

CURRICULUM VITAE

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EDUCATION

Ph.D.	Purdue University, 1965
M.S.	Purdue University, 1962
B.S.	Purdue University, 1961

PROFESSIONAL EXPERIENCE

2000 -	Professor, Mechanical Engineering, Michigan State University
1998 - 2000	Off-campus assignment: Program Director – Fluid Dynamics and Hydraulics, National Science Foundation
1994 - 1995	Sabbatical Leave: NSF Faculty Intern at the Ford Motor Co. (Sept.-Dec.) and Visiting Research Fellow, Univ. of Melbourne, Australia (April, May 1995)
1986 - 1998	Professor, Mechanical Engineering, Michigan State University
1985 - 1986	Sabbatical Leave Goethe Language Institute, Rothenburg O.D.T. and The L.S.T.M. (Prof. Durst), University of Erlangen, Federal Republic of Germany
1979 - 1985	Professor, Mechanical Engineering, Michigan State University
1978 - 1979	Sabbatical Leave to the University of Karlsruhe and Technical University, Berlin
1975 -	Professor, Mechanical Engineering, Michigan State University
1971 - 1975	Assoc. Professor, Mechanical Engineering, Michigan State University
1970 - 1971	Sabbatical to Johns Hopkins University
1968 - 1970	Assoc. Professor, Mechanical Engineering, Michigan State University
1964 - 1968	Asst. Professor, Mechanical Engineering, Michigan State University

PROFESSIONAL SERVICE (Selected)

3/04-Present	US National Committee, Theoretical and Applied Mechanics
11/03-11/06	Executive Committee, American Physical Society/Div. Fluid Dynamics
8/96 - Present	Editorial Board, <i>Measurement Science and Technology</i> Currently North American and Special Issues and Special Features Editor
8/95	Organizer: NSF, Big 3, MSU Sponsored Workshop: "Fluid Flows/Fundamental Automotive Issues"
1/88 - 1/91	Associate Editor, <i>ASME Journal of Fluids Engineering</i>
9/82 - 9/85	Associate Editor, <i>AIAA Journal</i>
1972 - 82	Reviewer, <i>Applied Mechanics Reviews</i>

9/86	Participant, NSF workshop: "Engineering fluid mechanics to establish research goals in fluid mechanics"
8/85 - 3/90	Short Course Creator and Director: "Perspectives on the Utilization of Hot-Wire and Hot-Film Anemometry" presented annually
1965 - 1970	ASME Central Michigan Section Executive Committee
1965 - 1970	Faculty Advisor - ASME (Note, MSU had Region V. ASME Speech Contest participant in each of these years) Faculty Advisor -Pi Tau Sigma 1974-78

TECHNICAL AND PROFESSIONAL SOCIETIES

American Society of Mechanical Engineers
 American Society of Engineering Education
 American Institute of Aeronautics and Astronautics
 American Physical Society
 American Association for the Advancement of Science
 Tau Beta Pi
 Sigma Xi

AWARDS AND RECOGNITION

Pi Tau Sigma, Mechanical Engineering Honorary Fraternity
 Tau Beta Pi, Engineering Honorary Fraternity
 Sigma Xi, Scientific Honor Society
 Sloane Fellowship for post-doctoral studies, the John Hopkins University 1970 - 1971
 Alexander von Humboldt Fellowship for Research Activity: i) at the University of Karlsruhe and the Technical University, Berlin 1978 - 1979 and ii) at the University of Erlangen 1986
 Visiting Research Fellow, Dept. of Mech. Engr., University of Melbourne, Melbourne, Australia, 1995
 Listing in *Who's Who in America*, 42nd Ed., 1982 (Continuing)
 Listing in *Who's Who in Technology Today*, Vol. 2, 1982 (Continuing)
 Listing in *Who's Who in Engineering*
 Fellow, American Society of Mechanical Engineers, 1987
 Society of Scholars, The Johns Hopkins University, 1992
 Elected: Fellow and Chartered Physicist, Institute of Physics (United Kingdom), 1999

CONSULTING, PATENTS, ETC.

Hicks, T.J., Foss, J.F. and Bohl, D.G., "Pulse Width Modulated Constant Temperature Anemometer," U.S. Patent No. 5,654,507, 1997.

Foss, J.F., "Improved Cooling Fan Shroud," U.S. Patent No. 5,762,034, 1998.

Foss, J.F. and Morris, S.C., "Fan Shroud with Integral Air Supply," U.S. Patent No. 5,881,685, 1999.

Foss, J.F., "Controllable High Volume Positive Displacement Pump", U.S. Patent No. 6,200,111, 2001.

Foss, J.F., "High Volume Positive Displacement Pump", U.S. Patent No. 6,264,442, July 2001.

Foss, J.F., "Apparatus and Method for Measuring Infiltration Flow Rate", U.S. Patent No. 6,351,989, March 2002.

Foss, J.F., "Thermal transient anemometer having sensing cell assembly," U.S. Patent No. 7,051,599, May 2006.

Consulting: Dupont Fibers, Ford Motor Company, McDonald Douglas Research Lab, Caterpillar, Inc., Balance Technology, Inc., Brinks Hofer Gilson & Lione, PC

BOOKS

Fluid Mechanics, with M.C. Potter. The Ronald Press Co., New York, 1975, (Now published by Great Lakes Press, Okemos, MI).

Springer Handbook of Experimental Fluid Mechanics, C. Tropea, A. Yarin, J. Foss, eds., Springer-Verlag, Berlin, 2007.

Chapter-in-book: J. Foss, *Springer Handbook of Experimental Fluid Mechanics*, Chapters A.2, B.5, C.13, Sections 2.1, 5.2.8, 5.6, Springer-Verlag, Berlin, 2007.

J. C. Klewicki, J. F. Foss and J. M. Wallace, "High Reynolds Number [$R_0 = O(10^6)$] Boundary Layer Turbulence in the Atmospheric Surface Layer Above Western Utah's Salt Flats," in *Flow at Ultra-High Reynolds and Rayleigh Numbers: A Status Report*, ed. by R. J. Donnelly and K. R. Sreenivasan, Springer-Verlag, 1998, p. 450.

J. Foss, "Basic Engineering Fluid Mechanics", Chapter 5 (Sections 5.1 through 5.6) of *The Handbook of Fluid Dynamics*, Richard W. Johnson, Ed., CRC Press, Boca Raton, 1998.

J. Foss, D. Williams and C. Wark, "Measuring Velocity in Electronic Systems," *Thermal Measurements in Electronic Systems*, Ed. K. Azar, CRS Press, Boca Raton, FL (1997) pp. 111-165.

J.F. Foss, J.M. Wallace and C.E. Wark, "Vorticity Measurements", Vol. II *Handbook of Fluid Dynamics and Fluid Machinery*, Ed. J. Schetz and A. Fuchs, John Wiley and Sons (1996), pp. 1064-1078.

J.M. Wallace and J.F. Foss, "The Measurement of Vorticity in Turbulent Flows", *Ann Reviews of Fluid Mechanics* (January 1995).

J.F. Foss and J.M. Wallace, "The Measurement of Vorticity in Transitional and Fully Developed Turbulent Flows", *Advances in Fluid*

Mechanics Measurements. Lecture Notes in Engineering, No. 45, Springer Verlag, Berlin (1989).

J.F. Foss, "Radial Flow Between Parallel Plates", *Experiments in Fluid Mechanics*, R.A. Granger, Ed. Holt, Rinehart and Winston, pp. 151-156 (1988).

TECHNICAL PUBLICATIONS (Journals)

- J.F. Foss, J.B. Jones, "Secondary flow effects in a bounded rectangular jet," *J. Basic Engr.*, Trans. ASME **90**:2, Series D, 241 (June 1968).
- J.D. Holdeman, J.F. Foss, "On the initiation, development, and decay of secondary flow in a bounded jet," *J. of Fluids Engr.*, Trans. ASME **97**:3, Series 1 (September 1975).
- J.F. Foss, "Measurements in a large angle oblique jet impingement flow," *AIAA Jour.*, Vol. 17, No. 8, p. 801, (Aug. 1979) (Synoptic with an extended M.S. on file as N79-20342).
- J.F. Foss, D. Korschelt, "Instabilities in the slit-jet flow field," *J. Fluid Mech.*, Vol. 132, pp. 79-86 (1983).
- R. Carde, L. Duidonis, B. Agar, and J.F. Foss, "Appearance of pulsed and continuous pheromone to male gypsy moths," *J. of Chem. Ecology*, Vol. 10, No. 2 (1984).
- C.E. Wark, J.F. Foss, "Forces caused by the radial outflow between parallel disks," *J. Fluids Engineering*, ASME, Vol. 106, pp. 292-297 (1984).
- T.P. Schmitt, S.K. Ali and J.F. Foss "Relative Efficiencies of Parallel and Perpendicular Entrainment Flow Paths," *AIAA Journal*, **24**; 1443-4 (Aug 1986).
- J.F. Foss, "Basic Elements in a Fluid Mechanics Laboratory Experience: An Engineering Science Approach," (1988) *Jour. of Fluids Engr.*, Vol. 110, No. 1, pp. 9-15.
- C.E. Wark and J.F. Foss, "Thermal Measurement for Jets in a Disturbed and Undisturbed Cross Wind Condition," *AIAA Jour.*, Vol. 26, No. 8, Aug. (1988).
- J.F. Foss, J.K. Foss and P. Spalart, "Numerical and Experimental Evaluation of the Flow Past Staggered Chevrons," (1989), *AIAA, Jour.* Vol. 27, No. 6, June 1, pp. 675).
- J.C. Klewicki, C.P. Gendrich, J.F. Foss and R.E. Falco, "On the Sign of the Instantaneous Spanwise Vorticity Component in the Near-Wall Region of Turbulent Boundary Layers" (1990) *Physics of Fluids*, A 2(8) August.
- J.C. Klewicki, R.E. Falco and J.F. Foss, "Some Characteristics of the Vortical Motions in the Outer Region of Turbulent Boundary Layers," (1992), *Jour. Fluids Engr.*, ASME Vol. 114, pp. 530-536, December.
- A.A. Praskovsky, J.F. Foss, S.J. Kleis and M.Y. Karyakin, "Fractal properties of isovelocity surfaces in high Reynolds number laboratory shear flows," (1993), *Phys. Fluids*, A 5(8), August.
- J.F. Foss, "Vorticity Considerations and Planar Shear Layers," (April 1994) *Experimental Thermal and Fluid Sciences*, Volume 8, No. 3, pp. 260-270.
- Ali, S.K. and Foss, J.F., "A computer controlled, finite duration 'Steady' flow facility," *Experiments in Fluids*, **19** (1995), Springer-Verlag, 250-254.
- J.F. Foss, D.G. Bohl, and T.J. Hicks (1996) "The Pulse Width Modulated-Constant Temperature Anemometer," *Meas. Sci. and Tech.*, vol. 7, pp. 1388-1395.
- S.C. Morris, J.J. Good and J.F. Foss, (1998) "Velocity measurements in the wake of an automotive cooling fan, *Experimental Thermal and Fluid Science*, vol. 17, pp. 100-106.

- D.G. Bohl and J.F. Foss (1999) "Near Exit Plane Effects Caused by Primary and Primary-Plus-Secondary Tabs", *AIAA Journal*, vol. 37, No. 2, pp. 192-201.
- R.S. AbdulNour, K. Willenborg, J.J. McGrath, J.F. Foss, and B.S. AbdulNour (2000) "Measurements of the convection heat transfer coefficient for a planar wall jet: uniform temperature and uniform heat flux boundary conditions" *Experimental Thermal Fluid Science*, vol. 22, pp. 123-131.
- S.C. Morris, D.R. Neal, J.F. Foss and G.L. Cloud, (Feb. 2001) "A moment-of-momentum flux mass air flow measurement device," *Measurement Science and Technology*, **12**, pp. N9-N13.
- S.C. Morris and J.F. Foss (June 2001) "An Aerodynamic Shroud for Automotive Cooling Fans", *Journal of Fluids Engr.*, **123**, pp. 287-292.
- S.C. Morris and J.F. Foss (March 2003) "Transient thermal response of a hot-wire anemometer", *Meas. Sci. and Tech.*, **14**, pp. 251-259.
- S.K. Ali and J.F. Foss (July 2003) "The Discharge Coefficient of a Planar Submerged Slit-Jet", *Jour. Fluids Engr.*, ASME **125**, No. 4, pp. 613-619.
- S.C. Morris and J.F. Foss (November 2003) "Turbulent boundary layer to single-stream shear layer: the transition region", *Jour. Fluid Mechanics*, **494**, pp. 187-221.
- J. F. Foss, J.K. Schwannecke, A.R. Lawrenz, M.W. Mets, S.C. Treat, and M.D. Dusel, (2004) "The thermal transient anemometer," *Measurement Science and Technology*, **15**, pp. 2248-2255.
- J.F. Foss (2004) "Surface Selections and Topological Constraint Evaluations for Flow Field Analyses," *Experiments in Fluids*, Springer-Verlag, **37**, pp. 883-898.
- S.C. Morris and J.F. Foss "Vorticity spectra in high Reynolds number anisotropic turbulence," *Phys. Fluids*, **17**, 088102 (2005).
- J.F. Foss, J.A. Peabody, M.J. Norconk, A.R. Lawrenz (2006) "Ambient Temperature and Free Stream Turbulence Effects on the Thermal Transient Anemometer," *Measurement Science and Technology*, **17**, pp. 2519-2526.
- Moreau, S., Neal, D. and Foss, J.F. (2006) "Hot-Wire Measurements Around a Controlled Diffusion Airfoil in an Open-Jet Anechoic Wind Tunnel," *Jour. Fluids Engr.*, **128m** pp. 699-706.
- Priyadarshana, P.J.A., Klewicki, J.C., Treat, S. & Foss, J.F. (2007) "Statistical structure of turbulent-boundary-layer velocity—vorticity products at high and low Reynolds numbers," *Jour. Fluid Mech.* **570**, 307-346.
- Neal, D.R. and J.F. Foss (2007) "The Application of an Aerodynamic Shroud for Axial Ventilation Fans," *Jour. Fluids Engr.* **129**:6, 764-772.
- Bade, K.M. and J.F. Foss (2010) "Attributes of the large-scale coherent motions in a shear layer," *Exp. in Fluids*, Springer-Verlag, **49**, pp. 225-239.

SHORT COMMUNICATIONS (Journals)

- Foss, J.F., "U.S. Competitiveness: A Fluid Engineer's Viewpoint," *Journal of Fluids Engineering*, vol. 115, No. 2, 1993, pp. 192-193.
- Foss, J.F., "Editorial," *Journal of Fluids Engineering*, vol. 118, 1996, pp. 1-2.
- Foss, J.F., Review of the Volume: "Advances in Turbulence IV," for the *AIAA Journal*, vol. 32, No. 12, 1996, F.T.M. Nieuwstadt, ed., Kluwer Academic Publishers, Dordrecht, The Netherlands, 1993.

Reviewed by D.R. Neal and J.F. Foss In *AIAA Jour.*, **44**:2, p. 414 (2006) "Multimedia Fluid Mechanics-Multilingual Version CD-ROM," G.M. Homsy, H. Aref, K.S. Breuer, S. Hochgreb, J.R. Koseff, B.R. Munson, K.G. Powell, C.R. Robertson and S.T. Thoroddsen, Cambridge University Press, NY (2004).

Neal, D.R. and Foss, J.F., "Book Review of Multimedia Fluid Mechanics -- Second Edition DVD-ROM," 2009, *AIAA Journal* vol. 47, #6, pp. 1596-1598.

IUTAM SYMPOSIA

B. Walter, M.M. Koochesfahani, and J.F. Foss, "Transverse Vorticity Measurements in the Wake of an Inverted D-Shaped Cylinder, *proc. of the IUTAM Conf. on Bluff Body Wakes*, Springer Verlag (1992).

Foss, J.F. and S.C. Morris, "The Non-Universality of the Large Wave Number Vorticity Field at $R_\lambda=850$ ", IUTAM Symposium on High Reynolds Number Flows 2002, Princeton University, A.J. Smits, Ed., Kluwer Academic Publishers, 2004, pp. 77-82.

S.C. Morris and J.F. Foss, "Non Self Similar Scaling of Vorticity in a Shear Layer", IUTAM Symposium on High Reynolds Number Flows 2002, Princeton University, A.J. Smits, Ed., Kluwer Academic Publishers, 2004, pp. 65-70.

TECHNICAL PUBLICATIONS (Refereed Symposia)

J.F. Foss, "Flow characteristics of the defined region geometry for high gain proportional amplifiers," ASME-HDL Symp., *Advances in Fluidics* (May 1967).

J.F. Foss, S. J. Kleis, "The oblique impingement of an axisymmetric jet," *Proc. of the Fourth Canadian Cong. of Applied Mechanics* (May 1973).

J.F. Foss, S.J. Kleis, "Vorticity and acoustics measurements in impinging jet," *Third Symp. on University Sponsored Research in Transportation Noise*, the University of Utah and the Department of Transportation (November 1975).

J.F. Foss, "The effect of the laminar/turbulent boundary layer states on the development of a plane mixing layer," *Proc. 1st Inter. Symp. on Turb. Shear Flows*, Penn. State Univ., p. 11-33, (1977).

J.F. Foss, "Transverse vorticity measurements," (an invited paper) *Dynamic Flow Conference '78*, The Disa Corp. Skovlunde, Denmark, 1979.

J.F. Foss, "Advanced techniques for transverse vorticity measurements," 1981, 7th Biennial Symp. on Turb., Rolla, MO, Sept.

J.F. Foss, C. L. Klewicki, "Vorticity and velocity measurements in the intermittent region of a large plane shear layer," *4th Intl Symp. on Turbulent Shear Flow*, Karlsruhe, West Germany (1983).

S.K. Ali, C.L. Klewicki, P.J. Disimile, I. Lawson, J.F. Foss, "Entrainment Region Phenomena for a Large Plane Shear Layer," *5th Intl. Symposium on Turbulent Shear Flows*, Cornell Univ., 1985, pp. 3, 7-12.

J.F. Foss, R.C. Haw, S.K. Ali and C.M. Laws, "A Critical Analysis of Transverse Vorticity Measurements in a Large Plane Shear Layer," *proc. of the First European Turbulence Conference: 1-4 July 1986, Advances in Turbulence*, Ed. by G. Comte-Bellot, Lange and Springer, 1987.

R.C. Haw, S.K. Ali and J.F. Foss (1987) "Gravitationally Defined Velocities for a Low Speed Hot-wire Calibration," *Symposium on Thermal Anemometry*, ed. DE Stock, ASME FED-Vol. 53, pp. 7-14.

- R.C. Haw, J.K. Foss and J.F. Foss, "Vorticity Based Intermittency Measurements in a Single Stream Shear Layer" *proc. Second European Turb. Conf. Advance in Turbulence 2*, Ed. H.H. Fernholz and H.E. Fiedler Spring Verlag, Berlin (1989).
- R.C. Haw and J.F. Foss, "The Effects of Forcing on a Single Stream Shear Layer and Its Parent Boundary Layer" *proc. Seventh Symp. on Turbulent Shear Flows*, Stanford University, Stanford, CA, August 1989).
- J.F. Foss and R.C. Haw, "Transverse Vorticity Measurements Using a Compact Array of Four Sensors" *The Heuristics of Thermal Anemometry*, Eds. D.E. Stock, S.A. Sherif, and A.J. Smits, ASME FED-Vol. 97, pp. 71-76, June (1990).
- R.C. Haw and J.F. Foss, "A Facility for Low Speed Calibrations", *The Heuristics of Thermal Anemometry*, Eds. D.E. Stock, S.A. Sherif and A.J. Smits, ASME FED Vol. 97, pp. 29-34, June (1990).
- J.F. Foss, "Vorticity Considerations and Planar Shear Layers," *Experimental Heat Transfer, Fluid Mechanics, and Thermodynamics*, 1991, Elsevier Sci. Publ. Inc., pp. 240-251 (an invited paper).
- J.M. Bruns, R.C. Haw, and J.F. Foss, "The Velocity and Transverse Vorticity Fields in a Single Stream Shear Layer," *proc. Eighth Turbulent Shear Flows Conference*, T.U. Munich, 9-11 Sept 1991, pp. 3-1-1 to 3-1-6.
- B. Kock am Brink and J.F. Foss, "Enhanced Mixing via Geometric Manipulation of a Splitter Plate," AIAA 3rd Shear Flow Control Conference, Paper No. 93-3244, July 7-9, 1993.
- J.F. Foss, B. Walter, and M.M. Koochesfahani, "Velocity and Vorticity Measurements in the Near Wake of a D-Shaped Cylinder," Ninth Turbulent Shear Flows Conference, Kyoto, Japan, August 16-18, 1993.
- D.G. Bohl and J.F. Foss, "Streamwise Vorticity and Velocity Measurements in the Near Field of a Tabbed Jet," *Turbulence in Complex Flows*, Eds. P. Purtell and C. Wark, ASME FED Vol. 203, pp. 79-84, (1994).
- D. Bohl and J. Foss, "Characteristics of the Velocity and Streamwise Vorticity Fields in a Developing Tabbed Jet," AIAA 33rd Aerospace Sciences Meeting and Exhibit, Paper No. 95-0102, January 9-12, 1995.
- J.F. Foss, D.G. Bohl and S.J. Kleis, "Transverse Vorticity Measurements in a Two-Stream Mixing Layer at High Reynolds Numbers," in *Proceedings: 6th Asian Conference on FM and CPTSO*, Singapore, edited by C.T. Chew, 2:1070 (1995).
- J.F. Foss, D.G. Bohl and S.J. Kleis, "Activity Intermittency in a Two-Stream Shear Layer," *Tenth Symposium on Turbulent Shear Flows*," Pennsylvania State Univ., August, 1995, p. 3-1.
- D. Bohl and J. Foss, "Enhancement of Passive Mixing Tabs by the Addition of Secondary Tabs," 34th Aerospace Sciences Meeting and Exhibit, AIAA 96-0545 (1996).
- S.C. Morris, J.J. Good and J.F. Foss, "Velocity Measurements in the Wake of an Automotive Cooling Fan," *Engineering Turbulence Modelling and Experiments 3*, Proceedings of the 3rd International Symposium on Engineering Turbulence Modelling and Measurements, eds. W. Rodi and G. Bergeles, Heraklion-Crete, Greece (1996), pp. 785-794.
- J.F. Foss, "Vorticity, Circulation and Vortices," Proceedings of the ASME Fluids Engineering Division Summer Meeting, vol. 3, FED-vol. 238, San Diego, CA, July 7-11, 1996, pp. 83-95.

- T.J. Hicks, J.F. Foss and D.G. Bohl, "The Sources of Internal Errors in Constant Temperature Anemometry," Proceedings of the ASME Fluids Engineering Division Summer Meeting, vol. 4, FED-vol. 239, San Diego, CA, July 7-11, 1996, pp. 337-343.
- S.C. Morris, J.F. Foss, and J.E. Pakkala (1997) "The Automotive Cooling Fan Research and Development Facility," SAE Vehicle Thermal Management Systems Meeting, Paper No. 971784, May.
- S.C. Morris, and J.F. Foss (1997) "Integral Performance Measurements and Detailed Flow Field Observations for a 1994 Ford Explorer Cooling Fan," SAE Vehicle Thermal Management Systems Meeting, Paper No. 971794, May.
- J.F. Foss and C.J. Blechinger (1997) "A 'Controlled Sudden Expansion/Plenum/Nozzle Flow' Strategy for Accurate Flow Rate Measurements in Pipe Flows," ASME/FED Summer Meeting, Paper No. FEDSM97-3214, July.
- S.C. Morris and J.F. Foss (1997) "The 'Aerodynamic Shroud': An Automotive Application," ASME/FED Summer Meeting, Paper No. FEDSM97-3277, July.
- B.S. AbdulNour and J.F. Foss (1997) "Computational & Experimental Predictions of Automotive Windshield Flow," ASME/FED Summer Meeting, Paper No. FEDSM97-3022, July.
- S.K. Ali and J.F. Foss (1997) "Experimental Determination of Discharge Coefficient in a Two-Dimensional Slit Jet," ASME/FED Summer Meeting, Paper No. FEDSM97-3048, July.
- S.D. Larson and J.F. Foss (1997) "Annular Slotted Plate Configuration to Achieve a Controlled Sudden Expansion," ASME/FED Summer Meeting, Paper No. FEDSM97-3682, July.
- K. Willenborg, J.F. Foss, R. AbdulNour, J.J. McGrath and B. AbdulNour (1997), "A Model Defroster Flow", Eleventh Turbulent Shear Flows Symposium, Grenoble, France, vol. 2, pp. 15-25 to 15-30, Sept.
- N.G. Humbad, J.F. Foss, R.A. Porada, S.C. Morris, R.J. Prevost and D.G. Johnson (1998), "Noise and Flow Measurements in an Automotive Blower Scroll," ASME Noise Control and Acoustics Div, NCA-Vol. 25.
- J. Foss, T. Hicks, D. Neal and S. Morris (1999), "Operating Experience of the Pulse Width Modulated-Constant Temperature Anemometer", AIAA 30th Fluid Dynamics Conference and Exhibit, July.
- S.C. Morris, T.J. Hicks and J.F. Foss (1999), "Transient Thermal Response of a Constant Temperature Anemometer", Proceedings of the 3rd ASME/JSME Joint Fluids Engineering Conference, San Francisco, July.
- D.R. Neal, S.C. Treat, S.C. Morris and J. F. Foss (1999), "Using Particle Image Velocimetry (PIV) Measurements to Evaluate Blade Designs for Axial Fans", Proceedings of the 3rd International Workshop on PIV'99, Santa Barbara, Sept, pp. 657-662.
- "Flow Measurements and Analysis for Automotive Blower Noise", with N. Humbad, C. Chen and R. Prevost, Proceedings of the ASME Noise Control and Acoustics Division, pp. 127-134, 1999.
- J.F. Foss, T.J. Hicks and S.C. Morris, "Operating Experience With The Pulse Width Modulated-Constant Temperature Anemometer", Sixth International Thermal Anemometry Symposium, Melbourne, Australia, Jan 2001.
- Foss, J.F., Morris, S.C. and Neal, D.R., "Tech Brief: Axial Fan Research for Automotive and Building Ventilation Applications", ASME FED Newsletter, Spring 2001, pp. 4-7.

- Moreau, S., Neal, D., Henner, M. and Foss, J.F., "Evaluating CFD Models of Axial Fans by Comparisons with Phase-Averaged Experimental Data", (2001) SAE Vehicle Thermal Management Systems, paper No. 2001-01-1701, May.
- Foss, J.F. and Hicks, T.J., "Processing Time Series Data (Velocity, Shear Stress) from the Pulse Width Modulated-Constant Temperature Anemometer (PWM-CTA)", 19th International Congress on Instrumentation in Aerospace Simulations Facilities, IEEE, pp. 448-453 (2001).
- J.F. Foss, R.J. Prevost, K.M. Bade and A. Levasseur, "The Velocity Field of an Annular Jet with Cross-Member," ASME/JSME Joint Fluids Engineering Conference, July 6-10, 2003, FED SM2003-45242.
- S.C. Morris, J.F. Foss and A. Hellum, "Velocity-Vorticity Decomposition of the Reynolds Stress Gradient in a Shear Layer", Paper C226, TSFP-3, Sendai, Japan, July 2003.
- Hicks, T.J., J.K. Schwannecke, M.J. Norconk, A.M. Hellum and J.F. Foss (2003), "The Evolved 100kHz PWM-CTA", ICIASF'03 IEEE, Göttingen, Germany.
- Moreau, S., D. Neal and J. Foss (2004) "Hot Wire Measurements Around a CD Airfoil in an Open-Jet Anechoic Wind Tunnel", Proceedings of ASME FEDSM'04, Charlotte, NC, July 11-15.
- Foss, J.F. (2005) "Temperature and Flow Rate Measurements with the Thermal Transient Anemometer," Paper No. 2005-01-2030, SAE 2005 Transactions, *Journal of Passenger Cars-Mechanical Systems*.
- Hellum, A.M. and J.F. Foss (2007) "Effects of Flow Scale on the Intermittent Properties of a Single Stream Shear Layer," 5th Int. Symposium on Turbulence and Shear Flow Phenomena, TU Munchen, Garching, Germany, 27-29 Aug, pp. 1181-1186.

TECHNICAL PUBLICATIONS (NASA CR)

- J.F. Foss, "Measurements in a Large Angle Oblique Jet Impingement Flow", NASA CR 158 385, 7 Aug. 1978.
- C.E. Wark, and J.F. Foss, Development of a Temperature Measurement and System with Application to a Jet in a Cross Flow Experiment, NASA CR 174896, April 1985.
- J.F. Foss, C.L. Klewicki and P.J. Disimilie, Transverse Vorticity Measurement Using an Array of Four Hot-Wire Probes, NASA CR 178098, May 1986.
- Bohl, D.G. and Foss, J.F., "An Experimental Study of the Near Field Region of a Free Jet with Passive Mixing Tabs," NASA CR 97-206296, November 1997.

TECHNICAL PUBLICATIONS

- J.F. Foss, D.E. Heyer, "Compressed air-water rocket for deformable control volume analyses," ASEE Mechanics Series, Monograph M-1 (1969).
- J.F. Foss, S.J. Kleis, "A note on the defined region geometry for high-gain proportional amplifiers," ASME Paper 70-WA/Flcs-12, presented at the ASME Winter Annual Meeting, New York (November 1970).
- J.F. Foss, "Vorticity effects in a large angle oblique jet impingement flow," Second Interagency Symp. on University Research in Transportation Noise, North Carolina State University, **1**, 264 (June 1974).
- J.F. Foss, "Discussion of the paper: Vortex stretching due to shear layer instability," by D.O. Rockwell Trans. ASME, JFE, Vol. 99, p. 240 (March 1977).

- J.F. Foss, J.A. Clark and L. Kit, "Discussion of the paper: Shear layer transition and the sharp-edge orifice," *Jour. Fluids Engr.*, Vol. 102, No. 2, pp. 219-225 (incl. disc.)
- C.E. Wark, J.F. Foss, "The influence of a large free stream disturbance level on the dynamics of a jet in a cross flow," *Combustion Fundamentals Conference, NASA Lewis Research Center, October 1982.*
- J.F. Foss, "Density ratio and free stream disturbance effects in the interaction region of a jet in a cross flow," *Combustion Fundamentals Conference, NASA Lewis Research Center, April 1984.*
- J.F. Foss, E.D. Davis, R.C. Haw and S.K. Ali (1987) Coherent Motion Induced Fluctuations in the Primary Transition Region of a Plane Shear Layer" (an Invited Paper) *Forum on Turbulent Flows*, ed. W.W. Bower, ASME, FED-Vol. 51, pp. 1-11.
- S.K. Ali and J.F., "An Evaluation of the Biot--Savart Computational Model for a Slit-Jet Flow Field", *proc. The Third Intl. Congress of Fluid Mechanics*, Cairo University, Egypt, January 1990.
- J.F. Foss and R.C. Haw, "Vorticity and Velocity Measurements in a 2:1 Mixing Layer" *Forum on Turbulent Flows*, Eds. W.W. Bowers, M.J. Morris and M. Samimy, ASME FED Vol. 94, pp. 115-120, June 1990.
- J.F. Foss, S.C. Morris and D.R. Neal, "Tech Brief: Axial Fan Research for Automotive and Building Ventilation Applications", ASME, Sept. 2001, pp. 4-7.

ABSTRACTS FOR THE DIVISION OF FLUID DYNAMICS, AMERICAN PHYSICAL SOCIETY

- J.F. Foss, J.D. Shlien and S. Corrsin, "Thermal interface in isotropic turbulence," *Bull. of the Am. Phys. Soc.*, Series 11, 17:11, 1089 (1972).
- J.F. Foss, S.J. Kleis, "Effect of the exit plane conditions on the near field of an axisymmetric jet," *Bull. Am. Phys. Soc.*, Series 11, **18**:11 (November 1973).
- J.F. Foss, "Some characteristics of free shear layers generated from laminar and turbulent boundary layers," *Bull. Am. Phys. Soc.*, 1146 (November 1974).
- K.C. Cornelius, J.F. Foss, "Molecular diffusivity effects in turbulent mixing," *Bull. Am. Phys. Soc.*, 1158 (November 1974).
- J.F. Foss, "Accuracy and uncertainty of transverse vorticity measurements in a free shear layer," EB4 *Bull. Am. Phys. Soc. Ser. II*, 21:10 (November 1976).
- J.F. Foss, BB4 w/K.C. Cornelius, "Turbulent, non-diffusive mixing of two distinct gaseous," *Volumes, Ibid.*
- J.F. Foss, R.E. Falco, "Vorticity measurements in vortex rings," BC 3, *Bull. Am. Phys. Soc. Ser. II* 22:10 (Nov. 1977).
- J.F. Foss, "Interaction region phenomena for the "Jet in a cross flow problem," CD 1, *Bull. Am. Phys. Soc. Ser. II* 24:8 (Oct. 1979).
- J.F. Foss, w/R.C. Haw, "Sharp-edge orifice shear layer instability," CDF, *Bull. Am. Phys. Soc.*, Ser. II, 25:3, November, 1980).
- J.F. Foss, w/J. Andreopoulos, "An interpretation of the pressure fields for the jet in a cross flow problem," BF4, *Bull. Am. Phys. Soc.*, Ser. II, 25:9, November 1980.
- J.F. Foss, C. Klewicki, "Transverse velocity effects in x-ray anemometry," *Bull. Am. Phys. Soc.* **26**, 9, ES 5, p. 1279 (Nov. 1981).
- J.F. Foss, C. Klewicki, "Vorticity, strain rate and velocity measurements in the intermittent region of a plane shear layer," *Bull. Am. Phys. Soc.*, DA 9, p. 1181 (Nov. 1982).

- J.F. Foss, C.L. Klewicki, "The entrainment field of a plane shear layer," Bull. Am. Phys. Soc., Series II, Vol. 28, No. 9, DA 1, p. 1379 (1983).
- S.K. Ali, J.F. Foss, "Finite Plenum Effects in the Slit-Jet Flow Field," DH6 Bull Am. Phys Soc., Vol. 29, No 9, p. 1556 (1984).
- J.F. Foss, T.P. Schmitt and S.K. Ali, "The Relative Efficacy of Parallel and Perpendicular Entrainment," DH7 Bull. Am. Phys. Soc. Vol. 29, No. 9, p. 1556 (1984).
- J.F. Foss, J.F. Foss, "Excess Entrainment Effects in a Single Stream Shear Layer," EC2, Bull. Am. Phys. Soc. Vol. 30, No. 9, P. 1744 (1985).
- S.K. Ali and J.F. Foss, "Transverse Velocity Effects on X-Array Measurements," Vol. 30, No. 9, p. 1747 (1985).
- J.F. Foss, "Three-Dimensional Free Convection Flow Patterns in a Heleshaw Cell," Bull. Am. Phys. Soc., Vol. 31, No. 10, p. 1691 (1986).
- S.K. Ali, J.F. Foss, "Schlieren Observations of the Slit-Jet Flow Field Instabilities," Bull. Am. Phys. Soc., Vol. 31, No. 10, p. 1744 (1986).
- J.F. Foss and R.C. Haw, "Comparative Measurements: Time Resolved Transverse Vorticity in a Two-Stream Mixing Layers," Bull. Am. Phys. Soc., Vol. 32, No. 10, p. 2043 (1987).
- R.C. Haw and J.F. Foss, "Large Amplitudes Forcing of a Single Stream Shear Layer," Bull. Am. Phys. Soc., Vol. 33, No. 10, p. 2227 (1988).
- S.K. Ali and J.F. Foss, "Instability Phenomena in a 2-D Slit Jet Flow Field," Bull. Am. Phys. Soc., Vol. 33, No. 10, p. 2271 (1988).
- J.F. Foss and S.K. Ali, "Mean Velocity Distribution in a Slit-Jet Flow Field", Bull. Am. Phys. Soc. Vol. 34, No. 10, pp. 2250 (1989).
- S.K. Ali and J.F. Foss", Growth of Disturbances in a Slit-Jet Flow Field." Bull. Am. Phys. Soc. Vol. 34, No. 10, pp. 2302 (1989).
- J.F. Foss and J.M. Bruns, "Vorticity Measurements in Shear Layers," Bull Am. Phys. Soc. Vol. 35, No. 10, p. 2225 (1990).
- S.K. Ali and J.F. Foss, "Comparison of Strouhal Number Based Upon Flow Visualization and Measured Centerline Velocity in a Slit Jet Flow Field, Bull Am. Phys. Soc., Vol. 35, No. 10, p. 2246 (1990).
- J.F. Foss, "Reynolds Shear Stress/Transverse Vorticity Conditional Statistics in Planar Shear Layers," Bull. Am. Phys. Soc. Vol. 36, No. 10 (1991).
- J.F. Foss, S.D. Larson, S.J. Kleis, S. Tung, "Transverse Vorticity Measurements in a Two-Stream Mixing Layer," Bull. Am. Phys. Soc. Vol. 37, No. 8 (1992).
- J.F. Foss, D.G. Bohl and S.J. Kleis, "Vorticity-Vorticity Correlation Functions in a Two-Stream Mixing Layer, Bull Am Phys Soc. Vol. 38, No. 12 (1993).
- J.F. Foss, D.G. Bohl, and S.J. Kleis "Vorticity Based Intermittency in a Large R_0 Two-Stream Mixing Layer," Bull Am Phys Soc., Vol. 39, No. 9 (1994).
- J.F. Foss, D.G. Bohl and S.J. Kleis, " R_0 Failure/ R_λ Success in Describing the Two-Stream Shear Layer Vorticity Field Properties," Bull Am. Phys. Soc., Vol. 40, No. 12 (1995).
- J.F. Foss, D.G. Bohl and T.J. Hicks, "The Pulse Width Modulated (PWM)-Constant Temperature Anemometer (CTA)", Bull Am. Phys. Soc., Vol. 41, No. 9 (1996).
- J.F. Foss, T.J. Hicks, M. Hites and W. Ornt, "Wall Shear Stress Measurements with a PWM-CTA Driven 'Ho-Sensor'", Bull. Am. Phys. Soc., Vol. 42, No. 11 (1997).
- J.F. Foss, S.C. Morris and T.J. Hicks, "An Empirical/Analytical Assessment of Noise Effects on the Maximum PWM-CTA Frequency Response", Bull. Am. Phys. Soc., Vol. 43, No. 9 (1998).

- S.C. Morris and J.F. Foss, "Constant Resistance Is Not Constant Temperature Anemometry – A Lesson From the PWM-CTA Simulation and Its Impact on All CTA Frequency Response Evaluations", *Bull. Am. Phys. Soc.*, Vol. 43, No. 9 (1998).
- S.C. Morris and J.F. Foss, "Statistics of Micro-Circulation in a Turbulent Flow Field", *Bull. Am. Phys. Soc.*, Vol. 44, No. 9 (1999).
- J.F. Foss and S.C. Morris, "The Spatial/Temporal Correlation of Velocity and Vorticity in Single Stream Shear Layer", *Bull. Am. Phys. Soc.*, Vol. 44, No. 9 (1999).
- J.F. Foss, S.C. Morris and T.J. Hicks, "Time Resolved Measurements using the PWM-CTA (500KHz?)" *Bull. Am. Phys. Soc.*, Vol. 46, No. 10 (2001).
- S.C. Morris and J.F. Foss, "Turbulent Boundary Layer to Single Stream Shear Layer", *Bull. Am. Phys. Soc.*, Vol. 46, No. 10 (2001).
- S.C. Morris, J.F. Foss and M. Maher, "Correlation length of vorticity in the near wall region of a high Reynolds number boundary layer", *Bull. Am. Phys. Soc.*, Vol. 47, No. 10 (2002).
- J.F. Foss, M.C. Maher, R.J. Prevost and S.C. Morris, "Velocity-Vorticity Correlations in the High Re Boundary Layer at the SL TEST Site-Utah", *Bull. Am. Phys. Soc.*, Vol. 47, No. 10 (2002).
- J.F. Foss and S.R. Treat, "SL Test Velocity/Vorticity Measurements at $y^+=2600$ and 1100," *Bull. Am. Phys. Soc.*, Vol. 49, No. 9 (2004).
- J.F. Foss and A.R. Hellum, "Vorticity Based (External) Intermittency Measurements in a High R_θ Single Stream Shear Layer," *Bull. Am. Phys. Soc.*, Vol. 51, No. 9 (2006).
- John Foss and Kyle Bade "Galilean Identification of Large Scale Coherent Motions in a Shear Layer," *Bull. Am. Phys. Soc.*, **53**:15 (November 2008).
- John Foss and Jason Peabody "The Low Speed Intermittent Region of a Single Stream Shear Layer (SSSL)," *Bull. Am. Phys. Soc.*, **54**:19 (November 2009).

SELECTED TECHNICAL REPORTS

Note: The grants identified in the Curriculum Vitae have resulted in the preparation of a large number of technical reports. The information content of many of these reports is represented in the list of publications presented in the previous pages. The following list of selected reports is to indicate completed research work which has not yet been (or will not be) submitted for publication.

- S.J. Kleis, J.F. Foss, "The effect of exit conditions on the development of an axisymmetric turbulent free jet," Third Year Technical Report, NASA Grant NGR 23-004-068, Div. of Engr. Res., MSU (May 1974).
- T. Merrow, J.F. Foss, "The use of digital techniques to examine the intermittent region of a turbulent jet," Special Report, NASA Grant NGR 23-004-091, Div. of Engr. Res., MSU (August 1974).
- K.C. Cornelius, J.F. Foss, "An experimental study of the transport of a non-diffusive scalar contaminant in the decaying turbulence field of an enclosed chamber," Special Report to project SQUID, sub-contract No. 8960-11, Div. of Engr. Res., MSU (August 1978).
- J.F. Foss, "Interaction region phenomena for the jet-in-a-cross-flow problem," SFB 80/E/161, February, Univ. of Karlsruhe, Karlsruhe, West Germany (1980).
- J.F. Foss and P.J. Disimile, "Vorticity measurements in a forced plane mixing layer," FSFL-R-85-007, NASA Ames Research Center.

