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Department of Mechanical Engineering
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EDUCATION

Ph.D. Mechanical Engineering, March 2006
Northwestern University, Evanston, IL, USA
Dissertation Title: Development of a feedback-controlled carbon nanotube-based
nanoelectromechanical device
Dissertation Advisor: Horacio D. Espinosa

M.S. Mechanical Engineering, March 2000
Beijing Institute of Technology, Beijing, China

B.S. Mechanical Engineering, July 1997
Beijing Institute of Technology, Beijing, China

PROFESSIONAL EXPERIENCE

09/13 – present: Associate Professor, Department of Mechanical Engineering, State University of New York at Binghamton, Binghamton, NY.

09/07 – 08/13: Assistant Professor, Department of Mechanical Engineering, State University of New York at Binghamton, Binghamton, NY.

04/06 – 08/07: Postdoctoral Research Associate, Department of Mechanical Engineering and Materials Science, Center of Biologically Inspired Materials and Material Systems, Duke University, Durham, NC. (Supervisor: Piotr E. Marszalek)

06/05 – 09/05: Mechanical Engineer, Intel Corporation, Hillsboro, OR.

AWARDS AND HONORS (SINCE 2008)

AFOSR Young Investigator Program Award, 2011
ICTAM Award, US National Committee on Theoretical and Applied Mechanics, 2012
NYS/UUP Individual Development Award, Binghamton University, 2008 & 2011
NSF Fellowship, NSF Summer Institute on Energy Challenge and Nanotechnology, 2008

RESEARCH INTERESTS

Experimental mechanics of 1D and 2D nanostructures, nanoscale adhesion and interfaces, nanocomposites, bio-inspired complex and hybrid nano-systems, and NEMS

TEACHING/COURSE OFFERING

- ME 211 “Introduction to Solid Mechanics”
- ME 412 “Structural Mechanics”
- ME 511 “Elasticity”
- ME 514 “Plasticity”
- ME 518 “Advanced Mechanics of Materials”
- ME 580C “Selected Topics in Nano-Bio Science and Engineering”
- ME 480/590 “Introduction to Nanotechnology”

PUBLICATIONS

Published Refereed Journal Articles

(Researcher ID: [C-4064-2008](http://www.researcherid.com/rid/C-4064-2008); <http://www.researcherid.com/rid/C-4064-2008>)

30. Xiaoming Chen, Meng Zheng, Cheol Park, and **Changhong Ke**, “Collision and Dynamic Frictional Properties of Boron Nitride Nanotubes,” *Applied Physics Letters*, Vol. **102**, Art No 121912, 2013.
29. Xiaoming Chen, Meng Zheng, Cheol Park, and **Changhong Ke**, “Direct Measurements of the Mechanical Strength of Carbon Nanotube-Poly(methyl methacrylate) Interfaces,” *Small*, accepted for publication, 2013.
28. Shanshan Li, Quan Yuan, Bashir I. Morshed, **Changhong Ke**, Jie Wu and Hongyuan Jiang, “Dielectrophoretic Responses of DNA and Fluorophore in Physiological Solution by Impedimetric Characterization,” *Biosensors and Bioelectronics*, Vol.41, pp.649–655, 2013.
27. Meng Zheng, Lianfeng Zou, Howard Wang, Cheol Park, and **Changhong Ke**, “Quantifying the Transverse Deformability of Double-walled Carbon and Boron Nitride Nanotubes using an Ultrathin Nanomembrane Covering Scheme,” *Journal of Applied Physics*, Vol. 112, Art No 104318, 2012.
26. Meng Zheng, Lianfeng Zou, Howard Wang, Cheol Park, and **Changhong Ke**, “Engineering Radial Deformations in Single-walled Carbon and Boron-Nitride Nanotubes,” *ACS Nano*, Vol. 6, pp. 1814–1822, 2012.
25. Meng Zheng, **Changhong Ke**, Intae Bae, Cheol Park, Michael W. Smith, Kelvin Jordan, “Radial Elasticity of Multi-walled Boron Nitride Nanotubes,” *Nanotechnology*, Vol. 23, Art No 095703, 2012.
24. Meng Zheng, Xiaoming Chen, Intae Bae, **Changhong Ke**, Park, Michael W. Smith, Kelvin Jordan, “Radial Mechanical Properties of Single-walled Boron Nitride Nanotubes,” *Small*, Vol. 8, pp. 116-122, 2012.
23. Meng Zheng and **Changhong Ke**, “Mechanical Deformation of Carbon Nanotube Nano-Rings on Flat Substrate,” *Journal of Applied Physics*, Vol. 109, 074304, 2011. [This article

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22. Owen Loh, Xiaoding Wei, **Changhong Ke**, John Sullivan, Horacio D. Espinosa, “Robust carbon nanotube-based nanoelectromechanical devices: Understanding and eliminating prevalent failure modes using alternative electrode materials,” *Small*, Vol.7, pp.79-86, 2011.
 21. Qing Wei, Meng Zheng, and **Changhong Ke**, “Post-buckling Deformation of Single-walled Carbon Nanotubes,” *Nanoscience and Nanotechnology Letters*, Vol. 2, pp.308-314, 2010.
 20. Meng Zheng and **Changhong Ke**, “Elastic Deformation of Carbon Nanotube Nano-Rings,” *Small*, Vol. 6, pp.1647–1655, 2010.
 19. **Changhong Ke**, Meng Zheng, Intae Bae, Guangwen Zhou, “Adhesion-Driven Buckling of Single-walled Carbon Nanotube Bundles,” *Journal of Applied Physics*, Vol. 107, 104305, 2010. [*This article is selected to be included in the Virtual Journal of Nanoscale Science & Technology, 2010 Vol.21, No.22.*]
 18. **Changhong Ke**, Meng Zheng, Guangwen Zhou, Wei Cui, Nicola Pugno, Ron N. Miles, “Mechanical Peeling of Freestanding Single-walled Carbon Nanotube Bundles,” *Small*, Vol. 6, pp.438-445, 2010.
 17. Meng Zheng, Kholo Eom, and **Changhong Ke**, “Calculations of the Resonant Response of Carbon Nanotube to Binding of DNA,” *Journal of Physics D- Applied Physics*, Vol. 42, Art No 145408, 2009.
 16. **Changhong Ke**, “Resonant Pull-in of a Double-sided Driven Nanotube-Based Electromechanical Resonator,” *Journal of Applied Physics*, Vol.15, 024301, 2009. [*This article is selected to be included in the Virtual Journal of Nanoscale Science & Technology, 2009 Vol.19, No.5.*]
 15. **Changhong Ke**, Anna Loksztajn, Yong Jiang, Minkyu Kim, Michael Humeniuk, Mahir Rabbi, Piotr E. Marszalek “Detecting Solvent Driven Transitions of poly(A) to Double-Stranded Conformations by Atomic Force Microscopy,” *Biophysical Journal*, Vol. 96, pp. 2918-2925, 2009.
 14. Yong Jiang, M. Rabbi, Minkyu Kim, **Changhong Ke**, W. Lee, R.L. Clark, P.A. Mieczkowski, and Piotr E. Marszalek, “UVA Generate Pyrimidine Dimers in DNA directly,” *Biophysical Journal*, Vol. 96, pp1151-1158, 2009.
 13. M. Rivera, W. Lee, **Changhong Ke**, P. E Marszalek, D. G Cole, Robert. L. Clark, “Minimizing Pulling Geometry Errors in Atomic Force Microscope Single Molecule Force Spectroscopy,” *Biophysical Journal*, Vol.95, pp.3991-3998, 2008.
 12. **Changhong Ke**, Yong Jiang, P.A. Mieczkowski, Garrett G. Muramoto, John P.Chute, Piotr E. Marszalek, “Nanoscale Detection of Radiation Damage to DNA by Atomic Force Microscopy,” *Small*, Vol. 4, pp. 288-294, 2008.
 11. **Changhong Ke**, M. Humeniuk, Hanna S-Gracz, Piotr E. Marszalek, “Direct Measurements of Base Stacking Interactions in DNA by Single-Molecule Atomic Force Spectroscopy,” *Physical Review Letters*, Vol. 99, pp. 018302, 2007. [*The work reported in this paper was selected as one of the most exciting work worldwide in Physics in 2007 by APS News.*]
 10. Yong Jiang, **Changhong Ke**, P.A. Mieczkowski, and Piotr E. Marszalek, “Detecting UV Damage in Single DNA Molecules by Atomic Force Microscopy,” *Biophysical Journal*, Vol.93, pp.175-1767, 2007.
 9. **Changhong Ke**, Yong Jiang, M. Rivera, R. L. Clark, Piotr E. Marszalek, “Pulling Geometry Induced Errors in Single Molecule Force Spectroscopy Measurements,” *Biophysical Journal-Biophysical Letters*, Vol. 92, pp.L76-L78, 2007.

8. Yong Zhu, **Changhong Ke** and Horacio D. Espinosa, “Experimental Techniques for the Mechanical Characterization of One-Dimensional Nanostructures,” *Experimental mechanics*, Vol. 47, pp.7-24, 2007.
7. **Changhong Ke** and Horacio D. Espinosa, “In-situ Electron Microscopy Electro-Mechanical Characterization of a NEMS Bistable Device,” *Small*, Vol. 2, pp. 1484-1489, 2006.
6. Keun-Ho. Kim, Nicolas Moldovan, **Changhong Ke**, Horacio D. Espinosa, X. Xiao, J. Carlisle, O. Auciello, “Novel Ultrananocrystalline Diamond Probes for High Resolution Low-Wear Nanolithographic Techniques,” *Small*, Vol. 1, pp. 866-874, 2005.
5. **Changhong Ke**, Nicola Pugno, Bei Peng, and Horacio D. Espinosa, “Experiments and Modeling of Carbon Nanotube Based NEMS devices,” *Journal of the Mechanics and Physics of Solids*, Vol. 53, pp.1314-1333, 2005.
4. Nicola Pugno, **Changhong Ke**, and Horacio D. Espinosa, “Analysis of Doubly-Clamped Nanotube Devices in Finite Deformation Regime,” *Journal of Applied Mechanics*, Vol.72, pp.445-449, 2005.
3. **Changhong Ke**, Horacio D. Espinosa and Nicola Pugno, “Numerical Analysis of Nanotube Based NEMS Devices. Part II: Role of Finite Kinematics, Stretching and Charge Concentrations,” *Journal of Applied Mechanics*, Vol. 72, pp.726-731, 2005.
2. **Changhong Ke** and Horacio D. Espinosa, “Numerical Analysis of Nanotube Based NEMS Devices. Part I: Electrostatic Charge Distribution on Multiwalled Nanotubes,” *Journal of Applied Mechanics*, Vol. 72, pp.721-725, 2005.
1. **Changhong Ke** and Horacio D. Espinosa, “Feedback Controlled Nanocantilever Device,” *Applied Physics Letters*, Vol. 85, pp.681-683, 2004. [This article is selected to be included in the *Virtual Journal of Nanoscale Science & Technology*, 2004 Vol.10, No. 6.]

Book Chapters

5. **Changhong Ke** and Qing Wei, “Advances in Nano-resonators: towards Ultimate Mass, Force and Molecule Sensing,” chapter in book “*Simulations in Nanobiotechnology*,” Editor Dr. Kilho Eom, Elsevier, 2011.
4. **Changhong Ke** and Meng Zheng, “Nanoscale Adhesion Interactions in 1D and 2D Nanostructure-based Material Systems,” chapter in book “*Simulations in Nanobiotechnology*,” Editor Dr. Kilho Eom, Elsevier, 2011.
3. **Changhong Ke** and Horacio D. Espinosa, “Nanoelectromechanical Systems (NEMS) and Modeling,” chapter 121 in the *Handbook of Theoretical and Computational Nanotechnology*, American Scientific Publishers, 2006.
2. Horacio D. Espinosa and **Changhong Ke**, “Nanoelectromechanical Systems – Experiments and Modeling,” *Applied Scanning Probe Methods*, Vol. 5-7 Edited by B. Bhushan, H. Fuchs, and S. Kawata, Springer-Verlag, Heidelberg, 2006.
1. Horacio D. Espinosa, **Changhong Ke** and Nicola Pugno, “Nanoelectromechanical Systems (NEMS): Device and Modeling,” *Encyclopedia of Materials: Science and Technology*, Editor-in-chief Dr. Patrick Veyssi re, Elsevier, 2005.

Patent

1. Horacio D. Espinosa and **Changhong Ke**, “Nanoelectromechanical Bistable Cantilever Device,” US patent 7,612,424.