B. V. RAMARAO
Curriculum Vitae

EXPERIENCE

Professor, SUNY College of Environmental Science & Forestry, 1997- current.
Associate Director, Empire State Paper Research Institute, 2003-current.
Acting Chair, Faculty of Paper Science and Engineering, SUNY College of Environmental Science & Forestry, 1999-2000.
Associate Professor, SUNY College of Environmental Science & Forestry. 1992 -1997.
Senior Fellow, Department of Chemical Engineering, National University of Singapore, Singapore (1995-1996).
Adjunct Professor, Department of Chemical Engineering, Syracuse University. 1988 -.
Assistant Professor, SUNY College of Environmental Science & Forestry, 1988-1992.
Research Associate, Department of Chemical Engineering, Syracuse University. 1986-1988.

EDUCATION

Ph. D. Chemical Engineering. Clarkson University, Potsdam NY 1986.
M. S. Chemical Engineering. Clarkson University, Potsdam NY 1982.
B. S. Chemical Engineering. University of Madras, India. 1980.

MEMBERSHIPS, ACTIVITIES, HONORS & AWARDS

Editor, Separation and Purification Technology, International Journal, Elsevier Science. CURRENT.

Alkyl Amines CHEMCON Distinguished Speaker Award 2012. Indian Institution of Chemical Engineers, Kolkata INDIA.

Symposium Co-Chair: China-USA Joint Symposium on Forest Biorefinery Processes. ICBT 2012 Nanjing, China. October 2012.
American Institute of Chemical Engineers: AIChE,
Chair, Forest & Plant BioProducts Division, Group 17.
Programming Chair, Forest Products Division, Group 17. 2005-Current.
2011: AIChE Annual Meeting & 1st International Congress on Sustainability. Programming Chair and Plenary Session Chair. November 6-11, Minneapolis MN, 2011.
2011: Session Chair: Nanotechnology in the Forest Products Industries. Arlington VA, 2011.
2010: AIChE Annual Meeting & 1st International Congress on Energy: Sustaining Supplies.
Key Session Chair: 'Separation and Transport Processes in Lignocellulosic Treatment Processes." Salt Lake City.
2009: "Separations Processes in Biorefineries." Nashville TN.
Session Co-Chair. 'Nanotechnology in the Forest Products Industry.' Annual Meeting, Cincinnati OH 2005.
Session Chair. 'Fluid Mechanics and Rheology in the Forest Products Industry.' AIChE Annual Meeting, Reno, NV (2001).
Session Chair. 'Transport Processes in the Forest Products Industry.' AIChE Annual Meeting, Dallas TX (1999).
Session Chair. 'Transport Processes in the Forest Products Industry.' AIChE Annual Meeting, Miami Beach, FL (1998).
Program Chair. Symposium on Moisture Interactions with Paper Materials. Empire State Paper Research
Institute, Syracuse, NY. 1998.
Member, Tappi – Since 1988. (Technical Association of the Pulp and Paper Industry, USA).
Member, American Institute of Chemical Engineers – Since 1986; Forest Products Division.
9th World Filtration Congress. American Filtration & Separation Society. New Orleans, LA:
Session Chair:: Paper Making and Rheology of Suspensions. 2004.
TEHNICAL ASSOCIATION OF PULP AND PAPER INDUSTRY, Member since 1989; Fluid Mechanics Division
INTERNATIONAL PAPER PHYSICS.

Session Chair and Organizing Committee:
2010: Tissue and Towel Drying. Progress in Paper Physics Seminar. McGill University, Montreal.
2009: Papermaking Research Symposium, University of Kuopio, Kuopio Finland.
2008: Wet End Forming. International Paper Physics Conference, Gold Coast, Australia.
2006: Image Analysis and Paper Structure. Progress in Paper Physics Seminar, Miami University, Oxford OH.
2004: Paper variation. Progress in Paper Physics Seminar, Technical University, Trondheim, Norway,
2003: International Paper Physics Conference, Victoria BC, Canada 2003.
2002: Progress in Paper Physics Seminar, Syracuse, NY 2002 (Meeting Program Chair).
Member of Editorial Board, IPPTA Journal, New Delhi, India.

NASA - Space Alliance Technology Opportunity Program (SATOP). Advised a small business on filter media. SATOP listed this as a success story and was extensively carried in the newsmedia in Florida. SATOP Award: Best partner in SATOP Alliances awarded to SUNY ESF, 2003.
University of Madras, India. Dr. M. A. Govinda Rau Gold Medal and Alagappa Chettiar Memorial Prize Award for student graduating at the top of the B. Tech. Class with best academic record. (Out of approximately 150 students). (1975-1980).

PATENTS & INVENTIONS

1. U. S. Patent, 5,954,922. (1999). 'A method to determine pulp specific surface area, specific volume and compressibility characteristics on-line.' B. V. Ramarao. Successfully commercialized with many units operating at industrial locations. This has spawned further modified instruments, which are in successful operation at pulp and paper industry and research center locations in North America, Europe, China and South America.
2. International Patent Application: PCT/US2006/016118: 'New product and processes from an integrated forest biorefinery.' (2007). Amidon, T. E., Francis, R. C., Scott, G. M., Bartholomew, J. M., Ramarao, B. V., Wood, C.
3. 'Flocculation of Lignocellulosic Hydrolyzates.' US Patent Application No. 61/613,196. 3/20/2012.

BOOKS
*Granular Filtration of Aerosols and Hydrosols***.** 2nd Edition, 2007. C. Tien, B. V. Ramarao. Elsevier Publishing Co., New York NY.

Separation Processes in Biorefineries. 2012. John Wiley & Sons, New York NY. Editors - S. Ramaswamy, S. Huang, B. V. Ramarao.

CURRENT RESEARCH INTERESTS

SEPARATION PROCESSES IN BIOREFINERIES
Our research group is actively involved in research, design and development of new separation processes including nanofiltration, adsorption and chromatographic techniques, reactive and catalytic processes for separating lignocellulosic and other plant biomaterials from different feedstocks.

Current projects:
Separation process development and optimization for purification of lignocellulosic hydrolyzate feedstocks – supported by New York State Energy Research & Developmental Authority, Albany NY. (2012).
Empire State Paper Research Associates, Syracuse NY.
Development of lignocellulosic energy sources from papermill waste materials –
Supported by New York State Energy Research & Developmental Authority, Albany NY. (2012).
Modeling and Design studies of Geotextile Tubes for Dewatering Dredging Slurries- supported by the US National Science Foundation, Washington DC (2011-2014).

Modeling and Design optimization of paper and board products – supported by the Empire State Paper Research Associates, Syracuse NY.
Studies of liquid penetration and spreading in fibrous media - – supported by the Empire State Paper Research Associates, Syracuse NY.

SOLID FLUID SEPARATION PROCESSES

General research in the fundamentals of fluid solid separations including the filtration of aerosols, hydrosols, cake suspensions, sedimentation and consolidation phenomena.

PUBLICATIONS OF B. V. RAMARAO

1. JOURNAL PAPERS

71. G. V. Duarte, B. V. Ramarao, J. A. Gamelas, P. T. Ferreira. 'Correlation of Hardwood pulp properties with Pre-extraction and Kraft Pulping.'
70. S. Lavrykov, B. Arthur, B. V. Ramarao, L. Sun, S. Tripathi. 'Computational modeling of damage and fracture of packaging under dynamic impact loading.' Nordic Pulp Pap. Res. J., 4, (2012).
69. C. Tien, B. V. Ramarao. 'Can the Kozeny-Carman Equation be used for estimating the porosity of filter cakes?' In Press, Powder Technol., 2012.
68. N. S. Marrain, B. V. Ramarao. 'Drainage of papermaking pulp suspensions.' Accepted, Ind. Eng. Chem. Res., 2012.
67. L. R. Yasarla, B. V. Ramarao. 'Application of polyethylene oxide as a flocculation agent for lignocellulosic hydrolyzates.' Submitted (2012).
66. S. Grieco, B. V. Ramarao. 'Removal of Tris-chloroethylene phosphate from wastewater using zeolite adsorbents.' Under review, (2012).
65. S. Lavrykov, B. V. Ramarao, R. Solimeno, K. M. Singh. 'Energy and thermal transients in fusing in high speed copiers.' Under review. (2012).
64. S. Lavrykov, S. B. Lindstrom, K. M. Singh, B. V. Ramarao. '3D network simulations of paper structure.' Nordic Pulp Pap. Res. J., 2, 184-196 (2012).
63. G. V. Duarte, J. A. Gamelas, P. T. Ferreira, B. V. Ramarao, T. E. Amidon. 'Properties of extracted Eucalyptus globulus kraft pulps.' Tappi J., 11, 4, 47-58, (2012).
62. L. R. Yasarla, B. V. Ramarao. 'Dynamics of flocculation of lignocellulosic hydrolyzates by polymers.' Ind. Eng. Chem. Res., 51, 19, 6847-6861, (2012).
61. D. D. Choi, S. Lavrykov, B. V. Ramarao. 'Delamination during the folding and creasing of paperboard.' Tappi J., 11, 1, 20-26 (2012).
60. S. Lavrykov, B. V. Ramarao. 'Thermal properties of copy paper.' Drying Technol., 1-15, (2011).
59. B. Arthur, R. Smith, S. Lavrykov, B. V. Ramarao. 'Imaging of ink jet penetration in uncoated paper using microscopic techniques.' Tappi J., 10, 11, 35-40 (2011).
58. C. Tien, B. V. Ramarao. 'Revisiting the laws of filtration for membrane cross-flow filtration.' J. Memb. Sci., 383, 17-25 (2011).
57. G. V. Duarte, B. V. Ramarao, T. E. Amidon, P. T. Ferreira. 'Effect of Hot Water Extraction on Hardwood Kraft Pulp fibers (Acer saccharum, Sugar Maple)'. Ind. Eng. Chem. Res., 50(17), 9949-9959 (2011).
56. A. Hasan, L. R. Yasarla, B. V. Ramarao, T. E. Amidon. 'Separation of Lignocellulosic Hydrolyzate Components Using Ceramic Microfilters'. J. Wood Chem. Tech. (2011), 31(4), 357-383.
55. G. V. Duarte, B. V. Ramarao, T. E. Amidon. "Colloidal stability and flocculation of lignocellulosic hydrolyzates." Bioresource Technol., 101, 8526-8534 (2010).
54. R. Singh, S. Lavrykov and B. V. Ramarao. 'Saturated permeability of pulp fiber mats with filler particles.' Coll. Surf., A, 333, 1-2, 96-107 (2009).
53. C. Tien, B. V. Ramarao, 'On the analysis of dead-end filtration of microbial cells.' J. Memb. Sci., 112, (2008).
52. H. J. Huang, S. Ramaswamy, B. V. Ramarao, U. Tschirner. 'A review of separation technologies in current and future biorefineries.' Sep. Pur. Tech., 62, 1 – 21 (2008).
50. S. Liu, T. E. Amidon, R. C. Francis, B. V. Ramarao, Y. Z. Lai and G. M. Scott. From forest biomass to chemicals and energy. Industrial Biotechnology 2: 113-120 (2006).
51. N. Sameer, M. Markwei, B. V. Ramarao, R. C. Francis. 'Recovery of Molybdate from Dilute Aqueous Solutions by Complexation with Cationic Surfactants and Extraction with Isobutanol.' Ind. Eng. Chem. Res., 47, 428-433 (2008).
49. C. Tien and B. V. Ramarao. 'Cake Filtration Approaches – A criticism.' AIChE Journal, 52, 5, 1971 (2006).
48. C. Tien, B. V. Ramarao. 'On Analysis of cake formation and growth in cake filtration.' J. Chin. Inst. Chem. Eng., 37, 1, 81-94 (2006).

47. A. Massoquete, S. Lavrykov, B. V. Ramarao, A. Goel, S. Ramaswamy. 'The effect of pulp refining on lateral and transverse moisture diffusion in paper.' Tappi J., 4, 12, 3-8 (2005).
46. B. V. Ramarao, C. Tien. 'Analysis of fine particle migration and retention in cake filtration.' Ind. Eng. Chem. Research., 44, 1200-1210, (2005).
45. A. Massoquete, S. Lavrykov and B. V. Ramarao. 'Non-Fickian nature of moisture diffusion in paper.' J. Pulp & Paper Sci., 31, 3, 121-127, (2005).
44. S. Lavrykov and B. V. Ramarao. 'Axi-symmetric pore-fiber model for transport processes in paper.' Nordic Pulp and Paper Res. J., 19, 3, (2004).
43. S. Lavrykov and B. V. Ramarao. 'Transient hygroexpansion of paper: Experimental Results and Mathematical Model', Nordic Pulp and Paper Res. J., 19, 2, 183-90 (2004).
42. S. Ramaswamy, M. Gupta, A. Goel, U. Aaltosalmi, M. Kataja, A. Koponen and B. V. Ramarao. 'The 3 D structure of fabric and its relationship to liquid and vapor transport.' Coll. Surf., A: Phys. Chem. Eng. Asp., 241, 323-333, (2004).
41. B. V. Ramarao, A. Massoquete, S. Lavrykov and S. Ramaswamy. 'Moisture transport in paper materials in the hygroscopic range and characteristics of diffusion parameters.' A review. DRT - Drying Technology, 21, 10, 2007-2056, (2003).
40. C. Tien, B. V. Ramarao. 'Validation of a new filtration technique for dewaterability characterization. Comments.' AIChE Journal , 48(10), 2417-2418 (2002).
39. R. C. Francis, S. Chaiarrekij and B. V. Ramarao. 'Pulp bleaching by the addition of peroxide to the D2 stage and recovery of molybdates by selective ion flotation techniques.' J. Wood Chem. Tech., 23, 2, 113-129 (2003).
38. J. Liesen, B. Hojjatie, D. Coffin, S. Lavrykov, B. V. Ramarao and H. Beckham. 'Through-plane diffusion of moisture in paper detected by MR Imaging Techniques.' Ind. Engng. Chem. Res., 41, 25, 6555-6565 (2002).
37. S. K. Mohan and B. V. Ramarao. 'A comprehensive study of self-induced torque amplification in rotary viscous couplings.' J. Tribology, 125, 110-120(2003).
36. S. Das and B. V. Ramarao. "Inversion of lime mud and papermaking pulp filtration data to determine compressibility and permeability relationships." Sep. Pur. Technol. 28, 149-160 (2002).
35. S. Huang, A. Goel, S. Ramaswamy, B. V. Ramarao and D. Choi. "Transverse and in-plane characterization of the pore structure of paper." APPITA Journal, 55, 3, 230-234 (2002).
34. A. Bandyopadhyay, B. V. Ramarao and S. Ramaswamy. "Transient moisture diffusion through paperboard materials." Colloids and Surfaces A, Phys. Chem. Engng Aspects, 206, 455-467 (2002).
33. A. Bandyopadhyay, B. V. Ramarao and E. Shih. "Transient temperature, moisture and pressure fields in a paper sheet exposed to a traveling thermal pulse." J. Imaging Sci. Tech. 45, 6, 1-14, (2001).
33. A. Goel, M. Tzanakakis, S. Huang, S. Ramaswamy, D. Choi and B. V. Ramarao. "Characterization of the Three-Dimensional Structure of Paper using X-Ray Microtomography." Tappi J., 84, 5, 72-80 (2001).
32. A. Goel, M. Tzanakakis, S. Huang, S. Ramaswami, W. Hu, D. Choi and B. V. Ramarao. "Confocal Laser Scanning Microscopy to Visualize and Characterize the Structure of Paper." Fundamentals and Numerical Modeling of Unit Operations in the Forest Products Industries, AIChE Symp. Ser., 324, 96, 75-80 (2000).
31. S. Chaiarrekij, H. Dhingra and B. V. Ramarao. "Deinking of Recycled Pulps by Column Flotation: Energy and Environmental Benefits." Resources, Conservation & Recycling, 28, 219-226 (2000).
30. H. Radhakrishnan, S. G. Chatterjee and B. V. Ramarao. "Steady State Diffusion of Moisture in Paper Board." J. Pulp Paper Sci., 26, 4, 140-144 (2000).
29. A. Bandyopadhyay, H. Radhakrishnan, B. V. Ramarao and S. G. Chatterjee. "Moisture Sorption Response of Paper Subjected to Ramp Humidity Changes: Modeling and Experiments." Ind. Eng. Chemistry, Research, 39, 219-226 (2000).
28. R. Vengimalla, G. G. Chase and B. V. Ramarao. "Modeling of filler retention in compressible fibrous media." Separation and Purification Technology, 15, 2, 153-161 (1999).

27. S. G. Chatterjee, B. V. Ramarao and C. Tien. 'Water vapor sorption characteristics of a bleached kraft paperboard: A study of the hysteresis region.' J. Pulp and Pap. Sci.23, 8, 366-374 (1997).
26. C. Tien, R. Bai and B. V. Ramarao 'Analysis of cake growth in cake filtration. The case of fine particle retention.' AIChE J., 43, 1, 33-44 (1997).
25. R. Vengimalla, G. G. Chase and B. V. Ramarao. 'Filler particle retention in paper fiber beds.' Separation and Purification Tech., 11 (1), 17-26 (1997).
24. H. L. Wei, P. Kumar, B. V. Ramarao and C. Tien. 'Drainage and Fine particle retention in forming incompressible fibrous mat.' J. Pulp and Pap. Sci., 22, 11, J1-6 (1996).
23. B. V. Ramarao and P. Kumar. 'A model for the gravity drainage of pulp suspensions.' Nordic Pulp and Paper Res. J. 11, 2, 86-94 (1996).
22. P. Kumar, H. L. Wei, B. V. Ramarao and M. Doshi. 'Application of gravity drainage models to the freeness measurement of pulp suspensions.' Chem. Eng. Comm., 152, 287-306 (1996).