Life-Cycle Analysis of Engineering Systems: Modeling Deterioration, Instantaneous Reliability, and Resilience." In: Paolo Gardoni P (Ed) *Risk and Reliability Analysis: Theory and Application*. Springer.
3. Taflanidis, A.A., Jia, G., Gidaris, I (2016) "Natural Hazard Probabilistic Risk Assessment Through Surrogate Modeling." In: Gardoni P, LaFave JM (eds) *Multi-hazard Approaches to Civil Infrastructure Engineering*. Springer International Publishing, Cham, pp 59–86

Conference Proceedings

Refereed

1. Jia, G., Gardoni, P., and Trejo, D. (2017). "Stochastic modelling of deterioration of reinforced concrete structures considering joint effects of earthquakes, corrosion and ASR." *ICOSSAR 2017: 12th International Conference on Structural Safety & Reliability*, August 6-10, Vienna, Austria.
2. Taflanidis, A. A., Jia, G., Kijewski-Correa, T.L., and Kennedy, A.B. (2015). "Hurricane risk rapid assessment and cyber-implementation." *The Twenty-fifth International Offshore and Polar Engineering Conference (ISOPE-2015)*, June 21-26, Kona, Hawaii.
3. Jia, G., Taflanidis, A. A., and Scruggs, J.T. (2015). "Layout optimization of Wave Energy Converters in a random sea." *The Twenty-fifth International Offshore and Polar Engineering Conference (ISOPE-2015)*, June 21-26, Kona, Hawaii.
4. Jia, G., Taflanidis, A. A., and Beck, J. L. (2014). "Non-parametric stochastic subset optimization for design problems with reliability constraints." *EURODYN 2014: 9th International Conference on Structural Dynamics*, June 30- July 2, Porto, Portugal.
5. Jia, G., Taflanidis, A. A., and Beck, J. L. (2014). "Adaptive stochastic sampling using kernel density approximations." *CSM-7: Proc. of the 7th International Conference on Computational Stochastic Mechanics*, June 15-18, Santorini, Greece.
6. Taflanidis, A. A., Jia, G., and Gidaris, I. (2013). "Reliability-based assessment/design of floor isolation systems for protection of critical structural contents." *Vienna Congress on*

Recent Advances in Earthquake Engineering and Structural Dynamics, August 28-30, Vienna, Austria.

7. Jia, G., and Taflanidis, A. A. (2013). "Real-time hurricane risk assessment through surrogate modeling." *ICOSSAR 2013: 11th International Conference on Structural Safety & Reliability*, June 16-20, New York, NY.
8. Taflanidis, A. A, Jia, G., and Gidaris, I. (2013). "Reliability-based optimal design of floor isolation systems for protection of critical structural contents." *ICOSSAR 2013: 11th International Conference on Structural Safety & Reliability*, June 16-20, New York, NY.

Non-Refereed

1. Taflanidis, A. A., Jia, G., Nadal-Caraballo, N. C., Kennedy, A. B., Melby, J. A., and Smith, J. M. (2014). "Development of Real-Time Tools for Hurricane Risk Assessment." *The Second International Conference on Vulnerability and Risk Analysis and Management (ICVRAM2014)*, July 13-16, University of Liverpool, UK.
2. Taflanidis, A. A., Jia, G., and I. Gidaris (2014). "Probabilistic assessment/design of floor isolation systems through reliability criteria." *Structures Congress*, April 3-5, Boston, MA.
3. Jia, G., and Taflanidis, A. A. (2013). "Non-Parametric Stochastic Subset Optimization for System Design Optimization under Uncertainty." *The Third International Conference on Soft Computing Technology in Civil, Structural and Environmental Engineering*, September 3-6, Cagliari, Sardinia, Italy.
4. Jia, G., Taflanidis, A. A., and Gidaris, I. (2013). "A Simulation-Based and Reliability-Based Design Framework for Floor-Isolation Protective Systems." *The Third International Conference on Soft Computing Technology in Civil, Structural and Environmental Engineering*, September 3-6, Cagliari, Sardinia, Italy.
5. Jia, G., and Taflanidis, A. A. (2013). "Non-parametric stochastic subset optimization for reliability-based design optimization problems." *2013 Conference of the ASCE Engineering Mechanics Institute*, August 4-7, Evanston, IL.
6. Jia, G., and Taflanidis, A. A. (2012). "Efficient hurricane risk assessment using kriging metamodel." *2012 Joint Conference of the Engineering Mechanics Institute and 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability*, June 17-20, Notre Dame, IN.
7. Jia, G., and Taflanidis, A. A. (2011). "Relative Entropy Estimation through Stochastic Sampling and Stochastic Simulation Techniques." *The Second International Conference on Soft Computing Technology in Civil, Structural and Environmental Engineering*, September 6-9, Chania, Crete, Greece.

Conference Abstracts

1. Z. Wang, and Jia, G. (2018) "Sample-based approach for identification of critical links in seismic risk assessment of large-scale transportation networks." *ASCE Engineering Mechanics Institute Conference*, May 29-June 1, M.I.T., Cambridge, MA.

2. Jia, G., and Gardoni, P. (2016) “A general formulation for modeling impacts of deterioration on reliability of infrastructure systems.” *ASCE Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference*, May 22-25, Nashville, TN.
3. Taflanidis, A. A., Jia, G., and Gidaris, I. (2015). “Seismic risk assessment for isolated bridges exposed to near-fault excitations.” *Proceedings of the ASCE 2015 Structures Congress*, April 23-25, Portland, OR.
4. Taflanidis, A. A., and Jia, G. (2011). “Evaluation of stochastic simulation based methodologies for estimation of relative information entropy.” *2011 Conference of the ASCE Engineering Mechanics Institute*, June 2-4, Boston, MA.

Invited Talks

1. “Enhancing infrastructure resilience to natural hazards: addressing modeling complexity through soft computing and simulation driven approaches.” Colorado State University. March 8th 2016. Fort Collins, CO.
2. “Risk assessment/mitigation against natural hazards: addressing modeling complexity through soft computing and simulation driven approaches.” Ohio State University. March 19th 2015. Columbus, OH.

Student Advising

Current Students

- Min Li, PhD, 2018-present
- Zhenqiang Wang, PhD, 2017-present
- Jeet Kuman Sonwani, MS (Plan A, co-advise with Dr. Hussam Mahmoud), 2017-present

Graduate Students Committees

- Mohammad Reza Ameri Kaznoui, PhD
- Yangyang Wu, PhD
- Ali Hadi Badr Badr, MS (Plan A), graduated 2017
- Kyle Nickless, MS (Plan A), graduated 2017

Teaching

- CIVE680B1: Stochastic Simulation in Engineering Applications, Colorado State University, Spring 2018
- CIVE 367: Structural Analysis, Colorado State University, Fall 2016, 2017
- Reliability Analysis, University of Illinois at Urbana-Champaign, Fall 2015 (Guest lecturer for topics on “Advanced Stochastic Simulation Methods”)
- Courses TAed at University of Notre Dame
 - Methods of Civil Engineering Analysis, Fall 2009 and Fall 2010
 - Geotechnical Engineering, Spring 2010
 - Introduction to Structural Engineering, Fall 2011

- Stochastic System Analysis, Optimization, and Bayesian Updating, Spring 2011
- Course TAed at Beijing Jiaotong University
 - Structural Mechanics

University Committees

- CEE Graduate Admission Committee, Fall 2017 – present

Workshops Attended

- ARPA-E Workshop, University of Colorado Boulder, Boulder, CO, November 28, 2017
- NSF NHERI Coastal Hazards Engineering New User Workshop, Oregon State University, July 19-20, 2017
- ASCE ExCEED Teaching Workshop, Florida Gulf Coast University, Fort Myers, FL, June 18-23, 2017
- Writing Successful Grants Workshop, University of Notre Dame, Notre Dame, IN, September 25-26, 2014.
- Modeling and Numerical Methods for Uncertainty Quantification (MNMUQ2014), Porquerolles Island, France, September 1-5, 2014.

Some of the covered topics are:

- Reliability assessment by simulation methods
- Surrogate models (Kriging, SVM, polynomial chaos, applications to reliability assessment and global sensitivity analysis)
- High Performance Computing (HPC) for stochastic analysis
- Decision under uncertainty, robust optimization

Professional Memberships

- American Society of Civil Engineers (ASCE)
- Earthquake Engineering Research Institute (EERI)
- Engineering2Empower (E2E)

Journal Reviewer

- *Journal of Engineering Mechanics*
- *Sustainable and Resilient Infrastructure*
- *Reliability Engineering and System Safety*
- *Journal of Structural Engineering (ASCE)*
- *Journal of Bridge Engineering (ASCE)*
- *Engineering Structures*
- *Structural Safety*
- *Journal of Wind Engineering & Industrial Aerodynamics*

- *Applied Mathematical Modeling*
- *IEEE Transactions on Systems, Man and Cybernetics: Systems*
- *International Journal of Geographical Information Science*