

## Zhang Jian, Ph.D.

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### HIGHLIGHTS OF QUALIFICATIONS

- Expert in **numerical methods** for computational engineering mechanics, structures and inverse problems
- **Five years'** project research experience in offshore structural analysis, optimization and health monitoring
- Postgraduate research experience in developing numerical methods for **solids, structures & porous media**
- **Ten years'** professional programming in **FORTRAN** / Experienced in ABAQUS, ANSYS, MATLAB, etc.

### EDUCATION

Ph. D.	Computational Mechanics	National University of Singapore, Singapore	2008
M. Eng.	Mechanical Engineering	National University of Singapore, Singapore	2004
B. Eng.	Naval Architecture	Dalian University of Technology, P. R. China	2000

### PROFESSIONAL EXPERIENCE

08/11 – present **Research Fellow**, Minerals, Metals and Materials Technology Centre, NUS  
*Project: Feasibility Studies of Underground Coal Mining in Indonesia*

03/08 – 08/11 **Research Fellow**, Centre for Offshore Research and Engineering, NUS  
*Project: Smart Sensing and System Identification for Offshore Structures*

- Developed **genetic algorithm** based numerical strategy for **offshore structural dynamic identification**
- Focused on **jack-up structural modeling / fixity identification** along with **hydrodynamic coefficients**
- Completed **time domain output-only identification of foundation fixity** with **wave force estimated**
- Experimented **novel laboratory models** with **static & dynamic tests** for **model calibration / updating**
- Familiar with **time/frequency domain analysis**, and **wave theories, spectra & wave force calculations**

02/09 – 04/10 **Collaborative Researcher**, College of Civil Engineering, Southeast University, China  
*Project: Structural Health Monitoring (SHM) System for the Run Yang Suspension Bridge*

- Conducted frequency domain **modal identification** with **ambient vibration test** for model calibration
- Identified **variations of modal frequency** at different **excitations** and **temperatures** with SHM system
- Performed intensive **dynamic analyses of modal frequencies** to **boundary conditions, vehicle loads, structural / material properties** with a three-dimensional finite element bridge model using **ANSYS**

01/04 – 01/08

**Ph.D. Candidate**, Department of Mechanical Engineering, NUS

*Thesis: Development of Strong Form Methods with Applications in Computational Mechanics*

- Proposed **novel numerical methods**(Meshless/FEM) with high accuracy, efficiency, stability & versatility
- Performed **static, dynamic & adaptive modeling** using **FEM/devised methods** for **solids & structures**
- Accomplished **code programming/developing** in FORTRAN & MATLAB for **method generalization**
- Made in-depth studies on **error, efficiency & convergence** issues for practical engineering applications
- Experienced in **numerical modeling** with **ANSYS, ABAQUS** for **structural elastodynamic analysis**

01/02 – 12/03

**M.Eng. Candidate**, Department of Mechanical Engineering, NUS

*Thesis: A Numerical Study of Wave Propagation in Poroelastic Media by use of the Localized Differential Quadrature Method*

- Developed **wave propagation models** in **poroelastic media** with **derived closed-form exact solutions**
- Familiarized with **poroelasticity/fluid-solid interaction** and **differential quadrature** & its localization
- Skilled in **Fortran programming**, numerical algorithms (**Runge-Kutta, Newmark**) & implementation

07/00 – 12/01

**Research Assistant**, Dalian University of Technology, China

*Project: Structural Design & Optimization of BINGO-9000 Semisubmersible Drilling Platform*

- Familiarized with **structural dynamic analyses** of **tubular joints, columns & supporting structures**
- Experienced in computing **wave load** & analyzing **stress, strength & fatigue** of structural components
- Skilled in modeling with software **ANSYS** for **finite element structural analysis / optimization**
- Assisted the principal investigator in **model validating, report writing** and **project managing**

## HONORS & AWARDS

- **Marquis Who's Who in Asia**, New Jersey, USA, 2012 – present
- **Marquis Who's Who in the World**, New Jersey, USA, 2010 – present
- **Invited Lecture**, Anhui University of Science and Technology, Huainan, China, September 2009
- **Research Scholarship**, National University of Singapore, Singapore, 01/02 – 01/08
- **Dean's List**, Dalian University of Technology, China, 1997 – 2000
- **Second Prize**, Advanced Mathematics Competition, Dalian, China, 1997
- **Third Prize**, National Olympic Chemistry Competition, Anhui Province, China, 1995

## PROFESSIONAL ACTIVITIES

**Member**, Society for Experimental Mechanics, 02/09 – present

**Reviewer**, International Journal of Applied Mechanics, 02/09 – present

**Teaching Assistant**, National University of Singapore, 08/07 – 04/08

**Member**, International Association for Computational Mechanics, 04/04 – present

**Member**, Singapore Association for Computational Mechanics, 04/04 – present

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**PUBLICATIONS** (\* Corresponding author; # Main supervisor)

**ResearcherID:** <http://www.researcherid.com/rid/A-1080-2009>

(i) *Peer Reviewed Journal Articles*

1. Lam KY<sup>#</sup>, **Zhang J**, Zong Z, “A numerical study of wave propagation in a poroelastic medium by use of localized differential quadrature method”, *Applied Mathematical Modelling* 28, 487-511, 2004.
2. Liu GR<sup>#</sup>, **Zhang J**, Li H, Lam KY, Kee BBT, “Radial point interpolation based finite difference method for mechanics problems”, *International Journal for Numerical Methods in Engineering* 68, 728-754, 2006.
3. Liu GR<sup>#</sup>, **Zhang J**, Lam KY, Li H, Xu G, Zhong ZH, Li GY, Han X, “A gradient smoothing method (GSM) with directional correction for solid mechanics problems”, *Computational Mechanics* 41, 457-472, 2008.
4. **Zhang J\***, Liu GR, Lam KY, Li H, Xu G, “A gradient smoothing method (GSM) based on strong form governing equation for adaptive analysis of solid mechanics problems”, *Finite Elements in Analysis and Design* 44, 889-909, 2008.
5. Deng B, Tan KBC, Lu Y, Zaw K, **Zhang J**, Liu GR, Geng JP, “Inverse identification of elastic modulus of dental implant-bone interfacial tissue using neural network and FEA model”, *Inverse Problems in Science and Engineering* 17, 1073-1083, 2009.
6. Li ZJ, Li AQ, **Zhang J**, “Effect of boundary conditions on modal parameters of the Run Yang Suspension Bridge”, *Smart Structures and Systems* 6, 905-920, 2010.
7. Chen L, Liu GR, Jiang Y, Zeng K, **Zhang J**, “A singular edge-based smoothed finite element method (ES-FEM) for crack analyses in anisotropic media”, *Engineering Fracture Mechanics* 78, 85-109, 2011.
8. Chen L, Zhang GY, **Zhang J\***, Nguyen-Thoi T, Tang Q, “An adaptive edge-based smoothed point interpolation method for mechanics problems”, *International Journal of Computer Mathematics* 88, 2379-2402, 2011.
9. Chen L, Liu GR, Zeng K, **Zhang J**, “A novel variable power singular element in G space with strain smoothing for bi-material fracture analyses”, *Engineering Analysis with Boundary Elements* 35, 1303-1317, 2011.
10. Chen L, **Zhang J\***, Zeng KY, Jiao PG, “An edge-based smoothed finite element method for adaptive analysis”, *Structural Engineering and Mechanics* 39(6), 2011.

(ii) *Submitted/Prepared Journal Articles*

11. **Zhang J**, Koh CG, Trinh TN, Wang XM, Zhang Z, “Time domain output-only substructural identification of jack-up spudcan fixity”, *Marine Structures* (Submitted).
12. Koh CG, Wang XM, **Zhang J**, “System identification of jack-up platform in time domain and frequency domain”, *Applied Ocean Research* (Prepared).

(iii) *Peer Reviewed Conference Proceedings*

13. **Zhang J\***, Liu GR, Lam KY, Li H, “A gradient smoothing method (GSM) for adaptive stress analysis in solids”, in: *Proceedings of the International Conference on Computational Methods (ICCM 2007)*, Hiroshima, Japan, 4 - 6 April 2007, p. 104.
14. Zhang Z, Koh CG, **Zhang J\***, “System identification via orthogonal arrays sampled genetic algorithms”, in: *Proceedings of the 27th International Modal Analysis Conference (IMAC XXVII) on Structural Dynamics*, Orlando, Florida, USA, 9 - 12 February 2009, Paper No. 263.
15. Wang XM, Koh CG, **Zhang J**, “System identification of offshore jack-up platform”, in: *Proceedings of the Nineteenth International Offshore and Polar Engineering Conference (ISOPE 2009)*, Osaka, Japan, 21 - 26 June 2009, pp. 236-241.
16. **Zhang J\***, Thanh TN, Wang XM, Koh CG, Zhang Z, “Substructural identification of jack-up spudcan fixity using an improved genetic algorithm”, in: *Proceedings of the 22nd KKCNN Symposium on Civil Engineering (KKCNN 2009)*, Chiangmai, Thailand, 31 October - 2 November 2009, pp. 25-28.
17. **Zhang J\***, Koh CG, Wang XM, Thanh TN, Zhang Z, “Output-only substructural identification of jack-up spudcan fixity”, in: *Proceedings of the IV European Conference on Computational Mechanics (ECCM 2010)*, Paris, France, 16 - 21 May 2010, Paper No. 1641.
18. Wang XM, Koh CG, Thanh TN, **Zhang J**, “System identification of jack-up platform by spectral analysis”, in: *Proceedings of the ASME 29th International Conference on Ocean, Offshore and Arctic Engineering, 2010, Vol 1 (OMAE 2010)*, Shanghai, China, 6-11 June 2010, pp. 411-420.
19. Koh CG, **Zhang J**, Trinh TN, “System identification of offshore structures by genetic algorithms”, in: *Proceedings of the International Workshop on Structural Health Monitoring and Damage Assessment*, Taipei, Taiwan, 9 - 10 June 2011, pp. 40-47 (Invited paper).
20. Koh CG, **Zhang J**, Trinh TN, “Vibration-based parameter identification of large scale offshore structures”, in: *Proceedings of the 14th Asia Pacific Vibration Conference*, Hong Kong, China, 5 - 8 December 2011 (Invited keynote paper).

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## REFERENCES

(i) Prof. **Gui-Rong Liu**

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Ohio Eminent Scholar

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(ii) Prof. **Chan Ghee Koh**

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