Curriculum Vitae: Pradeep Sharma

EDUCATION:
1990–1994
Bachelor of Science in Mechanical Engineering**,** August 1995
M.S. University of Baroda, India

1995–2000
Ph.D. in Mechanical Engineering, August 2000
University of Maryland, College Park

PROFESSIONAL ACCREDITATION:
Chartered Physicist (Ch.Phy.)---Institute of Physics, London, UK, 2003

PROFESSIONAL EXPERIENCES:
2012 - present, M.D. Anderson Professor and Department Chair, Department of Mechanical Engineering, University of Houston, TX
2008-2011, Bill Cook Endowed Associate Professor, Department of Mechanical Engineering, University of Houston, TX

2005-2008, Bill Cook Endowed Assistant Professor, Department of Mechanical Engineering, University of Houston, TX

Jan 2004-present, Assistant Professor, Department of Mechanical Engineering, University of Houston, TX

September 2000– October 2003, Research Scientist, General Electric Corp. R & D, Schenectady, NY

AWARDS AND HONORS:

(1) Thomas J.R. Hughes ASME Young Investigator Award[1], 2009; **Citation**: "*For outstanding contributions to understanding size-effects of coupled mechanical and physical phenomena in materials*".
(2) ONR Young Investigator Award
(3) Fulbright Award, 2013
(4) Distinguished M.D Anderson Professorship
(5) ASME Fellow
(6) Bill D. Cook Faculty Chair Position (Assistant Professor, Associate Professor)
(7) Texas Space Grants Consortium New Investigators Program Award
(8) University of Houston, Excellence in Research and Scholarship Award, Assistant Professor Level, 2006
(9) University of Houston, Excellence in Research and Scholarship Award, Associate Professor Level, 2011
(10) (past) Associate Editor**:** *Journal of Theoretical and Computational Nanoscience*
(11) Associate Editor: *Journal of Applied Mechanics*
(12) Guest Editor: *Mathematics and Mechanics of Solids*, 2007 (special issue on size-effects in mechanics)
(13) Selected as one of the Top Referees (2009); *Proceedings of the Royal Society*

[1] Awarded annually by the ASME to a mechanician under 40.

(14) Founding Editor: iMechanica Journal Club
(15) Faculty of the Year award by local ASME student chapter--2010

PATENTS

(1) Monolithic light emitting devices based on wide bandgap semiconductor nanostructures and methods for making same; US Patent Issued on October 17, 2006
(2) Professional patent issued through University of Houston on "guided self-assembly", 2006 (Co-inventors: Gemunu Gunaratne, Physics; Don Kouri, Chemistry; Fazle Hussain, Mechanical Engineering, Girish Nathan, Physics; Feng Shi, Mechanical Engineering)

BOOK CHAPTER

(Invited) R. Maranganti, and **P. Sharma**, "A Review of Strain Field Calculations in Embedded Quantum Dots and Wires", Chapter 118, *Handbook of Theoretical and Computational Nanotechnology*, Michael Reith and Wolfram Schommers (eds.), 2006

SELECTED REFEREED JOURNAL PUBLICATIONS: out of 64 total; Reprints and preprints of most listed papers are available on the following website:
http://www2.egr.uh.edu/~psharma/Index.html

ASTERIX * indicates graduate student I advised and funded. **indicates a graduate student co-advised.

1. **P. Sharma**, " Entropic force between membranes reexamined", *Proceedings of the National Academy of Sciences*, 110(6), 1976-1977, 2013
2. L.P. Liu and **P. Sharma**, "Flexoelectricity and thermal fluctuations of lipid bilayer membranes: Renormalization of flexoelectric, dielectric, and elastic properties", *Physical Review E*, 87, 032715, 2013
3. Z. Liu, Y. Zhan, S. Moldovan, M. Gharbi*, L. Song, G. Shi, L. Ma, W. Gao, S. Zhao, J. Huang, R. Vajtai, F. Banhart, **P. Sharma**, J. Lou, P.M. Ajayan, "Anomalous High Capacitance in a Coaxial Nanowire Capacitor", *Nature Communications*, 3:879, 2012
4. S. Chandratre***, P. Sharma**, "Coaxing Graphene to be Piezoelectric", *Applied Physics Letters,* 100, 023114-1-023114-3, 2012
5. P. Chhapadia*,P. Mohammadi*, **P. Sharma**, "Curvature-dependent Surface Energy and Implications for Nanostructures", *Journal of the Mechanics and Physics of Solids*, 59, 2103-2115, 2011
6. P. Mohammadi*, L. Liu, **P. Sharma**, R. Kukta, "Homogenization of Rough Surfaces: Effective Surface Stress and Superficial Elasticity", *Journal of the Mechanics and Physics of Solids*, accepted for publication
7. S. Dai**, M. Gharbi*, **P. Sharma**, H.S. Park, Surface Piezoelectricity, Size-effects in Nanostructures and Emergent Piezoelectricity in Non-piezoelectric Materials", *Journal of Applied Physics,* 110, 104305, 2011
8. C. Mi, D. A. Buttry, **P. Sharma**, D.A. Kouris, "Atomistic insights into dislocation-based mechanisms of void growth and coalescence", *Journal of the Mechanics and Physics of Solids,* Volume 59, Issue 9, 1858, 2011
9. R. Maranganti* and **P. Sharma** , "Revisiting Quantum Notions of Stress " , *Proceedings of Royal Society A*, 466,1097-1116, 2010

10. M. Gharbi*, Z.H. Sun, K. White, S. El-Borgi, and **P. Sharma** , "Flexoelectric properties of ferroelectrics and the nanoindentation size-effect " , *International Journal of Solids and Structures*, 48 (2011) 249-256
11. N.D.Sharma*, C.M.Landis and **P. Sharma** , "Piezoelectric Thin-Film Super Lattices Without Using Piezoelectric Materials " , *Journal of Applied Physics* , 108,024304, 2010
12. M. Gharbi*, Z.H. Sun** , **P. Sharma** , K. White, " The Origins of Electromechanical Indentation Size Effect in Ferroelectrics", *Applied Physics Letters, 95, 142901 ,2009*
13. M.S. Majdoub*, R. Maranganti*, **P. Sharma**, "Understanding the origins of the intrinsic dead layer effect in nanocapacitors", *Physical Review B*,**79**, 115412, 2009
14. R. Maranganti* and **P. Sharma**, "Atomistic Determination of Flexoelectric Properties of Crystalline Dielectrics", *Physical Review. B* 80 , 054109, 2009
15. **(Invited)** A. K. Tagantsev, V. Meunier, and **P. Sharma**, “Novel Electromechanical Phenomena at the Nanoscale: Phenomenological Theory and Atomistic Modeling”, *MRS bulletin*, volume 34 , 2009
16. F. Shi*, **P. Sharma** and G.H. Gunaratne, "How To Create Perfectly Ordered Quantum Dots via Self-Assembly, *Chaos*, 19 , 033141 ,2009
17. X. Zhang*, M. Gharbi*, **P. Sharma**, and H. T. Johnson, "Quantum Field Induced Strains in Nanostructures and Prospects for Optical Actuation", *International Journal of Solids and Structures*, 46,3810–3824, 2009
18. M.S. Majdoub*, **P. Sharma** and T. Cagin, Enhanced Size-Dependent Piezoelectricity And Elasticity in Nanostructures Due to The Flexoelectric Effect", *Physical Review B***,** 77, 125424-1 – 125424-9, 2008
19. M.S. Majdoub*, **P. Sharma** and T. Cagin, "Dramatic Enhancement in Energy Harvesting For a Narrow Range of Dimensions in Piezoelectric Nanostructures", *Physical Review B***,** 78, 121407 (R), 2008
20. S. Sahoo, R. Maranganti*, S. Lastella, G. Mallick, S. Karna, **P. Sharma** and P.M. Ajayan, "Reversible Separation of Single-Walled Carbon Nanotubes in Bundles", *Applied Physics Letters,* **93**, 083120, 2008
21. F. Shi*, **P. Sharma**, D.J. Kouri, F. Hussain and G.H. Gunaratne, "Nanostructures with Long-Range Order in Monolayer Self-Assembly ", *Physical Review E*, 78, 025203, 2008
22. R. Maranganti* and **P. Sharma**, "Length Scales at Which Classical Elasticity Breaks Down for Various Materials", *Physical Review Letters*, **98**, 195504-1– 195504-4, 2007
23. X.Zhang*, **P.Sharma** and H.T.Johnson, "Quantum Confinement Induced Strain in Quantum Dots", *Physical Review B*, **75**, 155319-1– 155319-8, 2007
24. N.D. Sharma*, R. Maranganti* and **P. Sharma**, "On the Possibility of Piezoelectric Nanocomposites without using Piezoelectric Materials", *Journal of the Mechanics and Physics of Solids*, **55**, 2328–2350, 2007
25. R. Maranganti* and **P. Sharma**, "A Novel Atomistic Approach to Determine Strain Gradient Elasticity Constants: Tabulation and Comparison for Various Metals, Semiconductors, Silica, Polymers and the (lr) relevance for Nanotechnologies", *Journal of the Mechanics and Physics of Solids*, Vol. 55, issue 9, p. 1823-1852, 2007
26. S. Hu**, G. Nathan**, F. Hussain, D.J. Kouri, **P. Sharma**, and G.H. Gunaratne, "On Stability of Self-Assembled Nanoscale Patterns", *Journal of the Mechanics and Physics of Solids*, **55**, 1357– 1384, 2007
27. **(Invited Review Article)** R.Maranganti*, **P.Sharma**, and L.Wheeler, "Quantum Notion of Stress"*, Journal of Aerospace Engineering,* **20**, 22– 37, 2007

28. **P. Sharma**, and L.T. Wheeler, "Size-dependent Elastic State of Ellipsoidal Nano-inclusions Incorporating Surface/Interface Tension", *Journal of Applied Mechanics*,74, 447– 454, 2007
29. X. Peng**, S. Ganti, **P. Sharma**, A. Alizadeh, S. Nayak, S. Kumar, "Strain Engineered Photoluminescence of Silicon Nanoclusters", *Physical Review B* **74**,035339-1– 035339-5, 2006
30. R. Maranganti*, N.D. Sharma* and **P. Sharma**, "Electromechanical Coupling in Non-piezoelectric Materials due to Nonlocal Size Effects at the Nanoscale: Fundamental Solutions (Green's Functions) and Embedded Inclusions", *Physical Review B* **74**,014110-1– 014110-14, 2006
31. X. Zhang*, J.Kun**, **P. Sharma** and B. Yakobson, "An Atomistic and Non-classical Continuum Field Theoretic Perspective of Elastic Interactions between Defects (Force Dipoles) of Various Symmetries and Application to Graphene", *Journal of the Mechanics and Physics of Solids*, **54**, 2304-2329, 2006
32. **P. Sharma** and X. Zhang*, "Gauge Field Theoretic Solution of a Uniformly Moving Screw Dislocation and Admissibility of Supersonic Speeds", *Physics Letters* A 349, 170–176, 2006
33. X. Zhang* and **P. Sharma**, "On the Scaling of Strain in Arbitrary Shaped, Anisotropic Embedded Quantum Dots due to (Nonlocal) Dispersive Effects ", *Physical Review B*, **72**, 195345, 2005
34. X. Peng**, S. Ganti, **P.Sharma**, A. Alizadeh, S. Nayak, S. Kumar, "Novel Scaling Laws for Band Gaps of Quantum Dots", *Journal of Computational and Theoretical Nanotechnology, **2**, 3,* 2005
35. A. Mathur**, **P. Sharma**, R. Cammarata, "Negative Surface Energy: A Cautionary Note", *Nature Materials*, **4**, 186, 2005
36. Z. Li**, P. Dharap**, **P. Sharma**, S. Nagarajaiah and B. Yakobson, "A Physically Inspired Continuum Field Interpretation of (Stone-Wales) Defect Formation in Single Walled Carbon Nanotubes", *Journal of Applied Physics*,**97**,074303, 2005
37. F. Shahedipour-Sandvik, J. Grandusky, A. Alizadeh, C. Keimel, S. P. Ganti, S. T. Taylor, S. F. LeBoeuf and **P. Sharma**, "Strain Dependent Facet Stabilization in Selective-area Heteroepitaxial Growth of GaN Nanostructures", *Applied Physics Letters*, **87**, 233108, 2005
38. X. Zhang* and **P. Sharma**, "Inclusions and Inhomogeneities in Second Gradient Elasticity with Couple Stresses and Related Problems", *International Journal of Solids and Structures*,**42**,3833, 2005
39. **P. Sharma**, and S. Ganti, "Gauge-field-theory Solution of the Elastic State of a Screw Dislocation in a Dispersive (non-local) Crystalline Solid ",*Proceedings of the Royal Society*, **461**, 1081, 2005
40. **P. Sharma**, A. Dasgupta, and G.Cuddalorepatta**, "The Connection Between Microstructural Damage Modeling and Continuum Damage Modeling for Eutectic Sn-Pb Solder Alloys", accepted, *International Journal of Damage Mechanics,* 14, 343-363, 2005
41. A. Alizadeh, **P. Sharma**, S. Ganti, S. LeBoeuf, L. Tsakalakos, "Templated Wide Bandgap Nanostructures", *Journal of Applied Physics*, **95,** No. 12, 8199, 2004
42. **P. Sharma**, S. Ganti, H. Ardebili, A. Alizadeh, "Scaling of Thermal Stresses in Passivated Nano-interconnects", *Journal of Applied Physics*, **95**, No. 5, p 2763, 2004
43. **P. Sharma** and S. Ganti, "Size-dependent Eshelby's Tensor for Embedded Nano-inclusions Incorporating Surface/Interface Energies", *Journal of Applied Mechanics*, Vol 71, 663, 2004

44. **P. Sharma**, "Inclusions and Defects in Chiral Solids", *International Journal of Solids and Structures*, **41**,6317, 2004
45. **P. Sharma**, S. Ganti and N. Bhate, "The Effect of Surfaces on the Size-Dependent Elastic State of (Nano) Inhomogeneities", *Applied Physics Letters*, **82**, No 4, 2003
46. **P. Sharma**, and S. Ganti, "On the Grain-size Dependent Elastic Modulus of Nanocrystalline Materials with and without Grain Boundary Sliding", *Journal of Materials Research*, 1823-1826, 18, No.8, 2003
47. **P. Sharma**, and S. Ganti, "The Size-dependent Elastic State of Inclusions in Non-local Elastic Solids", *Philosophical Magazine Letters,* Vol. 83, No. 12, 745, 2003
48. **P. Sharma**, and R. Sharma, "On the Eshelby's Inclusion Problem for Ellipsoids with Non-Uniform Dilatational Gaussian and Exponential Eigenstrains", *Journal of Applied Mechanics*, 70, No 3, 418-425, 2003
49. **P. Sharma**, A. Dasgupta, S. Ganti and J. Loman, "Prediction of Rate-Independent Constitutive Behavior of Pb-Free Solders Based on First Principles", *IEEE Transactions on Components and Packaging*, **26**,659, 2003
50. **P. Sharma**, and A. Dasgupta, "Scale-Dependent Average Elastic Fields of Spherical and Cylindrical Inhomogeneities in Micropolar Medium and Overall Properties", *Physical Review* B **66**, 2241XX, 2002
51. **P. Sharma**, and S. Ganti, "Interfacial Elasticity Corrections to the Elastic State of Quantum Dots*", Physica Status Solidi* (b) **234**, No.3, R10–R12, 2002
52. **P. Sharma**, H. Ardebili and J. Loman, "A Note on the Thermal Stresses in Passivated Metal Interconnects", *Applied Physics Letters*, Vol. 79, No. 11, p 1706, 2001

SELECTED GRANTS

(1) NSF grant on nanocapacitors for energy storage, 2010-2013, **$ 280, 000, PI: Sharma**, 33 %
(2) NSF GK12-Program, 2009-2014, **$ 3 million, PI: Sharma**, 20 %
(3) AFOSR Program on high temperature materials, 2009-2014, $ 1.6 million, Sharma's share (**$400, 000**), PI is Ken White
(4) NSF International Materials Institute, 2009-2014, **$ 2.3 million,** Sharma's share ($ 17 %). PI is Dimitris Lagoudas in Texas A&M University.
(5) NSF grant on "giant" piezoelectricity, 2008-2012, **$ 390, 000**, **PI: Sharma**, 50 %
(6) NSF NIRT, 2007-2012, **$ 1.20 million**, **PI: Sharma**, 25 %
(7) Aerospace Workforce Innovation Network (AWIN), Texas Workforce Commission, 2007-2009, 2 years, **$ 248, 944**, **PI: Karolos Grigoriadis**, 16 %
(8) NSF, **$3,067** , "US-Tunisia Planning Visit: Research Collaboration between University of Houston and Ecole Polytechnique de Tunisie", **PI: Sharma**, 100 %
(9) ONR Young Investigator Award, 2005-2008, 3 yrs, **$ 262, 471**, **PI: Sharma,** 100 %
(10) Texas Advanced Research Program (2006-2008), 2 yrs, **$ 100, 000**, **PI: Sharma**, 50 %

ACADEMIC AND COMMUNITY SERIVCES:

- Reviewer for: Physical Review Letters, Physical Review B, Physical Review E, Journal of the Mechanics and Physics of Solids, Applied Physics Letters, Philosophical Magazine, Proceedings of the Royal Society, Journal of Physics: Mathematical, Journal of Physics: Condensed Matter, Journal of Materials Research, Journal of Applied Mechanics, International Journal of Solids and Structures, Surface

Science, Journal of Mechanics of Materials and Structure, Mathematics and Mechanics of Solids, Journal of Elasticity, Physica Status Solidi

- Organizer of various sessions and symposiums in ASME annual conference 2003-Present.
- (Past) Associate editor of Journal of Computational and Theoretical Nanoscience
- Associate editor of Journal of Applied Mechanics
- iMechanica Journal Club Founding and Chief Editor