

Guigen Zhang

Micro/Nano Bioengineering, Faculty of Engineering, University of Georgia

A. Education and Positions

Highest Degree

1990-1994	PhD Bioengineering	Clemson University, SC, USA
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Positions and Employment

1990-1994	Research Assistant	Clemson University, SC
1994-1996	Postdoctoral Fellow	Northwestern University, IL
1997- 2001	Research Assistant Professor	Northwestern University, IL
2001-2006	Assistant Professor	University of Georgia, GA
2001-2006	Adjunct Assistant Professor	Northwestern University, IL
2006-Present	Associate Professor	University of Georgia, GA
2006-present	Adjunct Associate Professor	Northwestern University, IL

B. Research Interests

Micro/Nano Technologies

Nanostructures by electrochemical processes; electrochemical based biosensors (e.g., glucose sensors); electromechanical based biosensors (e.g., SAW sensors)

Multiphysics Computational Modeling

Modeling of multiple phenomena including biological, biochemical, mass-momentum-energy balance, thermal and heat, mechanical, electrical and magnetic phenomena, individually and combined;
Modeling of mutliphysics phenomena in micro/nano structures and devices (e.g., biosensors, fuel cells)

Bioengineering

Biomaterials and tissue engineering; Cell/surface interactions; viscoelastic materials; biomechanics of biological tissues and constructs

C. Selected peer-reviewed publications (in chronological order)

(Publications selected from 50 plus peer-reviewed publications)

1. Zhang G and Latour RA Jr. 1993. FRP Composite Compressive Strength and Its Dependence upon Interfacial Bond Strength, Fiber Misalignment, and Matrix Nonlinearity. *Journal of Thermoplastic Composite Materials*, Vol.6, p298-311.
2. Zhang G and Latour RA Jr. 1994. An Analytical and Numerical Analysis of Fiber Microbuckling. *Composite Science and Technology*, Vol.51, p95-109.
3. Zhang G and Latour RA Jr. 1994. Influence of Interfacial Debonding and Free Edges upon Compressive Strength of Unidirectional FRP Composites, *Proceedings of the American Society for Composites*, p769-776.
4. Zhang G, Latour RA. Jr, Kennedy JM, Schutte HD Jr., and Friedman RJ. 1996 Long Term Compressive Strength Durability of Carbon Fiber Reinforced PEEK Composite in Physiological Saline. *Biomaterial*, Vol. 17, p781-789.
5. Zhang G and Latour RA Jr. 1997. The Prevention of Kink Band Formation at Free Edges of Unidirectional Composite under Compressive Load," *Journal of Composite Materials*, 31: 2426-2444.
6. Zhang G and Latour RA Jr. 1997. Influence of Interfacial Debonding and Free Edges upon Compressive Strength of Unidirectional FRP Composites, *Journal of Thermoplastic Composite Materials*, Vol.10, March, p108-123,.
7. Zhang G and Latour RA Jr. 1997. A Three Dimensional Micromechanical Model of the Compressive Behavior of Unidirectional FRP Composite, *Journal of Thermoplastic Composite Materials*, Vol.10, March, p173-184.
8. Zhang G. 2003. An Integrated Method for Evaluating the Mechanical Integrity of Biomaterials In-Situ. *Materials Science Forum*. Vols. 426-432, 3225-3230.

9. Zhang G, Gilbert JL. 2004. A New Method for Real-Time and In-Situ Characterization of the Mechanical and Material Properties of Biological Tissue Constructs. *Tissue Engineered Medical Products (TEMPs)*, ASTM STP 1452, 120-133, E. Schutte, D.S. Kaplan and G.L. Picciolo Eds., ASTM International, West Conshohocken, PA.
10. Zhang G. 2004. Geometric Nonlinearity in Nanoscale Helical Coils, *Proceedings of SPIE: Nanomodeling*, Vol. 5509, 115-122.
11. Fan J, Dyer D, Zhang G, Zhao YP. 2004. Pattern Formation During Wetting of Vertically Aligned Nanorod Arrays. *Nano Letter*. Vol.4, No.11, 2133-2138.
12. Zhang G. 2004. Geometric and Material Nonlinearity in Tensioned Wires of an External Fixator. *Clinical Biomechanics*. Vol.19, 513-518.
13. Zhang G, Zhao Y-P. 2004. Mechanical Characteristics of Nano-Scale Springs. *Journal of Applied Physics*. 95, 267-271.
14. Zhang G. 2004. Avoiding the Material Nonlinearity in an External Fixation Device. *Clinical Biomechanics*. Vol. 19, 746-750.
15. Yu JC, Borke JL, Zhang G, 2004. A Brief Synopsis on Cranial Sutures: Optimization by Adaptation, *Seminars in Pediatric Neurology (Special issue) Craniosynostosis: Concepts and Recent Advances* - Edited by Harold L. Rekate, Vol 11/4, 249-255.
16. Haq F, Rao YL, Keith C, Zhao Y, and Zhang G, 2005. Nano and Micro Structured Substrates for Neuronal Cell Development, *Journal of Biomedical Nanotechnology*, Vol.1, No.3, 313-319.
17. Zhang G, 2005. Evaluating the Viscoelastic Properties of Biological Tissues in a New Way, *Journal of Musculoskeletal and Neuronal Interactions*. 5(1):85-90.
18. Rao YL, Anandan V, Zhang G, 2005. "FFT Analysis of Pore Pattern in Anodized Alumina Formed at Various Conditions," *Journal of Nanoscience and Nanotechnology*, Vol. 2, No. 12, 2070-2075.
19. Haq F, Rao YL, Keith C, Zhao Y, and Zhang G, 2005. "Nano and Micro Structured Substrates for Neuronal Cell Development," *Journal of Biomedical Nanotechnology*, Vol.1, No.3, 313-319.
20. Anandan V, Rao YL and Zhang G, 2006. "Nanopillar Array Structures for Enhancing Biosensing Performance," *International Journal of Nanomedicine*, Vol.1, No.1, 73-79.
21. Haq F, Keith C, and Zhang G, 2006. "Neurite Development in PC12 Cells on Flexible Micro-Textured Substrates Under Cyclic Stretch," *Biotechnology Progress*. Vol.22, No.1, 133-140.
22. Radke H, Aron DN, Applewhite A, Zhang G. 2006, "Biomechanical analysis of unilateral IMEX SK and IMEX KE external skeletal fixators combined with IM-pin using finite element method," *Veterinary Surgery*, Vol. 35, 15-23.
23. Rao YL, and Zhang G, 2006. Enhancing the Sensitivity of SAW Sensors with Nanostructures, *Current Nanoscience*. *Current Nanoscience*. Vol.2, No.4, 311-318.
24. Zhang G, Haq F, Venkatramani A. 2006. Neurite Development in PC12 Cells on Nanostructured Substrates, *Advances in Science and Technology*. Vol.53, 85-90.
25. Tang XJ, Zhang G, Zhao YP. 2006. Electrochemical characterization of silver nanorod electrodes prepared by oblique angle deposition, *Nanotechnology*, 17, 4439-4444.
26. Zhang G. 2007. Chapter 5: Maxillofacial Bone Augmentation and Replacement, in *Polymers for Dental and Orthopedic Applications*, 169-183. SW Shalaby and U Salz, Eds., CRC Press.
27. Yang X and Zhang G. 2007. Simulating the Structure and Effect of the Electrical Double Layer at Nanometer Electrodes, *Nanotechnology*, 18, 335201, 1-9.
28. Haq F, Anandan V, Keith C, Zhang G. 2007. Neurite Development in PC12 Cells Cultured on Nanopillars and Nanopores, *International Journal of Nanomedicine*, 2 (1), 107-115.
29. Yang X and Zhang G. 2007. The Voltammetric Performance of Interdigitated Electrodes with Different Electron-Transfer Rate Constants, *Sensors and Actuators B*, 126, 624-631.
30. Anandan V, Yang X, Kim E, Rao Y, and Zhang G. 2007. Role of Reaction Kinetics and Mass Transport in Glucose Sensing with Nanopillars Array Electrodes, *Journal of Biological Engineering*. doi: 10.1186/1754-1611-1-5.
31. Zhang G. 2008. Chapter 9: Nanotechnology Based Biosensors in Drug Delivery, *Nanotechnology in Drug Delivery*, Springer, In Press.
32. Lee SJ, Anandan V and Zhang G. 2008. Electrochemical fabrication and evaluation of highly sensitive nanorod-modified electrodes for a biotin/avidin system, *Biosensors and Bioelectronics*, 23, 1117-1124.