

# Chunyu Li, Ph. D.

## Education:

- 09/1996~04/1999 Ph.D, Solid Mechanics, Harbin University of Technology, China  
09/1986~05/1989 M.S., Structural Engineering, Tongji University, China  
09/1982~07/1986 B.S., Applied Mechanics, Tianjin University, China

## Research Interests:

- **Computational Material Sciences:**  
Molecular Mechanics; Molecular Dynamics Simulations; Monte Carlo Simulations;
- **Computational Solid Mechanics:**  
Finite Element Method; Boundary Element Method; Extended Finite Element Method;  
Dynamic Fracture Mechanics;
- **Composite Materials:**  
Fiber-Reinforced Polymeric Composites; Metal/Ceramic Functionally Graded Materials;  
Environment Barrier Coating; Nanotube-based composites; Multifunctional Composites;  
Conductive Composites; Thermoplastic/Thermoset Polymers;

## Book Chapters:

Chunyu Li, Erik T. Thostenson and Tsu-Wei Chou, **Chapter 5: Carbon Nanotube-Based Composites and Damage Sensing.** In *Multifunctional Polymer Nanocomposites*. Publisher: Taylor and Francis Group. (2010).

## Journal Publications:

1. Chunyu Li, Zou, Zhenzhu. Internally circumferentially cracked cylinder with functionally graded material properties. *International Journal of Pressure Vessels & Piping*, **75(6)**: 499-507(1998).
2. Chunyu Li, Zou, Zhenzhu. Stress intensity factors for function-ally graded material cylinder with an external circumferentially crack. *Fatigue & Fracture of Engineering Material & Structures*, **21**:1447-1457(1998).
3. Chunyu Li, Zou, Zhenzhu. Local stress field for a penny-shaped crack in a functionally Graded material. *International Journal of Fracture*, 91: L17-L22. (1998).
4. Chunyu Li, Zou, Zhenzhu. Torsional impact response of a functionally graded material with a penny-shaped crack. *Journal of Applied Mechanics*, 66: 566-567(1999).
5. Chunyu Li, Zou, Zhenzhu Duan, Zhuping. Stress intensity factors for functionally graded solid cylinders. *Engineering Fracture Mechanics*, 63: 735-749 (1999).
6. Chunyu Li, Zou, Zhenzhu Duan, Zhuping. Torsional impact response of a transversely isotropic solid with functionally graded moduli and a penny-shaped crack. *Theoretical and Applied Fracture Mechanics*, 32: 157-163(1999).
7. Chunyu Li, Zou, Zhenzhu Duan, Zhuping. Dynamic stress field around the mode III crack tip in an orthotropic functionally graded material. *Applied Mathematics and Mechanics*, 21: 651-658(2000).
8. Chunyu Li, Zou, Zhenzhu Duan, Zhuping. Multiple isoparametric finite element method for nonhomogeneous Media. *Mechanics Research Communications*, 27: 137-142 (2000).
9. Zou, Z. Z, Wu, S. X., Chunyu Li. On the multiple isoparametric finite element computation of stress intensity factor for cracks in FGMs. *Key Engineering Materials*, 183: 511-516(2000).
10. Chunyu Li, Zou Zhenzhu, Duan Zhuping. Dynamic stress field around the crack tip in a functionally graded material. *Acta Mechancia Sinica*, 33(2): 270-274(2001).

11. Chunyu Li, Weng, G. J. Duan, Zhuping, Zou, Zhenzhu. Dynamic stress intensity factor of a functionally graded material with a finite crack under antiplane shear loading. *Acta Mechanica*, 149: 1-10(2001).
12. Chunyu Li, Zou Zhenzhu, Duan Zhuping. Stress field around the antiplane crack tip in an orthotropic functionally graded material. *Acta Mechnica Solida Sinica*, 22(1): 81-84(2001).
13. Chunyu Li, Weng, G. J., Dynamic behavior of a cylindrical crack in a functionally graded interlayer under torsional loading. *International Journal of Solids and Structures*, 38, 7473-7485(2001).
14. Chunyu Li, Weng, G. J., Dynamic stress intensity factor for a cylindrical interface crack between two coaxial dissimilar cylinders bonded with an FGM interlayer. *Mechanics of Materials*, 33(6): 325-333(2001).
15. Chunyu Li, Duan, Zhuping Zou, Zhenzhu. Torsional impact response of a penny-shaped interface crack in bonded materials with a graded material interlayer. *Journal of Applied Mechanics*, 69: 303-308 (2002).
16. Chunyu Li, Weng, G. J., Dynamic fracture analysis of a penny-shaped crack in a functionally graded material interlayer. *Mathematics and Mechanics of Solids*, 7: 149-163 (2002).
17. Chunyu Li, Weng, G. J., Antiplane crack problem in functionally graded piezoelectric materials. *Journal of Applied Mechanics*, 69: 481-488 (2002).
18. Chunyu Li, Weng, G. J., Yoffe-type moving crack in a functionally graded piezoelectric material. *Proceedings of Royal Society of London, A* 458: 381-399(2002).
19. Chunyu Li, Chou, T.-W., A structural mechanics approach for the analysis of carbon nanotubes. **International Journal of Solids and Structures**, 40(10):2487-2499 (2003).
20. Chunyu Li, Chou, T.-W., Elastic moduli of multi-walled carbon nanotubes and the effect of van der Waals forces. *Composite Science and Technology*, 63 (11), 1517-1524(2003).
21. Chunyu Li, Chou, T.-W., Single-walled carbon nanotubes as ultrahigh frequency nanoresonators. **Physics Review B**, 68: 073405 (2003).
22. Chunyu Li, Chou, T.-W., Modeling of carbon nanotube-reinforced composites. *Journal of Nanoscience and Nanotechnology*, 3: 423-430(2003).
23. Chunyu Li, Chou, T.-W., Modeling of Elastic Buckling of Carbon Nanotubes by Molecular Structural Mechanics Approach. *Mechanics of Materials*, 36(11): 1047-1055(2004).
24. Chunyu Li, Chou, T.-W., Elastic properties of single-walled carbon nanotubes in transverse directions. **Physics Review B**, 69: 073401(2004).
25. Chunyu Li, Chou, T.-W., Vibrational behaviors of multi-walled carbon nanotube-based nanomechanical resonators. **Applied Physics Letters**, 84,:121-123 (2004).
26. Chunyu Li, Chou, T.-W., Mass detection using carbon nanotube-based nanomechanical resonators. **Applied Physics Letters**, 84: 5246-5248 (2004).
27. Chunyu Li, Chou, T.-W., Strain and pressure sensing using single-walled carbon nanotubes. *Nanotechnology*, 15: 1493-1496(2004).
28. Chunyu Li, Chou, T.-W., Quantized molecular structural mechanics modeling for specific heat of single-walled carbon nanotubes. **Physics Review B**, 71, 075409(2005).
29. E.T. Thostenson, Chunyu Li, Chou, T.-W., Nanocomposites in context. *Composite Science and Technology*, 65, 491-516 9(2005).
30. Chunyu Li, Chou, T.-W., Axial and radial thermal expansion of single-walled carbon nanotubes. **Physics Review B**, 71, 155401(2005).
31. Chunyu Li, Chou, T.-W., Static and dynamic properties of single-walled boron nitride nanotubes. *J. Nanoscience and Nanotechnology*, 6, 54-60 (2005).
32. Chunyu Li, Chou, T.-W., Atomistic modeling of carbon nanotube-based mechanical sensors. *Journal of Intelligent Materials Systems and Structures*, 17, 247-254(2005).
33. Chunyu Li, Chou, T.-W., Modeling of heat capacities of multiwalled carbon nanotubes by molecular structural mechanics. *Materials Science and Engineering A*, 409, 140-144(2005).
34. Chunyu Li, Chou, T.-W., Modeling of carbon nanotube clamping in tensile tests. *Composite Science and Technology*, 65, 2407-2415(2005).

35. Chunyu Li, Chou, T.-W., Elastic wave velocities in single-walled carbon nanotubes. **Physical Review B**, 72, 245407(2006).
36. Chunyu Li, Chou, T.-W., Multiscale Modeling of Compressive Behavior of Carbon Nanotube/Polymer Composites. *Composites Science and Technology*, 66, 2409-2414(2006).
38. Chunyu Li, Chou, T.-W., Charge-Induced Strains in Single-Walled Carbon Nanotubes. *Nanotechnology*, 17, 4624-4628(2006).
39. Chunyu Li, Chou, T.-W., Electrostatic charge distribution on single-walled carbon nanotubes, **Applied Physics Letters**, 89, 063103(2006).
40. Chunyu Li, Chou, T.-W., Theoretical studies on the failure of charged single-walled carbon nanotubes. *Carbon*, 45, 922-930(2007).
41. Chunyu Li, Chou, T.-W., Continuum percolation of nanocomposites with multiple fillers of arbitrary shapes. **Applied Physics Letters**, 90, 174108(2007).
42. Chunyu Li, Chou, T.-W., A highly efficient algorithm for backbone identification. *J. Phys. A: Math. Theor.* 40 (2007) 14679–14686.
43. Chunyu Li, Thostenson, E. T., Chou, T.-W. Dominant role of contact resistance in electrical conductivity of carbon nanotube-based composites. **Applied Physics Letters** 91, 223114(2007).
44. Chunyu Li, Thostenson, E. T., Chou, T.-W. Sensors and actuators based on carbon nanotubes and their composites: A review. *Composite Science and Technology* 68 (2008) 1227–1249.
45. Chunyu Li, Thostenson, E. T., Chou, T.-W., Effect of nanotube waviness on the electrical conductivity of carbon nanotube-based composites. *Composite Science and Technology*, 68 (2008) 1445–1452.
46. Chunyu Li, Chou, T.-W., Electrical conductivity of composites with aligned carbon nanotubes. *J. Nanoscience and Nanotechnology*, 12 (2008) 456-464.
47. Chunyu Li, Thostenson, E. T., Chou, T.-W., Modeling of damage sensing in fiber composites using carbon nanotube networks. *Composite Science and Technology*, 68 (2008) 1016.
48. Chunyu Li, Chou, T.-W., Precise determination of backbone structure and conductivity of 3D percolation networks. *Int J Modern Physics C*, 20, 423-433 (2009).
49. Chunyu Li, Jim Lua, A hyper-viscoelastic constitutive model of polyurea. *Materials Letters*, 63, 877-880 (2009).
50. Chunyu Li, Chou, T.-W., Failure of Carbon Nanotube Polymer Composites and the Effect of Nanotube Waviness. *Composites Part A-Applied Science and Manufacturing*, 40(10): 1580-1586 (2009).
51. Thostenson ET, Gangloff JJ, Li CY, Byun JH, Electrical anisotropy in multiscale nanotube/fiber hybrid composites. **Applied Physics Letters** 95(7), 073111 (2009).
52. Chunyu Li and A. Strachan, Molecular Dynamics Simulations on Crosslinking Process of Thermosetting Polymers. **Polymer** 51, 6058-6070 (2010).
53. Chunyu Li and A. Strachan, Molecular dynamics predictions of thermal and mechanical properties of thermoset polymer EPON862/DETDA. **Polymer** 52, 2920-2928 (2011).
54. Chunyu Li, A. Strachan, Effect of thickness on the thermo-mechanical response of free-standing thermoset nanofilms from molecular dynamics. **Macromolecules** 44, 9448-9454 (2011).
55. Chunyu Li, A. R. Browning, S. Christensen and A. Strachan, Atomistic Simulations on Multilayer Graphene Reinforced Epoxy Composites. *Composites A: Applied Science and Manufacturing*, 2012 (in press).
56. Chunyu Li, G.A. Medvedev, J. M. Caruthers, and A. Strachan, Molecular Dynamics Simulations and Experimental Studies on Glassy and Rubbery Thermomechanical Properties of Thermoset EPON825/33DDS. *Polymer*, 2012 (submitted).

### Conference papers:

1. E. T. Thostenson, Chunyu Li, Tsu-Wei Chou and Zhifeng Ren. "Carbon Nanotube-Based Polymeric Composites," Proceedings of the 8<sup>th</sup> International Conference on Composites Engineering, Tenerife, Spain (2001).

2. E. T. Thostenson and Chunyu Li, Tsu-Wei Chou, "Carbon Nanotube Based Polymeric Composites – A Review," Proceedings of the Third Canadian International Conference on Composites, Montreal, Canada (2001).
3. E. T. Thostenson, Chunyu Li and Tsu-Wei Chou, "Processing, Characterization and Modeling of Carbon Nanotube/Polymer Composites," Proceedings of DURACOSYS, Tokyo, Japan (2001),
4. Chunyu Li and Tsu-Wei Chou, "An Atomistic Modeling of Carbon Nanotube Tensile Strength," Proceedings of 43<sup>rd</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, AIAA-2002-1520, Denver, Colorado (2002).
5. Tsu-Wei Chou, E. T. Thostenson and Chunyu Li, "Recent Research in Carbon Nanotube Composites," Proceeding of ICCE-9, San Diego, CA (2002) (Keynote Address).
6. E. T. Thostenson, Chunyu Li, Tsu-Wei Chou "Carbon Nanotube Reinforcement: Characterization and Modeling of Composites at the Nano-Scale," Proceedings of ECCM-10, Brugge, Belgium (2002), (Keynote Address).
7. Chunyu Li and Tsu-Wei Chou, "A Computational Structural Mechanics Approach to Modeling of Nanostructures," Proceedings of Fifth World Congress on Computational Mechanics, Vienna, Austria (2002).
8. E. T. Thostenson and Chunyu Li and Tsu-Wei Chou, "Carbon Nanotube-Reinforced Composites: Processing, Modeling and Property Characterization," Proceedings of the 10<sup>th</sup> US-Japan Conference on Composite Materials (2002), Stanford, CA.
9. E. T. Thostenson, Chunyu Li and Tsu-Wei Chou, "Modeling and Characterization of Carbon Nanotubes and their Composites: Bridging the Micro and Nano Scales," Proceedings of the International Symposium on Textile Composites (TEXCOMP 6), (2002), Philadelphia, PA.
10. Chunyu Li and Tsu-Wei Chou, "Modeling of the Elastic Behavior of Double-Walled Carbon Nanotubes," Proceedings of the 44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference (2003), Norfolk, VA, Paper No. AIAA 2003-1553.
11. Chunyu Li and Tsu-Wei Chou, "Effective Elastic Modulus of Aligned Carbon Nanotube Reinforced Polymer Composites," International Conference on Computational & Experimental Engineering and Sciences, ICCES' 03 Corfu, Greece, (2003).
12. Chunyu Li and Tsu-Wei Chou, "Multiscale Modeling of Compressive Behavior of Carbon Nanotube/Polymer Composites," Proceedings of the American Society for Composites 18<sup>th</sup> Technical Conference, (2003), Gainesville, FL.
13. Chunyu Li and Tsu-Wei Chou, "Modeling of Carbon Nanotubes and Carbon Nanotube/Polymer Composites," Proceedings of the 16<sup>th</sup> U. S. Army Symposium on Solid Mechanics, Charleston, SC, (2003), p. 1111.
14. Chunyu Li and Tsu-Wei Chou, "Anisotropic Elastic Properties of Carbon Nanotubes," Proceedings of the 45<sup>th</sup> AIAA Structural, Dynamics and Materials Conference, Palm Springs, CA, (2004).
15. Chunyu Li and Tsu-Wei Chou, "Modeling of Carbon Nanotubes and Their Composites," Proceedings of the International Workshop on Nanomechanics, Monterey, CA, (2004).
16. E. T. Thostenson, Chunyu Li and Tsu-Wei Chou, "Nanoscale Devices and Nanocomposites Based on Carbon Nanotubes: Processing, Characterization and Modeling," Proceedings of the 11<sup>th</sup> International Conference on Composites/Nano Engineering (ICCE-11), Hilton-Head, SC, (2004).
17. Chunyu Li and Tsu-Wei Chou, "Atomistic Modeling for Static, Dynamic and Thermal Properties of Carbon Nanotubes," Proceedings of the American Society for Composites 19<sup>th</sup> Annual Technical Conference, Atlanta, GA, (2004).

18. Chunyu Li and Tsu-Wei Chou, "Simulations of Carbon Nanotube-Based Nanoresonators and Nanosensors," Proceedings of the 46th AIAA Structural, Dynamics and Materials Conference, Austin, TX, (2005).
19. Chunyu Li and Tsu-Wei Chou, "Modeling Studies on Boron Nitride Nanotubes and Their Composites," Proceedings of the American Society for Composites 20<sup>th</sup> Technical Conference, (2005), Philadelphia, PA.
20. Chunyu Li and Tsu-Wei Chou, "The Mechanics of Carbon Nanotubes and Their Composites," Proceedings of the International Conference on Computational Experimental Engineering and Sciences, (2005), Chennai, India.
21. Chunyu Li and Tsu-Wei Chou, "Charge Distributions on Single-Walled Carbon Nanotubes by an Atomistic Moment Method," Proceedings of the American Society for Composites—Twentieth Technical Conference, Sep. 9-14 (2006) Philadelphia.
22. E.T. Thostenson, C. Li and Tsu-Wei Chou. "Carbon Nanotube-Based Composites for Damage Detection and Health Monitoring," Proceedings of the 16<sup>th</sup> International Conference on Composite Materials, (2007), Kyoto, Japan (Keynote).

**Refereeing Activities:**

Acta Mechanica  
 Applied Mechanics Review  
 Carbon  
 Composite Science and Technology  
 Composites Part A-Applied Science and Manufacturing  
 Composites Part B-Engineering  
 Computational Materials Science  
 Computer Modeling of Engineering Science  
 International Journal of Solids and Structures  
 International Journal of Smart and Nano Materials  
 Journal of AIAA  
 Journal of Applied Physics  
 Journal of Physical Chemistry  
 Journal of Sound and Vibration  
 Journal of the Mechanics and Physical Solids  
 Materials Science and Engineering A  
 Mechanics of Materials  
 Proceedings of the Royal Society of London A  
 Physica B  
 Physical Review B  
 Physical Review Letters  
 Smart Materials and Structures  
 Solid State of Communications  
 Thin Solid Films

**PhD Dissertation:**

"Static/Dynamic Fracture Mechanics of Functionally Graded Composite Materials", 1999

**MS Thesis:**

"Boundary Element Analysis of Surface Crack on Cylinders", 1989

**Honors and Awards**

Outstanding Dissertation, “Static/Dynamic Fracture Mechanics of Functionally Graded Materials”,  
Harbin Institute of Technology, China, 1999.

Outstanding Research Scholar, Center of Composites Materials, University of Delaware, 2007

**Publication citations:**

Total 2276 times of SCI citations; 2124 times without self-citations;  
average 45 times per article; h-index 20.