

RESUME

Name: Xiaodan Ren, Ph.D., Associate Professor

Citizenship: China

Education:

Ph.D. 2006-2010 Tongji University — University of California, Los Angeles, Structural Engineering

M.S. 2003-2006 Tongji University, Structural Engineering

B.E. 1999-2003 Qingdao Institute of Technology, Civil Engineering

Employment:

01/2013-present Tongji University, Associate Professor

12/2010-12/2012 Tongji University, Lecturer

Invited visits:

École Polytechnique Fédérale de Lausanne (3/2017)

Atomic Energy Commission, France (7/2015)

University of Houston (7/2013), Rice University (7/2013)

Institute of Applied Mechanics, AMSS, CAS (5/2012)

Research:

I have been working on damage mechanics and computational mechanics for more than 10 years. The major achievements include: (1) the development of a class of novel damage model considering rate dependency and randomness; (2) investigation of multi-scale damage theory and invention of computational size effect; (3) systematic application for damage theory to the simulation of super high-rise buildings. My current research involves damage theory for brittle and ductile materials, advanced numerical methods for the simulation of structures underdoing extreme events, bio-mechanics and bone mechanics.

Publications:

I have co-authored more than 60 academic papers. The selected papers are as follows:

- [1] Ren X, Zeng S, Li J. A rate-dependent stochastic damage–plasticity model for quasi-brittle materials[J]. *Computational Mechanics*, 2015, 55(2): 267-285.
- [2] Ren X, Li J. A unified dynamic model for concrete considering viscoplasticity and rate-dependent damage[J]. *International Journal of Damage Mechanics*, 2013, 22(4): 530-555.
- [3] Ren X, Li J. Dynamic fracture in irregularly structured systems[J]. *Physical Review E*, 2012, 85(5): 055102.
- [4] Ren X, Chen J S, Li J, et al. Micro-cracks informed damage models for brittle solids[J]. *International journal of solids and structures*, 2011, 48(10): 1560-1571.
- [5] Li J, Ren X. Stochastic damage model for concrete based on energy equivalent strain[J]. *International Journal of Solids and Structures*, 2009, 46(11): 2407-2419.
- [6] Kulper, S. A., Fang, C. X., Ren, X., Guo, M., Sze, K., Leung, F. K. and Lu, W. W., Development and initial validation of a novel smoothed-particle hydrodynamics-based simulation model of trabecular bone penetration by metallic implants. *Journal of Orthopaedic Research*. Accepted. doi:10.1002/jor.23734
- [7] Xiaodan Ren, Jie Li. Two-level consistent secant operators for cyclic loading of structures. *Journal of Engineering Mechanics—ASCE*. 2018. DOI: 10.1061/(ASCE)EM.1943-7889.0001494.
- [8] Jianbing Chen, Jingran He, Xiaodan Ren, Jie Li. A Stochastic Harmonic Function Representation of Random Fields for Material Properties of Structures. *Journal of Engineering Mechanics—ASCE*. 2018. DOI: 10.1061/(ASCE)EM.1943-7889.0001469.
- [9] Xiangling Gao, Xiaodan Ren, Jie Li and Yangbo Zhang. Bond behavior between steel reinforcing bars and concrete under dynamic loads. *Structural Concrete*. DOI: 10.1002/suco.201700205.
- [10] Sloan A. Kulper, K.Y. Sze, Christian X. Fang, Xiaodan Ren, Margaret Guo, Kerstin Schneider, Frankie Leung, William Lu, Alfonso Ngan. A novel fracture mechanics model explaining the axial penetration of bone-like porous, compressible solids by various orthopaedic implant tips, *Journal of the Mechanical Behavior of Biomedical Materials*, 2018, 80(1): 128-136.
- [11] Xiaodan Ren and Qingxia Yue. Reliability assessment of reinforced concrete structures based on random damage model. *Structure and Infrastructure Engineering*. 2017, doi: 10.1080/15732479.2017.1360366.
- [12] Xiaodan Ren, Qiong Bai and Jie Li. Seismic Behaviors of Tall Buildings Using Steel-Concrete Composite Columns and Shear Walls, *The Structural Design of Tall and Special Buildings*. 2018, 27(4): e1441.
- [13] Xiaodan Ren, Kai Liu, Jie Li and Xiangling Gao, Compressive behavior of stirrup-confined concrete under dynamic loading. *Construction and Building Materials*. 2017, 154(1): 10-22.
- [14] Tiancan Huang, Xiaodan Ren, Jie Li. Incremental dynamic analysis of seismic collapse of super-tall building structures. *The Structural Design of Tall and Special Buildings*. 2017, 26(16): 1-11.
- [15] Hao Zhou, Jie Li and Xiaodan Ren. Multiscale Stochastic Structural Analysis Toward Reliability Assessment for Large Complex Reinforced Concrete Structures. *International Journal for Multiscale Computational Engineering*. 2016, 14(3): 303-321.
- [16] Ren X, Li J. Multi-scale based fracture and damage analysis of steel fiber reinforced concrete[J]. *Engineering Failure Analysis*, 2013, 35: 253-261.

- [17] Ren X, Li J. Pragmatic analysis of material instability under strain control loading[J]. Engineering Failure Analysis, 2011, 18(2): 720-725.
- [18] Ren X, Li J. Hysteretic deteriorating model for quasi-brittle materials based on micromechanical damage approach[J]. International Journal of Non-Linear Mechanics, 2011, 46(1): 321-329.
- [19] Ren X D, Yang W Z, Zhou Y, et al. Behavior of high-performance concrete under uniaxial and biaxial loading[J]. ACI materials journal, 2008, 105(6): 548-557.
- [20] Decheng Feng and Xiaodan Ren. Enriched Force-Based Frame Element with Evolutionary Plastic Hinge. Journal of Structural Engineering-ASCE. 2017, 143(10): 06017005.

Selected Grants:

NSFC, “Study of fatigue damage behavior of concrete based on multi-scale approach”, 2017-2020.

NSFC, “Mesoscopic Damage Simulation and Numerical Size Effect of Concrete”, 2013-2015.

Ministry of Education of China, “Multi-scale damage modeling of concrete”, 2013-2015.

NSFC, “Reliability theory of complex concrete structure”, 2016-2020, with Prof. Jie Li.

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