

Curriculum Vitae of
Robert J. Stango, Ph.D., P.E.

Business Address:

Department of Mechanical Engineering
Marquette University
1515 W. Wisconsin Avenue
Milwaukee, WI 53233
Telephone: (414) 288-6972
Fax: (414) 288-7790
e-mail: robert.stango@mu.edu

Education:

Ph.D. Theoretical and Applied Mechanics University of Illinois, Urbana, Illinois 1985
M.S. Applied Mechanics University of Bridgeport, Bridgeport, Connecticut 1977
B.S. Mechanical Engineering University of New Haven, West Haven, Connecticut 1974

Professional Registration, Memberships:

Licensed Professional Engineer (P.E.), State of Wisconsin 1992-date
Member, American Society of Mechanical Engineers, (ASME) 1974-date
Member Society for Protective Coatings (SSPC) 2004-date
Member National Society of Corrosion Engineers (NACE) International, 2006-date

Patents:

- *Method and Device for Depositing a Layer of Material on a Surface*
U. S. Patent Application 09/131,848
Notice of Allowance: Nov. 1, 1999
- *Device for Depositing a Layer of Material on a Surface*
Unites States Patent no. 5,827,368
Date of Patent: Oct. 27, 1998.

Professional Experience:

2003- date Professor of Mechanical Engineering and Director, Deburring and Surface Finishing Research Laboratory (DSFRL), Marquette University, Milwaukee, WI.
2005-2006 Visiting Scientist,(sabbatical), Medical Simulation Corporation, Denver, CO.
1990-2003 Associate Professor of Mechanical Engineering, and Director, Deburring and Surface Finishing Research Laboratory, Department of Mechanical and Industrial Engineering, Marquette University, Milwaukee, WI.
1998-1999 Visiting scientist, (Sabbatical), 3M Abrasive Systems Division, St. Paul, MN.
1998 Visiting Scientist (Summer), United Technologies Research Center, E. Hartford, CT.
1991-1992 Visiting Scientist, (Sabbatical), Pferd-Milwaukee Brush Manufacturing Co., Menomonee Falls, WI.
1982-1990 Assistant Professor of Mechanical Engineering, Department of Mechanical and Industrial Engineering, Marquette University, Milwaukee, WI.
1977-1982 Teaching/Research Assistant, Department of Theoretical and Applied Mechanics, University of Illinois, Urbana, IL.
1980 Research Engineer (Internship), Owens-Corning Fiberglass Technical Center, Granville, OH.
1975-1976 Application Development Engineering, Branson Sonic Power Co., Danbury, CT.

Course Instruction:

Graduate:

- Introduction to Finite Element Method
- Advanced Machine Design/Stress Analysis
- Analysis and Design of Polymers/Composite Materials
- Advanced Dynamics/Vibrations

Undergraduate:

- Statics/Dynamics
- Machine Design/Mechanics of Materials
- Senior Design
- Dynamics of Mechanical Systems
- Numerical Methods in Engineering

Publications:

Refereed Journal:

- 1 Stango, R.J., and Khullar, P., *Introduction to the Bristle Blasting Process for Simultaneous Corrosion Removal/Anchor Profile*, **ACA Journal of Corrosion and Materials**, vol. 33 no. 5, p. 26-31, (2008).
- 2 Zhao, H., and Stango, R. J., *Development and Application of Model for Assessing Brush Seal Hysteresis*, **AIAA Journal of Propulsion and Power**, vol. 129, no.1, p. 199-204 (2007).
- 3 Zhao, H., and Stango, R. J., *Role of Distributed Inter-bristle Friction Force On Brush Seal Hysteresis*, **ASME Journal of Tribology**. vol. 23, no.2, p. 273-282 (2007).
- 4 Stango, R. J., Cariapa, V. and Zuzanski, M., *Contact Zone Force Profile and Machining Performance of Filamentary Brush*, **ASME Journal of Manufacturing Science and Engineering**, vol. 127, pp.217-225, (2005).
- 5 Zhao, H. and Stango, R.J., *Effect of Flow-induced Radial Load on Brush Seal/Rotor Contact Mechanics*, **ASME Journal of Tribology**, vol. 126, pp. 208-215, (2004).
- 6 Stango, R.J., Zhao, H., and Shia, C.Y., *Analysis of Contact Mechanics for Rotor-Bristle Interference of Brush Seal*, **ASME Journal of Tribology**, 125, pp. 414-421 (2003).
- 7 Overholser, R., Stango, R.J., and Fournelle, R.A., *Morphology of Metal Surface Generated by Nylon/Abrasive Brush*, **International Journal of Machine Tools and Manufacture**, vol. 43, pp. 193-202 (2003).
- 8 Chen, L., Stango, R. J., and Cariapa, V., *Development of Force Control Model for Edge Deburring with Filamentary Brush*, **ASME, Journal of Manufacturing Science and Engineering**, vol. 123, no. 3, pp.528-532, (2001).
- 9 Stango, R.J., Chen, L., and Cariapa, V., *Automated Deburring with Filamentary Brush: Prescribed Burr Geometry*, **ASME Journal of Manufacturing Science and Engineering**, vol. 121, no. 3, pp. 385-392, (1999).
- 10 Shia, C.Y., Stango, R.J., and Heinrich, S.M., *Analysis of Contact Mechanics for a Circular Filamentary Brush/Workpart System: Solution Method and Numerical Studies*, **ASME Journal of Manufacturing Science and Engineering**, vol. 120, no. 4, pp. 715-721, (1998).
- 11 Stango, R.J., and Shia, C.Y., *Analysis of Filament Deformation for a Freely Rotating Cup Brush*, **ASME Journal of Manufacturing Science and Engineering**, vol. 119, no. 3, pp. 298-306, (1997).
- 12 Shia, C.Y. and Stango, R.J., *Analysis of Compliant Honing Tool for Brushing of Cylindrical Surface*, **ASME Journal of Manufacturing Science and Engineering**, vol. 119, no. 3, pp. 441-444, (1997).
- 13 Stango, R.J., Fournelle, R.A., and Chada, V., *Morphology of Surfaces Generated by Circular Wire Brushes*, **ASME Journal of Engineering for Industry**, vol. 117, no. 1, pp. 9-15, (1995).
- 14 Stango, R.J., Shia, C.Y., and Henderson, J.A., *Development of a Rational Basis for Design of Advanced Brushing Tools*, **ASME Journal of Engineering for Industry**, vol. 116, no. 3, pp. 308-315, (1994).
- 15 Shia, C.Y. and Stango, R.J., *On the Frictional Response of Circular Filamentary Brush in Contact with Planar Workpart*, **International Journal of Machine Tools and Manufacture**, vol. 34, no. 4, pp. 573-589, (1994).
- 16 Cariapa, V., Stango, R.J., Chen, L., and Hermann, R., *Aspects of Process Model for Automatic Control of Edge Deburring with Filamentary Brush*, **ASME Journal of Engineering for Industry**, vol. 114, no. 3, pp. 294-300, (1992).
- 17 Stango, R.J., Matar, J.E., Cariapa, V., and Ryan, W.E., *Effect of Fabrication Parameters on Void Content for Filament-Wound Composites*, **ASME/SME Manufacturing Review**, vol. 4, no. 3, pp. 205-213, (1991).
- 18 Cariapa, V., Stango, R.J., Liang, S.K., and Prasad, A., *Measurement and Analysis of Brushing Tool Performance Characteristics - Part II: Contact Zone Geometry*, **ASME Journal of Engineering for Industry**, vol. 113, no. 3, pp. 290-296, (1991).

- 19 Stango, R.J., Cariapa, V., Prasad, A., and Liang, S.K., *Measurement and Analysis of Brushing Tool Performance Characteristics - Part I: Stiffness Response*, **ASME Journal of Engineering for Industry**, vol. 113, no. 3, pp. 283-289, (1991).
- 20 Heinrich, S. M., Stango, R. J., and Shia, C. Y., *Effect of Workpart Curvature on the Stiffness Properties of Circular Filamentary Brushes*, **ASME Journal of Engineering for Industry**, vol. 113, no. 3, pp. 276-282, (1991).
- 21 Stango, R.J., Heinrich, S.M., and Shia, C.Y., *Analysis of Constrained Filament Deformation and Stiffness Properties of Brushes*, **ASME Journal of Engineering for Industry**, vol. 111, no. 3, pp. 238-243, (1989).
- 22 Stango, R.J., Wang, S.S., and Nelson, C.R., *A Note on Analytical Representation of Anisotropic Viscoelastic Constitutive Equations for Fiber-Reinforced Composites*, **Composites Science and Technology**, vol. 35, no. 3, pp. 273-282, (1989).
- 23 Stango, R.J. and Jungmann, R.H., *A Variational Method for Evaluating Thrust Bearing Element Load Distribution*, **ASME Journal of Engineering for Industry**, vol. 111, no. 1, pp. 79-86, (1989).
- 24 Stango, R.J. and Wang, S.S., *Process-Induced Residual Thermal Stresses in Advanced Fiber-Reinforced Composite Laminates*, **ASME Journal of Engineering for Industry**, vol. 106, no. 1, pp. 48-54, (1984).
- 25 Wang, S.S. and Stango, R.J., *Optimally Discretized Finite Elements for Boundary-Layer Stresses in Composite Laminates*, **AIAA Journal**, vol. 21, no. 4, pp. 614-620, (1983).

Refereed Conference:

- 1 Stango, R.J., Fournelle, R. A., and Martinez, J., *Bristle Blast Surface of Welded Joints Fabricated From Commercial Ship Construction Steel*, **National Association of Corrosion Engineers, NACE Corrosion Conference**, Houston, TX (March 2011, in-press).
- 2 Stango, R.J., Fournelle, R. A., and Khullar, P., *Application of Bristle Blasting Process for Corrosion Removal in ABS-A Ship-building Steel*, **National Association of Corrosion Engineers, NACE Corrosion Conference**, San Antonio, TX (March 2010).
- 3 Stango, R.J., and Khullar, P., *Fundamentals of Bristle Blasting Process for Removal of Corrosive Layers*, **National Association of Corrosion Engineers, NACE CORROSION Conference**, Atlanta, GA (March 2009).
- 4 Zhao H., Stango R., Chen Y., Albano R. *Aspects of Contact Force and Path Configuration Generated During Catheter Navigation*, Best technical paper award, (153 papers presented), **Spring Simulation Multi-conference**, San Diego, CA (March 2009).
- 5 Zhao, H., and Stango, R. J., *Development and Application of Model for Assessing Brush Seal Hysteresis*, Paper Number : AIAA-2005-3983, **41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference**, Tucson, AZ (2005).
- 6 Zhao, R.J. Stango, "Effect of Flow-induced Radial Load on Brush Seal/Rotor Contact Mechanics", *Proceedings of 2003 STLE/ASME Joint International Tribology Conference*, Ponte Vedra Beach, Florida, Oct. 26-29, 2003
- 7 Stango, R.J., Zhao, H., and Shia, C.Y., *Analysis of Contact Mechanics for Rotor-bristle Interference of Brush Seal*, **ASME/STLE International Joint Tribology Conference**, Cancun, Mexico, 27-30 October 2002.
- 8 Stango, R. J., Cariapa, V. and Zuzanski, M., *Contact Zone Force Profile and Machining Performance of Filamentary Brush*, **Proceedings of IMECE 2002 ASME International Mechanical Engineering Congress & Exposition**, IMECE2002-MED-34111 New Orleans, Louisiana, November 17-22, 2002.
- 9 Chen, L., Stango, R.J., and Cariapa, V., "Development of Force-Control Model for Edge-deburring with Filamentary Brush," **ASME Symposium on Automatic Deburring and Finishing Methods: Non-traditional and Traditional Processes**, MED Vol. 6-1, vol. 1, pp. 281-291, IMECE, Dallas, TX, (1997).
- 10 Stango, R.J. and Shia, C.Y., "Analysis of Filament Deformation for a Freely Rotating Cup Brush," **ASME Symposium on Physics of Machining Processes - II, and Materials Issues in Machining - II**, Stephenson, D.A. and Stevenson, R., Eds., Chicago, IL, pp. 182-203, (1994).
- 11 Shia, C.Y. and Stango, R.J., "Analysis of Compliant Honing Tool for Brushing of Cylindrical Surface," **ASME Symposium on Physics of Machining Processes - II and Materials Issues in Machining - II**, Stephenson, D.A. and Stevenson, R., Eds., Chicago, IL, pp. 204-216, (1994).
- 12 Stango, R.J. and Henderson, J.A., "Design and Selection of Advanced Brushing Tools for Surface Finishing Processes," **SME Deburring and Surface Conditioning Conference**, Paper No. MR93-325, Cincinnati, OH, (1993).
- 13 Shia, C.Y., Stango, R.J., and Heinrich, S.M., "Analysis of Contact Mechanics for Circular Filamentary Brush/Workpart System - Part II: Solution Method and Numerical Studies," **ASME Symposium on**

- Contact Problem and Surface Interactions in Manufacturing and Tribological Systems, Attia, M.H. and Komanduri, R., Eds., New Orleans, LA, PED vol. 67, TRIB-Vol. 4, pp. 181-190, (1993).
- 14 Shia, C.Y., Stango, R.J., and Heinrich, S.M., "Analysis of Contact Mechanics for Circular Filamentary Brush/Workpart System - Part I: Modeling and Formulation," ASME Symposium on Contact Problem and Surface Interactions in Manufacturing and Tribological Systems, Attia, M.H. and Komanduri, R., Eds., New Orleans, LA, PED vol. 67, TRIB-Vol. 4, pp. 171-180, (1993).
 - 15 Stango, R.J., Shia, C.Y., and Henderson, J.A., "Development of Rational Basis for Design of Advanced Brushing Tools," 4th International Conference on Design Theory and Methodology, ASME Design Engineering Division, Scottsdale, AZ, (1992).
 - 16 Stango, R.J., "Rational Approach for Design and Development of Advanced Brushing Tools," 18th Annual NSF Conference on Design and Manufacturing Systems Research, Atlanta, GA, pp. 1105-1108, (1992).
 - 17 Stango, R.J., "Damage Assessment of Wire and Nylon/Abrasive Filamentary Brushes," Proceedings of the SME, Deburring and Surface Conditioning Conference, Paper No. MR91-133, Orlando, FL, (1991).
 - 18 Cariapa, V., Stango, R.J., and Chen, L., "Application of Neural Network to Compliant Tool Deburring Operation," Proceedings of the SME, Deburring and Surface Conditioning Conference, Paper No. MR91-135, Orlando, FL, (1991).
 - 19 Stango, R.J., Matar, J.E., Cariapa, V., and Ryan, W.E., "Effect of Fabrication Parameters on Void Content of Filament-Wound Composites," ASME, Symposium on Processing and Manufacturing of Composite Materials, Atlanta, GA, pp. 277-290, (1991).
 - 20 Chen, L., Stango, R.J., and Cariapa, V., "Automated Prototype Deburring with Compliant Brushing Tool," ASME, Symposium on Intelligent Design and Manufacturing for Prototyping, Atlanta, GA, pp. 147-162, (1991).
 - 21 Stango, R.J., Fournelle, R.A., and Chada, S., "Morphology of Surfaces Generated by Circular Wire Brushes," Proceedings of the ASME, Symposium on Microstructural Evolution in Metal Processing, Geskin, E.S. and Samarasekera, I.V., Eds., Dallas, TX, PED vol. 46, pp. 59-75, (1990).
 - 22 Cariapa, V., Stango, R.J., Chen, L., and Hermann, R., "Aspects of Process Model for Automatic Control of Edge Deburring with Filamentary Brush," Proceedings of the ASME, Symposium on Monitoring and Control of Manufacturing Processes, Liang, S.V. and Tsao, R.C., Eds., Dallas, TX, PED vol. 44, pp. 133-147, (1990).
 - 23 Cariapa, V., Stango, R.J., Chen, L., and Hermann, R., "Development of Process Model for Robotic Adaptive Control of Compliant Tool Deburring Operations," Proceedings of the 7th International Conference on Systems Engineering, University of Nevada, Las Vegas, NV, pp., 578-586, (1990).
 - 24 Shia, C.Y., Stango, R.J., and Heinrich, S.M., "Theoretical Analysis of Frictional Effect on Circular Brush Stiffness Properties," Proceedings of the SME, Deburring and Surface Conditioning Conference, Paper No. MR89-143, San Diego, CA, (1989).
 - 25 Stango, R.J., Cariapa, V., and Manion, J.M., "Experimental Evaluation of Circular Brush Stiffness: Preliminary Results," Proceedings of the SME, Deburring and Surface Conditioning Conference, Paper No. MR89-144, San Diego, CA, (1989).
 - 26 Heinrich, S.M., Stango, R.J., and Shia, C.Y., "Effect of Workpart Curvature on the Stiffness Properties of Circular Filamentary Brushes," Proceedings of the ASME, Symposium on the Mechanics of Deburring and Surface Finishing Processes, Stango, R.J. and FitzPatrick, P.R., Eds., San Francisco, CA, PED vol. 38, pp. 27-40, (1989).
 - 27 Cariapa, V., Stango, R.J., Liang, S.K., and Prasad, A., "Measurement and Analysis of Brushing Tool Performance Characteristics - Part II: Contact Zone Geometry," Proceedings of the ASME, Symposium on the Mechanics of Deburring and Surface Finishing Processes, Stango, R.J. and FitzPatrick, P.R., Eds., San Francisco, CA, PED vol. 38, pp. 159-172, (1989).
 - 28 Stango, R.J., Cariapa, V., Prasad, A., and Liang, S.K., "Measurement and Analysis of Brushing Tool Performance Characteristics - Part I: Stiffness Response," Proceedings of the ASME, Symposium on the Mechanics of Deburring and Surface Finishing Processes, Stango, R.J. and FitzPatrick, P.R., Eds., San Francisco, CA, PED vol. 38, pp. 143-157, (1989).
 - 29 Stango, R.J., Heinrich, S.M., and Shia, C.Y., "Analysis of Constrained Filament Deformation and Stiffness Properties of Brushes," Proceedings of the ASME Symposium on Computer-Aided Design and Manufacturing of Dies and Molds, Srinivasa, K. and DeVries, W.R., Eds., Chicago, IL, PED vol. 32, pp. 92-103, (1988).
 - 30 Stango, R.J., Nelson, C.R., and Wang, S.S., "Analytical Representation and Anisotropic Behavior of Viscoelastic Data for Advanced Composite Lamina," Proceedings of the 3rd ASM/ESD, Advanced Composites Conference, Paper No. 8707-004, Detroit, MI, pp. 93-102, (1987).

- 31 Stango, R.J., and Wang, S.S., “Viscoelastic Analysis of Post-Cure Processing Stresses in Advanced Composite Laminates,” Invited paper, Symposium on Applied Mechanics Problems in Composite Manufacturing and Processing: Polymer Matrix Composites, ASME Winter Annual Meeting, Boston, MA, (1987).
- 32 Stango, R.J. and Wang, S.S., “Process-Induced Residual Thermal Stresses in Advanced Fiber-Reinforced Composite Laminates,” Proceedings of the ASME, Symposium on Polymer Processing: Analysis and Innovation, Suh, N.P. and Tucker, C.L., Eds., Washington, D.C., PED vol. 5, pp. 67-81, (1982).
- 33 Wang, S.S. and Stango, R.J., “Optimally Discretized Finite Elements for Boundary-Layer Stresses in Composite Laminates,” Proceedings of the 22nd AIAA/ASME/ASCE/AHE, Structures, Structural Dynamics, and Materials Conferences, Paper No. 82-0748, New Orleans, LA, pp. 328-337, (1982).
- 34 Durocher, L.L. and Stango, R.J., “Grid Selection and Refinement Procedures in Finite Element Analysis,” ASME Design Engineering Division, Paper No. DE 21, 1978. (Design Engineering Conference, Chicago, IL, 1978, and Western Design Engineering Conference, Anaheim, CA, 1978).

Funded Research (Principal Investigator):

- 1 “Performance of Bristle Blasting Process for Corrosion Removal of Steel Surfaces”, Monti Werkzeuge GmbH, Bonn, Germany, 2010; \$43,100.
- 2 “Investigation of Bristle Blasting Process for Refurbishment of Corroded Infrastructure”, Monti Werkzeuge GmbH, Bonn, Germany, 2009, \$42,134.
- 3 “Development of Bristle Blasting Technology”, Monti Werkzeuge GmbH, Bonn, Germany, 2008; \$37,150.
- 4 “Investigation of Bristle Blasting Tool for Surface Cleaning and Preparation”, Monti Werkzeuge GmbH, Bonn, Germany, 2007; \$43,023.
- 5 “Development of Bristle Peening Process”, Monti Werkzeuge GmbH, Bonn, Germany, 2006; \$36,000.
- 6 “Measurement and Analysis of Mechanical Properties for Design of Compliant Brushing Tools”, 3M Corporation, St. Paul, MN, 2001; \$26,000.
- 7 “Development of Wire Brush Test Station”, Pferd Milwaukee Brush Co., Menomonee Falls, WI, 2000; \$7,150.
- 8 “Residual Stress in Post-machining Operations,” United Technologies Research Corporation, East Hartford, CT, 1998; \$17,200.
- 9 “Development of Brushing Tool Process for Preparation of Sheet Metal Product,” A.O. Smith Corp., Milwaukee, WI, 1997; \$18,500.
- 10 “Brush Seal Analysis and Design”, EG&G Corporate Research Award, EG&G Corp., Cranston, RI, 1996-2000; \$100,000
- 11 “Design, Analysis, and Application Development of Filamentary Brushing Tools,” Advance/Milwaukee Brush Mfg. Co., Menomonee Falls, WI, 1994; \$32,760.
- 12 “Design, Analysis, and Application Development of Filamentary Brushing Tools,” Milwaukee Brush Mfg. Co., Menomonee Falls, WI, 1993; \$28,980.
- 13 “Design and Development of Advanced Brushing Tools,” National Science Foundation (NSF), 1992;\$35,986.
- 14 “Development of Automated Deburring Process,” Briggs & Stratton, Milwaukee, WI, 1990; \$22,575
- 15 “Brush Deburring of Aluminum Alloy Materials,” Briggs & Stratton, Milwaukee, WI, 1990; \$21,500.
- 16 “Elementary Analysis of Wire Brush Systems,” Milwaukee Brush Mfg. Co., Menomonee Falls, WI, 1988; \$18,247.