

# Raman P. Singh

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## Research Interests

My research interests are in the *mechanics of advanced materials*, with an emphasis on the investigation of modern engineered materials and development of new techniques for mechanical characterization at highly localized nano/micro length scales. Currently active research projects include the following:

- Polymer nanocomposites
- Environmental degradation and durability of fiber-reinforced polymer composites
- Amorphous/nanocrystalline ceramics composites for aerospace and nuclear applications
- Nanoindentation schemes for testing viscoelastic properties of polymers and biological materials

## Professional Experience

**Associate Professor**, School of Mechanical and Aerospace Engineering, Oklahoma State University, July 2006–Present

**Associate Professor**, Department of Mechanical Engineering, State University of New York at Stony Brook, September 2004–July 2006

**Assistant Professor**, Department of Mechanical Engineering, State University of New York at Stony Brook, October 1998–August 2004

**Postdoctoral Scholar**, Graduate Aeronautical Laboratories, California Institute of Technology, October 1995–September 1998

**University Graduate Fellow**, Department of Mechanical Engineering and Applied Mechanics, University of Rhode Island, September 1993–August 1995

**Research Assistant**, Department of Mechanical Engineering and Applied Mechanics, University of Rhode Island, January 1991–August 1993

**Project Assistant**, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, June 1990–December 1990

## Education

**Ph.D. Mechanical Engineering and Applied Mechanics**, University of Rhode Island, 1995  
Dissertation: Catastrophic Failure of Bimaterial Interfaces  
Advisor: Professor Arun Shukla

**M.S. Mechanical Engineering and Applied Mechanics**, University of Rhode Island, 1992  
Thesis: Effect of Particle Shape and Particle Damage on Stress Wave Propagation in Granular Media  
Advisor: Professor Arun Shukla

**B.Tech. Mechanical Engineering**, Indian Institute of Technology, Kanpur, India, 1990

## Honors and Awards

**Promising Inventor Award**, Research Foundation of the State University of New York, 2003

**Outstanding Article**, Journal of Testing and Evaluation, with Arun Shukla, 1998

**Certificate of Recognition**, National Aeronautics and Space Administration, 1997

**University Graduate Fellowship**, University of Rhode Island, 1994–1995

**University Graduate Fellowship**, University of Rhode Island, 1993–1994

**Proficiency Award for Academic Excellence**, Indian Institute of Technology, Kanpur, 1988

## Funded Proposals and Grants

**Recycled Rubber Composites For Aerospace, Defense, and Infrastructure Applications**

\$27,668, May 2008–December 2008, Technology Business Assessment Group (TBAG), *Principal Investigator* with Ranji Vaidyanathan.

**Effect of Moisture Absorption on Fiber Adhesion in Fluorinated Epoxies:**

**A Micromechanical Study**, \$21,000, February 2008–July 2008, NASA Space Grant Consortium/NASA EPSCoR, *Principal Investigator*

**Development of Polymer Systems and Composites for Space Exploration and Radiation**

**Shielding: Grant for Travel to LaRC**, \$1,035, October 2007–December 2007, NASA Space Grant Consortium/NASA EPSCoR, *Principal Investigator*

**Post-Curing of Polymer Samples Supplied by TD Williamson**, \$500, November 2007, *Principal Investigator*

**Degradation at the Fiber-matrix Interphase and Effects on Long-term Performance of Composites, International Research and Education in Engineering (IREE) Supplement**, \$18,250, September 2007–August 2008, Subcontracted by The Research Foundation of the State University of New York for the National Science Foundation, *Principal Investigator*

**Degradation at the Fiber-matrix Interphase and Effects on Long-term Performance of Composites, Research Experiences for Undergraduates (REU) Supplement**, \$5,000, July 2007–August 2007, Subcontracted by The Research Foundation of the State University of New York for the National Science Foundation, *Principal Investigator*

**Degradation at the Fiber-matrix Interphase and Effects on Long-term Performance of Composites**, \$116,649, September 2006–August 2009, Subcontracted by The Research Foundation of the State University of New York for the National Science Foundation, *Principal Investigator*

**Novel Processing of Unique Ceramic-Based Nuclear Materials and Fuels**, \$229,500, July 2006–April 2008, Subcontracted by The Research Foundation of the State University of New York for the Department of Energy, *Principal Investigator*

**Novel Processing of Unique Ceramic-Based Nuclear Materials and Fuels**, \$188,930, April 2005–July 2006, Department of Energy, *Principal Investigator* with Hui Zhang

**Multifunctional Nanostructured/Microporous Materials**, \$227,927, March 2003–February 2005, Bethpage Technologies Inc. (NASA Phase II STTR), *Principal Investigator*

**Nanoscale Characterization of Failure Processes in Polymer Nanocomposites**, \$196,309, September 2002–August 2005, U.S. Army Research Office, *Principal Investigator*

**Synergistic Effects Of Multiple Environments On Composite Degradation**, \$313,933,  
August 2002–July 2006, National Science Foundation, *Principal Investigator* with Toshio Nakamura,  
Clive Clayton and Gary Halada

**Toughening of Thermosetting Polymers through Nanoparticle Reinforcement**, \$225,644,  
June 2001–May 2004, National Science Foundation, *Principal Investigator*

**Development of Coherent Gradient Sensing Tomographic Interferometer: Application to 3D  
Transient Temperature, Concentration and Refractive Index Measurement**, \$232,401,  
June 2000–December 2003, National Science Foundation, *Co-Principal Investigator* with Jon Longtin  
(PI), Vish Prasad and Harbans Dadhwal

**Low-Cost, Closed-Cell Ceramic Foams**, \$43,150, January 2003–June 2003, Bethpage Technologies  
(NSF Phase I SBIR), *Co-Principal Investigator* with John Metzger (PI)

**Light-weight Materials Process Demonstration**, \$5,341, May 2002–September 2002, Bethpage  
Technologies Inc., *Principal Investigator*

**2002 Graduate Student Symposium, Northeast Region**, \$1,500, May 2002, Society of  
Experimental Mechanics Education Foundation

**Multifunctional Nanostructured/Microporous Materials**, \$66,960, November 2001–December  
2002, Bethpage Technologies Inc. (NASA Phase I STTR), *Principal Investigator*

**Nanoindentation System for Advanced Material Characterization**, \$100,000, September  
2001–December 2001, U.S. Army Research Office, *Co-Principal Investigator* with Toshio Nakamura  
(PI)

**Testing of High-Tech Wind Turbines**, \$9,595, January 2001–December 2001, Fosdick Hi-Tech Inc.,  
*Principal Investigator*

**Ultra-Reliability Evaluation Based on Multi-Property Degradation Mechanisms**, \$399,867,  
October 2000 to September 2002, U.S. Army Research Office, *Co-Principal Investigator* with Toshio  
Nakamura (PI)

## Professional Contributions

### Journal Editing

**Associate Technical Editor**, *Experimental Mechanics*, June 2004–Present

**Guest Editor**, Special Issue on “Optical Methods for Time Resolved Measurements of Short Duration  
Events in Solids,” *Journal of Optics and Lasers in Engineering*, Issue 40, No. 1, 2003. (With Vikas  
Prakash, Case Western Reserve University).

### Conference and Conference Track Organization

**Co-Chair**: Track 1: Experimentation and Modeling at the Nanoscale, SEM Annual Conference on  
Experimental and Applied Mechanics, Charlotte, North Carolina, June, 2003. (With Craig S. Hartley,  
Air Force Office of Scientific Research, and James M. Larsen, Air Force Research Laboratory)

**Conference Organizer**: Society of Experimental Mechanics Graduate Student Symposium, Stony Brook,  
New York, May 2002.

## Symposia Organization

**Panel on Junior Faculty Development**, SEM XI International Congress & Exposition on Experimental and Applied Mechanics, Orlando, Florida, June 2008. (With Ioannis Chasiotis, University of Illinois at Urbana-Champaign, and Hugh Bruck, University of Maryland at College Park).

**Symposium on the Durability of Composites**, SEM XI International Congress & Exposition on Experimental and Applied Mechanics, Orlando, Florida, June 2008. (With Chad Korach, State University of New York at Stony Brook).

**Symposium on the Micro/Nanoindentation of Time-Dependent Materials**, SEM Annual Conference and Exposition, Springfield, Massachusetts, June 2007. (With Hongbing Lu, Oklahoma State University).

**Symposium on Failure Phenomena of Inhomogeneous Materials**, ASME International Mechanical Engineering Congress and Exposition, Orlando, Florida, November 2005. (With Toshio Nakamura, Stony Brook University).

**Symposium on Integrated Experimental/Computational Failure Analysis**, ASME International Mechanical Engineering Congress and Exposition, Washington, DC, November 2003.

**Symposium on Damage in Heterogeneous Structures**, ASME International Mechanical Engineering Congress and Exposition, New Orleans, Louisiana, November 2002.

**Symposium on Hybrid Methods for Failure Analysis**, USNCTAM14: Fourteenth U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, Virginia USA, June 2002. (With Toshio Nakamura, Stony Brook University).

**Symposium on Deformation and Failure in Advanced Polymers**, USNCTAM14: Fourteenth U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, Virginia, June 2002. (With Vikas Prakash, Case Western Reserve University).

**Failure of Nano/Micro-Structured Materials**, SEM Annual Conference and Exposition, Milwaukee, Wisconsin, June 2002. (With Mark Walter, Ohio State University).

**Failure Due to Environmental Degradation**, Mechanics and Materials Conference, San Diego, California, June 2001. (With Toshio Nakamura, Stony Brook University).

**Fracture of Multi-Layered Material Systems**, Mechanics and Materials Conference, San Diego, California, June 2001. (With Vikas Prakash, Case Western Reserve University).

**Recent Advances in the Dynamic Behavior of Materials**, ASME International Mechanical Engineering Congress and Exposition, Orlando, Florida, November 2000. (With Philippe Geubelle, University of Illinois at Urbana-Champaign and Vikas Prakash, Case Western Reserve University).

**Micromechanics of Fracture and Fatigue**, SEM IX International Congress, Orlando, Florida, June 2000. (With Tim Miller, Air Force Research Laboratory).

**Session Chair** for several SEM and ASME Conferences

## Professional Society Contributions

**Member**, American Society of Mechanical Engineers (ASME), 1995–Present

**Member**, Society of Experimental Mechanics (SEM), 1993–Present

**Member**, Materials Research Society (MRS), 2004–Present

**Member**, American Ceramics Society (ACerS), 2005–Present

**Member**, American Nuclear Society (ANS), 2007–Present

**Member**, Fracture and Failure Mechanics Technical Committee, AMD, ASME, 1995–Present

**Member**, Fracture and Fatigue Technical Division, SEM, 1995–Present

**Chair**, Papers Review Committee, Fracture and Fatigue Technical Division, SEM, June 2002–May 2004

**Secretary**, Fracture and Fatigue Technical Division, SEM, June 2004–May 2006

**Vice-Chair**, Fracture and Fatigue Technical Division, SEM, June 2006–Present

**Secretary**, Research Committee, SEM, June 2007–Present

### **Paper Reviews for Refereed Journals**

ASTM Journal of Testing and Evaluation, Composites Science and Technology, Experimental Mechanics, International Journal of Solids and Structures, International Journal of Fracture, Journal of Composite Materials, Journal of Engineering Materials Technology, Journal of Materials Science, Journal of the American Ceramic Society, Journal of Thermoplastic Composite Materials, Materials Science and Engineering A, Mechanics of Materials, Metallurgical and Materials Transactions A, Optics and Lasers in Engineering, Polymer Engineering and Science, and Strain.

### **Technical Review Panels**

**NSF Proposal Review Panel**, Centers for Research Excellence in Science & Technology (CREST), HBCU Research Infrastructure in Science & Engineering (HBCU-RISE), Division of Human Resource Development, Directorate for Education and Human Resources, May, 2007

**NSF Proposal Review Panel**, Infrastructure Materials Applications and Structural Mechanics, Division of Civil, Mechanical, and Manufacturing Innovation, Directorate for Engineering, December 2006

**NSF Proposal Review Panel**, Infrastructure Materials and Structural Mechanics, Division of Civil and Mechanical Systems, Directorate for Engineering, March 2005

**NSF Proposal Review Panel**, Infrastructure Materials and Structural Mechanics, Division of Civil and Mechanical Systems, Directorate for Engineering, February 2004

**NSF Proposal Review Panel**, Surface Engineering and Material Design, Division of Civil and Mechanical Systems, Directorate for Engineering, February 2003

### **Book Proposal Reviews**

Theory and Applications of Elasticity, Martin H. Sadd, CRC Press, Boca Raton, Florida, 2003

## **Service, Oklahoma State University (2006–Present)**

### **University**

**Radiation Safety Committee (RSC)**, Oklahoma State University, March 2007–Present

## **College and Department**

**Graduate Advisory Committee (GAC)**, Department of Mechanical and Aerospace Engineering,  
August 2006–Present

**Laboratory Committee (LC)**, Department of Mechanical and Aerospace Engineering, August 2006–  
Present

## **Service, Stony Brook University (1998–2006)**

### **Outreach and Mentoring for Minority Students**

**Faculty Advisor**, SUNY Louis Stokes Alliance for Minority Participation, September 1999–May 2006

**Research Mentor**, Minority Access to Research Careers, September 1999–May 2006

**Faculty Advisor**, Alliances for the Graduate Education and the Professoriate, June–August 2000

**Research Advisor**, BP Amoco EngiPrep Program, June–August 1999

## **College and Department**

**Undergraduate Program Committee (UPC)**, Department of Mechanical Engineering, September  
1998 – July 2006

**Facilities Committee**, Department of Mechanical Engineering, September 1999–August 2004

**Committee on Academic Standing and Appeals (CASA)**, College of Engineering, September 1998  
– August 1999

**Solid Mechanics Faculty Search Committee**, Department of Mechanical Engineering, September  
1998–May 1999

## **Industrial Collaboration and Consulting**

**TD Williamson**, Tulsa, Oklahoma

**ExxonMobil Research and Engineering**, Annandale, New Jersey

**ETS-Lindgren**, Cedar Park, Texas

**Pelco Products**, Edmond, Oklahoma

**RL Hudson**, Broken Arrow, Oklahoma

**Fosdick Hi-Tek Wind Turbines**, Port Jefferson Station, New York

**Engineering and Technology Associates**, Hauppauge, New York

**Hughes-Treitler Manufacturing**, Garden City, New York

**Bethpage Technologies**, Melville, New York

**Cytec Engineered Materials**, Anaheim, California

## Patents

1. Coherent Gradient Sensing Method and System for Measuring Surface Curvature: US Patent No. 6,031,611.

## Disclosures on File

2. Fabrication Methods and Properties of Multi-functional Open or Closed Cell Foam Sandwich Core Composites, Office of Intellectual Property Management, Oklahoma State University, March 2008.

## Refereed Journal Publications

1. Singh, A. K., S. C. Zunjarrao, and R. P. Singh, "Processing of Uranium Oxide and Silicon Carbide Based Fuel Using Polymer Infiltration and Pyrolysis," *Journal of Nuclear Materials*, In press review, 2008.
2. Singh, S. P., R. P. Singh and J. F. Smith, "Viscoelastic Characterization of Polymers Using a Displacement Modulation Based Dynamic Indentation Method." *Experimental Mechanics*, In press, DOI: [10.1007/s11340-007-9117-x](https://doi.org/10.1007/s11340-007-9117-x), 2008.
3. Ramanujam, N., P. Vaddadi, T. Nakamura, and R. P. Singh, "Interlaminar Fatigue Crack Growth of Cross-Ply Composites Under Thermal Cycles," *Composite Structures*, In press, DOI:[10.1016/j.compstruct.2007.10.018](https://doi.org/10.1016/j.compstruct.2007.10.018), 2007.
4. Vaddadi, P., T. Nakamura, and R. P. Singh, "Inverse-Analysis to Determine Hygrothermal Properties in Fiber Reinforced Composites," *Journal of Composite Materials*, Vol. 41, No. 3, pp. 309–334, 2007.
5. Zunjarrao, S. C., and R. P. Singh, "Characterization of the Fracture Behavior of Epoxy Reinforced with Nanometer and Micrometer Sized Aluminum Particles," *Composites Science and Technology-Part A*, Vol. 66, Iss. 13, pp. 2296–2305, 2006.
6. Dyjak, P., and R. P. Singh, "Acoustic Emission Analysis of Nanoindentation-Induced Fracture Events," *Experimental Mechanics*, Vol. 46, No. 3, pp. 333–345, 2006.
7. Nakamura, T., R. P. Singh, and P. Vaddadi, "Effects of Environmental Degradation on Flexural Failure Strength of Fiber Reinforced Composites," *Experimental Mechanics*, Vol. 46, No. 2, pp. 257–268, 2006.
8. Zunjarrao, S. C., R. Sriraman, and R. P. Singh, "Effect of Processing Parameters and Clay Volume Fraction on the Mechanical Properties of Epoxy-Clay Nanocomposites," *Journal of Materials Science*, Vol. 41, No. 8, pp. 2219–2228, 2006.
9. Ozcivici, E., and R. P. Singh, "Fabrication and Characterization of Closed-Cell Foams Based on Silicon Carbide," *Journal of the American Ceramics Society*, Vol. 88, No. 12, pp. 3338–3345, 2005.
10. D. Mishra, J. P. Longtin, R. P. Singh, and V. Prasad, "Coherent Gradient Sensing Interferometry: Application in Convective Fluid Medium for Tomographic Measurements," *Experiments in Fluids*, Vol. 38, pp. 59–69, 2005.
11. Singh R. P., and M. Zhang, "Reinforcement of Unsaturated Polyester by Aluminum and Aluminum Oxide Nanofillers," *Materials Letters*, Vol. 58, pp. 408–412, 2004.
12. Singh, R. P., and A. Gratien, "An Experimental Investigation of the Effect of Interface-Strength on Fracture Characteristics of a Brittle-Ductile Layered Material," *Journal of Adhesion Science and Technology*, Vol. 17, No. 6, pp. 871–888, 2003.

13. Vaddadi, P., T. Nakamura, and R. P. Singh, "Transient Hygrothermal Stresses in Fiber-Reinforced Composites: A Heterogeneous Characterization Approach," *Composites: Part A—Applied Science and Manufacturing*, Vol. 34, pp. 719–730, 2003.
14. Singh, R. P., and V. Parameswaran, "An Experimental Investigation of Dynamic Crack Propagation in a Brittle Material Reinforced with a Ductile Layer," *Optics and Lasers in Engineering*, Vol. 40, pp. 289–306, 2003.
15. Vaddadi, P., T. Nakamura, and R. P. Singh, "Inverse Analysis for Transient Moisture Diffusion through Fiber Reinforced Composites," *Acta Materialia*, Vol. 51, pp. 177–193, 2002.
16. Kumar, B.G., R. P. Singh, and T. Nakamura, "Degradation of Carbon Fiber Reinforced Epoxy Composites by Ultraviolet Radiation and Condensation," *Journal of Composite Materials*, Vol. 36, No. 24, pp. 2713–2733, 2002.
17. Mishra D., S. L. Wong, J. P. Longtin, R. P. Singh, and V. Prasad, "Development of a Coherent Gradient-Sensing Tomographic Interferometer for Three-dimensional Refractive-index Based Measurements", *Optics Communications*, Vol. 212, No. 1–3, pp. 17–27, 2002.
18. Wong, S. L., D. Mishra, J. P. Longtin, R. P. Singh, and V. Prasad, "Visualization of Iso-Gradient Lines in Convective and Diffusive Systems Using Gradient-Sensing Interferometry," *Journal of Heat Transfer*, Vol. 124, No. 4, pp. 600, 2002.
19. Singh, R. P., M. Zhang, and D. Chan, "Toughening of a Brittle Thermosetting Polymer: Effects of Reinforcement Particle Size and Volume Fraction," *Journal of Materials Science*, Vol. 37, No. 4, pp. 781–788, 2002.
20. Singh, R. P., and A. J. Rosakis, "Determination of the Yield Properties of Thin Films Using Enhanced Coherent Gradient Sensing," *Experimental Mechanics*, Vol. 41, No. 4, pp. 403–411, 2001.
21. Rosakis, A. J., O. Samudrala, and R. P. Singh, "Dynamic Shear-Dominated, Supersonic Crack Growth in Bimaterial and Layered Systems and its Relationship to Earthquake Rupture," *Journal of the Mechanical Behavior of Materials*, Vol. 11, No. 1–3, pp. 191–204, 2000.
22. Rosakis, A. J., O. Samudrala, R. P. Singh, and A. Shukla, "Intersonic Crack Propagation in Bimaterial Systems," *Journal of the Mechanics and Physics of Solids*, Vol. 46, No. 10, pp. 1997–2016, 1998.
23. Guduru, P. R., R. P. Singh, G. Ravichandran, and A. J. Rosakis, "Dynamic Crack Initiation in Ductile Steels," *Journal of the Mechanics and Physics of Solids*, Vol. 46, No. 10, pp. 1789–1813, 1998.
24. Rosakis, A. J., R. P. Singh, Y. Tsuji, E. Kolawa, and N. R. Moore, Jr., "Full Field Measurements of Curvature using Coherent Gradient Sensing: Application to Thin Film Characterization," *Thin Solid Films*, Vol. 325, No. 1–2, pp. 42–54, 1998.
25. Ricci, V., A. Shukla, and R. P. Singh, "Evaluation of Fracture Mechanics Parameters in Bimaterial Systems using Strain Gages," *Engineering Fracture Mechanics*, Vol. 58, No. 4, pp. 273–283, 1997.
26. Singh, R. P., J. Lambros, A. Shukla, and A. J. Rosakis, "Two Optical Techniques Applied to the Investigation of the Mechanics of Crack Propagation Along a Bimaterial Interface," *Proceedings of the Royal Society of London, Series A*, Vol. 453, pp. 2649–2667, 1997.
27. Singh, R. P., M. Kavaturu, and A. Shukla, "Initiation, Propagation and Arrest of an Interface Crack Subjected to Controlled Stress Wave Loading," *International Journal of Fracture*, Vol. 83, pp. 291–304, 1997.

28. Singh, R. P., and A. Shukla, "Subsonic and Intersonic Crack Growth Along a Bimaterial Interface," *Journal of Applied Mechanics*, Vol. 63, pp. 919–924, 1996.
29. Singh, R. P., A. Shukla, and H. Zervas, "Explosively Generated Pulse Propagation through Particles Containing Natural Cracks," *Mechanics of Materials*, Vol. 23, pp. 255–270, 1996.
30. Singh, R. P., and A. Shukla, "A Critical Evaluation of the Performance of Optical Fiber Sensors for Monitoring Dynamic Strains," *Journal of Testing and Evaluation*, Vol. 24, No. 5, pp. 295–301, 1996.
31. Singh, R. P., and A. Shukla, "Characterization of Isochromatic Fringe Patterns for a Dynamically Propagating Interface Crack," *International Journal of Fracture*, Vol. 76, pp. 293–310, 1996.
32. Singh, R. P., A. Shukla, and H. Zervas, "Effect of Flaws on the Stress Wave Propagation in Particulate Aggregates: Near and Far Field Observations," *International Journal of Solids and Structures*, Vol. 32, No. 17/18, pp. 2523–2546, 1995.
33. Shukla, A., S. V. Letcher, R. P. Singh, N. Narendran, C. Zhou, and F. Sienkiewicz, "Advantages and Disadvantages of Using Fiber Optic Sensors in Fracture Mechanics," *Novel Experimental Techniques in Fracture Mechanics*, ASME-AMD Vol. 176, pp. 47–62, 1993.
34. Shukla, A., M. H. Sadd, R. P. Singh, Q. Tai, and S. Vishwanathan, "Role of Particle Shape and Contact Profile on the Dynamic Response of Particulate Materials," *Optics and Lasers in Engineering*, Vol. 19, pp. 99–119, 1993.

### Manuscripts Submitted for Publication

35. Wang, X., S. C. Zunjarrao, H. Zhang, and R. P. Singh, "A Binary Particle Model for Polymer Pyrolysis and Uranium Ceramic Material Processing," *Journal of Analytical and Applied Pyrolysis*, under review, 2007.

### Book Chapters

1. Shukla, A., R. P. Singh, S. V. Letcher, and N. Narendran, "Fiber-Optic Sensors and Fracture Mechanics," *Application of Fiber Optic Sensors in Engineering Mechanics*, F. Ansari, Ed., pp. 177–191, American Society of Civil Engineers, New York, 1993.

### Colloquium Presentations

1. The Power Struggle: Is nuclear energy a savior or a threat?, Helmerich ATRC, Oklahoma State University–Tulsa, March 28, 2008. (*A Faculty Research Excellence Series seminar*).
2. Precursor Derived Ceramics: Opportunities and Challenges, Seimens Power Generation, Inc., January 25, 2008.
3. An Overview of the Mechanics of Advanced Materials Laboratory, NASA LaRC, December 13, 2007.
4. Environment Degradation of Fiber-Reinforced Polymer Matrix Composites, Indian Institute of Technology–Delhi, August 7, 2007.
5. Composites for Advanced Infrastructure Applications: The Challenge of Long-Term Durability, Indian Institute of Technology–Kanpur, August 2, 2007.
6. Durability of Composites Subjected to Multi-Environment Degradation, Indian Institute of Technology–Guwahati, July 25, 2007.

7. Environmental Degradation of Carbon Fiber Reinforced Epoxy Composites, Indian Institute of Technology–Bombay, July 12, 2007.
8. Precursor Derived Ceramics: A Route For Fabricating Closed-Cell Foams, ExxonMobil Research and Engineering Company, May 11, 2007.
9. Environmental Degradation of Polymer Composites (Why your tennis racket will not last forever), Student ASME Chapter, Oklahoma State University (Tulsa), April 9, 2007.
10. Viscoelastic Characterization of Polymers Using Nanoindentation, University of Central Florida, February 9, 2006.
11. Displacement Based Dynamic Nanoindentation for Viscoelastic Characterization of Polymers, Rutgers University, September 28, 2005.
12. Viscoelastic Characterization of Polymers using Dynamic Nanoindentation, NIST, March 16, 2005.
13. Mechanical Property Enhancement in Polymers Using Nanofillers: An Overview of Current Research, Columbia University, April 18, 2003.
14. Dynamic Delamination Failure of Brittle-Ductile Multilayered Materials, Indian Institute of Science, March 17, 2003.
15. Synergistic Mechanisms for Environmental Degradation of Composites, University of Rhode Island, October 16, 2001.
16. Effects of Environmental Degradation on Failure Processes in Carbon/Epoxy Composites, City College of New York, October 4, 2001.
17. Catastrophic Failure of Bimaterial Interfaces, Stony Brook University, January 15, 1998.

## Full-Paper–Reviewed Conference Proceedings

1. Singh, A. K., S. C. Zunjarrao, and R. P. Singh, “Silicon Carbide and Uranium Ceramic based Composite Fuel Preparation using Polymer Infiltration and Pyrolysis (PIP),” *American Nuclear Society, 2007 Annual Meeting*, Boston, Massachusetts, 2007.
2. Zunjarrao, S. C., A. K. Singh and R. P. Singh, “Modulus and Hardness of Nanocrystalline Silicon Carbide as Functions of Grain Size” *31st International Conference on Advanced Ceramics and Composites*, Daytona Beach, Florida, 2007.
3. Zunjarrao, S. C., A. K. Singh and R. P. Singh, “Structure-Property Relationships in Polymer Derived Amorphous/Nano-crystalline Silicon Carbide for Nuclear Applications,” *Proceedings of the 14th International Conference on Nuclear Engineering, ICONE 14*, Miami, Florida, 2006.
4. Singh, A. K., S. C. Zunjarrao and R. P. Singh, “Silicon Carbide and Uranium Oxide Based Composite Fuel Preparation Using Polymer Infiltration and Pyrolysis,” *Proceedings of the 14th International Conference on Nuclear Engineering, ICONE 14*, Miami, Florida, 2006.
5. Wang, X., S. C. Zunjarrao, H. Zhang and R. P. Singh, “Advanced Process Model for Polymer Pyrolysis and Uranium Ceramic Material Processing,” *Proceedings of the 14th International Conference on Nuclear Engineering, ICONE 14*, Miami, Florida, 2006.
6. Singh, R. P., S. P. Singh and J. F. Smith, “Displacement Modulation Based Dynamic Nanoindentation for Viscoelastic Material Characterization,” *Fundamentals of Nanoindentation and Nanotribology III*, edited by Kathryn J. Wahl, Norbert Huber, Adrian B. Mann, David F. Bahr, and Y.-T. Cheng, Materials Research Society Symposium Proceedings, Vol. 841, Paper No. R4.6, Warrendale, Pennsylvania, 2005.

7. Dyjak, P., and R. P. Singh, "Acoustic Emission Analysis of Nanoindentation-Induced Fracture Events," *Fundamentals of Nanoindentation and Nanotribology III*, edited by Kathryn J. Wahl, Norbert Huber, Adrian B. Mann, David F. Bahr, and Y.-T. Cheng, Materials Research Society Symposium Proceedings, Vol. 841, Paper No. R8.10, Warrendale, Pennsylvania, 2005.
8. Ozcivici, E., and R. P. Singh, "Syntactic Closed-Cell Foams Based on Silicon Carbide," *Materials for Space Applications*, edited by Mircea Chipara, David L. Edwards, Roberto S. Benson, Shawn Phillips, Materials Research Society Symposium Proceedings, Vol. 851, Paper No. NN11.7, Warrendale, Pennsylvania, 2005.
9. Rosakis, A. J., R. P. Singh, Y. Tsuji, E. Kolawa and N. R. Moore, Jr., "Full-Field Measurements of Curvature Using Coherent Gradient Sensing: Application to Thin Film Characterization," *Thin Films—Stresses and Mechanical Properties VII*, edited by Esteban Busso, Robert Cammarata, Michael Nastasi, Warren Oliver, Materials Research Society Symposium Proceedings, Vol. 505, Paper No. NN1.2, pp. 15–20, Warrendale, Pennsylvania, 1998.
10. Zhou, C., A. Shukla, S. Letcher, R. P. Singh and F. Sienkiewicz, "On the Use of Microbend Fiber-Optic Sensor in Material Characterization," *Fiber Optic Physical Sensors in Manufacturing and Transportation, Proceeding of the SPIE—the International Society for Optical Engineering*, edited by John W. Berthold III, Richard O. Claus, Michael A. Marcus, Robert S. Rogowski, Vol. 2072, pp. 214–223, 1993.
11. Narendran, N., S. V. Letcher, A. Shukla and R. P. Singh, "Embedded Fiber Optic Acoustic Sensor for Flaw Detection," *Fiber Optic Smart Structures and Skins V, Proceeding of the SPIE—the International Society for Optical Engineering*, edited by Richard O. Claus, Robert S. Rogowski, Vol. 1798, pp. 124–133, 1993.

## Abstract-Reviewed Conference Proceedings

1. Wang, X., S. C. Zunjarrao, H. Zhang, and R. P. Singh, "Advanced Process Model for Polymer Derived Ceramic Processing," *Proceedings of IMECE2006*, ASME International Mechanical Engineering Congress and Exposition, Chicago, Illinois, USA, 2006.
2. Singh, A. K., and R. P. Singh, "Effect of Mechanical Loading and Environmental Degradation on Carbon Fiber Reinforced Composites," *Proceedings of the 2006 SEM Annual Conference & Exposition*, St. Louis, Missouri, 2006.
3. Khait, M., S. C. Zunjarrao and R. P. Singh, "Characterization of Environmental Degradation Mechanisms in Epoxy-clay Nanocomposites," *Proceedings of the 2006 SEM Annual Conference & Exposition*, St. Louis, Missouri, 2006.
4. Zhang, M., and R. P. Singh, "Particulate Toughening of Unsaturated Polyester: Effect of Particle Size and Volume Fraction," *Proceedings of the SEM Annual Conference on Experimental and Applied Mechanics*, Portland, Oregon, pp. 42–45, 2001.
5. Chan, D., V. Shao and R. P. Singh, "Fracture of Metal Toughened Polymers," *Proceedings of the SEM IX International Congress on Experimental Mechanics*, Orlando, Florida, pp. 853–855, 2000.
6. Rosakis, A. J., O. Samudrala, and R. P. Singh, "Dynamic Shear-Dominated, Supersonic Crack Growth in Bimaterial and Layered Systems and its Relationship to Earthquake Rupture," *ATEM 97—International Conference on Advanced Technology in Experimental Mechanics*, Wakayama, Japan, July 25–26, 1997.

7. Singh, R. P., A. J. Rosakis, O. Samudrala, and A. Shukla, "Two Optical Techniques Applied to the Investigation of the Mechanics of Interfacial Crack Propagation Along a Bimaterial Interface," *DFI-1-1st International Conference on Damage and Failure of Interfaces*, Vienna, Austria, September 22–24, 1997.
8. Singh, R. P., A. J. Rosakis, and G. Ravichandran, "Characterization of Dynamic Ductile Fracture using High Speed Infrared and Visible Optics," *Proceedings of the ASME Aerospace Division*, Vol. 52, pp. 199-207, 1996.
9. Singh, R. P., and A. Shukla, "Dynamic Failure of Bimaterial Interfaces: A Photoelastic Investigation," *Proceedings of the 1995 SEM Spring Conference*, Grand Rapids, Michigan, pp. 31–38, 1995.
10. Singh, R. P., and A. Shukla, "Fiber-Optic Sensors for Dynamic Stress Wave Propagation Studies," *Proceedings of the 1994 SEM Spring Conference*, Baltimore, Maryland, pp. 514–519, 1994.
11. Shukla, A., R. P. Singh, and C. H. Zhou, "High Strain Rate Evaluation of Materials using Fiber-Optic Sensors," *Recent Advances in Experimental Mechanics, Proceeding of the 10th International Conference on Experimental Mechanics*, edited by J. F. Silva Gomes, F. B. Branco, F. Martins De Brito, J. Gil Saraiva, M. Lurdes Eusébio, J. Sousa Cirne, A. Correia Da Cruz, pp. 583–587, Lisbon, Portugal, 1994.
12. Zhou, C., A. Shukla, S. Letcher, R. P. Singh and F. Sienkiewicz, "On the Use of Microbend Fiber-Optic Sensor in Material Characterization," *Fiber Optic Physical Sensors in Manufacturing and Transportation, Proceeding of the SPIE—the International Society for Optical Engineering*, edited by John W. Berthold III, Richard O. Claus, Michael A. Marcus, Robert S. Rogowski, Vol. 2072, pp. 214–223, 1993.
13. Shukla, A., R. P. Singh and H. Zervas, "Dynamic Load Transfer in Cracked Particulate Aggregates - A Dynamic Photoelastic Study," *Proceedings of ATEM '93, Conference on Advanced Technology in Experimental Mechanics*, Kanazawa, Japan, pp. 125–130, 1993.
14. Singh, R. P., A. Shukla and H. Zervas, "Dynamic Response of Damaged Particulate Media," *Proceedings of SEM Spring Conference on Experimental Mechanics*, Dearborn, Michigan, pp. 1119–1128, 1993.
15. Narendran, N., S. V. Letcher, A. Shukla and R. P. Singh, "Embedded Fiber Optic Acoustic Sensor for Flaw Detection," *Fiber Optic Smart Structures and Skins V, Proceeding of the SPIE—the International Society for Optical Engineering*, edited by Richard O. Claus, Robert S. Rogowski, Vol. 1798, pp. 124–133, 1993.
16. Shukla, A., R. P. Singh, and N. Narendran, "Performance of Fiber Optic Sensors in Fracture Mechanics Applications," *Proceedings of the 1st European Conference on Smart Structures and Materials*, Glasgow, United Kingdom, pp. 285–288, 1992.
17. Shukla, A., R. P. Singh, and N. Narendran, "Determination of Stress Intensity Factors Using Interference and Polarization Based Optical Fiber Sensors," *Proceedings of the SEM VII International Congress on Experimental Mechanics*, Las Vegas, Nevada, pp. 251–256, 1992.
18. Shukla, A., and R. P. Singh, "Influence of Particle Shape on Stress Wave Propagation in Granular Media," *Proceedings of the SEM VII International Congress on Experimental Mechanics*, Las Vegas, Nevada, pp. 584–589, 1992.

## Conference Presentations

1. Zhao, W., R. P. Singh, and C. S. Korach, "Environmental Degradation of the Fiber-Matrix Interphase in CFRP Composites," *ASME International Mechanical Engineering Congress and Exposition*, Seattle, Washington, November 10–16, 2007.
2. Pandey, G., N. Ramanujam, T. Nakamura, and R. P. Singh, "Viscoelastic Properties of Fingernails as Potential Indicators of Disease," *ASME International Mechanical Engineering Congress and Exposition*, Seattle, Washington, November 10–16, 2007.
3. Zunjarrao, S. C., P. Dyjak, J. D. Metzger, and R. P. Singh, "Microwave Processing of Polymer Derived Ceramics from Actively Seeded Precursor," *Materials Science & Technology 2007 Conference Conference and Exhibition*, Detroit, Michigan, September 16–20, 2007.
4. A. K. Singh, and R. P. Singh, "Fabrication of NbC, ZrC and UC based Silicon Carbide Matrix Composites for Nuclear Applications Using Polymer Infiltration and Pyrolysis," *Materials Science & Technology 2007 Conference Conference and Exhibition*, Detroit, Michigan, September 16–20, 2007.
5. Singh, A. K., S. C. Zunjarrao, and R. P. Singh, "Silicon Carbide and Uranium Ceramic based Composite Fuel Preparation using Polymer Infiltration and Pyrolysis (PIP)," *American Nuclear Society, 2007 Annual Meeting*, Boston, Massachusetts, June 24–28, 2007.
6. Korach, C.S., and R.P. Singh, "Degradation of Fiber-Matrix Interphase in CFRP Composites Subjected to Environmental Degradation," *2007 SEM Annual Conference & Exposition on Experimental and Applied Mechanics*, Springfield, Massachusetts, June 3–6, 2007.
7. Zunjarrao, S. C., A. K. Singh and R. P. Singh, "Modulus and Hardness of Nanocrystalline Silicon Carbide as Functions of Grain Size" *Presented at the 31st International Conference on Advanced Ceramics and Composites*, Daytona Beach, Florida, January 21–26, 2007.
8. Singh, A. K., and R. P. Singh, "Effect of Mechanical Loading and Environmental Degradation on Carbon Fiber Reinforced Composites," *Presented at the 2006 SEM Annual Conference & Exposition*, St. Louis, Missouri, June 4–7, 2006.
9. Khait, M., S. C. Zunjarrao and R. P. Singh, "Characterization of Environmental Degradation Mechanisms in Epoxy-clay Nanocomposites," *Presented at the 2006 SEM Annual Conference & Exposition*, St. Louis, Missouri, June 4–7, 2006.
10. Zunjarrao, S. C., and R. P. Singh, "Fabrication of Amorphous and Nanograined Silicon Carbide by Modified Polymer Infiltration and Pyrolysis," *Presented at the 2005 ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, November 5–11, 2005.
11. Singh, A. K., and R. P. Singh, "In-Situ Fatigue Testing of Composite Materials Subject to Degradation Environments," *Presented at the 2005 ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, November 5–11, 2005.
12. Dyjak, P., and R. P. Singh, "Investigation of Nanoindentation Induced Fracture in Brittle Materials," *SEM Annual Conference and Exposition on Experimental and Applied Mechanics*, Portland, Oregon, June 7–9, 2005.
13. Singh, S. P., and R. P. Singh, "Displacement Based Characterization of Viscoelastic Materials Using Dynamic Indentation," *SEM Annual Conference and Exposition on Experimental and Applied Mechanics*, Portland, Oregon, June 7–9, 2005.

14. Singh, R. P., S. P. Singh and J. F. Smith, "Displacement Modulation Based Dynamic Nanoindentation for Viscoelastic Material Characterization," *Symposium R, Fundamentals of Nanoindentation and Nanotribology III, MRS Fall Meeting*, Boston, Massachusetts, November 29–December 3, 2004.
15. Singh, R. P, M. R. VanLandingham and P. L. Drzal, "Comparative Evaluation of Different Dynamic Nanoindentation Techniques Used for Testing Polymeric Materials," *Symposium R, Fundamentals of Nanoindentation and Nanotribology III, MRS Fall Meeting*, Boston, Massachusetts, November 29–December 3, 2004.
16. Dyjak, P., and R. P. Singh, "Acoustic Emission Analysis of Nanoindentation-Induced Fracture Events," *Symposium R, Fundamentals of Nanoindentation and Nanotribology III, MRS Fall Meeting*, Boston, Massachusetts, November 29–December 3, 2004.
17. Ozcivici, E., and R. P. Singh, "Syntactic Closed-Cell Foams Based on Silicon Carbide," *Symposium NN, Materials for Space Applications, MRS Fall Meeting*, Boston, Massachusetts, November 29–December 3, 2004.
18. Dyjak, P., and R. P. Singh, "Acoustic Emission Analysis of Nanoindentation-Induced Fracture Events," *15th International Invitational Symposium on the Unification of Analytical, Computational, and Experimental Solution Methodologies in MEMS and Nanotechnology (UACEM) Symposium*, Springfield, Massachusetts, October 27–29, 2004.
19. Singh, S. P, and R. P. Singh, "Characterization of Viscoelastic Behavior of Polymers using Dynamic Nanoindentation," *15th International Invitational Symposium on the Unification of Analytical, Computational, and Experimental Solution Methodologies in MEMS and Nanotechnology (UACEM) Symposium*, Springfield, Massachusetts, October 27–29, 2004.
20. Ozcivici, E., and R. P. Singh, "Fabrication and Characterization of Closed-cell Silicon Carbide Foams," *SEM X International Congress on Experimental and Applied Mechanics*, Costa Mesa, California, June 7–10, 2004.
21. Zunjarrao, S. C., and R. P. Singh, "Effect of Silane Treatment on Fracture Toughness of Epoxy-aluminum Nano/Micro-composites," *SEM X International Congress on Experimental and Applied Mechanics*, Costa Mesa, California, June 7–10, 2004.
22. Zunjarrao, S. C., R. P. Singh, and R. Sriraman, "Fabrication and Mechanical Properties of Epoxy-Clay Nanocomposites," *SEM X International Congress on Experimental and Applied Mechanics*, Costa Mesa, California, June 7–10, 2004.
23. Ozcivici, E, and R.P. Singh, "Fabrication and Characterization of Closed-cell Silicon Carbide Foams," *Graduate Student Symposium on Mechanics and Packaging*, Worcester Polytechnic Institute, Worcester, Massachusetts, May 2004.
24. Singh, S.P, and R.P. Singh, "Use of Nanoindentation to Measure the Complex Modulus Behavior of Polymers," *Graduate Student Symposium on Mechanics and Packaging*, Worcester Polytechnic Institute, Worcester, Massachusetts, May 2004.
25. Zunjarrao, S.C. and R.P. Singh, "Effect of Silane Treatment on Fracture Toughness of Epoxy-Aluminium Nano/Micro Composites," *Graduate Student Symposium on Mechanics and Packaging*, Worcester Polytechnic Institute, Worcester, Massachusetts, May 2004.
26. Kumar, B. G., R. P. Singh, and T. Nakamura, "Energy dissipation during the dynamic delamination of a brittle-ductile layered material," *Presented at the 2003 ASME International Mechanical Engineering Congress and Exposition*, Washington, D.C., November 15–21, 2003.

27. Sriraman, R., V. S. Tasovski, and R. P. Singh, "Dispersion techniques for particle deagglomeration in aluminum-polymer nanocomposites," *SEM Annual Conference and Exposition on Experimental and Applied Mechanics*, Charlotte, North Carolina, June 2–4, 2003.
28. Sriraman, R., and R. P. Singh, "Fracture Toughness Measurements in Polymer Nanocomposites using Instrumented Indentation," *ICM9–9th International Conference on the Mechanical Behavior of Materials*, Geneva, Switzerland, May 25–29, 2003.
29. Singh, R. P., "Thermosetting Polymer Nanocomposites and their Characterization by Instrumented Indentation," *16th US Army Symposium on Solid Mechanics*, Charleston, South Carolina, May 4–7, 2003.
30. Singh, R. P., B. G. Kumar, and V. Parameswaran, "Energy Dissipation During Dynamic Failure of Brittle-Ductile Laminates," *Symposium on Damage in Heterogeneous Structures, ASME International Mechanical Engineering Congress and Exposition*, New Orleans, Louisiana, November 17–22, 2002.
31. Singh, R. P., B. G. Kumar, and T. Nakamura, "Fatigue Failure in Carbon Fiber Reinforced Epoxy Composites Subjected to Environmental Degradation," *Symposium on Damage in Heterogeneous Structures, ASME International Mechanical Engineering Congress and Exposition*, New Orleans, Louisiana, November 17–22, 2002.
32. Singh, R. P., V. Parameswaran, and T. Nakamura, "Dynamic Failure of Brittle-Ductile Laminates," *14th U.S. National Congress of Theoretical and Applied Mechanics*, Blacksburg, Virginia, June 23–28, 2002.
33. Kumar, B. G., R. P. Singh, and T. Nakamura, "Synergistic Effects of UV Radiation and Condensation on Degradation of Carbon/Epoxy Composites," *14th U.S. National Congress of Theoretical and Applied Mechanics*, Blacksburg, Virginia, June 23–28, 2002.
34. Vaddadi, P., T. Nakamura, and R. P. Singh, R.P. Transient Moisture Diffusion Analysis of Fiber Reinforced Composites *14th U.S. National Congress of Theoretical and Applied Mechanics*, Blacksburg, Virginia, June 23–28, 2002.
35. Singh, R. P., and V. S. Tasovski, "Processing and Characterization of Polyester-Aluminum and Polyester-Alumina Nanocomposites," *SEM Annual Conference and Exposition on Experimental and Applied Mechanics*, Milwaukee, Wisconsin, June 10–12 2002.
36. Singh, R. P., "Particulate Toughening of Unsaturated Polyester: Effect of Particle Size and Volume Fraction," *ICF10–10th International Conference on Fracture*, Ohau, Hawaii, December 2–6, 2001.
37. Wong, S. L., D. Mishra, J. P. Longtin, R. P. Singh and V. Prasad, "Visualization of Iso- Gradient Lines in Convective and Diffusive Systems Using Gradient-Sensing Interferometry," *Heat Transfer Photo Gallery, ASME International Mechanical Engineering Congress and Exposition*, New York, New York, November 11–16, 2001.
38. Singh, R. P., and M. Zhang, "Fracture of a Brittle Polymer Reinforced with Micron and Nanometer Sized Metal and Ceramic Particles," *Symposium on Multi-Physical Length Scale Modeling Simulation and Design of Materials and Systems, Joint ASME, ASCE and SES Mechanics and Materials Conference*, San Diego, California, June 27–29, 2001.
39. Singh, R. P., G. Rosene, and A. Gratien, "Mechanics of Crack Propagation Normal to a Ductile Layer in a Brittle Material," *Symposium on Fracture of Multi-Layered Material Systems, Joint ASME, ASCE and SES Mechanics and Materials Conference*, San Diego, California, June 27–29, 2001.

40. Kumar, B. G., T. Nakamura and R. P. Singh, "Effects of UV, Condensation and Thermal Degradation on Failure Processes in Carbon/Epoxy Composites," *Symposium on Failure Due to Environmental Degradation, Joint ASME, ASCE and SES Mechanics and Materials Conference*, San Diego, California, June 27–29, 2001.
41. Zhang, M., and R. P. Singh, "Particulate Toughening of Unsaturated Polyester: Effect of Particle Size and Volume Fraction," *SEM Annual Conference on Experimental and Applied Mechanics*, Portland, Oregon, June 4–6, 2001.
42. Singh, R. P., "Processing and High Strain Rate Characterization of Thermosetting Polymer Nanocomposites," *ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, November 5–11, 2000.
43. Chan, D., V. Shao and R. P. Singh, "Fracture of Metal Toughened Polymers," *SEM IX International Congress on Experimental Mechanics*, Orlando, Florida, June 5 – 8, 2000.
44. Singh, R. P., "Thermomechanical Behavior and Failure Modes in Thin Films," *15th US Army Symposium on Solid Mechanics*, Myrtle Beach, South Carolina, April 12 – 15, 1999.
45. Rosakis, A. J., R. P. Singh, Y. Tsuji, E. Kolawa and N. R. Moore, Jr., "Full-Field Measurements of Curvature Using Coherent Gradient Sensing: Application to Thin Film Characterization," *Symposium NN, Thin Films-Stresses and Mechanical Properties, MRS Fall Meeting*, Boston, Massachusetts, December 1–5, 1997.
46. Rosakis, A. J., R. P. Singh, Y. Tsuji, E. Kolawa and N. R. Moore, Jr., "Full-Field Measurements of Curvature Using Coherent Gradient Sensing: Application to Thin Film Characterization," *ASME International Mechanical Engineering Congress and Exposition*, Dallas, Texas, November 16–21, 1997.
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48. Singh, R. P., A. J. Rosakis, O. Samudrala, and A. Shukla, "Two Optical Techniques Applied to the Investigation of the Mechanics of Intersonic Crack Propagation Along a Bimaterial Interface," *DFI-1-1st International Conference on Damage and Failure of Interfaces*, Vienna, Austria, September 22–24, 1997.
49. Singh, R. P., P. R. Guduru, A. J. Rosakis and G. Ravichandran, "Dynamic Crack Initiation: Optical and Temperature Measurements," *Ductile Damage and Failure Mechanics Symposium, McNU'97-Joint ASME, ASCE and SES Summer Meeting*, Northwestern University, Evanston, Illinois, June 29–July 2, 1997.
50. Ravichandran, G., P. R. Guduru, R. P. Singh and A. J. Rosakis, "Dynamic Crack Initiation in Ductile Steels," *ONR-ARO Sponsored Symposium on the Dynamic Deformation and Failure of Solids*, California Institute of Technology, Pasadena, California, May 22–24, 1997.
51. Rosakis, A. J., S. Omprakash, R. P. Singh and D. Coker, "Intersonic Crack Propagation in Layered Systems," *ONR-ARO Sponsored Symposium on the Dynamic Deformation and Failure of Solids*, California Institute of Technology, Pasadena, California, May 22–24, 1997.
52. Rosakis, A. J., G. Ravichandran and R. P. Singh, "High Speed Temperature and Optical Measurements of Ductile Failure Events in Metals," *Recent Advances in Fracture-A Symposium dedicated to Professor Emeritus Frank A. McClintock, TMS Annual Meeting*, Orlando, Florida, February 9–13, 1997.

53. Singh, R. P., A. J. Rosakis and G. Ravichandran, "Characterization of Dynamic Ductile Fracture Using High Speed Infrared and Visible Optics," *Symposium on Fracture Mechanics for Ductile Materials, ASME International Mechanical Engineering Congress*, Atlanta, Georgia, November 17–22, 1996.
54. Singh, R. P., M. Kavaturu and A. Shukla, "Initiation, Propagation and Arrest of an Interface Crack Subjected to Controlled Stress Wave Loading," *ASME Mechanics and Materials Summer Meeting*, Johns Hopkins University, Baltimore, Maryland, June 12–14, 1996.
55. Singh, R. P. and A. Shukla, "Mechanics of Dynamic Crack Propagation along Bimaterial Interface: The Intersonic Regime," *SEM VII International Congress on Experimental Mechanics*, Nashville, Tennessee, June 10–13, 1996.
56. Shukla, A., and R. P. Singh, "Catastrophic Rupturing of Bimaterial Interfaces Subjected to Transient Loadings," *Joint ASME/JSME Pressure Vessel and Piping Conference*, Honolulu, Hawaii, June 23–27, 1995.
57. Singh, R. P., and A. Shukla, "Effect of Material Mismatch on Dynamic Failure of Interfaces," *ASME Mechanics and Materials Summer Meeting*, Los Angeles, California, June 28–30, 1995.
58. Singh, R. P., and A. Shukla, "Dynamic Failure of Bimaterial Interfaces: A Photoelastic Investigation," *SEM Spring Conference*, Grand Rapids, Michigan, June 11–15, 1995.
59. Singh, R. P., A. Shukla, and H. Zervas, "Effect of Flaws on the Stress Wave Propagation in Particulate Aggregates: Near and Far Field Observations," *NSF–ONR Sponsored Symposium on the Dynamic Failure of Modern Materials*, California Institute of Technology, Pasadena, California, February 3–5, 1994.
60. Singh, R. P., and A. Shukla, "A Photoelastic Investigation into the Mechanics of Dynamic Fracture of Bimaterial Interfaces," *ASME Winter Annual Meeting*, Chicago, Illinois, November 6–11, 1994.
61. Singh, R. P., and A. Shukla, "Fiber-Optic Sensors for Dynamic Stress Wave Propagation Studies," *SEM Spring Conference*, Baltimore, Maryland, June 6–10, 1994.
62. Shukla, A., R. P. Singh, and C. H. Zhou, "High Strain Rate Evaluation of Materials using Fiber-Optic Sensors," *Recent Advances in Experimental Mechanics, 10th International Conference on Experimental Mechanics*, Lisbon, Portugal, July 18–22, 1994.
63. Shukla, A., R. P. Singh and H. Zervas, "Dynamic Load Transfer in Cracked Particulate Aggregates - A Dynamic Photoelastic Study," *AETM '93, Conference on Advanced Technology in Experimental Mechanics*, Kanazawa, Japan, July 30–August 1, 1993.
64. Zervas, H., A. Shukla and R. P. Singh, "Crack Growth and Particle Damage Associated with Stress Wave Propagation in Granular Media," *25th National Symposium on Fracture Mechanics*, Lehigh University, Bethlehem, Philadelphia, June 29–July 1, 1993.
65. Singh, R. P., A. Shukla and H. Zervas, "Dynamic Response of Damaged Particulate Media," *SEM Spring Conference on Experimental Mechanics*, June 7–9, Dearborn, Michigan, 1993.
66. Shukla, A., R. P. Singh, and N. Narendran, "Performance of Fiber Optic Sensors in Fracture Mechanics Applications," *1st European Conference on Smart Structures and Materials*, Glasgow, United Kingdom, May 12–14, 1992.
67. Shukla, A., R. P. Singh, and N. Narendran, "Determination of Stress Intensity Factors Using Interference and Polarization Based Optical Fiber Sensors," *SEM VII International Congress on Experimental Mechanics*, Las Vegas, Nevada, June 8–11, 1992.

68. Shukla, A., and R. P. Singh, "Influence of Particle Shape on Stress Wave Propagation in Granular Media," *SEM VII International Congress on Experimental Mechanics*, Las Vegas, Nevada, June 8–11, 1992.

## **Teaching Experience, Oklahoma State University (2006–Present)**

### **Undergraduate Courses**

Mechanical Design I, MAE 3323 (Fall 2006, Fall 2007)

Mechanical Design II, MAE 4353 (Spring 2007, Spring 2008)

Mechanics of Advanced Composites For Structural Design, MAE 5503 (Fall 2007)

## **Teaching Experience, Stony Brook University (1998–2006)**

### **Undergraduate Courses**

Introduction to Stony Brook, EAS 101 (Fall 2001)

Technical Communication in Mechanical Engineering–I, MEC 200 (Spring 2003)

Engineering Statics, MEC 260 (Spring 2005)

Solid Mechanics Project Advisor for Sensors and Instrumentation–I, MEC 316 (Fall 1998, 1999)

Mechanics of Solids, MEC 363 (Spring 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006)

Design and Analysis of Machine Elements, MEC 410 (Fall 1999, 2000)

### **Graduate Courses**

Mechanics of Solids, MEC 536 (Fall 2001, 2002, 2003, 2005)

Elasticity, MEC 541 (Fall 2004)

Mechanics of Composite Materials, MEC 552 (Spring 2001, 2004)

Optical Methods in Experimental Stress Analysis, MEC 671 (Fall 1998)

### **Advising for Senior Design Projects**

Accessible Medication Dispensing Device, 2005–2006

*Awarded best senior design project*

*Selected as one of the five US teams invited to compete as finalists in the Second International Student Capstone Design Fair, EXCO Convention Center in Taegue, South Korea, November 30–December 2, 2006.*

Handicap-Assisted Treadmill, 2005–2006

Recreational Hovercraft for Handicapped Individuals , 2005–2006

The Cleaning Assistant, 2004–2005

Design of a Power Assisted Pedalo, 2002–2003

Design of a Handicapped Wheelchair Lift, 2000–2001

*Awarded best senior design project*

## Supported Personnel

### Ph.D. Dissertations in Progress

#### School of Mechanical and Aerospace Engineering, Oklahoma State University

*Processing of Ceramic-Based Nuclear Materials and Fuels*

Abhishek Singh, School of Mechanical and Aerospace Engineering, Oklahoma State University, degree expected 2008

### M.S. Theses in Progress

#### School of Mechanical and Aerospace Engineering, Oklahoma State University

*Carbon Nanotube Reinforced Ceramic Matrix Composites*

Arif Rahman, School of Mechanical and Aerospace Engineering, Oklahoma State University, degree expected 2009

*Bio-Material Based Composites*

Chirag Kareliya, School of Mechanical and Aerospace Engineering, Oklahoma State University, degree expected 2009

*Effect of Fiber Surface Treatment on the Properties of Carbon Fiber Reinforced Polymer Composites*

Dhivakar Jeevan Kumar, School of Mechanical and Aerospace Engineering, Oklahoma State University, degree expected 2009

### Current Undergraduate Researchers

#### School of Mechanical and Aerospace Engineering, Oklahoma State University

Bradley (Chuan Fang) Chai, Spring 2007–Present

Philip Rogers, Fall 2007–Present

Eric Pratchard, Spring 2008–Present

### Current Postdoctoral Scholars

#### School of Mechanical and Aerospace Engineering, Oklahoma State University

Dr. Gajendra Pandey, October 2007–Present

### Ph.D. Dissertations Completed

#### Department of Mechanical Engineering, Stony Brook University

*Polymer Precursor Derived Ceramics: Processing–Structure–Property Relationships*

Suraj Zunjarrao, School of Mechanical and Aerospace Engineering, Oklahoma State University, May 2008

*Damage Growth and Fracture in Composites Exposed to Multiple Environments*

Pavankiran Vaddadi, Department of Mechanical Engineering, Stony Brook University, August 2006, Co-advised with Toshio Nakamura

*Viscoelastic Characterization using Instrumented Indentation*

Sehaj P. Singh, Department of Mechanical Engineering, Stony Brook University, August 2006,

*A Study of Novel SiC Composites: Design, Fabrication, Characterization and Modeling*  
Mei Zhang, Department of Mechanical Engineering, Stony Brook University, August 2003

## **M.S. Theses Completed**

### **Department of Mechanical Engineering, Stony Brook University**

- Characterization of Environmental Degradation Mechanism in Epoxy-Clay Nanocomposites*  
Mikhail Khait, Department of Mechanical Engineering, Stony Brook University, May 2007,  
Co-advised with Chad Korach
- PMMA-Clay Nanocomposites: Fabrication, Characterization and Mechanical Properties*  
Yuqin Liu, Department of Mechanical Engineering, Stony Brook University, May 2006
- Processing Methodologies and Characterization of Polymer Derived Refractory Ceramic Composites*  
Jesse Fite, Department of Mechanical Engineering, Stony Brook University, May 2006, Co-advised  
with Chad Korach
- Failure Characterization of Brittle Materials Using Nanoindentation and Acoustic Emission*  
Pawel Dyjak, Department of Mechanical Engineering, Stony Brook University, August 2005
- Characterization of the Fracture Behavior of Epoxy-Aluminum and Epoxy-Clay Nanocomposites*  
Suraj C. Zunjarrao, Department of Mechanical Engineering, Stony Brook University, May 2005
- Fabrication and Characterization of Ceramic Foams Based on Silicon Carbide Matrix and  
Alumino-Silicate Spheres*  
Engin Ozcivici, Department of Mechanical Engineering, Stony Brook University, May 2005
- Effects of Dispersion Techniques on Particle Agglomeration and Mechanical Properties in  
Aluminum-Unsaturated Polyester Nanocomposites*  
Vasil S. Tasovski, Department of Mechanical Engineering, Stony Brook University, May 2003
- Degradation of Carbon Fiber Reinforced Epoxy Composites by UV Radiation and Condensation*  
Bhavesh G. Kumar, Department of Mechanical Engineering, Stony Brook University, November 2002,  
Co-advised with Toshio Nakamura
- Inverse Analysis for Transient Moisture Diffusion through Fiber Reinforced Composites and Transient  
Hygrothermal Stress Analysis: A Heterogeneous Characterization Approach*  
Pavankiran Vaddadi, Department of Mechanical Engineering, Stony Brook University, November  
2002, Co-advised with Toshio Nakamura
- Toughening of Brittle Polymer: Effects of Reinforcement Particle Size and Volume Fraction*  
Mei Zhang, Department of Mechanical Engineering, Stony Brook University, December 2000

## **Past Undergraduate Researchers**

### **School of Mechanical and Aerospace Engineering, Oklahoma State University**

Andrew Byrd, Spring 2007–Fall 2008

### **Department of Mechanical Engineering, Stony Brook University**

Mikhail Khait, Summer 2004–Spring 2006

Moris Behar, Fall 2005

Li Ching Chin, Summer 2003, Fall 2003

Eric Pflug, Summer 2003

Lorens Goskels, Summer 2002

Joohi Garg, Summer 2001

Vasil S. Tasovski, Fall 2000, Spring 2001

Gary Rosene, Summer 2000, Fall 2000, Spring 2001

Alains Gratien, Summer, 2000, Fall 2000, Spring 2001

David Chan, Summer 2000, Fall 2000

Vivian Shao, Summer 2000

Eric Alvarez, Summer 1999, Fall 1999

Jose Otero, Summer 1999

Panagiotis Gogas, Spring 1999

### **Past Postdoctoral Scholars**

#### **Department of Mechanical Engineering, Stony Brook University**

Dr. Masataka Uraguo, 2001–2002, co-supported with Toshio Nakamura

Dr. Ravi Sriraman, 2002–2003