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Education

- 1976-1977 SLOAN SCHOOL OF MANAGEMENT, M.I.T., Cambridge, Massachusetts.
S.M. (Management), 1977.
- 1975-1976 Visiting Fellow. Course work in finance, planning and policy, control systems, and organizational behavior studies.
- 1962-1966 RENSSELAER POLYTECHNIC INSTITUTE, Troy, New York.
Ph. D. (Mechanics). Course work in applied physics, mathematics, and engineering.
- 1958-1961 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Massachusetts.
S.M. Course work in mechanical engineering and textile technology.
- 1953-1957 DELHI UNIVERSITY, Delhi, India.
B.S. Course work in textile technology.

Employment Experience

- 1991 - to date NORTH CAROLINA STATE UNIVERSITY, Raleigh, North Carolina.
2001 Visiting Professor, Chemistry Dept. Duke University, Durham, NC
2001-2002 Sloan Industry Fellow, HCTAR, Harvard Univ., Cambridge, MA.
1991-1999 Director, (1999-2000) Director Emeritus, Nonwovens Cooperative Research Center
1996- ... Charles A. Cannon Professor
Professor, Department of Textile and Apparel, Technology and Management (TATM), and Department of Textile Engineering, Chemistry, and Science.
- 1988 - 1990 NORTH CAROLINA STATE UNIVERSITY, Raleigh, North Carolina.
Professor, Associate Head, Graduate Administrator, Department of Textile and Apparel Management (TAM), and Professor, Department of Textile Engineering, Chemistry, and Science. Served as Interim Head of TAM February 1990 to August 1990.
- 1977-1988 NORTH CAROLINA STATE UNIVERSITY, Raleigh, North Carolina.
Professor (1984 -), Associate Professor (1977-1984) Responsibilities in teaching and research in the areas of textile and fiber science, and management.
- 1970-1977 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Massachusetts.
Research Associate. Responsibilities in research, teaching, management of laboratories; wrote proposals, reports and technical papers; presented talks at conferences; reported to and dealt with sponsors; supervised research assistants; guided theses. On leave of absence 1975-1977.
- 1966-1970 BATTELLE MEMORIAL INSTITUTE, Columbus, Ohio.
Senior Scientist. Conducted and supervised research; wrote proposals, reports, and technical papers; reported to the sponsors.
- 1962-1966 RENSSELAER POLYTECHNIC INSTITUTE, Troy, New York.
Graduate Assistant. Taught undergraduate mechanics; carried out theoretical

- research for dissertation.
- 1961-1962 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Massachusetts.
Research Engineer. Managed a laboratory and conducted research in textile structures.
- 1959-1961 Research Assistant. Assisted in research on mechanical behavior of textile structures.
- 1957-1958 AHMEDABAD NEW COTTON MILL No. 2, Ahmedabad, India.
Supervisor. Responsible for production supervision in the weaving department.
- 1955-1956 DELHI CLOTH MILL, Delhi, India
Trainee. In the spinning department.

Summers

- 1960 CELANESE FIBER COMPANY, Charlotte, North Carolina.
Mechanical Engineer. Developed a novelty yarn.
- 1963 BENET LABORATORY, Watervliet Arsenal, Watervliet, New York.
Mechanical Engineer. Studied the mechanical properties of "whiskers," single crystals.

Consulting Experience

- FIBERWEB North America, Simpsonville, SC, 1995
BROMBERG and SUNSTEIN, Boston, MA 1995-1996
FIBER DYNAMICS, High Point, NC (1991- 1993)
LAHORE UNIVERSITY OF MANAGEMENT SCIENCE, Pakistan (1991-)
NEWMAN, WILLIAMS, ANDERSON AND OLSON, Chicago, Illinois (1985)
BERNARD, CASSISA, BABST & SAPORITO, Metairie, Louisiana. (1984)
EXXON CHEMICAL CO., P. O. Box 4255, Baytown TX 77520. (1981)
MONSANTO TRIANGLE PARK DEVELOPMENT CENTER, INC. Research Triangle Park, NC 27709. (1979-1983)
AVTEX FIBERS INC., Front Royal, Virginia. (1978)
THE WORLD BANK, Washington, D. C. (1975-1977)
JOHNSON AND JOHNSON, New Brunswick, New Jersey. (1976)
DATA PACKAGING CORPORATION, Cambridge, Massachusetts. (1975)
KENDALL RESEARCH LABORATORY, Lexington, Massachusetts. (1974)

Professional Experience

- Secretary and Member of the Governing Council, The Fiber Society, 2001-
Member, Steering Committee, NCRC/TRI-Princeton/The Fiber Society 1996 Joint
Conference on "Advances in Fiber, Textile and Nonwovens: Science and
Technology, May 13-15, 1996
Chair, Steering Committee, NCRC/TRI-Princeton/The Fiber Society 1995 Joint
Conference on "Advances in Fiber, Textile and Nonwovens: Science and
Technology, May 9-11, 1995
Program Chairman, spring 1993 Technical Symposium of the Fiber Society
President, The Fiber Society, 1989
Vice President, The Fiber Society, 1988
Editorial Advisory Committee (Member) of Nonwoven Research Journal
Principal Investigator, NSF Planning Workshop on Research Needs in Fiber, Textile

and Related Industries, May 1987
Chairman, Gordon Research Conference on Fiber Science, 1985
Vice Chairman, Gordon Research Conference on Fiber Science, 1984
Member, The Fiber Society Governing Council (1985-1988)
Member, 1978-1984 Textile Industries Division, ASME Executive Committee
Vice Chairman, 1982-1983 ASME TID Executive Committee
Conference Chairman, 1983 Annual TID Conference
Chairman, 1983-1984 ASME TID Executive Committee
Program Chairman, 1978 annual TID Conference
Program Chairman, 1980 annual TID Conference
Secretary-Treasurer, 1978-1979, 1979-1980, 1980-1981, 1981-1982
Program Co-Chairman, fall 1982 Technical Symposium of the Fiber Society

Professional Affiliations

ASME (Fellow), The Fiber Society (Honorary Member), Sigma Xi (Life Member),
The Textile Institute (Fellow), American Academy of Mechanics (Founding member),
New York Academy of Science, Phi Kappa Phi.

Professional Recognitions

Lifetime Achievement Award, INDA, September 2002.
Sloan Industry Fellow, Visiting Professor, Harvard Center for Textile and Apparel
Research (HCTAR), Harvard University, Cambridge, MA. 2001-2002
Elected Secretary/Treasurer of the Fiber Society, 2001-2006
Awarded "Doctor Honoris Causa," Technical University of Liberec, Czech Republic
(2000)
TAPPI, Nonwovens Division Hollingsworth and Vose Award, 1998
Awarded Charles A. Cannon Professorship, College of Textile, NCSU 1996-
E. R. Schwarz Lecturer, Textile Industry Division, ASME, 1995
Awarded Honorary Membership of the Fiber Society, 1994.
Invited to lecture at the China Textile University, Textile Academy, Beijing and North-
west Institute of Textile Science and Technology. Xi'an in PRC, 1993.
Keynote Speaker at the Int. Conference on Nonwovens, held by North-India Section of
The Textile Institute, Manchester, UK, New Delhi, India - December 1992.
Visiting Scholar, School of Mathematics and Statistics, University of Sydney,
Sydney, NSW, Australia, 1992.
Awarded 1990 Harold Dewitt Smith Medal and Award of the ASTM and The Albany
International Research Co.
Elected, President of The Fiber Society, 1989
Elected, Vice-President of The Fiber Society, 1988
Appointed Member of the Editorial Advisory Committee of the Nonwovens Research
Journal, 1988.
Invited to organize and lead an NSF Planning Workshop on Research Needs in Fiber
Textile and Related Industries, May 1987.
Invited to lecture at the China Textile University and other textile universities in PRC,
1987.
Elected, Member of Phi Kappa Phi, 1986.

Elected, Member of The Fiber Society Governing Council (1985-1988)
North Carolina - Israel Exchange Scholar, 1984.
Elected, Vice Chairman (1984), Chairman (1985), of the Gordon Research Conference
on Fiber Science
Elected, Fellow Grade Member ASME, 1984.
Elected, Chairman, ASME TID Executive Committee, 1982-1983
Elected, Vice-Chairman, ASME TID Executive Committee, 1982-1983
Elected, Member New York Academy of Sciences, 1982.
Elected, Fellow of the Textile Institute, UK, 1979.

Personal Background and Interests

U. S. citizen; excellent health.
Have traveled through Europe, Japan, India, Israel, Egypt, South Korea, People's
Republic of China, Australia, New Zealand and camped across the United States
and Canada.
Play tennis, enjoy hiking, gardening, indoor plants, theater, meditation and music.

Theses and Dissertation

1. Master's Degree Thesis, "Stress Strain Properties of Textile Fibers at Impact Velocities and Their Interaction in High Speed Processing," MIT, 1961.
2. Ph. D. Dissertation, "On Deformation Friction and Interface Shear Stress in Viscoelastic-Elastic Layered System Under a Moving Load," RPI, 1966.
3. "Cotton Development International," MS thesis, Sloan School of Management, M. I. T. 1977.

Refereed Publications

1. Batra, Subhash K. and Backer, S. "Recovery of Fibers and Yarns from Extensions at High Speed," Textile Research Journal, **16**(11) (1966).
2. Batra, S. K. and Ling, F. F. "On Deformation Friction and Interface Shear Stress in Viscoelastic-Elastic Layered System under a Moving Load," ASLE Trans. **10**:294-301 (1967).
3. Batra, S. K. and Bell, J. C. "An Approximate Method for Evaluating Stresses Caused by an Arbitrary Pressure Distribution on the Surface of an Elastic Half Space," Surface Mechanics, SME, 144-163 (1969).
4. Backer, Stanley and Batra, Subhash. "On the Mechanics of Bicomponent Fibers," Textile Research Journal, **41**(12):1008-1012 (1971).
5. Berg, C. A., Batra, S., and Tirosh, J. "Friction and Wear of Graphite Fiber Composites," in the Journal of Research of the National Bureau of Standards, **76C**:1,2, 41-52 (1972).
6. Batra, S. K. and Popoff, A. A. "On the Use of Heated Rolls for Hot Rolling of Metals," Trans. ASME, Series H. Journal of Engineering Material and Technology, **95**(1):27-35 (1973).
7. Batra, S. K. "The Normal Force Between Twisted Filaments: Part I: The Fiber-Wound-on-a-Cylinder Model-- Analytical Treatment," Journal of the Textile Institute, **64**(4):209-222 (1973).
8. Batra, S. K., Tayebi, A. and Backer, S. "Normal Force Between Twisted Filaments: Part II: Experimental Verification," Journal of the Textile Institute, **64**(4):363-373 (1973).
9. Berg, C. A., Batra, S., and Tirosh, J. "Wear and Friction of Two Different Types of Graphite Fiber Reinforced Composites Materials," Fiber Science and Technology, **6**(3):159 (1973).
10. Batra, S. K. "A Generalized Model for Crimp Analysis of Multi-Component Fibers: Part I: Theoretical Analysis," Textile Research Journal, **44**(5):377-385 (1974).
11. Batra, Subhash K. "A Generalized Model for Crimp Analysis of Multi- Component Fibers: Part II: An Illustrative Example," Textile Research Journal, **44**(5):386-392 (1974).
12. Batra, S. K. "On The Sperm Transport Through Vas Deferens: Review of Hypotheses and Suggestions for a Quantitative Model," Fertility and Sterility, **25**(2):186-202 (1974).
13. Krepchin, I. P., Lau, C. W., Batra, S. K., Shack, W. J., and Lardner, T. J. "Mechanical Properties of the Mammalian Vas Deferens in the Passive State," Advances in Bioengineering, ASME, New York, 1974.
14. Lau, C. W., Krepchin, I. P., Batra, S. K., Shack, W. J. and Lardner, T. J. "Mechanical Properties of the Mammalian Vas Deferens in the Active State," Advances in Bioengineering, ASME, New York, 1974.
15. Batra, Subhash K. and Syed, Nuruzzaman. "Elastic-Inelastic Behavior of PET and Nylon 66 Monofilaments Under Lateral Compression," Journal of Polymer Science, Polymer Physics Edition **13**:369-386 (1975).
16. Varela, Carlos, Batra, Subhash K. and Backer, Stanley. "Dynamic Observations of Abrasion Snagging: A Laboratory Device for the SEM," Textile Research Journal **45**(4):303-307 (1975).
17. Batra, Subhash K., Lee, Danny S. and Backer, Stanley. "On the Stress Analysis of Cylindrically Wound Packages: The Case of a Warp Beam," Textile Research Journal, **46**(6):453-459 (1976).
18. Batra, S. K. "On the Heat-setting and Thermo-mechanical Behavior of Polyethylene Terephthalate and Nylon 66 Monofilaments," J. Macromolecular Sci., Phys. Ed., **B12**(3):405-422 (1976).
19. Batra, S. K., Lee, D. S., and Backer, S. "On the Thermal Effects in a Warp Beam (A Wound-Yarn-Package)," Trans. ASME, Journal of Engineering for Industry, **100**(1):8-12 (1978).
20. Batra, S. K., Krepchin, I. P., Lau, C. W., Shack, W. J., and Lardner, T. J. "Mechanical Properties of the Mammalian Vas Deferens in the Passive State," Archives of Andrology, **3**:107-117 (1979).
21. Batra, S. K., Lau, C. W., Krepchin, I. P., Shack, W. J., and Lardner, T. J. "Mechanical Properties of the Mammalian Vas Deferens. II. In the Active State," Archives of Andrology, **3**:119-125 (1979).
22. Johnson, R. H., Jr., Hersh, S. P., Batra, S. K., and Myers, T. "Evaluation of Cleaning and Washing Processes for Cotton Fiber: Part III: Carding and Dust Levels," Textile Research Journal, **50**(2):73-78 (1980).
23. Batra, S. K., Fornes, R. E. and Hersh, S. P. "Humidifiers as a Source of Respirable Dust in Textile Mills," Textile Research Journal, **50**(7):454-455 (1980).
24. Hersh, S. P., Hobby, C. K. Fornes, R. E. and Batra, S. K. "The Effect of Cotton Grade, Variety, and Growing Location on the Dust Generated in a Model Card Room," Textile Research Journal, **50**(9):531-540 (1980).

25. Hersh, S. P., Batra, S. K. and Fornes, R. E. "Review of Cotton Dust Control Technology at North Carolina State University," *CHEST*, **79S**:101S- 108S (1981).
26. Leonard, M. H., Hersh, S. P., Batra, S. K. and Dyer, C. L. "Eliminating Respirable Dust from the Cotton Workplace by Purifying Humidifier Water: A Cost Analysis," *Textile Research Journal* **51**(10):642-649, 1981.
27. Hersh, S. P., Batra, S. K. and Fornes, R. E. "Cotton Dust Control Studies: Effects of Engineering Controls, Washing Cotton, and Additives," *Textile Research Journal* **51**(11):714-722 (1981).
28. Subhash K. Batra, T. K. Ghosh, M. I. Zeidman, "On the Dynamic Analysis of Yarn in Ring Spinning," in *Advanced Workshop on the Application of Mathematics and Physics in the Wool Industry*, Editors: G. A. Carnaby, E. J. Wood, L. F. Story, WRONZ and Textile Institute (New Zealand Section) (1988).
29. W. J. Rasdorf, P. D. Dastoor, S. K. Batra, "The Data Base Component of a Hybrid CAD System for Industrial Fabric Design," in *Managing Engineering Data: Emerging Issues*, R. Fulton, Editor, ASME, San Francisco, CA (1988) pp. 119-126.
30. Subhash K. Batra, T. K. Ghosh, M. I. Zeidman, "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process, Part I: Without Air Drag and Coriolis Acceleration," *Text. Res. J.*, **59**,309-317 (1989).
31. Subhash K. Batra, T. K. Ghosh, M. I. Zeidman, "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process. Part II: With Air Drag," *Text. Res. J.*, **59**, 416-424 (1989).
32. M. I. Zeidman, S. K. Batra, P. E. Sasser, "Using HVI Length Measurements to Estimate Short Fiber Content, Part II," *Proc. Second Annual Engineered Fibers Selection Conference*, Memphis, TN, 57-69, June (1989).
33. M. I. Zeidman, M. W. Suh, S. K. Batra, "A new Perspective on Yarn Unevenness: Components and Determinants of General Unevenness," *Text. Res. J.*, **60**, 1-6 (1990)
34. Girish A. Pai, Subhash K. Batra, Solomon P. Hersh, "Interpreting Creep and Fatigue of Fibers via Deformation Kinetics," *Proc. of the 50th Anniversary Conference of The Fiber Society* , 18-23 August, 1990, in *Journal of Applied Polymer Science*, (1990).
35. T. K. Ghosh, S. K. Batra, R. L. Barker, "The Bending Behavior of Plain Woven Fabrics, Part I: A Critical Review." *J. Text. Inst.*, **81**,3, 245-254 (1990).
36. T. K. Ghosh, S. K. Batra, R. L. Barker, "On the Bending Behavior of Plain Woven Fabrics, Part II: Linear Yarn Bending Behavior." *J. Text. Inst.*, **81**,3, 255-271 (1990).
37. T. K. Ghosh, S. K. Batra, R. L. Barker, "On the Bending Behavior of Plain Woven Fabrics, Part III: Bi-linear Bending Behavior of Yarn and Effect of Fabric Set." *J. Text. Inst.*, **81**,3, 272-287 (1990).
38. M. I. Zeidman, S. K. Batra, P. E. Sasser "Determining Short Fiber Content in Cotton: Part I. Some Theoretical Fundamentals," *Text. Res. J.*, **60**, 21-30 (1991)
39. M. I. Zeidman, S. K. Batra, P. E. Sasser "Determining Short Fiber Content in Cotton: Part II. Measures of SFC from HVI Data-Statistical Models," *Text. Res. J.*, **60**, 106-113 (1991).
40. W. B. Fraser, T. K. Ghosh, S. K. Batra, "On Unwinding of Yarn from a Cylindrical Package," *Proc. R. Soc. Lond. A* (1992) **436**, 479-498.
41. T. K. Ghosh, S. K. Batra, B. Dua, M. I. Zeidman, "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process: Part III: The effect of coefficients of friction and the balloon control rings," *Textile Praxis International*, **47**, September 1992.
42. Dastoor, P. H., Hersh, S. P., Batra, S. K., Rasdorf, W. J. "Computer-Assisted Structural Design of Industrial Woven Fabrics. Part I: Need, Scope, Background, System Architecture," *J. Text. Inst.*, **85**, 2, 89-109 (1994)
43. Dastoor, P. H., Hersh, S. P., Batra, S. K., Rasdorf, W. J. "Computer-Assisted Structural Design of Industrial Woven Fabrics. Part II: System Operation, Heuristic Design," *J. Text. Inst.*, **85**, 2, 110-134 (1994)
44. Dastoor, P. H., Ghosh, T. K., Batra, S. K., Hersh, S. P., "Computer-Assisted Structural Design of Industrial Woven Fabrics. Part III: Modeling of Fabric Uinaxial/Biaxial Load-Deformation," *J. Text. Inst.*, **85**, 2, 135-157 (1994).
45. Gilmore, T.F., S.K. Batra, N.B. Timble, and Yi Feng, "Parametric Study of Thermal Point Bonding Part II: Cotton-Bicomponent Staple Webs" *International Nonwovens Journal*, **6**, (4), 28-34 (1994)
46. Batra, S. K., Ghosh, T. K., Zeng, Q., Robert, K. Q., Fraser, W. B., "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process, Part IV: Inherent Instability of the Free Balloon," *Text. Res. J.*, **65**, 7,417-423(1995).
47. Wu, Z., Davis, H. A., Batra, S. K., "Interference Microscopy and Fiber Structure," *Proc. R. Soc. Lond. A*, **450**, 23-36 (1995)
48. Veerabadran, R., Davis, H. A., Batra, S. K., Bullerwell, A. C., "Devices for On-line Assessment of Nonwovens' Basis Weight and Structure," *Text. Res. J.*, **66**(4), 257-264 (1996).
49. Dharmadhikary, R., H. A. Davis, T. F. Gilmore (deceased), S. K. Batra, "Influence of Fiber Structure on Thermally Bonded Fabrics," *Textile Research Journal*, **69**(10),725-734 , 1999.
50. Meng, J., Seyam, A. M., and Batra, S. K., "Carding Dynamics, Part I: Previous Studies of Fiber Distribution and

- Movement in Carding,” *Textile Research Journal* **69**, 90-96, 1999.
51. Narter, Meltem A., Subhash K. Batra, and David R. Buchanan, “Micromechanics Of Three-Dimensional Fiberwebs: Constitutive Equations,” *Proc. Roy. Soc.*, London, A **455**, pp 3549-3569, 1999.
 52. Shahani, A., Shiffler, D.A., and Batra, S.K., “Foamed Latex Bonding of Spunlace fabrics to Improve Physical Properties,” *International Nonwovens Journal* , **8** (2), pp. 41-48, 1999.
 53. Chidambaram, A., H. A. Davis and S. K. Batra, “Strength Loss in Thermally Bonded Polypropylene Fibers,” *International Nonwovens Journal*, **9**, 3, pp. 27-35, 2000.
 54. Batra, S. K., T. K. Ghosh, Q. Zeng, “Dynamic Analysis of Ring Spinning: A Brief Review,” Proceedings of the Textile Science Conference 2000, Technical University of Liberec, Czech Republic.
 55. Ghosh, T. K., Batra, S. K., Murthy, A. S., Dynamic Analysis of Yarn Unwinding from Cylindrical Packages. Part I Parametric Studies of the Two-Region Problem, *Tex. Res. J.*, **71**(9), 771-778 (2001)
 56. Ma X., Ghosh T. K., BATRA S. K., “Dynamic Analysis of Yarn Unwinding from Cylindrical Packages -- Part II: The Three-Region Analysis,” **71**, No. 10: 855-784 (2001).
 57. Farer, R., Ghosh, T. K., Seyam, A. M., Grant, E., Batra, S. K. “Study of Meltblown Structures Formed by Robotic and Meltblowing Integrated System: Impact of Process Parameters on Fiber Orientation,” *International Nonwovens Journal* , **11** (4), pp. 14-21 (2002).
 58. Farer, R., Seyam, A.M., Ghosh, T.K., Grant, E., and Batra, S.K., Meltblown Structures Formed by a Robotic and Meltblowing Integrated System: Impact of Process Parameters on Fiber Orientation and Diameter Distribution, *Textile Research Journal* **72**, 1033-1040, 2002.
 59. Farer, R., Seyam, A.M., Ghosh, T.K., Batra, S.K., Grant, E., Lee, G., Forming Shaped/Molded Structures by Integration Meltblowing and Robotic Technologies, *Textile Research Journal* **73**, 15-21, 2003.
 60. Farer, R., Batra, S.K., Ghosh, T.K., Grant, E., and Seyam, A.M., Study of Meltblown Structures Formed by Robotic and Meltblowing Integrated System: Impact of Process Parameters on Fiber Diameter Distributions, *International Nonwovens Journal* **12**, No. 1, 36-42, 2003.

Non-Refereed Publications

1. Popoff, A. A., Walowit, J. A., Batra, S. K. and Fiorentino, R. J. "Development of a Process Utilizing Heated Rolls for Hot Rolling Metals," MF70-123, SME Technical Paper (1970).
2. Hersh, S. P., Fornes, R. E., Batra, S., Anand, M. and Johnson, R. H. "Characteristics of Card Room Dust Measured by Light Scattering and Short- Termed Samplers." Proceedings, Third Special Session on Cotton Dust Research, Beltwide Cotton Production Research Conference, Phoenix, AZ, January 1979.
3. Batra, S. K., Shang, P. Peter, Hersh, S. P. and Robert, Kearny Q. Jr. "Evaluation of the SRRC Precutter as a Cotton Dust Sampler," Proceedings, Fourth Special Session on Cotton Dust Research, Beltwide Cotton Production Research Conference, St. Louis, MO, January 1980.
4. Hersh, S. P., Hobby, C. K., Fornes, R. E. and Batra, S. K. "The Influence of Cotton Grade, Variety and Growing Location on Dust Emission," Proceedings, Fourth Special Session on Cotton Dust Research, Beltwide Cotton Production Research Conference, St. Louis, MO, January 1980.
5. Hersh, S. P., Batra, S. K. and Fornes, R. E. "Progress in Cotton Dust Technology: Effects of Engineering Controls, Washing Cotton, and Additives." Proceedings of the Symposium on Cotton Dust: Sampling, Monitoring and Control, ASME, New York, 1980.
6. Batra, S. K., Shang, P. P., Hersh, S. P. and Robert, K. Q. "The SRRC Cotton Dust Sampler as a Substitute for the Vertical Elutriator," Proceedings of the Symposium on Cotton Dust: Sampling, Monitoring and Control, ASME, New York, 1980.
7. Leonard, M. H., Hersh, S. P., Batra, S. K. and Dyer, C. L. "Costs for Removing Respirable Dust from the Cotton Workplace by Purifying Humidifier Water Supply." Proceedings of Fifth Special Session on Cotton Dust Research, Beltwide Cotton Research Conferences, Atlanta, GA, January 1981.
8. Blackburn, W. A., Zimmerman, G. S. and Batra, S. K. "A Method for Measuring Fiber to Fiber Bonding in Nonwovens," INDA, Ninth Technical Symposium: 'Nonwovens in the '80s: Year of Change,' March 9-11, 1981, Atlanta, GA.
9. Batra, S. K. and Bohlmann, D. H. "Overview of the New Developments in Needle-and Stitch-Bonding Technologies," Proceedings of INSIGHT 81: Advanced Forming/Bonding Conference, September 13-15, 1981, San Antonio, TX.
10. Pan, W. W., Hersh, S. P. and Batra, S. K. "Evaluation of the Equivalency between Vertical Elutriators," Proceedings, Sixth Special Session on Cotton Dust Research, Beltwide Cotton Production Research Conferences, Las Vegas, Nevada, January 4, 1982.
11. Hersh, S. P., Batra, S. K., and Lee, W. W. "Real Time Measurement of Particle Size Distribution of Airborne Cotton Dust by Light Scattering," Cotton Dust: Controlling an Occupational Health Hazard, ACS Symposium Series No. 189,

- Ed. J. G. Mantalvo Jr., ACS, Washington, D.C. 1982.
12. Batra, S. K., "On Properties of Fibers as Structural Elements in Nonwovens," Advances in Nonwoven Technology, 10th Technical Symposium, INDA, 1982.
 13. Hersh, S. P., Batra S. K. and Udomkichdecha, W. "Release of Dust Suppressant Additives as Oil Mist or Vapor During Cotton Carding," Seventh Cotton Dust Research Conference, 1983 Beltwide Cotton Production Research Conferences, P. J. Wakelyn, ed., National Cotton Council of America, Memphis, TN, 130-134, 1983.
 14. Batra, S. K., Pan, W. W., Buchanan, D. R. "Application of Fracture Mechanics to the Tear Resistance of Fiberweb Structures," in Proceedings of the International Symposium on Fiber Science and Technology, 20-24 August 1985, Hakone, Japan. The Society of Fiber Science and Technology, Japan.
 15. Batra, S. K., Hersh, S. P., Barker, R. L., Buchanan, D. R., Gupta, B. S., George, T. W., and Mohamed, M. H. "Neither Woven Nor Knit: A New System for Classifying Textiles," 15th INDA Technical Symposium, June 4-6, 1985, INDA, New York. **Also** appeared in the Nonwovens Industry, September 1985, and Textile Horizon, Volume 6, Number 7, July 1986.
 16. Yakir Shoshani, Subhash K. Batra, "Use of Some Fiberwebs as Noise Insulation Materials: An Assessment," INDA-TEC, The International Technological Conference, June 2-5, 1986, INDA, NY (1986).
 17. Subhash K. Batra, Werask Udomkichdecha, Mansour H. Mohamed, "Measurement of Compressional Resistance of Fiberwebs: A New Procedure," 1987 Fiberfill and Other High Loft End-Uses Conference, INDA, New York, (1987) and Second International Conference on Nonwovens, Shanghai Textile Research Institute, Shanghai, PRC (1987).
 18. P. Peter Shang, Subhash K. Batra, "Designing Fiberwebs for Specific Elastic Properties," INDA-TEC 87, INDA (1987).
 19. S. K. Batra, S. P. Hersh, R. L. Barker, D. R. Buchanan, B. S. Gupta, T. W. George, "A New System for Classifying Textiles," in Advanced Seminar on Nonwovens, Proceedings of the ACS Meeting, June 1988, Toronto.
 20. Subhash K. Batra, "Fibers as Structural Elements in Nonwovens," in Advanced Seminar on Nonwovens, Proceedings of the ACS Meeting, June 1988, Toronto.
 21. M. I. Zeidman, M. W. Suh, S. K. Batra, "Sample Types and Sampling Methods for Cotton Length Measurements," Proceedings of the "Cotton Utilization Technology", 3rd National Cotton Textile Conference, October 5-7, 1988, Myrtle Beach, SC.
 22. M. I. Zeidman, S. K. Batra, P. E. Sasser, "Relationship Between Short Fiber Content and the HVI Length Parameters," Proc. Beltwide Cotton Production Conferences, Nashville, TN, 605-610, January (1989).
 23. Batra, S. K., Mohamed, M. H., Udomkichdecha, W. "Some Thought on the Compressional Behavior of Fiber Assemblies," Proc. of the International Seminar on Nonwovens, Bombay Textile Research Association, January 22-23, 1990, Bombay India.
 24. Batra, S. K., Mohamed, M. H., Udomkichdecha, and W., Zeidman, M. I., "Measurement of Compressional Resistance of Fiberwebs: a New Procedure," Proce. 8th International Wool Textile Research Conference (February 7-14, 1990), Volume V, WRONZ (1990).
 25. S. P. Hersh, Batra, S. K., Dastoor, P., Rasdorf, W. J. "Development of an Expert System for the CAD of Woven Fabrics: A Progress Report," Proc. of the 8th International Wool Textile Research Conference (February 7-14, 1990), Volume III, WRONZ (1990).
 26. Subhash K. Batra, David R. Buchanan, Wen-Whe Pan, "New Measure for Tear Resistance of Fiberweb Structures: A Proposal," Proc. INDA-TEC '90, Baltimore, MD, June 5-8, (1990).
 27. Girish A. Pai, Subhash K. Batra, Solomon P. Hersh, "Effect of Molecular Weight and Draw Orientation on the Creep and Fatigue Behavior of PET Monofilaments," Proc. POLYESTERS '90, (17th Fiber Symposium and 7th Conference Polyester Filament Yarn), Tabor, Czechoslovakia, May 22-24, (1990).72. A. C. Bullerwell, S. K. Batra, K. Veerabadran and T. F. Gilmore, "On-Line Measurement of Fiberweb Basis Weight," Proc. 1991 TAPPI Nonwovens Conference, May 12-16, Marco Island, FL.
 28. S. K. Batra, Z. X. Mi, T. F. Gilmore, "Computational Model for Predicting Mechanical Behavior of Point-Bonded Webs: A Progress Report," Proc. of the International Conference "Textile Science '91, VSST, Liberec, Czechoslovakia, September 16-18, 1991.
 29. S. K. Batra, T. K. Ghosh, M. I. Zeidman, B. Dua, "An integrated Approach to Dynamic Analysis of the Ring Spinning Process: A Progress Report," Proc. of the International Conference "Textile Science '91, VSST, Liberec, Czechoslovakia, September 16-18, 1991.
 30. T. K. Ghosh, S. K. Batra, B. Dua, M. I. Zeidman, "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process: The Effect of Balloon Control Rings," Proc. of the 4th Engineered Fiber Selection Forum, Cotton Inc., Raleigh, NC, November 7-8, 1991.77. S. K. Batra, H. Shim, B. S. Gupta, "Test Method for Bond Strength Measurement: A Proposal," Proc. INDA-tec '92, April 7-10, Ft. Lauderdale Fla.
 31. H. J. Shim, S. K. Batra, B. S. Gupta, "Use of Multiple Needle Penetration Test for Characterizing Bond Strength Potential of Resin/Binder Systems," Proc. TAPPI, '92 Nonwovens Conference, May 11-13, 1992, Marco Island, FL

32. Batra, S.K., F.L. Cook, T.F. Gilmore, E.A. Vaughn, L.C. Wadsworth, W.K. Walsh (Editors) The Nonwovens Fabrics Handbook, INDA Association of the Nonwoven Fabrics Industry, Cary, NC 1992
33. Batra, S. K., Dharmadhikary, R. "Globalization of the Nonwovens Industry: Implication for Developing Countries," Proc. Int. Conference on Nonwovens, December 1992, The Textile Institute, Manchester, UK.
34. Gilmore, T. F., Mi, Z. X., Batra, S. K. "The Effect of Bond Point Design and Bond Strength on the Load-Deformation of Point Bonded Nonwovens: A Computer-Based Study," Proc. TAPPI Conference, May 1993.
35. Gilmore, T.F., Feng Yi, S.K. Batra, " The Application of a Mathematical Model to the Optimization of a Thermal Bonding Process: Consideration of Three Variables for a Cotton- Bicomponent Nonwoven,"Proc., INDA-TEC 93, Miami Beach, FL, Sept. 21-24 (1993)
36. Seyam, A., Z.X. Mi, S.K. Batra, A.C. Bullerwell , J. Meng, and A. Mohamed, "Measurement of Needle punching Forces: The Single Needle Case," Proc. INDA-TEC '93, Miami Beach, FL, September 21-24, (1993)
37. Batra, S. K., "Dynamic Analysis of Ring Spinning: A Historical Perspective," EFS Conference, Cotton Inc. November 2-3, 1995, Raleigh, NC. **[Invited, Featured Paper]**
38. Batra, S.K. and McLawhorn, B.M., "The Nonwovens Industry: An International Perspective" Indian Textile Association Conference, Madras, December 15-17, 1995.
39. Batra, S. K. "Glimpses of thermal Bonding," INDA-TEC '96, INDA, Cary NC, 1996.
40. Batra, S. K., Blackburn, W. A., "Nonwovens Cooperative Reserach Center: A Resource for Research and Development," TAPPI Proceedings, 1997, TAPPI, Atlanta GA 1997.
41. Timble, N. B., Shiffler, D. A., Batra, S. K. " Thermal Bonding of Needle punched Nonwovens Using IR," TAPPI Proceedings, 1997, TAPPI, Atlanta GA 1997.
42. Subhash K. Batra and William A. Blackburn, "Nonwoven Textile Fabrics," ILO Encyclopedia, 1997.
43. Batra, Subhash K., "Nonwovens Cooperative Research Center: The journey So Far", Proceedings of NSF State/IUCRC Symposium, Norman OK, September 3-5, 1997.
44. Farer, R., Batra, S. K., Gilmore, T. F., "Processing Cotton and Cotton/Pulp Blends for Wet-Laid Nonwovens using Novel Dispersion Technologies," 1998 TAPPI Nonwovens Conference Proceedings, TAPPI PRESS, St. Petersburg, Florida, pp.133-136, 1998.
45. Batra, Subhash K., Bhuvanesh C. Goswami, Robin W. Dent, "On the Properties of Nonwovens," Proceedings of the One Hundred Years of Fiber & Textile Research: An International Technical Symposium , organized by the Fiber Society, July 5-10, 1998, Asheville, North Carolina, USA **(Invited, Featured Paper)**
46. Ghosh, T. K., Batra, S. K., "On Over-end Unwinding of Yarn from Cylindrical Packages: A Progress Report," Mt. Fuji Conference, August 2001. **(Invited Paper)**
47. Subhash K. Batra, David Brookstien, "Rethinking the US 'Textile Industry'," Proceedings AUTEX II Conference, Brugge, Belgium, July 1-3, 2002.
48. Subhash K. Batra, Dunlop, J., Abernathy, F. H., Weil, D, Hammond, J., "Do fibers need be called textiles? If not, why not?" Proceedings of Korean Fiber Society Conference, November, 13-15, 2002, Seoul, S. Korea.

Special Reports

1. Batra, S. K. and Bell, C. "On the Science and Technology of Natural Vegetable Fibers," A review report prepared under Technology Adaptation Program at MIT, sponsored by U.S.A.I.D., 1975.
2. "Cotton Development International," A proposal prepared on behalf of the World Bank (IBRD), UNDP and Rockefeller Foundation, 1977.
3. Subhash K. Batra, "Research Needs in Fiber, Textile and Related Industries," Final Report of the NSF Planning Workshop (1987).
4. Batra, S. K., Gilmore, T. F., "Nonwovens Cooperative Research Center: Annual Report- Year 1," May 1, 1992, Submitted to NSF and the Industrial Advisory Board of NCRC
5. Batra, S. K., Gilmore, T. F., Seyam, A. M. "Nonwovens Cooperative Research Center: Annual Report- Year 2," May 1, 1993, Submitted to NSF and the Industrial Advisory Board of NCRC
6. Batra, S. K., Gilmore, T. F., Seyam, A. M. "Nonwovens Cooperative Research Center: Annual Report- Year 3," May 1, 1994, Submitted to NSF and the Industrial Advisory Board of NCRC
7. Batra, S. K., Gilmore, T. F., Seyam, A. M. "Nonwovens Cooperative Research Center: Annual Report- Year 4," May 1, 1995, Submitted to NSF and the Industrial Advisory Board of NCRC
8. Batra, S. K., Gilmore, T. F. "Nonwovens Cooperative Research Center: Annual Report- Year 5," May 1, 1996, Submitted to NSF and the Industrial Advisory Board of NCRC
9. Batra, S. K. "Nonwovens Cooperative Research Center: Annual Report- Year 6," May 1, 1997, Submitted to NSF and the Industrial Advisory Board of NCRC
10. Batra, S. K. "Nonwovens Cooperative Research Center: Annual Report- Year 7," May 1, 1998, Submitted to NSF and

the Industrial Advisory Board of NCRC

11. Batra, S. K., Behnam Pourdeyhimi, Don Shiffler, Anh Tranphuoc "Nonwovens Cooperative Research Center: Annual Report- Year 8," August 31, 1999, Submitted to NSF and the Industrial Advisory Board of NCRC

Monographs and Book Chapters

1. Batra, S. K. and Lardner, T. J. "On the Mechanism of Sperm Transport in the Vas Deferens," The Human Semen and Fertility Regulation in the Male, Ed., Dr. E. S. E. Hafez, The C. V. Mosby Company, 1976.
2. "Cotton Development International," A proposal prepared on behalf of the World Bank (IBRD), UNDP and Rockefeller Foundation, 1977.
3. Robert, K. Q. and Batra, S. K., Eds. 1980. Symposium on Cotton Dust: Sampling, Monitoring and Control, New York: ASME.
4. Batra, S. K. "Other Long Vegetable Fibers - Abaca, Banana, Sisal, Henequen, Flax, Ramie, Hemp, Sunn, and Coir" - in Fiber Chemistry, Editors: Lewin/Pearce, Marcel Dekker, NY, 1986.
5. Dharmadhikary, R., Gilmore, T. F., Davis, H. A., Batra, S. K. "On Thermal Bonding," Textile Progress, The Textile Institute, Manchester, UK, (1995)
6. Batra, S. K. "Other Long Vegetable Fibers - Abaca, Banana, Sisal, Henequen, Flax, Ramie, Hemp, Sunn, and Coir" - a revised chapter in Fiber Chemistry, Editors: Lewin/Pearce, Marcel Dekker, NY, 1998.
7. B. Pourdeyhimi and S. K. Batra. ITMA '99: A Review, Textile Progress, No. 1/2, (30), 51-68, (2000).
8. Subhash K. Batra and Behnam Pourdeyhimi Chapter 6. Thermal Bonding in Handbook of Nonwovens, S. J. Russel, Editor, Woodhead Publishing, 2003.

Paper Presentations and Talks

1. Stress-Strain Properties of Textile Fibers at Impact Velocities, Fiber Society Meeting, West Point, NY, 1961.
2. On Deformation Friction and Interface Shear Stress in Viscoelastic Elastic Layered Systems Under a Moving Load, ASLE Conference, Toronto, Canada, 1967.
3. An Approximate Method for Evaluating Stresses Caused by Arbitrary Pressure Distribution on the Surface of an Elastic Half-Space, Winter Annual Meeting, ASME, Los Angeles, 1969.
4. On the Use of Heated Rolls for Hot Rolling of Metals, Winter Annual Meeting, ASME, New York, NY, 1972.
5. A Generalized Model for Crimp Analysis of Multi-Component Fibers, Gordon Research Conference, New London, NH, 1974.
6. A Generalized Model for Crimp Analysis of Multi-Component Fibers, Invited Talk at the Mechanics of Texturing, Special Summer Session, MIT, 1974.
7. Elastic-Inelastic Behavior of PET and Nylon 66 Monofilaments under Lateral Compression, Annual Meeting, Organic Coatings and Plastics Division, ACS, Philadelphia, 1975.
8. On the Stress Analysis of a Warp Beam, Fiber Society Meeting, Atlanta, GA, 1975.
9. On the Stress Analysis of a Warp Beam, Invited Seminar, NCSU, 1975.
10. On Heat-Setting and Thermo-mechanical Properties of PET and Nylon 66 Monofilaments, Fiber Society Meeting, Montreal, Canada, 1976.
11. On Heat-Setting and Thermo-mechanical Properties of PET and Nylon 66 Monofilaments, Invited Seminar, NCSU, 1976.
12. On the Thermal Effects in a Warp Beam, Annual Conference, Textile Engineering Division, ASME, Greenville, SC, 1977.
13. On the Stress Analysis of A Warp Beam, Invited Talk at Indian Institute of Technology, Delhi, India, 1977.
14. On Heat-Setting and Thermo-mechanical Properties of PET and Nylon 66 Monofilaments, Invited Talk at Indian Institute of Technology, Delhi, India, 1977.
15. On the Stress Analysis of a Warp Beam, Invited Talk at Ahmedabad Textile Industries Research Association, Ahmedabad, India, 1977.
16. On the Role of Fracture Mechanics in Wear and Attrition of Fiber Assemblies, FPS Seminar, NCSU, 1978.
17. On The Role of Fracture Mechanics in Wear and Attrition of Fiber Assemblies, Gordon Research Conference, New London, NH, 1978.
18. Characteristics of Card Room Dust Measured by Light Scattering and Short- Termed Samplers, 1979 Beltwide Cotton Production Research Conf., Phoenix, AZ, Jan. 9, 1979.
19. Textile Structures as Reversible Vasectomy Devices: Is There a Potential Role? FPS Seminar, NCSU, April 1979.
20. Textile Structures as Reversible Vasectomy Devices: Is There a Potential Role?, Invited Talk, Fiber Society, Technical Conference, Princeton, NJ, May 1979.
21. Washing Cotton to Eliminate Health Hazard. Part III. Carding and Dust Levels, Natural Fibers Textile Conf., Charlotte, NC, Sept. 18, 1979.
22. The Influence of Cotton Grade, Variety and Growing Location on Dust Emission, 1980 Beltwide Cotton Production Research Conf., St. Louis, MO, Jan 9, 1980.
23. Evaluation of SRRC Precutter Sampler, Beltwide Cotton Production Research Conference, St. Louis, MO, January 1980.
24. Review of Cotton Dust Control Technology Studies at North Carolina State University, Am. College of Chest Physicians International Conf. on Byssinosis, Birmingham, AL, Apr. 15, 1980.
25. Bulk Specimens as Fiber Models (Nylon 66, PET), The Fiber Society Technical Conference, New Orleans, LA, May 1980.
26. Evaluation of SRRC Precutter Sampler, Seminar, SRRC, New Orleans, LA, May 1980.
27. Progress in Cotton Dust Control Technology: Effects of Engineering, Atlanta, GA, Oct. 7, 1980.
28. The SRRC Sampler as a Substitute for the Vertical Elutriator, 1980 Annual ASME Textile Industries Conference, Atlanta, GA, October 1980.
29. Costs for Removing Respirable Dust from the Cotton Workplace, 1981 Beltwide Cotton Production Research Conf., New Orleans, LA, Jan. 8, 1981.
30. A Method for Measuring Fiber to Fiber Bonding in Nonwovens, 9th Annual Technical Symposium, INDA, Atlanta, GA, Mar. 9-11, 1981.
31. Analysis and Synthesis of Textile Structures and Processes, Gordon Research Conference on Fiber Science, New London, NH, July 1981.
32. A Method for Measuring Fiber to Fiber Bonding in Nonwovens, invited seminar, Nonwovens Forum, 3M Company, St. Paul, MN, March 1981.

33. Overview of the New Developments in Needle- and Stitch-Bonding Technologies, INSIGHT 81: Advanced Forming/Bonding Conference, September 13-15, 1981, San Antonio, TX, invited talk.
34. Mechanical Bonding of Nonwovens, Exxon Chemical Company, Baytown, TX, September 21, 1981, invited seminar.
35. On Properties of Fibers as Structural Members in Nonwovens INDA, Tenth Technical Symposium: Advances in Nonwoven Technology, November 1982, New York, invited talk.
36. Release of Dust Suppressant Additives as Oil Mist or Vapor During Cotton Carding, 1983 Beltwide Cotton Production Research Conf., San Antonio, TX, Jan. 3-4, 1983.
37. Characterization of Anisotropy of Spunbonded Nonwovens, Fiber Society Symposium on Engineered Structures, Calloway Gardens, GA, April 1983.
38. On Tear Characterization of Nonwovens, Invited talk, Albany International Research Corp., Dedham, MA, November 1983.
39. On the Tear Characterization of Spunbonded Nonwovens, Christina Laboratory E. I. duPont de Nemours and Co., Inc., Wilmington, DE, August 1983.
40. Stitchbonding Technology and Mechanics of Nonwovens, presented at Workshop on Nonwovens, University of Tennessee, Knoxville, TN, August 1983.
41. Extended Seminar on Overview of Nonwovens Technology. Israel Textile Association, March 7, 1984, Tel-Aviv, Israel.
42. Mechanics of Spunbonded Nonwovens. Talks given at
 . Israel Fiber Institute, Israel, March 11, 1984 . ITT, RWTH, Aachen, W. Germany, March 29, 1984
 . ITT, Denkendorf, W. Germany, April 13, 1984 . TEFO, Gothenberg, Sweden, April 15, 1984
43. On Stitchbonding Technology and Mechanics of Nonwovens. Three talks presented at the Workshop on Nonwovens, University of Tennessee, Knoxville, TN. August 1984.
44. The Effect of Mechanically Cleaning Cotton on Cotton Dust Generation During Subsequent Processing in a Model Card Room, ACS Symposium on Cotton Dust, August 28, 1984.
45. On the Anisotropy of Spunbonded Systems, The Fiber Society Meeting, October 10-12, 1984, Knoxville, TN.
46. Neither Woven Nor Knit: A New System for Classifying Textiles, June 4-6, 1985. INDA 15th Technical Symposium, Boston, MA.
47. August 1985. Presented Seminars on the Mechanics of Nonwovens at the Research and Development Laboratories of
 . Toyobo Fiber Company . Toray Fiber Company . Teijin Fiber Company in Japan
48. August 1985. Presented two invited Seminars at Kyoto University on the Mechanics of Nonwovens.
49. August 1985. Presented invited seminars on the Overview of Nonwovens Technology at the National University, Seoul, South Korea.
50. August 1985. Presented invited seminars at
 . Tong Yang Nylon Co. Ltd., Anyang, S. Korea . Sunkyang Fibers Ltd., Suwon, S. Korea
 . Kolon Industries, Inc., Gumi, S. Korea
51. Characterization of Anisotropy of Spunbonded Fiberwebs, Paper Presented at the Annual Seminar of the Korean Society of Textile Engineers and Chemists, Kyong Ju, S. Korea, August 12, 1985.
52. Application of Fracture Mechanics to the Tear Resistance of Fiberweb Structures. Invited presentation at the International Symposium on Fiber Science and Technology, August 20-24, 1985, Hakone, Japan.
53. Experimental Evaluation of Some Fiberwebs as Noise Insulators. The Fiber Society Meeting, May 1-2, 1986, Princeton, NJ.
54. Use of Some Fiberwebs as Noise Insulation Materials: An Assessment. Presented at INDA-TEC, June 2-5, 1986, Philadelphia, PA.
55. Mechanics of Nonwovens. Two lectures given at the Nonwovens Workshop at the University of Tennessee, Knoxville, TN, August 18-22, 1986.
56. Fracture Mechanical Characterization of Tear of Spunbonded Fiberwebs: Some Additional Results. The Fiber Society Fall 1986 Technical Conference, Wychmere Harbor Club, Harwichport, Cape Cod, MA.
57. Measurement of Compressional Resistance of Fiberwebs: A New Procedure," INDA Conference on Fiberfill and Other High Loft End-Uses, January 27, 28, 1987, Charlotte, NC.
58. Dynamics of the Ring Spinning Balloon: New Analysis, New Results. The Fiber Society, Spring 1987 Technical Conference on Modeling and Design of Textile Structures, May 4-6, 1987, Greensboro, NC.
59. Designing Fiberwebs for Specific Fiber Properties. INDA-TEC meeting, May 18-21, 1987, Hilton Head, SC.
60. Delivered invited lecture (1) on "Nonwovens Technology and Mechanics of Nonwovens" (a) (15 hours) at the China Textile University, PRC, June 4-12, 1987, (b) (12 hours) at the Tianjin Textile Institute, Tianjin, PRC, June 13-17, 1987, (c) (4 hours) at the Textile Academy, Ministry of Textile, Beijing, PRC, June 18-19, 1987.
61. Measurement of Compressional Resistance of Bulky Fiberwebs: A New Procedure, 2nd International Conference on

- Nonwovens, organized by the Shanghai Textile Research Institute, Shanghai, PRC, June 21-24, 1987.
62. "On the Characterization of Lateral Compression of Bulky Fiberwebs (Nonwovens)." Gordon Research Conference on Fiber Science, July 6-10, 1987, Colby-Sawyer College, New London, NH.
 63. "Topics in the Mechanics of Nonwovens," HORIZON lecture series, Kimberly Clark Corp., Roswell, GA, July 17, 1987.
 64. "Mechanics of Nonwovens" (4 hours), Nonwovens Workshop, University of Tennessee, Knoxville, TN, August 1987.
 65. Conducted a group discussion on Future Directions in Fiber, Textile Research Fiber Society Technical Conference, Clemson, SC, November 11-13, 1987.
 66. On the Dynamic Analysis of Yarn in Ring Spinning. Invited paper at the workshop on "Mathematics and Physics Applications in the Wool Industry," February 9-12, Christchurch, New Zealand. Organized by The Textile Institute New Zealand Section and Wool Research Organization of New Zealand, Inc.
 67. "Fibers as Structural Elements in Nonwovens" at The Advanced Seminar on Nonwovens, ACS Meeting, June 6-8, 1988, Toronto.
 68. "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process," July 7, 1988, SRRC, USDA, New Orleans - an invited seminar.
 69. "The Data Base Component of a Hybrid CAD System for Industrial Fabrics Design," (given by P. D. Dastoor), P. D. Dastoor, W. J. Rasdorf, S. K. Batra, S. P. Hersh, 1988 ASME Computers in Engineering Conference, San Francisco, CA, July 31-August 4, 1988.
 70. Mechanics of Nonwovens - 4 hours of lectures at the Workshop on Nonwovens at the University of Tennessee, Knoxville, TN, August 8-12, 1988.
 71. "Sample Types and Sampling Methods for Cotton Length Measurements: Some Reflections." 3rd National Cotton Textile Conference on "Cotton Utilization Technology," October 5-7, 1988, Myrtle Beach, SC, with M. W. Suh and M. I. Zeidman (presenting).
 72. Mechanics of Nonwovens - 2 hours of lectures at the Nonwovens Short Course at NCSU, October 11-12, 1988.
 73. "Development of an 'Expert System' for Computer-Aided Design (CAD) of Woven Fabrics," together with Phiroze Dastoor and S. P. Hersh, Fall Technical Conference, Fiber Society (1988).
 74. "Toward a Computational Scheme for the Design of Plain Woven Fabrics: 1: Modeling the In-plane Mechanical Behavior," (given by Ghosh) with T. K. Ghosh, P. Dastoor and S. P. Hersh, Fall Technical Conference, Fiber Society (1988).
 75. "Relationship Between Short Fiber Content and the HVI Length Parameters," Beltwide Cotton Production Conferences, Nashville, TN, January (1989), with M. I. Zeidman (presenter), and P. E. Sasser.
 76. "Computer-Aided Design of Textile Structures Through the Expert System Approach," A poster presentation at the INDA-TEC '89, May 30 - June 2, 1989, with S. P. Hersh, W. J. Rasdorf, P. Dastoor.
 77. "Using HVI Length Measurements to Estimate Short Fiber Content, Part II," Second Annual Engineered Fibers Selection Conference, Memphis, TN, June (1989) with M. I. Zeidman (presenter) and P. E. Sasser.
 78. "Basic Aspects Related to Assessment of Fiber Characteristics in Mixtures," 2nd Engineered Fiber Selection Research Forum, COTTON Inc., Raleigh NC, November 8-9, 1990, with Mishu I. Zeidman (presenter).
 79. "Some Thought on the Compressional Behavior of Fiber Assemblies," Proceedings of the Second International Seminar on Nonwovens, Bombay Textile Research Association, January 22-23 (1990), Bombay, India, with Mohamed, M. H., Udomkichdecha, W.
 80. "An Overview of the Nonwovens Technology," A Seminar given to the Binny Mills Research and Development staff and the local group of textile technologists, January 24, 1990, Madras India.
 81. "Dynamic Analysis of the Ring Spinning Problem," A Seminar given at the A. C. College of Textile Technology, Anna University, January 25, 1990, Madras, India.
 82. "Dynamic Analysis of the Ring Spinning Problem," A Seminar given at the department of Textile Technology, Indian Institute of Technology, February 1, 1990, New Delhi, India.
 83. "Measurement of Compressional Resistance of Fiberwebs: a New Procedure," Proceedings of the 8th International Wool Textile Research Conference (February 7-14, 1990), Volume V, WRONZ (1990), with Mohamed, M. H., Udomkichdecha, and W., Zeidman, M. I.
 84. "Development of an Expert System for the CAD of Woven Fabrics: A Progress Report," Proceedings of the 8th International Wool Textile Research Conference (February 7-14, 1990), Volume III, WRONZ (1990), with S. P. Hersh (presenter), Dastoor, P., Rasdorf, W. J.
 85. "New Measure for Tear Resistance of Fiberweb Structures: A Proposal," INDA-TEC '90, June 5-8, 1990, Baltimore, MD, with D. R. Buchanan, W. W. Pan.
 86. "Effect of Molecular Weight and Draw Orientation on the Creep and Fatigue Behavior of PET Monofilaments," POLYESTERS '90, (17th Fiber Symposium and 7th Conference Polyester Filament Yarn), Tabor, Czechoslovakia, May

- 22-24, (1990), with Girish A. Pai, Solomon P. Hersh (presenter).
87. "Application of Fracture Mechanics to Measure Tear Resistance of Fiberwebs" Advanced Workshop on Engineering with Textiles, July 17-20, 1990, Leeds, UK., with D. R. Buchanan, W. W. Pan
 88. "Interpreting Creep and Fatigue of Fibers via Deformation Kinetics," Proceedings of the 50th Anniversary Conference of The Fiber Society, 18-23 August, 1990, with Girish A. Pai (presenter), Solomon P. Hersh.
 89. "A possible Approach to Determination of a Model of Cotton Length Distribution from HVI Data," 3rd Engineering Fiber Selection Research Forum, COTTON Inc., Raleigh NC November 8-9, 1990, with Mishu I. Zeidman (presenter).
 90. "Unravelling the Unwinding Problem," with W. Barrie Fraser, Tushar K. Ghosh, presented at the Australian Mathematical Society, 27th Applied Mathematics Conference, Hanmer Springs, NZ, February 3-7, 1991.
 91. "On-Line Measurement of Fiberweb Basis Weight," 1991 TAPPI Nonwovens Conference, May 12-16, with A. C. Bullerwell, K. Veerabadran and T. F. Gilmore, (Presenter: Bullerwell)
 92. S. K. Batra, T. K. Ghosh, M. I. Zeidman, B. Dua "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process: A Progress Report," International Conference on Fiber and Science - 1991, April 10-12, 1991, Ottawa, Canada, with T. K. Ghosh (presenter), M. I. Zeidman, B. Dua and International Conference "Textile Science '91," VSST, Liberec, Czechoslovakia, September 16-18, 1991 (Batra presenter).
 93. "Computational Model for Predicting Mechanical Behavior of Point-Bonded Webs: A Progress Report," International Conference "Textile Science '91," VSST, Liberec, Czechoslovakia, September 16-18, 1991, with Z. X. Mi, T. F. Gilmore, .
 94. "An Integrated Approach to Dynamic Analysis of the Ring Spinning Process: The Effect of Balloon Control Rings," 4th Engineered Fiber Selection Forum, Cotton Inc., Raleigh, NC, November 7-8, 1991, with T. K. Ghosh (presenter), B. Dua, M. I. Zeidman, .
 95. "Unravelling the Over-end Unwinding Problem," The Fiber Society Spring 1992 Meeting, April 6-8, 1992, Bordeaux, France, with T. K. Ghosh, A-H Liu, W. B. Fraser.
 96. "Test Method for Bond Strength Measurement: A Proposal," INDA-tec '92, April 7-10, Ft. Lauderdale Fla. with H. Shim, B. S. Gupta.
 97. "Use of Multiple Needle Penetration Test for Characterizing Bond Strength Potential of Resin/Binder Systems," TAPPI, '92 Nonwovens Conference, May 11-13, 1992, Marco Island, FL, with H. Shim, B. S. Gupta (presenter).
 98. "Mechanics of Three Dimensional Fiberwebs," INDA, 1992 Fundamental Research Conference, Raleigh, NC, July 21-22, 1992, with M. Narter, D. R. Buchanan.
 99. "Globalization of the Nonwovens Industry: Implication for Developing Countries," Int. Conference on Nonwovens, The Textile Institute, North India Section, December 9-11, 1992, New Delhi India. **(Invited Paper)**, with Dharmadhikary, R.
 100. "The Effect of Bond Point Design and Bond Strength on the Load-Deformation of Point Bonded Nonwovens: A Computer-Based Study," Proc. TAPPI Conference, with Gilmore, T. F. (presenter), Mi, Z. X. May 11-13, 1993, Atlanta, GA.
 101. "Measurement of Needle Punching Dynamic Forces: The Single Needle Case," The Fiber Society Conference on Nonconventional Fiber Assemblies and their Applications, Raleigh, NC, May 10-12, 1993, with Seyam, A. M. (presenter), Mi, Z. X., Batra, S. K., Bullerwell, A. C., Meng, J., Mohamed, A.
 102. "An Overview of the Nonwovens Technologies," A lecture presented at the Symposium on "Performance Evaluation of Textile/Fiber Materials," at the The China Textile Institute, Taipei, Taiwan, June 3, 1993.
 103. "Globalization of the Nonwovens Industry: Implication for Developing Countries," A lecture presented at the Symposium on "Performance Evaluation of Textile/Fiber Materials," at the The China Textile Institute, Taipei, Taiwan, June 3, 1993.
 104. "Globalization of the Nonwovens Industry: Implication for Developing Countries,"
 "Mechanics of Three Dimensional Fiberwebs,"
 "Dynamic Analysis of Unwinding from Cylindrical Packages,"
 "Dynamic Analysis of Ring Spinning: Some Inherently Instabilities"
 "Computational Model for Predicting Mechanical Behavior of Point-Bonded Webs,"
 A series of lectures given at the China Textile University, Shanghai, PRC, June 8-13, 1993.
 105. "Globalization of the Nonwovens Industry: Implication for Developing Countries,"
 "Mechanics of Three Dimensional Fiberwebs,"
 "Computational Model for Predicting Mechanical Behavior of Point-Bonded Webs,"
 A series of lectures given at the Textile Academy, Ministry of Textiles, Beijing, PRC, June 15-17, 1993.
 106. "Globalization of the Nonwovens Industry: Implication for Developing Countries,"
 "Computational Model for Predicting Mechanical Behavior of Point-Bonded Webs,"

- A series of lectures given at the North-west Institute of Textile Science and Technology, Xi'an, PRC June 18-20, 1993.
107. "The Dynamics of Ballooning Yarn in Textile Processing," with W. B. Fraser, T. K. Ghosh, at the Gordon Research Conference on Fiber Science, New London, NH. July 11-16, 1993.
 108. "Mechanics of Nonwoven Fabrics," at the Gordon Research Conference on Fiber Science, New London, NH. July 11-16, 1993.
 109. "Industry-University Partnership: NCRC as a Case Study," Panel Discussion in connection with International Heat and Mass Transfer Conference, Bombay, India, January 5-7, 1994.
 110. "Mechanics of Nonwoven Fabrics," seminar, Department of Materials Engineering, University of Maryland, College Park, MD, April 1, 1994.
 111. "Role of Fiber Properties in Nonwovens Technology," INDA-TEC'95, St. Petersburg, FL, Sept. 18-20, 1995
 112. "Dynamic Analysis of Ring Spinning: A Historical Perspective," E. R. Schwartz Memorial Lecture, ASME, Textile Engineering Division Conference, October 9-11, 1995, Atlanta, GA.
 113. "Dynamic Analysis of Ring Spinning: A Historical Perspective," EFS Conference, Cotton Inc. November 2-3, 1995, Raleigh, NC.
 114. Ghosh, T. K., Batra, S. K., Ma, X., "Dynamic Analysis of Unwinding," Fiber Society Meeting, November 13-15, 1995
 115. Batra, S.K. and McLawhorn, B.M., "The Nonwovens Industry: An International Perspective" Indian Textile Association Conference, Madras, December 15-17, 1995.
 116. Posters at the NTC Forum, Raleigh NC, January 24-25, 1996
 117. "Dynamic Analysis of Ring Spinning: A Historical Perspective," FPTS Seminar, College of Textiles, 1996.
 118. Dharmadhikari, R., Davis, H. A., Gilmore, T. F., Batra, S. K., "Influence of Fiber Structure on Thermally Point Bonded Nonwovens," in Advances in Fiber, Textile and Nonwovens Science and Technology Conference of the Fiber Society, NCRC, TRI/Princeton, May 13-15, 1996.
 119. Batra, S. K. "Glimpses of thermal Bonding," INDA-TEC '96, Crystal City, VA September 11-13, 1996.
 120. Batra, S. K., Blackburn, W. A., "Nonwovens Cooperative Research Center: A Resource for Research and Development," 1997 Nonwovens Conference, March 17-19, 1997, Memphis TN.
 121. Timble, N. B., Shiffler, D. A., Batra, S. K. "Thermal Bonding of Needle-punched Nonwovens Using IR," 1997 Nonwovens Conference, March 17-19, 1997, Memphis TN.
 122. Zeng, Q., Ghosh, T. K., Batra, S. K., "Dynamic Analysis of Ring Spinning - With and Without Control Rings," Fiber Society Meeting, April 21-24, 1997, Mulhouse France.
 123. Batra, Subhash K., "Nonwovens Cooperative Research Center: The Journey So Far", NSF State/IUCRC Symposium, Norman OK, September 3-5, 1997.
 124. Farer, R., Batra, S. K., Gilmore, T. F., "Processing Cotton and Cotton/Pulp Blends for Wet-Laid Nonwovens using Novel Dispersion Technologies," 1998 TAPPI Nonwovens Conference, St. Petersburg, Florida.
 125. "On the Properties of Nonwovens," Invited paper presented at the One Hundred Years of Fiber & Textile Research: An International Technical Symposium, organized by the Fiber Society, July 5-10, 1998, Asheville, North Carolina, USA
 126. Batra, S. K., T. K. Ghosh, Q. Zeng, "Dynamic Analysis of Ring Spinning: A Brief Review," **Invited paper**, Textile Science Conference 2000, Liberec Czech Republic.
 127. Ghosh, T. K., Batra, S. K., "On Over-end Unwinding of Yarn from Cylindrical Packages: A Progress Report," Mt. Fuji Conference, Hakone, Japan, August 2001.
 128. Subhash K. Batra, David Brookstien, "Rethinking the US 'Textile Industry'," Autex II Conference, Brugge, Belgium, July 1-3, 2002. (**Invited keynote talk**)
 129. Subhash K. Batra, "Do Fibers need be called textiles? If not, why not?" Korean Fiber Society Conference, November 13-15, 2002
 130. Subhash K. Batra, "Engineering with Fibers: The Evolution of a New Industry" Keynote talk, The Fiber Society 2003 Spring Symposium on ADVANCED FLEXIBLE MATERIALS AND STRUCTURES: ENGINEERING WITH FIBERS, June 30 - July 2, 2003, Loughborough, UK
 131. Ma X., Z. Pan, Tushar K. Ghosh, Subhash K. Batra, "On Over-end Unwinding," CEC 2003, Portrose, Slovenia, September 10-12, 2003
 132. Subhash K. Batra, "Engineering with Fibers: The Evolution of a New Industry," The FPTS seminar, College of Textiles, November 12, 2003

AREAS OF RESEARCH INTEREST

In general, engineering analysis of the fiber and textile systems and structures.

More specifically:

Nonwovens manufacturing technology

Physical and mechanical properties of nonwoven structures

Dynamic analysis of the ring spinning process

Dynamic analysis of the winding and unwinding of textile packages

Mechanical properties of fibers

Mechanics of yarns and fabrics

Characterization of Textile/fibrous structures (structure-property relationships)

More recent interest: Structure of the Textile Industry and its Implications