



Curriculum Vitae

• Personal Data •

Xie, Fan, Ph.D. candidate

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• Objective •

Application for a postdoctoral position in Solid Mechanics

• Education •

Ph.D. in *Solid Mechanics*, Beihang University...09/2011~06/2016(expected)

Thesis: Finite element analysis and molecular dynamics simulation of the static and dynamic properties of the interpenetrating phase composites

Supervisor: Prof. Zixing Lu

B.E. in *Engineering Mechanics*, Beihang University.....09/2007~06/2011

Thesis: Models of low density foam and applications

• Research Interests •

- ✧ Modeling and simulation of composite materials
- ✧ Fracture and damage analysis of composites
- ✧ Multi-scale modeling of nano-materials

• Research Experience •

FEM simulation and theoretical study on Interpenetrating phase composites

The project is supported by the National Natural Science Foundation for young scientists of China. (NSFC, 10932001).

- ✧ Overall responsible for the project planning, theoretical derivation, numerical implementation and the final report writing, led a group of a doctoral student and two master students.
- ✧ Developed a 3D random finite element (FE) model to characterize the interpenetrating phase composite (IPC) based on the phase field method using an in-house FORTRAN code.
- ✧ Elastic and elastoplastic behaviors of IPC were studied using APDL in ANSYS.
- ✧ Developed a mechanical model with elastic foundation beam theory to predict the formula of elastic modulus of IPC theoretically.
- ✧ Current achievements: 3 papers published.

Investigations on disperse wave in viscoelastic polymer via Molecular dynamics simulation

The project is supported by a research institute of China.

- ✧ Overall responsible for the project planning, numerical simulation and the final report writing, led a group of two master students.
- ✧ Molecular dynamics simulation (MDs) based on a united atom (UA) approach was performed to analyze the mechanical behaviors of polyethylene (PE) under high speed shock compression.

- ✧ Hugoniot curve in u_s-u_p was presented for different system scales and the influences on chain number and chain length were analyzed.
- ✧ The molecular morphological evolution was investigated by the statistical method to study the major molecular deformation mechanism.
- ✧ All these simulations were based on LAMMPS and visualization was based on Ovito.
- ✧ Current achievements: 1 paper published.

Theoretical investigation on surface effects of nanoporous materials

- ✧ Studied surface effects on the mechanical behavior of nanoporous materials under high strains with an improved anisotropic Kelvin model.
- ✧ The influence of strut size of nanoporous materials was discussed, which became a key factor with consideration of the residual surface stress and the surface elasticity.
- ✧ The stress-strain relations were derived by the theories of Euler-Bernoulli beam and surface elasticity.
- ✧ Current achievements: 1 paper published.

Investigations on the mechanical properties of random fibrous ceramics

- ✧ Measured porosity and macro-mechanical behavior and analyzed the micro-damage mechanism of random fibrous ceramics using experiments.
- ✧ A micro-geometrical model was constructed to reveal the random fiber boned networks and FEM was employed to investigate the micromechanics, failure mechanism and mechanical properties of this highly porous material using APDL in ANSYS.
- ✧ Current achievements: 2 papers published as a co-author.

• Publications •

Journals:

- [1] **Fan Xie**, Zixing Lu, Zhenyu Yang, Wenjun Hu. Mechanical behavior of polymers under high speed shock compression: a molecular dynamics simulation study. *Polymer* (under review) (SCI, IF=3.562, JCR Q1)
- [2] **Fan Xie**, Zixing Lu, Zeshuai Yuan. Numerical analysis of elastic and elastoplastic behavior of interpenetrating phase composites. *Computational Materials Science*, 2015, 97:94-101. (SCI, IF=2.131, JCR Q2)
- [3] Zixing Lu, **Fan Xie**, Qiang Liu, et al. Surface effects on mechanical behavior of elastic nanoporous materials under high strain. *Applied Mathematics and Mechanics*, 2015, 36(7):927-938. (SCIE, IF=1.128, JCR Q2)
- [4] Zixing Lu, **Fan Xie**, Jianyue Wang. Theoretical prediction of elastic modulus of interpenetrating phase composites with open-cell foam skeleton. *Acta Materiae Compositae*, 2014, 31(5):1330-1336. (In Chinese) (EI)
- [5] Zixing Lu, Xiang Li, Zhenyu Yang, **Fan Xie**. Novel structure with negative Poisson's ratio and enhanced Young's modulus. *Composite Structures*, 2015, 138: 243-252. (SCI, IF=3.318, JCR Q1)
- [6] Zixing Lu, Zeshuai Yuan, Qiang Liu, Zijun Hu, **Fan Xie**, Man Zhu. Multi-scale simulation of the tensile properties of fiber-reinforced silica aerogel composites. *Materials Science and Engineering: A*, 2015, 625:278-287. (SCI, IF=2.567, JCR Q1)
- [7] Zeshuai Yuan, Zixing Lu, Mingyang Chen, Zhenyu Yang, **Fan Xie**. Interfacial properties of carboxylic acid functionalized CNT/polyethylene composites: A molecular dynamics simulation

study. *Applied Surface Science*, 2015, 351:1043-1052. (SCI, IF=2.711, JCR Q1)

- [8] Zixing Lu, Lianbang Cui, Zeshuai Yuan, Zhenyu Yang, **Fan Xie**. Numerical analysis of the elastic-plastic properties of the composites incorporating nanohybrid shish-kebab structures. *Computational Materials Science*, 2015, 109:56-65. (SCI, IF=2.131, JCR Q2)

Conferences:

- [9] **Fan Xie**, Zixing Lu. Shock wave propagation in polyethylene via molecular dynamics simulation. *International Conference on Composites and Nano-engineering*, 2015. (Oral presentation)
- [10] **Fan Xie**, Zixing Lu. Finite element analysis of thermo-mechanical behavior of IPC. *Chinese Congress of Theoretical and Applied Mechanics*, 2015. (In Chinese) (Oral presentation)

• Research Skills •

Computational skills:	Skilled in writing the UMAT subroutine in LS-DYNA, ANSYS and ABAQUS Skilled in Molecular Dynamics simulations with LAMMPS, Ovito and Atomeye Good at numerical computation using MATLAB, C and FORTRAN languages.
Theoretical skills:	Skilled in developing mechanical models for complicated material systems Deep understanding in fundamental theory, like continuum mechanics, elastic mechanics, material mechanics etc.
Experimental skills:	Experienced in static mechanical test and familiar with dynamic mechanical test.

• Honors and Awards •

2015	National scholarship for Graduate students (2.6/100)
	Chairman of School Graduate Student Union
2013	Football Referee National Level Two
	Chairman of School Graduate Student Union
2012	Basketball Referee National Level Two
	The Second-class graduate scholarship of Beihang University (15/100)
2011	Outstanding graduate student of Beihang University
	Second Place of AUBA of Beihang University
2010	Silver medallist of Chinese Undergraduate Mathematics Competitions
	Third-prize in the 20 th Beihang University Feng Ru Cup Competition
2008	Excellent Olympic Volunteer in Beijing Olympic Games
	Golden Boot of School Football Game

• References •

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✧ Jianxiang Wang	Title: Professor
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✧ **Yuli Chen**

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