

SHIKHA GUPTA

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EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY

Ph.D in Applied Science & Technology, April 2008.

Major Subjects: Biomaterials, contact mechanics, tissue mechanics, finite element modeling, infrared spectroscopy, medical implants.

Berkeley, CA

GPA 3.9/4.0

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Bachelor of Science in Materials Science and Engineering, June 2001.

Cambridge, MA

GPA 4.8/5.0

RESEARCH EXPERIENCE

STATE UNIVERSITY OF NEW YORK, STONY BROOK

Postdoctoral Research Associate

Stony Brook, NY

- Assessing the influence of multiple exposures to mechanical unloading on cortical and trabecular bone quantity and quality via *in-vivo* microCT, micro-finite element modeling, nanoindentation and FTIR.

UNIVERSITY OF CALIFORNIA, BERKELEY

Graduate Research Assistant-Medical Polymers and Biomaterials Group (*August 2002-February 2008*)

Berkeley, CA

- Addressed the pressing need for better *in-situ* microscale mechanical characterization tools for biomaterials research by systematically evaluating and validating the analytical and experimental methods used in nanoindentation for a diverse array of biomaterials such as elastomers (polydimethylsiloxane), hydrogels (agarose) and biological tissues (hyaline cartilage). Developed novel analytical schemes for indentation using numerical finite element based optimization.
- Improved the ability of microCT based computational simulations of bone to detect and predict the risk of osteoporotic bone fracture by developing a novel method to evaluate the spatially-resolved materials properties of trabecular bone using nanoindentation and microCT.
- Spearheaded efforts to develop a better assessment rubric to evaluate student competence and cognitive sophistication in problem-based learning assignment engineering courses.

GENERAL ELECTRIC

Research Staff - Polymer & Synthetic Materials Division (*August 2001-April 2002*)

Bangalore, India

- Fabricated a novel conducting polymer with high conductivity and thermal stability, creating a tough, lightweight conducting material suitable for potential automotive and aerospace applications. *Patent Pending.*
- Characterized the electrical properties of carbon nanotube – polymer composites.

MOTOROLA

Research Intern (*June 2000-August 2000*)

Schaumburg, IL

- Helped drive company-wide transition to greener technology by analyzing the heavy metal composition of microelectronic components using XRF and creating a database indexing the environmental toxicity for component.

HEWLETT-PACKARD/MIT- FRANCIS BITTER MAGNET LAB

Research Assistant (*June 1999-June 2001*)

Palo Alto, CA/Cambridge, MA

- Developed novel methods to fabricate nanoscale phase-change semiconductor thin films for high density memory devices, and characterized the chemical composition, structure, and conductivity of the films.

SELECT PUBLICATIONS

- S. Judex, **S. Gupta**, C. Rubin: Regulation of the Mechanical Singles in Bone, *Orthodontics and Craniofacial Research*. In press.
- **S. Gupta**, J. Lin, P.D. Ashby, L.A. Pruitt: A Fiber Reinforced Poroelastic Model of Nanoindentation of Porcine Costal Cartilage: A Combined Experimental and Finite Element Approach, *Journal of the Mechanical Behavior of Biomedical Materials*. In press.
- J. Furmanski, **S. Gupta**, A. Chawan, A. Kohm, J. Lannutti, B. Jewett, L.A. Pruitt, M. Ries: Aspherical femoral head with highly cross-linked ultra-high molecular weight polyethylene surface cracking – A case report. *J. Bone & Joint Surgery* 89A (10) 2266-2270 (2007).
- **S. Gupta**, F. Carrillo, C. Li, L. Pruitt and C.M. Puttlitz: Adhesion Significantly Affect Elastic Modulus Determination of Compliant Polymeric Materials in Nanoindentation. *Materials Letters* 61 (2) 448-451 (2007)
- **S. Gupta**, F. Carrillo, M. Balooch, L.A. Pruitt and C.M. Puttlitz: Simulated soft tissue nanoindentation – A finite element study. *J. Mater. Res.* 20(8), 1979 (2005).

CONFERENCE PAPERS/PRESENTATIONS

- C. Li, **S. Gupta**, L.A. Pruitt: Comparison of Nanoindentation and Unconfined Compression of Agarose gel and Porcine Costal Cartilage. Materials Research Society Meeting, Spring 2007, San Francisco, CA.
- J. Furmanski, S. Kane, **S. Gupta**, and L.A. Pruitt: Work-in-Progress: Problem-Based Learning and Assessment of Competence in an Engineering Biomaterials Course, Frontiers in Education Conference, 2006, San Deigo, CA.
- A. Charavartula, **S. Gupta**, C. Li, B. Ando, and L.A. Pruitt: Undergraduate Students Teaching Children: K-8 Outreach within the Core Engineering Curriculum. Meeting of American Society of Engineering Education 2006, Chicago, IL.
- A. Dhanabalan, D. Srinivasan, **S. Gupta** and A. Biswas: Novel Conducting Polyaniline-Sulphonated PPE Complexes. MACRO Conference 2004, Kerala, India.

LEADERSHIP EXPERIENCE

NATIONAL ACADEMY OF SCIENCE

Fall 2007 Christine Mirzayan Science and Technology Policy Fellow, Washington D.C.

- Selected as a policy fellow with the National Materials Advisory Board at the National Academy of Science. Conducted comprehensive survey of the state of continuing education courses in corrosion and reported the findings to the National Academies Assessing Corrosion Education (ACE) committee.
- Moderated and organized a public panel discussion on the nutritional implications of the 2007 Farm Bill. Responsibilities included developing topic questions, contacting speakers, publicizing seminar, and writing a post-seminar analysis.

LAWRENCE HALL OF SCIENCE – LHS Science Museum

2005-2007 Graduate Instructor for “Bionic Bear” and “Body by Design” Medical Implants and Devices Exhibition

- Coordinated an outreach event at LHS for undergraduate students developing science museum exhibits on medical device technology geared towards 4th- 6th grade students.

SOCIETY OF WOMEN ENGINEERS (SWE)

Executive Board Member from SWE for the MIT FALL 2000-2001 Years.

- MIT FALL 2000 Career Fair Chair. Organized career fair for MIT community of 10,000 graduate and undergraduate students and headed campus-wide Career Development Week.
- Helped initiate MIT SWE BeaverDash Engineering Design Competition.

AWARDS/AFFILIATIONS

- Christine Mirzayan Science and Technology Policy Fellow, National Academies (Fall 2007)
- Sigma Xi Grants-In-Aid Research Award (2006)
- National Science Foundation Graduate Fellow (2002-2006)
- Department of Defense Graduate Fellowship recipient (2002)
- Materials Research Society (MRS)
- American Society of Mechanical Engineers (ASME)