Curriculum Vitae

• Personal Data •

Xie, Fan, Ph.D. candidate

Affilication: Institute of Solid Mechanics, Beihang University
Tel: +86-158-1053-8295
Email: xiefan@buaa.edu.cn; fanfan.zd@163.com
Address: 37 Xueyuan Road, Haidian District, Beijing, 100083, China

• 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 and applications of low density porous materials

• 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 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 and compared with experimental data.
- ✧ 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.

Multi-scale investigations on the mechanical properties of CNT/fiber reinforced composites

- A periodic molecular dynamics (MD) model is proposed to investigate the mechanical properties of the interface between a functionalized single-walled carbon nanotube (SWNT) and matrix.
- A micro-geometrical model was constructed to reveal the random fiber networks and FEM was employed to investigate the micromechanics, failure mechanism and mechanical properties of this CNT/fiber reinforced composites using APDL in ANSYS.
- Current achievements: 3 papers published as a co-author.

• Research Interests •

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

• 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)
2013	Chairman of School Graduate Student Union Football Referee National Level Two
2012	Chairman of School Graduate Student Union Basketball Referee National Level Two
2011	The Second-class graduate scholarship of Beihang University (15/100) 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 20th Beihang University Feng Ru Cup Competition
2008	Excellent Olympic Volunteer in Beijing Olympic Games Golden Boot of School Football Game

• References •

- **Zixing Lu** Title: Professor
  Affiliation: Institute of Solid Mechanics, Beihang University, Beijing, China
  Tel: +86-136-2109-3373
  Email: luzixing@buaa.edu.cn

✧ **Jianxiang Wang**
Title: Professor
Affiliation: Dept. Mechanics & Engineering Science, Peking University, Beijing, China
Tel: +86-10-62757948
Email: jxwang@pku.edu.cn

✧ **Yuli Chen**
Title: Associate Professor
Affiliation: Institute of Solid Mechanics, Beihang University, Beijing, China
Tel: +86-10-82318410
Email: yulichen@buaa.edu.cn