January 1, 2014

CURRICULUM VITAE

R. Byron Pipes, PhD, NAE, IVA

John L. Bray Distinguished Professor of Engineering
School of Materials Engineering
School of Aeronautics and Astronautics
School of Chemical Engineering

Degrees

Ph.D.	**University of Texas at Arlington, 1972**
M.S.E.	**Princeton University, 1969**
B.S.	**Louisiana Polytechnic Institute, 1964**

Relevant Experience

Dr. R. Byron Pipes was elected to the National Academy of Engineering in 1987 in recognition of his development of an exemplary model for relationships between corporate, academic and government sectors to foster research and education in the field of composite materials. As co-founder and director of the Center for Composite Materials at the University of Delaware, he developed an industrial consortium of over forty corporate sponsors from the USA, Japan, Germany, France, Italy, United Kingdom, Belgium, Sweden and Finland. Today, almost 40 years after its founding, the University of Delaware Center is the largest and most successful of its kind in the United States. Research expenditures have exceeded $100 million.

His most recent research programs focus on the application of nanotechnology to engineering disciplines including aerospace, composite materials and polymer science and engineering. He has active programs in the study of the advanced manufacturing science for composite materials. As founder of the Akron Global Polymer Academy, he engaged in the development of Internet-based collaborative research wherein scientific instruments are shared by research groups located in academic, corporate and government scientific centers worldwide. In 2007 he founded the Purdue Institute for Defense Innovation with the goal of establishing centers of excellence in support of the missions of the Departments of Defense and Home Land Security. To date five centers are under development: Center for Traumatic Brain Injury Research, Center for Systems Integrity, Center for Thermal Management, Center for Military Electronics and Centers for Nanocomposites.

Dr. Pipes served as the 17th President of Rensselaer Polytechnic Institute from 1993-98. A hallmark of Pipes' career has been his commitment to innovation and change. He is recognized as a pioneer in revitalizing undergraduate education; a leader in creating new partnerships between government, the private sector and academia; and an international expert in advanced composite materials. As a visionary in higher education, he initiated

faculty led restructuring efforts at Rensselaer that addressed: curriculum reform, efficiency of educational processes, re-engineering administrative processes for enhanced efficiencies with improved service, and introduction of an incentive-based budgeting program to align Rensselaer's strengths with marketplace needs. The incentive-based budget program has provided a foundation for entrepreneurial ventures within the university and for growth of academic and research programs. Five-year school business plans and the contribution margin methodology yielded new academic programs and research directions with enhanced revenue and national recognition.

Awards

Recipient, THEODORE M. HESBURGH AWARD, (as President), 1995
Recipient, BOEING EDUCATOR AWARD, (as President), 1995
Recipient, PEW LEADERSHIP AWARD, (as President), 1996
Member, SWEDISH ROYAL ACADEMY OF ENGINEERING (IVA), 1993
Member, NATIONAL ACADEMY OF ENGINEERING, 1987
Recipient, GUSTUS L. LARSON AWARD of Pi Tau Sigma, 1983
Recipient, CHAIRE FRANCQUI, Distinguished Visiting Scholar Award, Catholic University of Louvain, Belgium, 1984-85
Recipient, AMERICAN SOCIETY OF COMPOSITES, OUTSTANDING RESEARCH AWARD, 1994
Recipient, MEDAL OF EXCELLENCE IN COMPOSITE MATERIALS, 1994

Employment Experience

Director, Composites Design and Manufacturing HUB 2012-present
Director, Purdue Institute for Defense Innovation, 2007-present
John L. Bray Distinguished Professor of Engineering, Purdue University, 2004-present
Goodyear Professor of Polymer Engineering, University of Akron, 2001- 2004
Distinguished Visiting Scientist, College of William and Mary, 1998-2001
President and Institute Professor, Rensselaer Polytechnic Institute, 1993-1998
Provost and Vice President for Academic Affairs, University of Delaware, 1991-93
Dean, College of Engineering, University of Delaware, 1985-91
Robert L. Spencer Professor of Engineering, 1989-93
Director, NSF National Engineering Research Center, "Center for Composites Manufacturing Science and Engineering," University of Delaware and Rutgers University, 1985
Professor of Mechanical and Aerospace Engineering, University of Delaware, 1980-89
Visiting Scientist, Imperial Chemicals Incorporated, Welwyn Garden City, United Kingdom, 1981
Director, Center for Composite Materials, University of Delaware, 1978-85
Acting Director, Center for Composite Materials, University of Delaware, 1977-78
Associate Professor, Mechanical and Aerospace Engineering, University of Delaware, 1974-80
Assistant Professor, Mechanical Engineering, Drexel University, 1972-74.

Professional Activities

Member	Integrating Materials and Manufacturing Innovation Editorial Oversight Committee, TMS, 2012-2014
Chairman	Army Research Laboratory Technical Assessment Board, 2013-14
Chairman	NRC Panel on Armor and Armaments, 2011-12
Member	NRC Committee Panel on Building and Fire Research, 2008-10
Chairman	NRC Committee on Bridging Design and Manufacturing, 2002-04
Chairman	NRC Panel on Technologies for Aeronautics and Aerospace, 1997-98
Chairman	Middle States Accreditation of Stevens Institute of Technology, 1997-98
Chairman	New England Accreditation of the University of New Hampshire, 1992-93
Chairman	U.S. Org. Committee of the U.S.-Sweden Joint Seminar, 1988
Chairman	Delaware Governor's High Technology Task Force, 1986-88
Chairman	NMAB Thermoplastic Composites for Structural Applications, 1985-86.
Chairman	NMAB NDI of Metal Matrix Components, 1982-83
Fellow	American Society of Mechanical Engineers
Fellow	Society for Advanced Materials and Process Engineering
Fellow	American Society for Composites
Fellow	World Fellow: International Conference on Composite Materials
Member	United States Advisory Committee, Council on Competitiveness, 1994-98
Member	Commission on Independent Colleges and Universities, 1993-98
Member	Capital Region Technology Development Council, 1993-98
Member	New York's Capital Reg., Ctr. for Economic Growth, 1993-98
Member	U.S. Army Science Board, 1988-91
Member	National Materials Advisory Board, 1980-86
Member	Advisory Panel, Office of Tech. Assessment, U.S. Congress, 1983-84
Member	NMAB, Characterization of Organic Matrix Composites, 1981-82
Member	Pioneer Savings Bank, Board of Directors, 1993-99
Member	GenCorp Board of Directors, 1993-99
Member	Omnova Solutions, Inc. Board of Directors, 1999-2008
Member	Northeast Health Board, 1996-2000
Member	Civil Engineering Research Foundation Board, 1995-1999
Member	Troy Redevelopment Foundation Board, 1995-98
Member	Boy Scouts of America Twin Rivers District Board, 1996-98
Member	Tau Beta Pi, National Engineering Honorary
Member	Pi Tau Sigma, National Mechanical Engineering Honorary
Member	Omicron Delta Kappa, National Leadership Honorary

Academic Legacy

Dr. Pipes has supervised over 100 graduate degree recipients including doctoral and masters students. While serving as both Dean and Provost he supervised an average of six graduate students per year. He currently supervises ten graduate students and one post-doctoral fellow.

Books

Co-Author, *Experimental Characterization of Advanced Composite Materials*, Prentice-Hall, 1987, translated to Japanese and German, 2nd Edition, Technomic Publication Co., 1997. Third edition CRC Press, 2002 and Fourth Edition CRC Press, (In Press) 2014.

Editor, *Composite Materials,* multivolume series, Elsevier - Applied Science, 1986-96.

Co-Author, *Experimental Mechanics of Fiber-Reinforced CompositeMaterials*, Prentice-Hall/SEM, 1982, reprinted 1985.

Editor, *Non-Destructive Evaluation and Flaw Criticality for Composite Materials*, ASTM, 1979

Co-Editor, *Application of Composite Materials in the Automotive Industry*, ASME, 1978.

Scholarship

Dr. Pipes has authored over 141 archival publications. Together, these have received over 5500 citations, as documented in the *Science Citation Index*, an international interdisciplinary index to literature of science, medicine, agriculture, technology and the behavioral sciences.

Selected Publications

Pipes, R.B., "A Vision to Accelerate the Composites Industry," *ACMA Composites Manufacturing Magazine,* May-June 2012 Issue.

Condit, P., Pipes, R.B., "The Global University," *Issues in Science and Technology*, National Academy of Sciences, Volume XIV, Number 1, (1997), pp. 27-28.

Pipes, R.B., Wilson, J.M., "A Multimedia Model for Undergraduate Education," *Technology in Society*, Vol. 18, No. 3, (1996), pp. 387-401.

Pipes, R.B., Coffin, D.W., Shuler, S.F., Simacek, P., "Non-Newtonian Constitutive Relationships for Hyper Concentrated Fiber Suspensions," *Journal of Composite Materials,* Vol. 28, No. 4, (1994), pp. 343-350.

Pipes, R.B., Lewis, C.S., "Research Centers in Sciences and Engineering," *Innovative Models for University Research,* edited by C.R. Haden, North- Holland, (1992).

Pipes, R.B., "Anisotropic Viscosities of an Oriented Fiber Assembly with a Power-Law Matrix Fluid," *Journal of Composite Materials*, Vol. 26, No. 10, (1992), pp. 1536-1552.

Pipes, R.B., Hearle, J.W.S., Beaussart, A.J., Okine, R.K., "Influence of Fiber Length on the Viscous Flow of an Oriented Fiber Assembly," *Journal of Composite Materials*, Vol. 25, (1991), pp. 1379-1398.

Pipes, R. B., "Interdisciplinary Engineering Research: A Case Study," *Engineering Education*, Vol. 78, No. 1, (1987), pp. 19-22.

Pipes, R.B., McCullough, R.L., Taggart, D.G., "Behavior of Discontinuous Fiber Composites: Fiber Orientation," *Polymer Composites*, Vol. 3, No. 1, (1982), p.34.

Pipes, R.B., Wetherhold, R.C., Gillespie, J.W., "Macroscopic Fracture of Fibrous Composites," *Materials Science and Engineering*, Vol. 45, (1980), pp.247-253.

Pipes, R.B., "Boundary Layer Effects in Composite Laminates," *Fiber Science and Technology*, Vol. 13, (1980), pp. 49-71.

Research Funding

As founding director of the Purdue Institute for Defense Innovation (2007), Dr. Pipes leads an effort for the establishment of centers of excellence that meet the needs of the Department of Defense and Home Land Security with a goal of $50 million/year in new sponsored programs of research and development. As stated above, the research funding for the Center for Composite Materials of the University of Delaware exceeded $65 million during the period 1974-1999. The annual research expenditures of Rensselaer Polytechnic Institute were $40 million annually during 1993-98. Current research grants:

"BOEING-PURDUE ATOMS TO AIRCRAFT PROGRAM," The Boeing Company, $1.25 million, 2008-12., Investigator, Ale Strachan, PI.

"NANOCOMPOSITES NIRT," National Science Foundation, $1.2 million, 2008-13, Investigator, Ale Strachan, PI.

"**CERTIFICATION OF SHORT FIBER COMPOSITES**," The Boeing Company, $175K, Dec. 1, 2013-Nov. 30, 2014, R.B. Pipes, PI.

"COMPUTATION-BASED NDE OF COMPOSITE STRUCTURES," The Boeing Company, $250K, January 1, 2014 – Nov. 30, 2014, R.B. Pipes, PI.

Total List of Publications

Books

Co-Author, *Experimental Characterization of Advanced Composite Materials*, Prentice-Hall, 1987, translated into Japanese and German, 2nd

	Edition, Technomic Publications Co., 1994, 3rd edition CRC Press, 2002 and Fourth edition, (In Press 2013).
Series Editor,	*Composite Materials*, Twelve-Volume Series, Elsevier-Applied Science, 1986-1999.
Editor,	*Materials Futures: Strategies and Opportunities*, U.S-Sweden Joint Symposium, Materials Research Society, 1988.
Co-Author,	*Experimental Mechanics of Fiber-Reinforced Composite Materials*, Prentice-Hall/SEM, 1982, reprinted 1985.
Editor,	*Non-Destructive Evaluation and Flaw Criticality for Composite Materials*, ASTM, 1979.
Co-Editor,	*Application of Composite Materials in the Automotive Industry*, ASME, 1978.

Refereed Publications

Kravchenko, O. G., Li, C., Strachan, A., Kravchenko, S.G. and Pipes, R.B. "Prediction of the chemical and thermal shrinkage in a thermoset polymer," *Composites Part A: Applied Science and Manufacturing*, Volume 66, (2014), Pages 35–43.

Goodsell , Johnathan E., Moon , Robert J., Huizar , Alionso and Pipes , R. Byron, "A Strategy for Prediction of the Elastic Properties of Epoxy-Cellulose Nanocrystal-Reinforced Fiber Networks," *Nordic Pulp and Paper Research Journal*, in press (2014).

Kravchenko, S., Kravchenko, O., Wortmann, M., Pietrek, M., Horst, P., Pipes, R.B, Composite Toughness Enhancement with Interlaminar Reinforcement, *Composites: Part A*, (2013), doi: http:// dx.doi.org/10.1016/j.compositesa.2013.07.006

Misiego, C.R. and Pipes, R.B., "Dispersion and its Relation to Carbon Nanotube Concentration in Polyimide Nanocomposites," *Composites Science and Technology*, 85, (2013), pp. 43-49.

Goodsell, J., Pagano, N.J., Kravchenko, O, and Pipes, R.B., "Interlaminar Stresses in Composite Laminates Subjected to Anticlastic Bending Deformation," *Journal of Applied Mechanics*, ASME *J Appl Mech*, (2013); 80(4): 041020-1 - 041020-7.

Cadena, M., Misiego, R., Smith, K.C., Avia, A., Pipes, R.B., Reifenberger, R. and Raman, A., "Subsurface Imaging of Carbon Nanotube-polymer Composites Using Dynamic AFM Methods*," Nanotechnology*, 24 (2013), 135706.

Carlsson, L.A., Adams, D. F. and Pipes, R. B., "Basic Experimental Characterization of Polymer Matrix Composite Materials," *Polymer Reviews*, 53:2, 277-302, (2013).

Dustin, J. and Pipes, R.B., "Free-Edge Singularities Meet the Microstructure: Important Considerations," *Composites Science and Technology*, 72, (2012), pp. 933-937.

Siengchin, S. and Pipes, R.B.,"Rheological and Dynamic Thermo-mechanical Properties of Epoxy Composites Reinforced with Single and Multi-Walled Carbon Nanotubes," *Mechanics of Composite Materials*, 47, No. 6, (2011).

Mendoza Jasso, A.J., Goodsell ,J.E., Ritchey, A.J., Pipes, R.B. and Koslowski,M., "A parametric study of fiber volume fraction distribution on the failure initiation location in open hole off-axis tensile specimen," *Composites Science and Technology*, 71 (2011) 1819–1825.

Mendoza Jasso, A.J., Goodsell, J.E., Pipes, R.B. and Koslowski, M., "Validation of Strain Invariant Failure Analysis in an Open Hole Off-Axis Specimen," *Journal of Materials*, Vol. 6, No. 3, (2011), pp. 43-48.

Ritchey, A., Dustin, J., Gosse, J. and Pipes, R.B. "Self-Consistent Micromechanical Enhancement of Continuous Fiber Composites," Advances in Composites, INTEC Publications, (2011).

Pipes, R.B., Goodsell, J., Ritchey, A. and Gosse, J., "Interlaminar Stresses in Composite Laminates: Thermoelastic Deformation," *Composites Science and Technology*, Vol. 70, (2010), pp. 1605-1611.

Buchanan, D.L., Gosse, J.H., Wollschlager, J.A., Ritchey, A., Pipes, R.B., "Micromechanical Enhancement of the Macroscopic Strain State for Advanced Composite Materials," *Composites Science and Technology*, 69 (2009), pp. 1974-1978.

Strus, M.C., Cano, C., Pipes, R.B., Nguyen, C., and Raman, A., "Interfacial Energy between Carbon Nanotubes and Polymers from Nanoscale Peel Testing the Atomic Force Microscope," *Composites Science and Technology*, Vol. 69, (2009), pp. 1580–1586.

Strus, M.C., Zalamea, L., Raman, A., and Pipes, R.B., Nguyen, C., and Stach, E.A., "Peeling Force Spectroscopy: Exposing the Adhesive Nanomechanics of One-Dimensional Nanosctuctures," *Nano Letters*, Vol. 8, No. 2, (2008), pp. 544-550.

Zalamea, L., Kim, H., and Pipes, R.B., "Stress Transfer in Multiwalled Carbon Nanotubes," *Composites Science and Technology*, Vol. 67, No. 15, (2007), pp. 3425-3433.

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Cano, C.I., Kyu, T., and Pipes, R.B., "Modeling Particle Inflation from Poly(amic acid) Powdered Precursors (Part I): Preliminary Stages Leading to Bubble Growth," *Polymer Engineering & Science*, Vol. 47, No. 5, (2007), pp. 560-571.

Zalamea, L. and Pipes, R.B., "Harmonic Oscillators of Carbon Nanotube Arrays," *Nanoscience and Nanotechnology*, Vol. 6, No. 4, (2006), pp. 1177-1181.

Pipes, R.B. and Zalamea, L., "Energetics of Imperfectly Bonded Carbon Nanotube Arrays in Flexure," *Composites Science and Technology*, Vol. 66, No. 15, (2006), pp. 2844-2854.

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Cano, C.I., Weiser, E.S., Kyu, T., and Pipes, R.B., "Polyimide Foams from Powder: Experimental Analysis of Competitive Diffusion Phenomena," *Polymer*, 46(22), (2005), pp. 9296-9303.

Coffin, D.W., Carlsson, L.A. and Pipes, R.B., "On the Separation of Carbon Nanotubes," *Composites Science and Technology*, Vol. 66, No. 9, (2006), pp. 1132-1140.

Pipes, R.B., Hubert, P., Salvetat, J.-P. and Zalamea, L., **"**Flexural Deflection as a Measure of van der Waals Interaction Forces in the CNT Array,**"** *Composites Science and Technology*, Vol. 66, No. 9, (2006), pp. 1125-1131.

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Camilo I. Cano, C.I., Weiser, E.S. and Pipes, R.B., "Solid State Polyimide Foaming from Powder Precursors: Effect of Morphology and Process Parameters on the Diffusive Phenomena," *Cellular Polymers*, Vol. 23, No. 5, (2004), pp. 299.

G.M. Odegard, R.B. Pipes and P. Hubert, "Comparison of Two Models of SWCN Polymer Composites," *Composites Science and Technology*, Vol. 64 (2004), pp. 1011-1020.

R. B. Pipes, P. Hubert, "Helical Carbon Nanotube Arrays: Mechanical Properties," *Composites Science and Technology*, Vol. 62, No. 3, (2002), pp. 418-28.

R. B. Pipes, P. Hubert, "Scale Effects in Carbon Nanostructures: Self-Similar Analysis," *Nano Letters*, Vol. 3, No. 2, (2003), pp 239-243.

R. B. Pipes, Frankland, S-J., Hubert, P. and Saether, E., "Self-Consistent Properties of the SWCN and Hexagonal Arrays as Composite Reinforcements," *Composites Science and Technology*, Vol. 63, No. 10, (2003), pp. 1349-1358.

R. B. Pipes, P. Hubert, "Helical Carbon Nanotube Arrays: Thermal Expansion," *Composites Science and Technology*, Vol. 63, No. 11, (2003), 1571-79.

E. Saether, R. B. Pipes, S-J. Frankland, "Nanostructured Composites: Effective Mechanical Properties Determination of Nanotube Bundles," *Composites Science and Technology*, Vol. 63, No. 11, (2003), pp. 1543-50.

Pipes, R. B. and Hubert, P., "Helical Carbon Nanotube Arrays: Mechanical Properties," *Composites Science and Technology*, Vol. 63, No. 3, (2002), pp. 419-428.

Condit, P., Pipes, R.B., "The Global University," *Issues in Science and Technology*, National Academy of Sciences, Vol. XIV, No. 1, (1997), pp. 27-28.

Pipes, R. B., Wilson, J.M., “A Multimedia Model for Undergraduate Education,” *Technology in Society*, Vol. 18, No. 3, (1996), pp. 387-401.

Pipes, R.B., Coffin, D.W., Shuler, S.F., Simacek, P., “Non-Newtonian Constitutive relations for Hyper Concentrated Fiber Suspensions,” *Journal of Composite Materials*, Vol. 28, No. 4, (1994), pp. 343-350.

Shuler, S.F., Binding, D.M., Pipes, R.B., “Rheological Behavior of Two- and Three-Phase Fiber Suspensions,” *Polymer Composites*, Vol. 15, (1994), pp. 427-435.

Pipes, R. B., Coffin, D. W., Simacek, P., Shuler, S. F., and Okine, R. K., "Rheological Behavior of Collimated Fiber Thermoplastic Composite Materials," *Flow Phenomena in Polymeric Composites*, edited by S. G. Advani, R. B. Pipes, Series Editor, Elsevier Science Publishers, (1994), pp. 85-125.

Astrom, Tomas B., and Pipes, R. Byron, "A Modeling Approach to Thermoplastic Pultrusion. I: Formulation of Models," *Polymer Composites*, Vol. 14, No. 3, (1993), pp. 173-183.

Astrom, Tomas B., and Pipes, R. Byron, "A Modeling Approach to Thermoplastic Pultrusion. II: Verification of Models," *Polymer Composites*, Vol. 14, No. 3, (1993), pp. 184-194.

Beaussart, A.J., Hearle, J.W.S., Pipes, R.B., “Constitutive Relationships for Anisotropic Viscous Materials,” *Composites Science and Technology*, Vol. 49, (1993), pp. 335-339.

O’Bradaigh, C.M., McGuinness, G.B., Pipes, R.B., “Numerical Analysis of Stresses and Deformations in Composite Sheet Forming—Central Indention of a Circular Sheet,” *Journal of Composites Manufacturing*, Vol. 4, No. 3, (1993), pp. 67-83.

Martin, T.A., Bhattacharyya, D., Pipes, R.B., “Deformation Characteristics and Formability of Fibre-Reinforced Thermoplastic Sheets,” *Composites Manufacturing*, Vol. 3, (1992), pp. 165-72.

Astrom, Tomas B., Pipes, R.B., and Advani, S. G., "On Flow through Aligned Fiber Beds and Its Application to Composites Processing," *Journal of Composite Materials*, Vol. 26, No. 9, (1992), pp. 1351-1373.

Altan, M.C., Guceri, S.I., Pipes, R.B., “Anisotropic Channel Flow of Fiber Suspensions,” *Journal of Non-Newtonian Fluid Mechanics*, Vol. 42, (1992), pp. 65-83.

Itoi, M., Yamada, Y., and Pipes, R. B., "Effect of Surface Treatment of Pitch-Based Carbon Fiber on Mechanical Properties of Polyethernitrile Composites," *Polymer Composites*, Vol. 13, No. 1, (1992), pp. 15-29.

Pipes, R. B., and Lewis, C. S., "Research Centers in Sciences and Engineering," *Innovative Models for University Research*, edited by C. R. Haden, North-Holland, (1992).

O'Bradaigh, C. M., and Pipes, R. B., "A Finite Element Formulation for Highly Anisotropic Incompressible Elastic Solids," *International Journal for Numerical Methods in Engineering*, Vol. 33, No. 8, (1992), pp. 1573-1596.

Astrom, B. T., Pipes, R. B., and Advani, S. G., "On Flow through Aligned Fiber Beds and Its Application to Composites Processing," *Journal of Composite Materials*, Vol. 26, No. 9 (1992), pp. 1351-1373.

Pipes, R. B., Beaussart, A. J., and Okine, R. K., "Anisotropic Viscosities of Oriented Discontinuous Fiber Laminates," *Journal of Composite Materials*, Vol. 26, No. 8, (1992), pp. 1088-1099.

Pipes, R. B., "Anisotropic Viscosities of an Oriented Fiber Assembly with a Power-Law Matrix Fluid," *Journal of Composite Materials*, Vol. 26, No. 10 (1992), pp. 1536-1552.

Pipes, R.B., Beaussart, A.J., Tzeng, J.T., "Anisotropic Viscosities of Oriented Discontinuous Fiber Laminates," *Journal of Composite Materials*, Vol. 26, (1992).

Tzeng, J.T., Pipes, R.B., "Thermal residual Stress Analysis for *In Situ* and Post Consolidated Composite Rings," *Journal of Composites Manufacturing*, Vol. 3, No. 4, (1992), pp. 273-279.

Pipes, R.B., Astrom, B.T., Larson, P.H., "Experimental Investigation of a Thermoplastic Pultrusion Process," *Engineering Plastics*, Vol. 4, No. 2, (1992), pp. 117-126.

Martin, T.A., Bhattacharyya, D., Pipes, R.B., "Deformation Characteristics and Formability of Fibre-Reinforced Thermoplastic Sheets, *Journal of Composites Manufacturing*, Vol. 3, No. 3, (1992), pp. 165-172.

Pipes, R.B., Hearle, J.W.S., Beaussart, A.J., Okine, R.K., Influence of Fiber Length on Viscous Flow of an Oriented Fiber Assembly," *Journal of Composite Materials*, Vol. 25, (1991), pp. 1379-1390.

Coffin, D.W., Pipes, R.B., "Anisotropic Viscosities for an Oriented Fiber Assembly with Temperature and Strain-Rate Dependence," *Composites*, Vol. 11, (1991), pp. 1-9.

Astrom, B.T., Pipes, R.B., "Correlation between Modeling and Experiments for a Thermoplastic Pultrusion Process," *Composites*, *Proceedings of ICCM -8*, Section 12-21, (1991), pp. 13A, 1-10.

O'Bradaigh, C.M., Pipes, R.B., "Finite Element Analysis of Composite Sheet-Forming Process," *Composites Manufacturing*, Vol. 2, No. 3, (1991), pp. 161-170.

Coffin, D. W., and Pipes, R. B., "Constitutive Relationships for Aligned Discontinuous Fiber Composites," *Journal of Composites Manufacturing*, Vol. 2, No. 3/4, (1991), pp. 141-146.

Cirino, M., and Pipes, R. B., "In Situ Consolidation for the Thermoplastic Composite Ring-Residual Stress State," *Journal of Composites Manufacturing*, Vol. 2, No. 2 (1991), pp. 105-113.

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Van West, B. P., Pipes, R. B., Keefe, M., and Advani, S. G., "The Draping and Consolidation of Commingled Fabrics," *Journal of Composites Manufacturing*, Vol. 2, No. 1, (1991), pp. 10-22.

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Pipes, R. B., Hearle, J.W.S., Beaussart, A. J., and Okine, R. K., "Influence of Fiber Length on the Viscous Flow of an Oriented Fiber Assembly," *Journal of Composite Materials*, Vol. 25, (1991), pp. 1379-1398.

Van West, B. P., Pipes, R. B., and Advani, S., "Consolidation of Commingled Fabric Thermoplastic Composites," *Polymer Composites*, Vol. 12, No. 6, (1991), pp. 417-427.

O'Bradaigh, C. M,, Mallon, P.J., and Pipes, R. B., "Issues in Diaphragm Forming of Continuous Fiber Reinforced Thermoplastic Composites," *Polymer Composites*, Vol. 12, No. 4, (1991), pp. 246-256.

Astrom, B. Thomas, and Pipes, R.B., "Modeling of a Thermoplastic Pultrusion Process," *SAMPE Quarterly*, Vol. 22, No. 4, (1991), pp. 55-64.

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Astrom, B.T., and Pipes, R.B., "Thermoplastic Filament Winding with On-Line Impregnation," *Journal of Thermoplastic Composite Materials*, Vol. 3, (1990), pp. 314-324.

Van West, B.P., Pipes, R.B., and Keefe, M., "A Simulation of the Draping of Bidirectional Fabrics over Arbitrary Surfaces," *Journal of the Textile Institute*, Vol. 81, No. 4, (1990), pp. 448-460.

Itoi, M., and Pipes, R. B., "PAN and Pitch-Based Carbon Fiber-Reinforced Polyethernitrile Composites," *Journal of Thermoplastic Composite Materials*, Vol. 3, (1990), pp. 172-189.

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