

RESUME

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NAME: Philip John Morris

TITLE & AFFILIATION: Boeing/A. D. Welliver Professor of Aerospace Engineering
Aerospace Engineering Department
The Pennsylvania State University
University Park, PA 16802

EDUCATION:

1964-67 University of Southampton
Department of Aeronautics
B. Sc. (hons) in Aeronautics and Astronautics

1967-68 University of Southampton
Institute of Sound and Vibration Research
M. Sc. in Advanced Acoustics

1968-71 University of Southampton
Department of Aeronautics and Astronautics
Ph.D. in Aeronautics and Astronautics

RESEARCH AND TEACHING EXPERIENCE:

1971-73 University of Toronto, Institute of Aerospace Studies

As Post-Doctoral Fellow and Research Associate, he conducted experiments in jet noise reduction and turbulence.

1973-77 Lockheed Georgia Company, Marietta, Georgia

As Consulting Scientist he developed analytical and numerical models for the coherent structure of turbulent jets and their associated noise. Made turbulence measurements in a supersonic free jet with a laser velocimeter to determine the effects of Mach number and temperature on the jet structure.

As Research, Design and Development Engineer-Associate he was principal investigator on AFAPL Supersonic Jet Noise Contract. He developed analytical and numerical models for the noise radiated by the large scale structure of turbulence. He also developed techniques for the study of the stability of diverging, inviscid, compressible, free shear layers.

1977-present The Pennsylvania State University, University Park, PA

As Assistant, Associate (1980), and Full (1986) Professor he has conducted research programs on broadband jet noise

RESEARCH AND TEACHING EXPERIENCE (continued)

amplification by a pure tone excitation, turbulence modeling in turbomachinery, boundary layer stability over compliant surfaces and mixing and mixing enhancement in supersonic shear layers. He is presently conducting research in the aeroacoustics of supersonic jets, numerical simulation of electromagnetic scattering, simulation of acoustic scattering by a rotorcraft fuselage, the noise of mixer ejector nozzles, cavity noise and computational aeroacoustics. He is also developing curricula for high performance computing instruction.

1984-85 **University of Southampton, Department of Aeronautics and Astronautics**

As Visiting Research Professor conducted studies of turbulence modeling in gas turbine combustors. Developed numerical methods to calculate the stability of boundary layers over compliant surfaces.

1987 (1992) **University of Exeter, Department of Engineering Science, (University of Warwick, Department of Mechanical Engineering)**

As SERC Research Fellow conducted studies of two- and three-dimensional boundary layer instabilities over compliant surfaces.

1999-2000 **NASA Langley Research Center, Aerodynamic and Acoustic Methods Branch (Hampton, VA)**

As Visiting Research Scientist conducted studies of flap side-edge and airframe noise

2007-08 **NASA Glenn Research Center, Acoustics and Inlets and Nozzle Branches, Cleveland, OH,** conducted computational and experimental studies of jet flow and noise

PUBLICATIONS IN REVIEWED JOURNALS

H. S. Ribner, P. J. Morris and W. H. Chu, "Laboratory Simulation of the Development of Superbooms by Atmospheric Turbulence," Journal of the Acoustical Society of America, Vol. 53, 926-928, 1973.

P. J. Morris, W. Richarz and H. S. Ribner, "Reduction of Peak Jet Noise Using Jet Refraction," Journal of Sound and Vibration, Vol. 29, 443-455, 1973.

P. J. Morris, "Turbulence Measurement in Subsonic and Supersonic Jets in a Parallel Stream," AIAA Journal, Vol. 14, 1468-1475, 1976.

P. J. Morris, "The Spatial Viscous Instability of Axisymmetric Jets," Journal of Fluid Mechanics, Vol. 77, 511-529, 1976.

P. J. Morris, "Flow Characteristics of the Large-Scale Wavelike Structure of a Supersonic Round Jet," Journal of Sound and Vibration, Vol. 53, No. 1, 1977.

H. K. Tanna and P. J. Morris, "Inflight Simulation Experiments on Turbulent Jet Mixing Noise," Journal of Sound and Vibration, Vol. 53, No. 1, 1977.

J. C. Lau, P. J. Morris and M. J. Fisher, "Measurements in Subsonic and Supersonic Free Jets Using a Laser Velocimeter," Journal of Fluid Mechanics, Vol. 93, Pt. 1, pp. 389-405, 1979.

C. K. W. Tam and P. J. Morris, "The Radiation of Sound by the Instability Waves of a Compressible Plane Turbulent Shear Layer," Journal of Fluid Mechanics, Vol. 98, Pt. 2, pp. 349-381, 1980.

P. J. Morris, "Stability of a Two-Dimensional Jet," AIAA Journal, Vol. 19, No. 7, 1981, pp. 857-862, 1981.

P. J. Morris, "The Three-Dimensional Boundary Layer on a Rotating Helical Blade," Journal of Fluid Mechanics, Vol. 112, pp. 283-296, 1981.

P. J. Morris, "Viscous Stability of Compressible Axisymmetric Jets," AIAA Journal, Vol. 21, No. 4, pp. 481-482, 1983.

P. J. Morris, "Modeling the Pressure Redistribution Terms," Physics of Fluids, Vol. 27(7), pp. 1620-1623, 1984.

T. J. Bridges and P. J. Morris, "Differential Eigenvalue Problems in which the Parameter Appears Non-Linearly," Journal of Computational Physics, Vol. 53(3), pp. 437-460, 1984.

H. K. Tanna and P. J. Morris, "The Noise from Normal-Velocity-Profile Coannular Jets," Journal of Sound and Vibration, Vol. 98(2), pp. 213-234, 1985.

C. K. W. Tam and P. J. Morris, "Tone Excited Jets, Part V: A Theoretical Model and Comparison with Experiment," Journal of Sound and Vibration, Vol. 102, pp. 119-151, 1985.

J. Lepicovsky, K. K. Ahuja, W. H. Brown and P. J. Morris, "Acoustic Control of Free Jet Mixing," J. Propulsion and Power, Vol. 2(4), pp. 323-330, 1986.

T. J. Bridges and P. J. Morris, "Boundary Layer Stability Calculations," Physics of Fluids, Vol. 30(11), pp. 3351-3358, 1987.

PUBLICATIONS IN REVIEWED JOURNALS (continued)

- P. J. Morris, "Instability of Elliptic Jets," AIAA Journal, Vol. 26(2), pp. 172-178, 1988.
- P. J. Morris, "A Note on the Effect of Forward Flight on Shock Spacing in Circular Jets," Journal of Sound and Vibration, Vol. 122(1), pp. 175-178, 1988.
- P. J. Morris, G. Chen and T. R. S. Bhat, "A Linear Shock Cell Model for Jets of Arbitrary Exit Geometry," Journal of Sound and Vibration, Vol. 132(2), pp. 199-211, 1989.
- R. D. Joslin and P. J. Morris, "The Sensitivity of Flow and Surface Instabilities to Changes in Compliant Wall Properties," Journal of Fluid and Structures, Vol. 3, pp. 423-437, 1989.
- P. W. Carpenter and P. J. Morris, "The Effect of Anisotropic Wall Compliance on Boundary-Layer Stability and Transition," Journal of Fluid Mechanics, Vol. 218, pp. 171-223, 1990.
- P. J. Morris, "Instability Waves in Twin Supersonic Jets," Journal of Fluid Mechanics, Vol. 220, pp. 293-307, 1990.
- P. J. Morris, M. G. Giridharan and G. M. Lilley, "On the Turbulent Mixing of Compressible Free Shear Layers," Proc. Roy. Soc. Lond. A, Vol.431, pp. 219-243, 1990.
- P. J. Morris and M. G. Giridharan, "The Effect of Walls on Instability Waves in Supersonic Shear Layers," Physics of Fluids A, Vol. 3, pp. 356-358, 1991.
- R. D. Joslin, P. J. Morris and P. W. Carpenter, "The Role of Three-Dimensional Instabilities in Compliant Wall Boundary Layers," AIAA Journal, Vol. 29(10), pp. 1603-1610, 1991.
- R. D. Joslin and P. J. Morris, "The Effect of Compliant Walls on Secondary Instabilities in Compliant Wall Boundary Layers," AIAA Journal, Vol. 30(2), pp. 332-339, 1992.
- K. Viswanathan and P. J. Morris, "Predictions of Turbulent Mixing in Axisymmetric Compressible Shear Layers," AIAA Journal, Vol. 30(6), pp. 1529-1536, 1992.
- W. W. Liou and P. J. Morris, "The Eigenvalue Spectrum of the Rayleigh Equation for a Plane Shear Layer," International Journal for Numerical Methods in Fluids, **15**, pp. 1407-1415, 1992.
- W. W. Liou and P. J. Morris, "Weakly Non-linear Models for Turbulent Mixing in a Plane Shear Layer," Physics of Fluids A, **4**(12), pp. 2798-2808, 1992.
- K. Viswanathan, P. J. Morris and G. Chen, "Instability Waves in Supersonic Jets Confined in Circular and Non-Circular Ducts," Journal of Sound and Vibration, Vol. 171(2), pp.231-254, March 1994.
- G. Chen, P. J. Morris and J. Zhou, "Visualization of Special Eigenmode Shapes of a Vibrating Elliptical Membrane," SIAM Review, 1994.
- P. J. Morris and T. R. S. Bhat, "The Spatial Stability of Compressible Elliptic Jets," Physics of Fluids, Vol. 7(1), pp. 185-194, 1995.
- P. J. Morris, "The Scattering of Sound From a Spatially-Distributed Cylindrical Source by a Circular Cylinder," Journal of the Acoustical Society of America, Vol. 97(5), pp. 2651-2656, 1995.

PUBLICATIONS IN REVIEWED JOURNALS (continued)

R. S. Baty and P. J. Morris, "The Instability of Jets of Arbitrary Exit Geometry," International Journal for Numerical Methods in Fluids, Vol. 21, pp. 763-780, 1995.

R. S. Baty and P. J. Morris, "Conformal Grid Generation for High Aspect Ratio Simply and Doubly Connected Regions," International Journal for Numerical Methods in Engineering, Vol. 38, pp. 3817-3830, 1995.

P. J. Morris, "The Scattering of Sound From a Spatially-Distributed Spherically-Symmetric Source by a Sphere," Journal of the Acoustical Society of America, Vol. 98(6), pp. 3536-3539, 1995.

C. M. Shieh and P. J. Morris, "Instability Wave Analysis of Confined Supersonic Jets Using the Finite Element Method," J. Sound and Vibration, Vol. 198(4), pp. 455-483, 1996.

M. Dahl and P. J. Morris, "Noise From Supersonic Coaxial Jets, Part I: Mean Flow Predictions," J. Sound and Vibration, Vol. 200(5), pp. 643-663, 1997.

M. Dahl and P. J. Morris, "Noise From Supersonic Coaxial Jets, Part II: Normal Velocity Profile Jets," J. Sound and Vibration, Vol. 200(5), pp. 665-699, 1997.

M. Dahl and P. J. Morris, "Noise From Supersonic Coaxial Jets, Part III: Inverted Velocity Profile Jets," J. Sound and Vibration, Vol. 200(5), pp. 701-719, 1997.

P. J. Morris, L. N. Long, A. Bangalore and Q. Wang, "A Parallel Three-Dimensional Computational Aeroacoustics Method Using Nonlinear Disturbance Equations," J. Computational Physics, Vol. 133, 56-74, 1997.

L.-S. Lee and P. J. Morris, "Absolute Instability in a Supersonic Shear Layer and Mixing Enhancement," J. Propulsion & Power, Vol. 13(6), 763-767, 1997.

D. P. Lockard and P. J. Morris, "A Parallel Implementation of a Computational Aeroacoustics Algorithm for Airfoil Noise," J. Computational Acoustics, Vol. 5(4), 337-353, 1997.

D. P. Lockard and P. J. Morris, "The Radiated Noise From Airfoils in Realistic Mean Flows," AIAA Journal, Vol. 36(6), 907-914, 1998.

T. S. Chyczewski, L. N. Long and P. J. Morris, "A Numerical Study of the Influence of Nozzle Exit Conditions on the Development of Supersonic Rectangular Jets," AIAA Journal, Vol. 36(6), 986-993, 1998.

M. D. Dahl and P. J. Morris, "Supersonic Jet Noise Reductions Predicted With Increased Jet Spreading Rate," J. Fluids Engineering, Vol. 120, 471-476, 1998.

D. P. Lockard and P. J. Morris, "Wing Tip-Vortex Calculations Using a High Accuracy Scheme" J. Aircraft, Vol. 35, No. 5, 728-738, 1998.

L. N. Long, P. J. Morris, K. Morooney and S. Kellogg, "The Teaching and Learning of High Performance Computing," J. Engineering Education, Vol. 87, No. 5, 591-597, 1998.

Chung, C. and Morris, P. J., "Acoustic Scattering From Two- and Three-Dimensional Bodies," J. Computational Acoustics Vol. 6, Part 3, 1998, pp. 357-375.

PUBLICATIONS IN REVIEWED JOURNALS (continued)

O. A. Laik and P. J. Morris, "Simulation of Acoustic Scattering by Two and Three-Dimensional Bodies," *J. Aircraft*, Vol. 37, No. 1, 2000, pp. 68-75.

M. T. Mendonca, L. L. Pauley and P. J. Morris, "Effect of Wave Frequency on the Nonlinear Interaction Between Gortler Vortices and Three-Dimensional Tollmien-Schlichting Waves," *J. Braz. Soc. Mechanical Sciences*, Vol. 22, No. 1, 2000, pp. 69-82.

G. Chen, M. P. Coleman, D. Ma, P. J. Morris and P. You, "The Fundamental Solution for Shallow Circular Cylindrical Shells. Part I: Derivations," *J. Engineering Science*, Vol. 38, 2000, pp. 1235-1257.

G. Chen, M. P. Coleman and P. J. Morris, "The Fundamental Solution for Shallow Circular Cylindrical Shells. Part II: Numerical Computation and Software," *J. Engineering Science*, Vol. 38, 2000, pp. 1259-1274.

A. Povitsky and P. J. Morris, "A Higher-Order Compact Method in Space and Time Based on Parallel Implementation of the Thomas Algorithm," *J. Computational Physics*, Vol. 161, 2000, pp. 182-203.

M. T. Mendonca, P. J. Morris and L. L. Pauley, "Interaction Between Gortler Vortices and Two-Dimensional Tollmien-Schlichting Waves," *Physics of Fluids*, Vol. 12, No. 6, 2000, pp. 1461-1471.

S. Boluriaan and P. J. Morris, "Numerical Simulation of Wake Vortex Detection Using a Radio Acoustic Sounding System," *AIAA Journal*, Vol. 39, No.6, 2001, pp. 1097-1105.

P. J. Morris and F. Farassat, "On the Acoustic Analogy and Alternative Theories of Jet Noise Prediction," *AIAA Journal*, Vol. 40, No. 4., 2002, pp. 671-680.

P. J. Morris, L. N. Long, T. E. Scheidegger and S. Boluriaan, "Simulations of Supersonic Jet Noise," *International Journal of Aeroacoustics*, Vol. 1, No. 1, 2002, pp. 17-42.

F. S. Souliez, L. N. Long, P. J. Morris, and A. Sharma, "Landing Gear Aerodynamic Noise Prediction Using Unstructured Grids," *International Journal of Aeroacoustics*, Vol. 1, No. 2, 2002, pp. 115-135.

J. W. Kim and P. J. Morris, "Numerical Simulation of Subsonic Inviscid Flow Past a Cone Using High-Order Finite Difference Schemes," *AIAA Journal*, Vol. 40, No. 10, 2002, pp. 1961-1968.

S. Boluriaan and P. J. Morris, "Two-Dimensional Simulations of Wake Vortex Detection Using RASS," *AIAA Journal*, **40**(11), 2002, pp. 2247-2256.

P. J. Morris and F. Farassat, "Reply by the Authors to C. K. W. Tam," *AIAA Journal*, Vol. 41, No. 9, 2003, pp. 1845-1848.

S. Boluriaan and P. J. Morris, "Acoustic Streaming: From Rayleigh to Today," *International Journal of Aeroacoustics*, Vol. 2, Nos. 3&4, 2003, pp. 255-292.

A. Agarwal, P. J. Morris, and R. Mani, "The Calculation of Sound Propagation in Nonuniform Flows: Suppression of Instability Waves," *AIAA Journal*, Vol. 42, No. 1, 2004, pp. 80-88.

P. J. Morris, S. Boluriaan, and C. M. Shieh, "Numerical Simulation of Minor Losses Due to a Sudden Contraction and Expansion in High Amplitude Acoustic Resonators," *Acta Acustica united with Acustica*, Vol. 90, 2004, pp. 393-409.

PUBLICATIONS IN REVIEWED JOURNALS (continued)

L. N. Long, P. J. Morris and A. Agarwal, "A Review of Parallel Computing in Computational Aeroacoustics," *International Journal of Computational Fluid Dynamics*, Vol. 18, Issue 6, August 2004, pp. 493-502.

A. Agarwal and P. J. Morris, "Numerical Computation of the Linear Convective and Absolute Instability of Free-Shear Flows," *Computers and Fluids*, Vol. 35, 2006, pp. 1282-1289.

A. Agarwal and P. J. Morris, "Broadband Noise from the Unsteady Flow in a Slat Cove," *AIAA Journal*, Vol. 44, No. 2, February 2006, pp. 301-310.

P. P. Rao and P. J. Morris, "Some Finite Element Applications in Frequency Domain Aeroacoustics," *AIAA Journal*, Vol. 44, No. 7, July 2006, pp. 1643-1652.

S. K. Lee, K. S. Brentner, F. Farassat and P. J. Morris, "Analytic Formulation and Numerical Implementation of an Acoustic Pressure Gradient Prediction," *Journal of Sound and Vibration*, Vol. 319, Nos. 3-5, January 2009, pp. 1200-1221.

S. Saxena, P. J. Morris, K. Viswanathan, "A New Algorithm for the Nonlinear Propagation of Broadband Jet Noise," *AIAA Journal*, Vol. 47, No. 1, 2009, pp. 186-194.

P. J. Morris, "A Note on the Noise Radiated by Large Scale Turbulent Structures in Subsonic and Supersonic Jets," *International Journal of Aeroacoustics*, Vol. 8, No. 4, 2009, pp. 301-316.

R. Cheng, P. J. Morris, K. S. Brentner, "A three dimensional parabolic equation method for sound propagation in moving inhomogeneous media," *Journal of the Acoustical Society of America*, Vol. 126, Pt. 4, 2009, pp. 1700-1710.

S. A. E. Miller, J. Veltin, P. J. Morris and D. K. McLaughlin, "Assessment of Computational Fluid Dynamics for Supersonic Shock Containing Jets," *AIAA Journal*, 47(11), 2009, pp. 2738-2746.

P. J. Morris and K. B. M. Q. Zaman, "Velocity measurements in jets with application to noise source modeling," *Journal of Sound and Vibration*, **329**(4), 2010, pp. 394-414.

P. J. Morris, "The Instability of High Speed Jets," *International Journal of Aeroacoustics*, **9** (1&2), 2010, pp. 1-50.

P. J. Morris, "Geoffrey Lilley: A Very Brief Biography," *International Journal of Aeroacoustics*, **9** (4&5), 2010, pp. 373-385.

L. V. Lopes, K. S. Brentner and P. J. Morris, "A Framework for a Landing Gear Model and Acoustic Prediction," *J. Aircraft*, Vol. 47, No. 3, 2010, pp. 763-774.

D. Papamoschou, P. J. Morris and D. K. McLaughlin, "Beamformed flow-acoustic correlations in a supersonic jet," *AIAA Journal*, Vol. 48, No. 10, 2010, pp. 2445-2453.

S. K. Lee, P. J. Morris and K. S. Brentner, "Improved Algorithm for Nonlinear Sound Propagation with Aircraft and Helicopter Noise Applications," *AIAA Journal*, Vol. 48, No. 11, 2010, pp. 2586-2595.

PUBLICATIONS IN REVIEWED JOURNALS (continued)

S. K. Lee, K. S. Brentner and P. J. Morris, "Acoustic Scattering in the Time Domain Using an Equivalent Source Method," *AIAA Journal*, Vol. 48, No. 12, 2010, pp. 2772-2780.

P. J. Morris and S. A. E. Miller, "Prediction of Broadband Shock-Associated Noise Using Reynolds-Averaged Navier-Stokes Computational Fluid Dynamics," *AIAA Journal*, Vol. 48, No. 12, 2010, pp. 2931-2961.

M. J. Hill, R. F. Kunz, R. B. Medvitz, R. F. Handschuh, L. N. Long, R. W. Noack and P. J. Morris, "CFD Analysis of Gear Windage Losses: Validation and Parametric Aerodynamic Studies," *Journal of Fluids Engineering*, Vol. 133, 2011, pp. 031103-1-031103-10.

S. Lee, K. S. Brentner and P. J. Morris, "Assessment of Time-Domain Equivalent Source Method for Acoustic Scattering," *AIAA Journal*, Vol. 49, No. 9, 2011, pp. 1897-1906.

MANUSCRIPTS ACCEPTED FOR PUBLICATION

S. K. Lee, K. S. Brentner, P. J. Morris, "Time-domain approach for acoustic scattering of rotorcraft noise," accepted to *Journal of the American Helicopter Society*, October 2010.

MANUSCRIPTS SUBMITTED FOR PUBLICATION

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS

- P. J. Morris, "Temperature Compensation of a Hot-Wire Anemometer," Symposium on Instrumentation and Data Processing in Industrial Aerodynamics, National Physical Laboratory, England, 1968.
- P. J. Morris, "The Structure of a Turbulent Water Jet," Symposium on Turbulence Measurements in Liquids, University of Missouri-Rolla, 1971.
- P. J. Morris, "A Model for the Structure of Jet Turbulence as a Source of Noise," AIAA Paper 74-1, 1974.
- J. C. Lau, P. J. Morris and M. J. Fisher, "Turbulence Measurements in Subsonic and Supersonic Jets Using a Laser Velocimeter," AIAA Paper 76-348, 1976.
- P. J. Morris and M. C. Whiffen, "The Characteristics and Applications of a Two-Axis Laser Velocimeter," Viscous Flow Symposium, Lockheed-Georgia Company, June 1976 (Report No. L677ER0044).
- P. J. Morris and C. K. W. Tam, "Near and Far Field Noise from Large-Scale Instabilities of Axisymmetric Jets," AIAA Paper 77-1351, 1977.
- P. J. Morris, "The Inviscid Stability of Diverging, Compressible, Free Shear Flows," 30th Meeting of the Division of Fluid Dynamics American Physical Society, Bethlehem, Pennsylvania, November 1977.
- P. J. Morris, "The Stability of a Two-Dimensional Jet," 31st Meeting of the Division of Fluid Dynamics, American Physical Society, Los Angeles, California, November 1978.
- P. J. Morris and C. K. W. Tam, "The Radiation of Sound by the Instability Waves of a Compressible Axisymmetric Jet," IUTAM/ICA/AIAA International Symposium on the Mechanics of Sound Generation in Flows, Gottingen, August 1979.
- P. J. Morris, "A Model for Broadband Jet Noise Amplification," AIAA Paper 80-1004, June 1980.
- P. J. Morris, "The Laminar Boundary Layer on a Rotating Twisted Helical Blade," 33rd Meeting of the Division of Fluids Dynamics, American Physical Society, Ithaca, NY, November 1980.
- P. J. Morris and C. Baltas, "Turbulence in Sound Excited Jets: Measurements and Theory," AIAA Aerospace Sciences Conference, St. Louis, Missouri, January 1981.
- P. J. Morris and H. K. Tanna, "The Noise from Normal Velocity Profile Coannular Jets," AIAA Aerospace Sciences Conference, Palo Alto, October 1981.
- P. J. Morris and C. Baltas, "Measurements and Predictions of Turbulence in Sound Excited Jets," AIAA Aeroacoustics Conference, Palo Alto, October 1981.
- P. J. Morris and W. S. Byon, "The Stability of the Axisymmetric Boundary Layer on a Circular Cylinder," AIAA/ASME Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, St. Louis, June 1982.
- P. J. Morris and T. J. Bridges, "Spectral Solution of the Orr-Sommerfeld Equation: Spatial Stability," 36th Meeting of the Division of Fluid Dynamics, American Physical Society, Houston, November 1983.
- P. J. Morris and D. G. Miller, "Wavelike Structures in Elliptic Jets," AIAA Aerospace Sciences Conference, Reno, January 1984.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

- T. J. Bridges and P. J. Morris, "Spectral Calculations of the Spatial Stability on Non-Parallel Boundary Layers," AIAA Aerospace Sciences Conference, Reno, January 1984.
- C. Baltas and P. J. Morris, "Turbulence Characteristics of the Noise Producing Region of an Excited Round Jet. Part I. Time-Average Flow Properties," AIAA/NASA Aeroacoustics Conference, Williamsburg, October 1984.
- C. K. W. Tam and P. J. Morris, "A Model of Tone Excited Jets," 37th Meeting of the Division of Fluid Dynamics, American Physical Society, Providence, November 1984.
- P. J. Morris, "The Nutation of Liquid-Filled Spacecraft," 27th British Theoretical Mechanics Colloquium, Leeds, England, March 1985.
- P. J. Morris, "Instability of Elliptic Jets," AIAA 10th Aeroacoustics Conference, Seattle, July 1986.
- P. J. Morris, "Applications of Matrix Factorization in Hydrodynamic Stability, 4th Army Conference on Applied Math. and Computing, Cornell, May 1986.
- P. J. Morris, W.-S. Byon and W.-W. Liou, "Reynolds Stress Closure Based on Instability Wave Models," 39th APS/Division of Fluid Dynamics Meeting, Columbus, November 1986.
- P. J. Morris and R. D. Joslin, "Sensitivity of Boundary Layer Instabilities to Compliant Surface Properties," Euromech 228 Colloquium on Boundary Layer Instability and Transition, Exeter, England, 21-25, September 1987.
- P. J. Morris, T. R. S. Bhat and G. Chen, "Shock Structure in Jets of Arbitrary Exit Geometry," AIAA 11th Aeroacoustics Conference, Sunnyvale, CA, 19-21 October 1987.
- P. J. Morris and M. G. Giridharan, "Turbulent Mixing in High Speed Shear Layers," 41st APS/Division of Fluid Dynamics Meeting, Buffalo, November 1988.
- R. D. Joslin and P. J. Morris, "A Preliminary Analysis of the Effect of a Non-Isotropic Compliant Wall on Secondary Instabilities in Boundary Layers," 41st APS/Division of Fluid Dynamics Meeting, Buffalo, November 1988.
- P. W. Carpenter and P. J. Morris, "Effect of Anisotropic Wall Compliance on Three-Dimensional Instabilities in Boundary Layers," 41st APS/Division of Fluid Dynamics Meeting, Buffalo, November 1988.
- P. J. Morris, "Resonance in Twin Supersonic Jets," AIAA 12th Aeroacoustics Conference, San Antonio, TX, April 10-12, 1989.
- P. J. Morris and T. R. S. Bhat, "Shock Structure in Non-Circular Jets," AIAA 12th Aeroacoustics Conference, San Antonio, TX, April 10-12, 1989.
- R. S. Baty and P. J. Morris, "Instability of Jets of Arbitrary Geometry," AIAA 20th Fluid Dynamics, Plasma Dynamics and Lasers Conference, Buffalo, New York, June 12-14, 1989.
- P. W. Carpenter and P. J. Morris, "Growth of Three-Dimensional Instabilities in Flow Over Compliant Walls," 4th Asian Congress of Fluid Mechanics, Hong Kong, August 19-23, 1989.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

- P. J. Morris and W.-W. Liou, "Turbulence Models for Free Shear Layers," 42nd APS/Division of Fluid Dynamics Meeting, Palo Alto, CA, November 19-21, 1989.
- R. D. Joslin and P. J. Morris, "Stability and Transition in Compliant Wall Boundary Layers," 42nd APS/Division of Fluid Dynamics Meeting, Palo Alto, CA, November 19-21, 1989.
- P. J. Morris, M. G. Giridharan and K. Viswanathan, "Turbulent Mixing in Plane and Axisymmetric Shear Layers," AIAA 28th Aerospace Sciences Meeting, Reno, NV, Jan 8-11, 1990.
- R. D. Joslin, P. J. Morris, and P. W. Carpenter, "The Role of Three-Dimensional Instabilities in Compliant Wall Boundary Layer Transition," AIAA 28th Aerospace Sciences Meeting, Reno, NV, Jan. 9-11, 1990.
- Whai-Wai Liou and P. J. Morris, "Wave Models for Turbulent Free Shear Flows," NASA Lewis Computational Fluid Dynamics Symposium on Aeropropulsion, April 24-26, 1990. ([NASA Conference Publication 3078](#)).
- T. R. S. Bhat, P. J. Morris and R. S. Baty, "A Linear Shock Cell Model of Non-Circular Jets using Conformal Mapping with a Pseudo-Spectral Hybrid Scheme," AIAA 13th Aeroacoustics Conference, Tallahassee, Florida, October 22-24, 1990.
- M. G. Giridharan and P. J. Morris, "The Development of Wave Packets in Supersonic Shear Layers," 43rd APS/Division of Fluid Dynamics Meeting, Ithaca, New York, November 18-20, 1990.
- M. G. Giridharan and P. J. Morris, "The Development of Wave Packets in Supersonic Shear Layers," AIAA 29th Aerospace Sciences Meeting, Reno, NV, January 7-10, 1991.
- R. D. Joslin and P. J. Morris, "The Effect of Compliant Walls on Secondary Instabilities in Compliant Wall Boundary Layers," AIAA 29th Aerospace Sciences Meeting, Reno, NV, January 7-10, 1991.
- P. J. Morris, and T. R. S. Bhat, "The Prediction of Noise Radiation from Supersonic Elliptic Jets," AGARD 78th B Specialists' Meeting, Bonn, Germany, October 23-25, 1991.
- P. J. Morris, "Theory of Supersonic Jet Noise," (invited paper), 122nd Meeting Acoustical Society of America, Houston, TX, November 6, 1991.
- K. Viswanathan, P. J. Morris and G. Chen, "Instability Waves in Supersonic Jets Confined in Non-Circular Ducts," AIAA 30th Aerospace Sciences Meeting, Reno, NV, January 6-9, 1992.
- P. J. Morris, "Validation of Computational Aeroacoustics Algorithms," ICASE/NASA Workshop on Computational Aeroacoustics, Hampton, VA, April 6-9, 1992.
- P. J. Morris and T. R. S. Bhat, "The Noise from Supersonic Elliptic Jets," DGLR/AIAA 14th Aeroacoustics Conference, Aachen, Germany, May 11-14, 1992.
- P. J. Morris, "Noise Radiation from Non-Circular Supersonic Jets," (invited paper) DGLR/AIAA 14th Aeroacoustics Conference, Aachen, Germany, May 11-14, DGLR/AIAA-92-02-061, 1992.
- P. J. Morris and D. K. McLaughlin, "Noise from Supersonic Non-Circular Jets," NASA/Industry HSR Nozzle Symposium, NASA Lewis Research Center, November 17-19, 1992.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

- A. R. Bajwa and P. J. Morris, "Stability of a Wake Embedded in a Boundary Layer," 45th APS/Division of Fluid Dynamics Meeting, Tallahassee, Florida, November 22-24, 1992.
- P. J. Morris and T. R. S. Bhat, "Supersonic Elliptic Jet Noise," 45th APS/Division of Fluid Dynamics Meeting, Tallahassee, Florida, November 22-24, 1992.
- A. R. Bajwa and P. J. Morris, "The Stability of a Wake in a Boundary Layer," IMACS International Conference, Bangalore, India, December 7-11, 1992.
- P. J. Morris and D. K. McLaughlin, "Supersonic Jet Noise: Theory and Experiments," International Conference on Noise and Vibration Control, St. Petersburg, Russia, May 31-June 3, 1993.
- P. J. Morris and T. R. S. Bhat, "Supersonic Elliptic Jet Noise," 15th AIAA Aeroacoustics Conference, Long Beach, CA, October 25-27, 1993.
- P. J. Morris and T. R. S. Bhat, "Instability Waves in Supersonic Elliptic Jets," 46th APS/Division of Fluid Dynamics Meeting, Albuquerque, NM, November 21-23, 1993.
- P. J. Morris, L. N. Long, C. Chung and T. Chyczewski, "Computational Aeroacoustics Algorithms," 25th AIAA Fluid Dynamics Conference, June 1994.
- M. Dahl and P. J. Morris, "Noise Radiation by Instability Waves in Coaxial Jets," 25th AIAA Fluid Dynamics Conference, June 1994.
- C. Chung and P. J. Morris, "Wave Propagation and Scattering in Computational Aeroacoustics," ICASE/LaRC Workshop on Benchmark Problems in Computational Aeroacoustics, Hampton, VA, October 1994.
- P. J. Morris, C. Chung and L. Pautet, "Acoustic Scattering: A Numerical Simulation," 47th APS/Division of Fluid Dynamics Meeting, Atlanta, GA, November 1994.
- A. R. Bajwa and P. J. Morris, "Spatial Stability of a Plane and Axisymmetric Wake in the Presence of a Plane Shear Flow," 47th APS/Division of Fluid Dynamics Meeting, Atlanta, GA, November 1994.
- C. M. Shieh and P. J. Morris, "Analysis of Instability Waves in Non-Circular Supersonic Jets With a Finite-Element Method," 47th APS/Division of Fluid Dynamics Meeting, Atlanta, GA, November 1994.
- C. Chung and P. J. Morris, "Wave Propagation and Scattering in Computational Aeroacoustics," ICASE/LaRC Workshop on Benchmark Problems in Computational Aeroacoustics, NASA CP 3300, May 1995.
- C. Chung and P. J. Morris, "A New Boundary Treatment for Two- and Three-Dimensional Acoustic Scattering Problems," CEAS/AIAA Aeroacoustics Conference, Munich, Germany, June 1995.
- M. Dahl and P. J. Morris, "Supersonic Coaxial Jet Noise Predictions," CEAS/AIAA Aeroacoustics Conference, Munich, Germany, June 1995.
- M. Dahl and P. J. Morris, "Supersonic Jet Noise Reductions Predicted With Increased Jet Spreading Rate," ASME/JSME Fluids Engineering Conference, August 1995.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

S. Martens, D. P. Lockard, P. J. Morris and D. K. McLaughlin, "An Experimental and Analytical Investigation of the Large Scale Instabilities in a Supersonic Shear Layer," 10th Symposium on Turbulent Shear Flows, August 1995.

P. J. Morris and L. S. Lee, "Compressible Shear Layer Mixing Enhancement Using Resonant Instabilities," 48th APS/Division of Fluid Dynamics Meeting, Irvine, CA, November 1995.

D. P. Lockard and P. J. Morris, "A Parallel Implementation of a Computational Aeroacoustic Algorithm for Airfoil Noise," 2nd AIAA/CEAS Aeroacoustics Conference, State College, PA, May 6-8, 1996.

A. Bangalore, P. J. Morris and L. N. Long, "A Parallel Three-Dimensional Computational Aeroacoustics method Using Nonlinear Disturbance Equations," 2nd AIAA/CEAS Aeroacoustics Conference, State College, PA, May 6-8, 1996.

P. J. Morris, L. N. Long, A. Haghghat and M. L. Brady, "Curriculum Development in Advanced Computation," ASEE Annual Conference, Washington, DC, June 23-26, 1996.

P. J. Morris, L. N. Long, A. Bangalore, T. Chyczewski, D. P. Lockard and Y. Ozyoruk, "Experiences in the Practical Application of Computational Aeroacoustics," Invited Paper, ASME Fluids Engineering Conference, San Diego, CA, July 1996.

P. J. Morris, "Computational Aeroacoustics and Parallel Computation," Invited Paper, 49th APS/Division of Fluid Dynamics Meeting, Syracuse, NY, November 1996.

D. P. Lockard and P. J. Morris, "The Radiated Noise From Airfoils in Realistic Mean Flows," AIAA Paper 97-0286, 35th AIAA Aerospace Sciences Meeting, Reno, NV, January 1997.

P. J. Morris, Q. Wang, L. N. Long and D. P. Lockard, "Numerical Predictions of High Speed Jet Noise," AIAA Paper 97-1598, 3rd AIAA/CEAS Aeroacoustics Conference, Atlanta, GA, May 1997.

P. J. Morris, "Scattering of Sound by a Sphere," Second Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, NASA CP 3352, pp. 15-17, June 1997.

C. M. Shieh and P. J. Morris, "Three-Dimensional Calculations of Acoustic Scattering by a Sphere: A Parallel Implementation," Second Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, NASA CP 3352, pp. 359-362, June 1997.

D. P. Lockard and P. J. Morris, "A Parallel Simulation of Gust/Cascade Interaction Noise," Second Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, NASA CP 3352, pp. 279-288, June 1997.

P. J. Morris, "Solutions Comparisons. Category 1: Problems 3 and 4. Category 2: Problem 1," Second Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, NASA CP 3352, pp. 15-17, June 1997.

D. P. Lockard and P. J. Morris, "The Radiated Noise From Realistic Airfoils Encountering Vortical Gusts," 133rd Acoustical Society of America Meeting, State College, PA, June 1997.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

C. M. Shieh and P. J. Morris, "A Numerical Solution of Acoustic Scattering by an Aircraft Wake Vortex," 133rd Acoustical Society of America Meeting, State College, PA, June 1997.

Q. Wang, P. J. Morris and L. N. Long, "Supersonic Jet Noise Prediction Using Large Eddy Simulation on Parallel Computers," First AFOSR International Conference on Direct Numerical Simulation and Large Eddy Simulation, Ruston, LA, August 1997.

P. J. Morris, L. N. Long, K. Morooney and S. Kellogg, "Teaching High Performance Computing," International Conference on Engineering Education, Chicago, IL, August 1997.

M. T. Mendonca, P. J. Morris and L. L. Pauley, "Gortler Vortices Tollmien Schlichting Waves Interaction: Reassessment of Previous Results With a Spatial/Nonparallel Model," XIV Brazilian Congress of Mechanical Engineering, 1997.

P. J. Morris and O. A. Laik, "Simulation of Acoustic Scattering From General Rigid Bodies," 50th APS/Division of Fluid Dynamics Meeting, San Francisco, CA, November 1997.

P. J. Morris, "Recent Simulations in Computational Aeroacoustics," Invited Paper 134th Acoustical Society of America Meeting, San Diego, PA, December 1997.

P. J. Morris, L. N. Long, Q. Wang, T. Scheidegger and A. R. Pilon, "High Speed Jet Noise Simulations," AIAA Paper 98-2290, 4th AIAA/CEAS Aeroacoustics Conference, Toulouse, France. June 1998.

C. M. Sheih and P. J. Morris, "High-order accurate dual time-stepping algorithm for viscous aeroacoustic simulations," AIAA/CEAS Aeroacoustics Conference, Toulouse, France. June 1998.

O. A. Laik and P. J. Morris, "Direct simulation of acoustic scattering by aircraft wings and bodies," AIAA/CEAS Aeroacoustics Conference, Toulouse, France. June 1998

P. J. Morris, L. N. Long and V. W. Sparrow, "Experiences in the Use of New Technology in Engineering Education," International Conference on Engineering Education, ICEE98, Rio de Janeiro, Brazil, August 1998.

L. N. Long, P. J. Morris, V. Ahuja, C. M. Hall, J. Liu, T. E. Scheidegger and C. M. Shieh, "Several aerospace applications of computational aeroacoustics," Proc. ASME Noise Control and Acoustics Division, NCA- Vol. 25, Book No. G01089-1998, August 1998.

M. T. Mendonca, L. L. Pauley, and P. J. Morris, "Effect of wave frequency on the nonlinear interaction between Gortler vortices and three-dimensional Tollmien-Schlichting waves." In "Proceedings of the 1st Brazilian School on Transition and Turbulence." Vol. I, pp 269-292. 21-25 September 1998, Rio de Janeiro, Brazil.

C. M. Shieh and P. J. Morris, "Computational aeroacoustic simulation of flow-induced cavity noise using parallel computers," 51st APS/Division of Fluid Dynamics Meeting, Philadelphia, PA, November 1998.

S. Boluriaan and P. J. Morris, "Numerical simulations of radar acoustic scattering," 51st APS/Division of Fluid Dynamics Meeting, Philadelphia, PA, November 1998.

Pilon, A. and Morris, P. J., "A Semi-Analytical Method for Jet Noise Prediction," AIAA Paper No. 99-0076. 37th AIAA Aerospace Sciences Meeting, Reno, NV. January 11-14, 1999.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

Mendonca, M, Pauley, L. L. and Morris, P. J. "Effect of Wave Frequency on Gortler Vortices/Tollmien-Schlichting Wave Interaction," AIAA Paper No. 99-0818. 37th AIAA Aerospace Sciences Meeting, Reno, NV. January 11-14, 1999.

Morris, P. J. "Jet Noise Simulations Using the Nonlinear Disturbance Equations," Invited Paper, 137th Meeting of the Acoustical Society of America, Berlin, Germany. March 14-19, 1999.

Morris, P. J., Long, L. N. and Scheidegger, T., "Parallel Computations of High Speed Jet Noise," AIAA Paper No. 99-1873. 5th AIAA/CEAS Aeroacoustics Conference, Bellevue, WA. May 10-12, 1999.

Shieh, C. M. and Morris, P. J. "Parallel Numerical Simulation of Subsonic Cavity Noise," AIAA Paper No. 99-1891. 5th AIAA/CEAS Aeroacoustics Conference, Bellevue, WA. May 10-12, 1999.

Santa Maria, O. L., Farassat, F. and Morris, P. J., "Two-Dimensional Fourier Transform Analysis of Helicopter Flyover Noise," American Helicopter Society 55th Annual Forum, Montreal, Quebec, Canada, May 25-27, 1999.

Povitsky, A. and Morris, P. J., "Parallel Compact Multi-Dimensional Numerical Algorithm With Applications to Aeroacoustics," AIAA Paper No. 99-3272. 14th AIAA Computational Fluid Dynamics Conference, Norfolk, VA. June 28–July 1, 1999.

Agarwal, A. and Morris, P. J., "Generation and Radiation of Acoustic Waves From a 2-D Shear Layer," 3rd Benchmarks Problems in Computational Aeroacoustics Workshop, Cleveland, OH. Nov. 8-9, 1999.

Scheidegger, T. and Morris, P. J., "Generation and Radiation of Acoustic Waves From a 2-D Shear Layer," 3rd Benchmarks Problems in Computational Aeroacoustics Workshop, Cleveland, OH. Nov. 8-9, 1999.

Shieh, C. M. and Morris, P. J., "A Parallel Simulation of Automobile Noise Involving Feedback," 3rd Benchmarks Problems in Computational Aeroacoustics Workshop, Cleveland, OH. Nov. 8-9, 1999.

Shieh, C. M. and Morris, P. J., "Parallel Computational Aeroacoustic Simulation of Turbulent Subsonic Cavity Flow," AIAA Paper No. 2000-1914. 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

Hansen, R. P., Long, L. N. and Morris, P. J., "Unsteady, Laminar Flow Simulations Using the Nonlinear Disturbance Equations," AIAA Paper 2000-1981. 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

Chyczewski, T., Morris, P. J. and Long, L. N., "Large-Eddy Simulation of Wall Bounded Shear Flow Using the NLDE," AIAA Paper 2000-2007, 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

Agarwal, A. and Morris, P. J., "Direct Simulation of Acoustic Scattering by a Rotorcraft Surface and Flow," AIAA Paper 2000-2030. 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

Boluriaan, S. and Morris, P. J., "Parallel Numerical Simulation of Wake Vortex Detection Using RASS," AIAA Paper No. 2000-2073. 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

Scheidegger, T., Morris, P. J. and Long, L. N., "Jet Noise Simulations for Circular and Rectangular Nozzles," AIAA Paper No. 2000-2080, 6th AIAA/CEAS Aeroacoustics Conference, Lahaina, Hawaii, June 12-14, 2000.

Shieh, C. M. and Morris, P. J., "Comparison of Two- and Three-Dimensional Turbulent Cavity Flows," AIAA Paper No. 2001-0511, 39th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 8-11, 2001.

Boluriaan, S. and Morris, P. J., "Two-Dimensional Simulations of Wake Vortex Detection Using RASS," AIAA Paper No. 2001-0984, 39th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 8-11, 2001.

V. W. Sparrow, C. M. Shieh and P. J. Morris, "Computational methods for streaming flows and minor losses in thermoacoustic devices," First International Workshop on Thermoacoustics, 's-Hertogenbosch, The Netherlands, April 2001.

Boluriaan, S., Morris, P. J., and Long, L. N., "High Speed Jet Noise Simulations for Non-Circular nozzles," 2001-2147, 7th AIAA/CEAS Aeroacoustics Conference, Maastricht, The Netherlands, May 2001.

Shieh, C. M. and Morris, P. J. and Boluriaan, S., "Computational Thermoacoustic Simulation of Minor Losses Through a Sudden Contraction and Expansion," 2001-2272, 7th AIAA/CEAS Aeroacoustics Conference, Maastricht, The Netherlands, May 2001.

Boluriaan, S., Morris, P. J. and Sparrow, V. W., "Numerical Simulation of Minor Losses in Thermoacoustic Devices," 141st Meeting of the Acoustical Society of America, Chicago, Illinois, June 2001.

Morris, P. J., "The Role of Computational Aeroacoustics in Thermoacoustics," 17th International Congress on Acoustics, Rome, Italy, September 2-7, 2001.

Morris, P. J., "Technical Evaluation: Development in Computational Aero- and Hydro-Acoustics," NATO/AVT Specialist's Meeting, Manchester, UK, October 8-11, 2001.

Morris, P.J., and Boluriaan, S., "Numerical Simulation of Viscous Losses in Resonators," 142nd Meeting of the Acoustical Society of America, Fort Lauderdale, FL, December 3-7, 2001.

Morris, P. J., Boluriaan, S., Lilley, G. M., and Long, L. N., "Two-Point Cross Correlations and Noise Predictions: Analysis and Simulation," 2002-0071, 40th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 14-17, 2002.

Souliez, F., Long, L. N., Sharma, A., and Morris, P. J., "Landing Gear Aerodynamic Noise Prediction Using Unstructured Grids and Advanced turbulence Models," 2002-0799, 40th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 14-17, 2002.

Kim, J.-W., Kim, D.-J., and Morris, P. J., "Noise generation and propagation From Subsonic Inviscid Flow Past a Cone," IMA Conference on Computational Aeroacoustics, Greenwich, UK, April 9-11, 2002.

Boluriaan, S., and Morris, P. J., "Minor Losses and Streaming in Thermoacoustic Devices," 143rd Meeting of the Acoustical Society of America, Pittsburgh, PA, June 3-7, 2002.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

Morris, P. J., Boluriaan, S., and Liew, Y.-P., "Simulation of Blast Loads on Arbitrary Geometry Structures," 17th International Symposium on the Military Aspects of Blast and Shock, Las Vegas, NV, June, 10-14, 2002.

Agarwal, A., and Morris, P. J., "Investigation of the Physical Mechanisms of Tonal Sound Generation by Slats," 2002-2575, 8th AIAA/CEAS Aeroacoustics Conference, Breckenridge, CO, June 17-19, 2002.

Boluriaan, S., and Morris, P. J., "Numerical Prediction of Minor Losses in High Amplitude Acoustic Resonators," 2002-2594, 8th AIAA/CEAS Aeroacoustics Conference, Breckenridge, CO, June 17-19, 2002.

Morris, P. J., "The Role of Large-Scale Turbulent Structures in Jet Noise," Invited Paper, 14th US National Congress on Theoretical and Applied Mechanics, Blacksburg, VA, June 23-28, 2002.

Morris, P. J., Agarwal, A. and Rao, P., "Tonal and Broadband Slat Noise Models," Airframe Noise Workshop. NASA Langley Research Center, Hampton, VA. October 22-23, 2002.

Morris, P. J. and Agarwal, A., "Issues in Jet Noise Predictions From CFD Data," First NASA Quiet Aircraft Technology (QAT) Engine Noise Workshop. NASA Glenn Research Center, Cleveland, OH. November 12-13, 2002.

Morris, P. J., "The Prediction of Noise Generated by Internal Mixers," Aeroacoustics Research Consortium Year End Review. Ohio Aerospace Institute, Cleveland, OH. November 14, 2002.

Doller, A. J., Boluriaan, S., Atchley, A. and Morris, P. J. "Computational and Experimental Investigation of Minor Losses in High Amplitude Acoustic Resonators With Varied Cross Section," 144th Meeting of the Acoustical Society of America, Cancun, Mexico, December 2-6, 2002.

S. Boluriaan and P. J. Morris, "Suppression of Traveling Wave Streaming Using a Jet Pump," 2003-0367, 41st AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 6-9, 2003.

A. Agarwal, P. J. Morris and R. Mani, "The Calculation of Sound Propagation in Nonuniform Flows: Suppression of Instability Waves," 2003-0878, 41st AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 6-9, 2003.

S. Boluriaan and P. J. Morris, "Numerical Simulation of Streaming in High Amplitude Standing Wave Resonators," 145th Meeting of the Acoustical Society of America, Nashville, Tennessee, April 28-May 2, 2003.

P. Rao and P. J. Morris, "Application of a Generalized Quadrature Free Discontinuous Galerkin Method in Aeroacoustics," 2003-3120, 9th AIAA/CEAS Aeroacoustics Conference, Hilton Head, South Carolina, May 12-14, 2003.

S. Boluriaan and P. J. Morris, "Numerical Simulation of Acoustic Streaming in High Amplitude Standing Waves," 2003-3152, 9th AIAA/CEAS Aeroacoustics Conference, Hilton Head, South Carolina, May 12-14, 2003.

U. Paliath and P. J. Morris, "Numerical Simulation of Laminar and Turbulent Two-Dimensional Cavity Flows," 2003-3233, 9th AIAA/CEAS Aeroacoustics Conference, Hilton Head, South Carolina, May 12-14, 2003.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

P. J. Morris, "Aeroacoustics: Classical and Modern Approaches," Internoise 2003, Jeju, Seogwipo, Korea, August 25-28, 2003.

A. Agarwal and P. J. Morris, "Radiation and Refraction of Sound Waves Through a 2-D Shear Layer: Numerical Simulation," 4th Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, Cleveland, Ohio, October 20-22, 2003.

Y.-P. Liew, S. Boluriaan and P. J. Morris, "The Application of 'Embedded Solid' Approaches to Computational Aeroacoustic Problems With Complex Geometries," 4th Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, Cleveland, Ohio, October 20-22, 2003.

P. J. Morris and A. Agarwal, "Category 4, Problem 1, Solutions and Comparisons," 4th Computational Aeroacoustics (CAA) Workshop on Benchmark Problems, Cleveland, Ohio, October 20-22, 2003.

P. J. Morris, "Prediction of Noise from Internal Mixers," Aeroacoustics Research Consortium Annual Review, Ohio Aerospace Institute, Cleveland, Ohio, October 23, 2003.

A. Agarwal and P. J. Morris, "Broadband Noise from the Unsteady Flow in a Slat Cove," 2004-0854, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5-8, 2004.

Y.-P. Liew, P. J. Morris and S. Boluriaan, "Simulation of Shockwave-Structure Interaction With the Brinkman Penalization Method," 2004-1126, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5-8, 2004.

P. J. Morris, L. N. Long and K. S. Brentner, "An Aeroacoustic Analysis of Wind turbines," 2004-1184, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5-8, 2004.

P. J. Morris and S. Boluriaan, "On the Prediction of Jet Noise From CFD Data," 2004-2977, 10th AIAA/CEAS Aeroacoustics Conference, Manchester, UK, May 10-12, 2004.

P. P. Rao and P. J. Morris, "Some Finite Element Applications in Frequency Domain Aeroacoustics," 2004-2962, 10th AIAA/CEAS Aeroacoustics Conference, Manchester, UK, May 10-12, 2004.

U. Paliath and P. J. Morris, "Prediction of Noise From Jets With Different Nozzle Geometries," 2004-3026, 10th AIAA/CEAS Aeroacoustics Conference, Manchester, UK, May 10-12, 2004.

P. J. Morris, "The Prediction of Fan Exhaust Noise Radiation," Aeroacoustics Research Consortium Annual Review, Ohio Aerospace Institute, Cleveland, Ohio, November 18, 2004.

P. J. Morris, "CAA Simulations of Jet Noise From Nozzles with Different Shapes," International Symposium on Recent Advances in Aeroacoustics and Active Flow-Combustion Control, Goa, India, January 4-6, 2005.

L. V. Lopes, K. S. Brentner, P. J. Morris, G. M. Lilley and D. P. Lockard, "Complex Landing Gear Noise Prediction Using a Simple Toolkit," AIAA-2005-1202, 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10-13, 2005.

Y. Zhao and P. J. Morris, "The Prediction of Fan Exhaust Noise Propagation," AIAA-2005-2815, 11th AIAA/CEAS Aeroacoustics Conference, Monterey, CA, May 23-25, 2005.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

- R. Cheng, P. J. Morris and K. S. Brentner, "An Application of the Parabolic Equation to Long-Range Propagation of Wind Turbine Noise," AIAA-2005-2834, 11th AIAA/CEAS Aeroacoustics Conference, Monterey, CA, May 23-25, 2005.
- B. Petitjean, P. J. Morris and D. K. McLaughlin, "On the Nonlinear Propagation of Shock-Associated Noise," AIAA-2005-2930, 11th AIAA/CEAS Aeroacoustics Conference, Monterey, CA, May 23-25, 2005.
- U. Paliath and P. J. Morris, "Prediction of Jet Noise From Circular Beveled Nozzles," AIAA-2005-3096, 11th AIAA/CEAS Aeroacoustics Conference, Monterey, CA, May 23-25, 2005.
- U. Paliath and P. J. Morris, "Numerical Simulation of Jet Noise From Different Jet Nozzle Geometries," NOISE-CON 2005, Minneapolis, Minnesota, October 17-19, 2005.
- P. J. Morris, "The Prediction of Fan Exhaust Noise Radiation," Aeroacoustics Research Consortium Annual Review, Ohio Aerospace Institute, Cleveland, Ohio, December 5-6, 2005.
- U. Paliath and P. J. Morris, "[Prediction of Jet Noise from Rectangular Nozzles](#)," AIAA-2006-0618, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 9-12, 2006.
- Y. Cho, S. Boluriaan, and P. Morris, "[Immersed Boundary Method for Viscous Flow Around Moving Bodies](#)," AIAA-2006-1089, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 9-12, 2006.
- E. Duque, L. Sankar, S. Menon, O. Bauchau, S. Ruffin, M. Smith, K. Ahuja, K. Brentner, L. Long, P. Morris, and F. Gandhi, "[Revolutionary Physics-Based Design Tools for Quiet Helicopters](#)," AIAA-2006-1068, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 9-12, 2006.
- S. A. E. Miller and P. J. Morris, "[Rotational Effects on the Aerodynamics and Aeroacoustics of Wind Turbines](#)," AIAA-2006-2575, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.
- B. Petitjean, D. K. McLaughlin, and P. J. Morris, "[An Experimental Investigation of Density Gradient Fluctuations in High-Speed Jets Using Optical Deflectometry](#)," AIAA-2006-2533, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.
- N. Raizada and P. J. Morris, "[Prediction of Noise from High Speed Subsonic Jets Using an Acoustic Analogy](#)," AIAA-2006-2596, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.
- Y. Zhao and P. J. Morris, "[The Prediction of Fan Exhaust Noise Propagation](#)," AIAA-2006-2420, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.
- R. Cheng, P. J. Morris, and K. S. Brentner, "[A 3D Parabolic Equation Method for Wind Turbine Noise Propagation in Moving Inhomogeneous Atmosphere](#)," AIAA-2006-2423, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.
- L. V. Lopes, K. S. Brentner, P. J. Morris, and K. S. Brentner, "Increased Fidelity in Predictions for Landing Gear Noise," AIAA-2006-2624, 12th AIAA/CEAS Aeroacoustics Conference (27th AIAA Aeroacoustics Conference), Cambridge, Massachusetts, May 8-10, 2006.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

L. E. Falco, P. J. Morris, and A. A. Atchley, "[A Frequency-Domain Algorithm for the Propagation of Finite-Amplitude Acoustic Signals](#)," J. Acoust. Soc. Am., Vol. **119**, p. 3294, 151st Meeting of the Acoustical Society of America, Providence, RI, 5-9 June 2006.

S.-M. Chang and P. J. Morris, "Development of a High-Order Adaptive Grid Method for Simulation of Unsteady Compressible Flow," US-Korea Conference, Teaneck, NJ, August 10-13, 2006.

P. J. Morris, (Invited paper) "Frequency Domain Methods for the Prediction of Fan Exhaust Noise," Internoise 2006, Honolulu, HI, December 3-6, 2006.

Y. Cho, J. Chopra, and P. J. Morris, "Immersed Boundary Method for Compressible High Reynolds Number Viscous Flow Around Moving Bodies," AIAA-2007-0125, 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 8-11, 2007.

R. Cheng, P. Morris and K. Brentner, "[A 3D Parabolic Equation Method for Sound Propagation in Moving Inhomogeneous Media](#)," AIAA-2007-3564, 13th AIAA/CEAS Aeroacoustics Conference (28th AIAA Aeroacoustics Conference), Rome, Italy, May 21-23, 2007.

B. Petitjean, K. Viswanathan, D. K. McLaughlin and P. J. Morris, "[Space-Time Correlation Measurements in Subsonic and Supersonic Jets Using Optical Deflectometry](#)," AIAA-2007-3613, 13th AIAA/CEAS Aeroacoustics Conference (28th AIAA Aeroacoustics Conference), Rome, Italy, May 21-23, 2007.

P. J. Morris, "Jet Noise Prediction: Past, Present and Future," Canadian Acoustical Association Conference, Montreal, Canada, October 2007. (Invited)

J. Veltin, D. K. McLaughlin and P. J. Morris, "[Improvement of Acoustic Models for Community Noise Exposure Prediction](#)," AIAA-2008-12, 46th AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan. 7-10, 2008.

S. A. E. Miller, J. Veltin, P. J. Morris and D. K. McLaughlin, "[Validation of Computational Fluid Dynamics for Supersonic Shock Containing Jets](#)," AIAA-2008-2988, 4th AIAA/CEAS Aeroacoustics Conference (29th AIAA Aeroacoustics Conference), Vancouver, British Columbia, May 5-7, 2008.

S. Saxena and P. J. Morris and K. Viswanathan, "[A New Algorithm for the Nonlinear Propagation of Broadband Jet Noise](#)," AIAA-2008-2934, 14th AIAA/CEAS Aeroacoustics Conference (29th AIAA Aeroacoustics Conference), Vancouver, British Columbia, May 5-7, 2008.

P. J. Morris, "Jet Noise from Large Scale Turbulent Structures," Acoustics08, 155th Meeting of the Acoustical Society of America, Paris, France, June 30 – July 4th 2008. (Invited)

P. J. Morris, K. S. Brentner and L. V. Lopes, "A Design-Oriented Approach to Landing Gear Noise Prediction," Acoustics08, 155th Meeting of the Acoustical Society of America, Paris, France, June 30 – July 4th 2008. (Invited)

P. J. Morris, "Noise radiated by large-scale structures in supersonic and subsonic jets," ERCOFTAC Symposium on Sound Source Mechanisms in Turbulent Shear-Flow, Poitiers, France, July 07-09 2008.

P. J. Morris, Y. Zhao and S. A. E. Miller, "The prediction of fan exhaust noise propagation," Fan Noise Workshop, University of Southampton, July 15, 2008.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

- P. J. Morris, "The reduction of military aircraft engine noise," Partners in Technology Symposium, Washington, DC, December 2-4, 2008.
- P. J. Morris and D. K. McLaughlin, "Jet noise research: experiment and modeling," 3rd NAVAIR Propulsion Workshop on Jet Noise Reduction Patuxent River, MD, December 10, 2008.
- J. Erwin, P. J. Morris and K. S. Brentner, "[Trailing-Edge Noise Prediction Using the Nonlinear Disturbance Equations](#)," AIAA-2009-0272, 47th AIAA Aerospace Sciences Meeting, Orlando, FL, January 5-8, 2009.
- P. J. Morris and K. Zaman, "[Velocity Measurements in Jets with Application to Noise Source Modeling](#)," AIAA-2009-0017, 47th AIAA Aerospace Sciences Meeting, Orlando, FL, January 5-8, 2009.
- P. J. Morris, "A comprehensive model for the prediction of supersonic jet noise," Supersonics NRA Annual Review, Cleveland, OH, January 22, 2009.
- P. J. Morris and S. A. E. Miller, "The Prediction of Broadband Shock-Associated Noise Using RANS CFD," AIAA-2009-3315, 15th AIAA/CEAS Aeroacoustics Conference Miami, Florida, May 11-13, 2009
- D. Papamoschou, P. J. Morris and D. K. McLaughlin, "Beamformed Flow-Acoustic Correlations in High-Speed Jets," AIAA-2009-3212, 15th AIAA/CEAS Aeroacoustics Conference Miami, Florida, May 11-13, 2009
- S. K. Lee, K. S. Brentner and P. J. Morris, "Prediction of Acoustic Scattering in the Time Domain Using a Moving Equivalent Source Method," AIAA-2009-3177, 15th AIAA/CEAS Aeroacoustics Conference Miami, Florida, May 11-13, 2009
- L. V. Lopes, K. S. Brentner and P. J. Morris, "Airframe Noise Prediction with Installed Landing Gear for a Complete Aircraft," AIAA-2009-3155, 15th AIAA/CEAS Aeroacoustics Conference Miami, Florida, May 11-13, 2009
- S. A. E. Miller, P. J. Morris and Y. Zhao, "Predictions of Fan Exhaust Noise Propagation," AIAA-2009-3145, 15th AIAA/CEAS Aeroacoustics Conference Miami, Florida, May 11-13, 2009
- P. J. Morris and Y.-P. Liew, "The Interaction of Shock Waves with Rigid and Responding Bodies Using an Immersed Boundary Approach," Joint Academy/Euromech/Ercoftac Colloquium on Immersed Boundary Methods, Amsterdam, Netherlands, June 15-17, 2009.
- P. J. Morris and S. A. E. Miller, "Broadband Shock-Associated Noise Predictions," EURONOISE 2009, Edinburgh, Scotland, October 26-28, 2009.
- P. J. Morris, "The importance of hot-wire measurements in aeroacoustics," Fifty Years of Research on Turbulence and Acoustics, Lyon, France, October 29-30, 2009.
- P. J. Morris, "The reduction of military aircraft engine noise," Partners in Technology Symposium, Washington, DC, December 1-3, 2009.
- P. J. Morris, "The Role of Large-Scale Turbulent Structures in Jet Flow and Noise," Keynote Address, Noise & Turbulence: Perspectives Past & Present, Southampton, England, December 11, 2009.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

S. K. Lee, P. J. Morris and K. S. Brentner, "Nonlinear Acoustic Propagation Predictions with Applications to Aircraft and Helicopter Noise," AIAA-2010-1384, 48th AIAA Aerospace Sciences Meeting, Orlando, Florida, Jan. 4-7, 2010.

P. J. Morris, Y. Du and K. Kara, "Jet Noise Simulations for Realistic Jet Nozzle Geometries," IUTAM Symposium on Computational Aero-Acoustics for Aircraft Noise Prediction, Southampton, England, March 29-31, 2010.

P. J. Morris and D. K. McLaughlin, "Scaling issues in jet noise experiments," High Performance Aircraft Noise Measurement Standard Workshop, Monterey, CA, May 11-13, 2010.

P. J. Morris, "Jet noise predictions and nonlinear propagation," High Performance Aircraft Noise Measurement Standard Workshop, Monterey, CA, May 11-13, 2010.

S. Lee, K. S. Brentner and P. J. Morris, "Long-Range and Nonlinear Propagation of Helicopter High-Speed Impulsive Noise," 66th American Helicopter Society Forum, Phoenix, AZ, May 11-13, 2010.

P. J. Morris, "Large Eddy Simulations of hot supersonic jets for aeroacoustics," 1st Annual LES for Jet Flows Workshop, NASA Glenn Research Center, Cleveland, OH, June 2-3, 2010.

P. J. Morris and K. Zaman, "Two components velocity correlations in jets and noise source modeling," AIAA Paper 2010-3781, 16th AIAA/CEAS Aeroacoustics Conference, Stockholm, Sweden, June 7-9, 2010.

H. Vold, P. Shah, J. Davis, P. Bremner, D. K. McLaughlin and P. Morris, "High resolution continuous scan acoustical holography applied to high-speed jet noise," AIAA Paper 2010-3754, 16th AIAA/CEAS Aeroacoustics Conference, Stockholm, Sweden, June 7-9, 2010.

S. Lee, K. S. Brentner and P. J. Morris, "Assessment of time-domain equivalent source methods for acoustic scattering," AIAA Paper 2010-3821, 16th AIAA/CEAS Aeroacoustics Conference, Stockholm, Sweden, June 7-9, 2010.

S. A. E. Miller and P. J. Morris, "The prediction of broadband shock-associated noise from dualstream and rectangular jets using CFD," AIAA Paper 2010-3961, 16th AIAA/CEAS Aeroacoustics Conference, Stockholm, Sweden, June 7-9, 2010.

P. J. Morris, Y. Du., D. K. McLaughlin, C.-W. Kuo, "Numerical simulation of flow and noise from chevron nozzles and experiments," Turbine Engine Technology Symposium 2010, Dayton, OH, Sept. 14-16, 2010.

P. J. Morris, "Military Aircraft Engine Noise: Measurements and Predictions," Partners in Environmental Technology Technical Symposium & Workshop, Washington, DC, Nov. 30 – Dec. 2, 2010.

C.-W. Kuo, D. K. McLaughlin and P. J. Morris, "Effects of supersonic jet conditions on broadband shock-associated noise," AIAA Paper 2011-1032, 49th AIAA Aerospace Sciences Meeting, Orlando, FL, Jan. 4-7, 2011.

S. A. E. Miller and P. J. Morris, "The prediction of broadband shock-associated noise including propagation effects," AIAA Paper 2011-2923, 17th AIAA/CEAS Aeroacoustics Conference, Portland, OR, June 5-8, 2011.

PAPERS PRESENTED AT TECHNICAL AND PROFESSIONAL MEETINGS (continued)

M. Christiansen, P. J. Morris and K. S. Brentner, "Trailing-edge noise prediction using the non-linear disturbance equations," AIAA Paper 2011-2797, 17th AIAA/CEAS Aeroacoustics Conference, Portland, OR, June 5-8, 2011.

Y. Du and P. J. Morris, "Noise simulations of supersonic hot jets for chevron nozzles," AIAA Paper 2011-2787, 17th AIAA/CEAS Aeroacoustics Conference, Portland, OR, June 5-8, 2011.

P. J. Morris, D. K. McLaughlin, C.-W. Kuo and Y. Du, "Simulations and measurements of the flow and noise in hot supersonic jets," GT2011-45368, ASME Turbo Expo, Vancouver, BC, Canada, Jun 10, 2011.

P. J. Morris and Y. Du., "Supersonic jet flow and noise simulations of military-style baseline and chevron nozzles," Invited Paper, Internoise 2011, Osaka, Japan, Sept. 4-7, 2011.

P. J. Morris, "The Reduction of Supersonic Military Aircraft Engine Noise," Poster presentation, SERDP/ESTCP Partners in Environmental Technology Symposium, Washington, DC, Nov. 30, 2011.

BOOKS OR PARTS OF BOOKS

G. M. Lilley, P. J. Morris and B. J. Tester, "On the Theory of Jet Noise and Its Applications," AIAA Paper 73-987, 1973 (also in *Progress in Astronautics and Aeronautics*, Vol. 37, AIAA and MIT Press).

P. J. Morris and C. K. W. Tam, "On the Radiation of Sound by Jets" in *Mechanics of Sound Generation in Flows*, Springer-Verlag, 1979.

P. W. Carpenter and P. J. Morris, "The Hydrodynamic Stability of Flows Over Non-isotropic Compliant Surfaces - Numerical Solution of the Differential Eigenvalue Problem," in *Numerical Methods in Laminar and Turbulent Flow*, Pineridge Press, 1985.

P. J. Morris, "Validation of Computational Aeroacoustic Algorithms," in *Computational Aeroacoustics*, J. C. Hardin and M. Y. Hussaini, eds., Springer-Verlag, 1993.

P. J. Morris and G. M. Lilley, "Aerodynamic Noise: Theory and Applications," in *Handbook of Noise and Vibration Control*, M. J. Crocker, ed., John Wiley & Sons, 2007.

P. J. Morris, "Aerodynamic Noise," *Encyclopedia of Aerospace Engineering*, John Wiley & Sons, 2010.

P. J. Morris, *Advances in Aeroacoustics: In Honour of Geoffrey Lilley*, P. J. Morris (ed.), Multi-Science Publishing Co. Ltd., Essex, UK, ISBN 978 1907132179, 2010.

P. J. Morris and K. Viswanathan, "Jet Noise," to appear in *Noise Sources in Turbulent Shear Flows: Fundamentals and Applications*, Springer-Verlag, 2012.

SPEAKING ENGAGEMENTS (Since 2000)

Invited Paper, P. J. Morris, "Noise From Large Scale Structures/Instability Waves," NASA Jet Noise Workshop, Ohio Aerospace Institute, Oh, Nov. 7-9, 2000.

Invited Seminar, "Jet Noise Research: Simulations and Analysis," Rolls-Royce Engine Division, Derby, UK., Dec. 2000.

Invited Seminar, "The Application of RANS CFD to Jet Noise Prediction," Boeing Commercial Airplane Company, Seattle, WA, Jan. 2001.

Invited Seminar, "The Application of RANS CFD to Jet Noise Prediction," University of Florida, April 20, 2001.

Seminar, "Numerical and Experimental Studies of Military Aircraft Noise Mechanisms," ONR Military Aircraft Noise Workshop, Penn State University, May 23-24, 2001.

Invited Seminar, "The Application of RANS CFD to Jet Noise Prediction," Aeroacoustics Research Consortium, Cleveland, Ohio, July 24, 2001.

Seminar, "The Role of Computational Aeroacoustics in Thermoacoustics," 17th International Congress on Acoustics, Rome, Italy, September 2-7, 2001.

Invited Talk, "Technical Evaluation Report on Development in Computational Aero- and Hydro-Acoustics," NATO R&T Symposium on Development in Computational Aero- and Hydro-Acoustics, Manchester, UK, October 8-11, 2001.

Invited Seminar, "The Application of RANS CFD to Jet Noise Prediction," Purdue University, December 11, 2001.

Invited Short Course, "Jet and Airframe Noise and CAA," Boeing Commercial Aircraft Company, Seattle, Washington, February 9, 2002.

Invited Short Course, "Jet and Airframe Noise and CAA," Honeywell, Phoenix, Arizona, February 13, 2002.

Invited Seminar, "Flow Instabilities and Noise: When Instabilities are Needed and When They are Not," NASA Langley Research Center, May 15, 2002.

Invited Seminar, "Unsteady Flow and Noise Simulations at Penn State University," Loughborough University, England, May 23, 2002.

Seminar, "Issues in Jet Noise Predictions From CFD Data," QAT Engine Noise Workshop, Cleveland, OH, November 12-13, 2002.

Keynote Speech, "Aeroacoustics: Classical and Modern Approaches," Internoise 2003, Jeju, Seoqwipo, Korea, August 28, 2003.

Invited Seminar, "A New Look at Jet Noise Source Modeling," Jet Noise Summit, Qinetiq, Farnborough, England, November 10-11, 2003.

Invited Seminar, "Forced Mixer Noise Prediction," Jet Noise Summit, Qinetiq, Farnborough, England, November 10-11, 2003.

Invited Seminar, “Computational Aero- and Thermo-Acoustics Research at Penn State,” University of Southampton, England, November 13, 2003.

Workshop Presentation, “Tonal and Broadband Slat Noise,” Airframe Noise Workshop, Hampton, VA, February 10-11, 2004.

Invited Talk, “An Introduction to Aeroacoustics,” CD-adapco European Users Group Meeting, London, UK, March 15-16, 2004.

Invited Talk, “An Introduction to Aeroacoustics,” CD-adapco North American Users Group Meeting, Detroit, MI, May 5-6, 2004.

Invited Seminar, “The Prediction of Jet Noise From CFD Data,” Loughborough University, Loughborough, UK, May 18, 2004.

Invited Talk, “The Prediction of Fan Exhaust Noise Propagation,” Pratt & Whitney, East Hartford, CT, Dec. 14, 2004.

Invited Talk, “Methods for Jet Noise Prediction,” Pratt & Whitney, East Hartford, CT, Dec. 14, 2004.

Invited Talk, “CAA Simulations of Jet Noise From Nozzles with Different Shapes,” International Symposium on Recent Advances in Aeroacoustics and Active Flow-Combustion Control, Goa, India, January 4-6, 2005.

Invited Seminar, “Jet Noise Prediction: Simulation and Analogies,” University of Michigan, March 31, 2005.

Invited Talk, “Recent Advances in Computational Aeroacoustics,” COBEM 2005, Ouro Preto, Minas Gerais, Brazil, November 7-11, 2005.

Short Course, “Introduction to Computational Aeroacoustics,” COBEM 2005, Ouro Preto, Minas Gerais, Brazil, November 7-11, 2005.

Invited Lecture, “Aircraft Noise, Past, Present, and Future,” Inaugural ISVR Lecture for the Queen’s Anniversary Prize 2006 for Further and Higher Education, University of Southampton, UK, Sept. 19, 2006.

Invited Plenary Lecture, “Sixty Years of Jet Noise Research,” 13th AIAA/CEAS Aeroacoustics Conference (28th AIAA Aeroacoustics Conference), Rome, Italy, May 21-23, 2007.

Invited Plenary Lecture, “Jet Noise Prediction: Past, Present and Future,” Canadian Acoustical Association Conference, Montreal, Canada, October 2007.

Invited Seminar, “High Speed Jet Noise,” Ohio State University, February 23, 2009.

Short Course, “Jet Noise,” in Noise Sources in Shear Flows, CISM - International Centre for Mechanical Sciences, Udine, Italy, April 18-22, 2011.

HONORS AND AWARDS

Harold Caldecott-Lake Scholarship, 1964-67.

PSES Outstanding Teaching Award, College of Engineering, 1984.

SERC Research Fellowship, 1987.

Best Paper Award, AIAA 11th Aeroacoustics Conference, 1989.

General Chairman, AIAA 13th Aeroacoustics Conference, 1990.

PSES Outstanding Research Award, College of Engineering, 1990

Who's Who in the East, 23rd ed., 1990

Pennsylvania Certificate of Citizen Service, 1990

Senior Member, AIAA, 1990

Associate Fellow, AIAA, 1991

Boeing Professor of Aerospace Engineering, 1992

Chairman, AIAA Aeroacoustics Technical Committee 1993-94

Fellow, American Physical Society, 1995

Who's Who in America, 50th edition, 1996

Boeing/A. D. Welliver Professor of Aerospace Engineering, 1997

PSES Premier Research Award, College of Engineering, 1997.

AIAA Aeroacoustics Award, 1999.

Fellow, American Institute of Aeronautics and Astronautics, 2002

Inaugural ISVR Lecture for the Queen's Anniversary Prize 2006 for Further and Higher Education, 2006

AIAA Sustained Service Award, 2011

SERVICE TO AIAA

AIAA Aeroacoustics Technical Committee,

Member (1981-1984)

Member, Awards Subcommittee (1981-1983)

Member, Organizing Committee, AIAA 7th Aeroacoustics Conference, 1981

Member, Organizing Committee, AIAA 8th Aeroacoustics Conference, 1983

Member (1989-1995)

Member, Awards Subcommittee (1989-1991)

Chairman, Awards Subcommittee (1990-1991)

General Chairman, AIAA 13th Aeroacoustics Conference, 1990

Member, Awards Subcommittee (1990)

Chairman, Awards Subcommittee (1991)

Member, Organizing Committee, AIAA 14th Aeroacoustics Conference, 1992

Chairman (1993-95)

Member (2010 - present)

Nomination Subcommittee (2011-present)

Technical Co-Chair, CEAS/AIAA Aeroacoustics Conference, Berlin, June 2013.

Associate Editor

AIAA Journal (1998 - 2001)

Reviewer,

AIAA Journal

Journal of Aircraft

Journal of Propulsion and Power

AIAA Professional Short Course

Aircraft Noise: Theory and Practice, State College, PA, May 1996 (23 attendees)

Aircraft Noise: Theory and Practice, Atlanta, GA, May 1997 (46 attendees)

GRADUATE THESES SUPERVISED

C. Baltas	Ph.D.	1984	Mean and Large-Scale Turbulence Characteristics of the Noise-Producing Region of an Acoustically Excited Round Jet
W.-S. Byon	Ph.D.	1984	Turbulence Modeling in a Two-Dimensional Wake
T. J. Bridges	Ph.D.	1984	A Mathematical and Computational Analysis of the Effect of Freestream Turbulence on the Blasius Boundary Layer
W.-W. Liou	M.S.	1986	The Computation of Reynolds Stress in an Incompressible Plane Mixing Layer
R. D. Joslin	M.S.	1987	The Sensitivity of Boundary Layer Instability Growth Rates to Compliant Wall Properties
R. S. Baty	Ph.D.	1989	Reynolds Stress Closure in Jet Flows Using Instability Wave Modeling
T. R. S. Bhat	Ph.D.	1990	Linear Models for the Shock Cell Structure of Supersonic Jets with Noncircular Exit Geometries
R. D. Joslin	Ph.D.	1990	The Effect of Compliant Walls on Three-Dimensional Primary and Secondary Instabilities in Boundary Layer Transition
W.-W. Liou	Ph.D.	1991	Weakly Nonlinear Models for Turbulent Free Shear Flows
M. G. Giridharan	Ph.D.	1991	Turbulent Mixing in Compressible Free Shear Flows
K. Viswanathan	Ph.D.	1991	Turbulent Mixing in Supersonic Jets
J. B. Augustin	M.S.	1991	Supersonic Jet Noise Predictions from an Instability Wave Analysis
L. Pautet	M.S.	1994	Diffraction by a Half-Plane Using the Dispersion Relation Preserving Scheme
M. Dahl	Ph.D.	1994	The Aeroacoustics of Supersonic Coaxial Jets
A. Bajwa	Ph.D.	1995	Effects of Freely Suspended Particles on Boundary Layer Stability
C. Chung	Ph.D.	1995	Wave Propagation and Scattering in Computational Aeroacoustics

GRADUATE THESES SUPERVISED (continued)

C. M. Shieh	M. S.	1995	Jet Instability: Finite Element Solutions
L. -S. Lee	Ph.D.	1996	Mixing Enhancement in Supersonic Shear Layers
M. Mendonca	Ph.D.	1997	Numerical Analysis of the Interaction of Gortler Vortices and Tollmien-Schlichting Waves Using a Spatial Nonparallel Model (co-supervised)
D. Lockard	Ph.D.	1997	Simulations of the Unsteady Loads and Radiated Sound Fields of Airfoils and Wings Using Computational Aeroacoustics and Parallel Computers
B. Paul	M. S.	1997	Frequency Dependent Boundary Conditions in Computational Aeroacoustics
O. Laik	M.S.	1998	Numerical Simulation of Acoustic Scattering from a Rotorcraft Fuselage
C. M. Shieh	Ph.D.	2000	Numerical Simulation of Cavity Noise
S. Boluriaan	Ph.D.	2000	Numerical Simulation of Acoustic and Electromagnetic Scattering
A. Agarwal	M.S.	2000	Numerical Simulation of Acoustic Scattering from a Rotorcraft Fuselage
Z. Wang	M.Eng.	2002.	Simulation of Unsteady Flow and Acoustics of Aircraft Landing Gear
U. Paliath	M. S.	2003	Numerical Simulation of Two- and Three-Dimensional Cavity Flows
H. Jeong	M. S.	2003	Methods for the Determination of Green's Functions for Sources in Sheared Mean Flows
A. Agarwal	Ph.D.	2004.	The Prediction of Tonal and Broadband Slat Noise
P. Rao	Ph.D.	2004	Discontinuous and Continuous Galerkin Methods in Computational Aeroacoustics
Y.-P. Liew	Ph.D.	2007	Embedded Solid Methods for the Prediction of Shock Structure Interactions
V. S. Mackay	Ph.D.	in prog.	Numerical Simulation of Oscillating Boundary Layers in Thermoacoustic Devices
B. S. Paul	Ph.D.	in prog.	Numerical Simulation of Underwater Cavity

U. Paliath	Ph.D.	2006	Flows Numerical Simulation of Military Aircraft Engine Flow and Noise
S. Zygmunt	M.S.	in prog.	Numerical Simulations of Flow and Noise in Forced Mixers
C. E. Valade	M.S.	2004	Turbulence Modeling for Oscillating Boundary Layers
N. Grube	M.S.	2005	Algebraic Reynolds Stress Modeling for Jet Flows
N. Raizada	M.S.	2005	Semi-Empirical Predictions of Jet Noise
S. A. E. Miller	M.S.	2006	The Prediction of Noise from Wind Turbines
J. Chopra	M.S.	2007	Embedded Boundary Method for UAV Aerodynamics
G. Bagci	M.S.	2007	Prediction of Jet Noise Using CFD Data
S. A. E. Miller	Ph.D.	2009	Prediction of Noise From Supersonic Jets
J. Stergiou	M.S.	2009	Numerical Simulation of Atmospheric Dispersion
K. Karachun	M.S.	2008	Prediction of Ducted Rotor Noise
S. Saxena	M.S.	2008	Simulation of Nonlinear Acoustic Propagation
R. Cheng	Ph.D.	2008	Propagation of Noise From Wind Turbines (co-supervised)
S. Lee	Ph.D.	2009	Numerical Prediction of Acoustic Scattering and Nonlinear Propagation of Rotorcraft Noise (co-supervised)
N. Sikarwar	M.S.	2009	Adjoint Design Methods for Acoustics
S. Saxena	Ph.D.	in prog.	Noise Simulations for High Bypass Ratio Turbofan Engines
Y. Du	Ph.D.	2011	Simulations of High Speed Jet Noise
S. Ha	M.S.	2009	Polar Correlation for Noise Source Identification
J. Erwin	M.S.	2009	Trialing Edge Noise Predictions
A. Goss	M.S.	2009	Simulations of the Performance of Damaged Airfoils
M. Christiansen	M.S.	in prog.	Wind Turbine Noise Predictions

T. Marotta	M. S.	in prog. Landing Gear Noise Predictions (co-advised)
N. Sikarwar	Ph.D.	in prog. Adjoint Design for Aeroacoustics
D. Hyatt	M. S.	in prog. Nonlinear Propagation of Broadband Noise
V. Manek	M. S.	in prog. Computational Aeroacoustics
M. Lurie	Ph. D.	in prog. High Cycle Fatigue in UAV Nozzles

POST-DOCTORAL SCHOLARS ADVISED

Ashok Bangalore, Numerical Simulation of High Speed Jets, 1995 - 1996

Qunzhen Wang, Computational Aeroacoustics Simulations, 1996 - 1997

Anthony Pilon, Jet Noise Prediction Scheme, 1997 - 1998

Thomas Scheidegger, Simulation of Rectangular Jet Noise, 1997 – 2000

Jae Wook Kim, Airframe Noise Simulations, 2000 – 2001

Chingwei Shieh, Thermoacoustics Simulations, 2000 – 2001

Said Boluriaan, Numerical Simulations, 2001 – 2005

Yuan Zhao, Numerical Simulations, 2004 – 2007

Yong Cho, Numerical Simulations, 2005 – 2006

Kursat Kara, Numerical Simulations, 2009 – 2010

Yongle Du, Numerical Simulations, 2011-present

Funded Research Projects for the Past 10 Years

“Computational Methods for the Analysis of Hydrodynamically Induced Sound Generation,” General Dynamics Electric Boat Corporation, \$62,761, (September 2000 – August 2003), Principal Investigator.

“The Physical Mechanisms for Tonal Noise Generation by Slats,” NASA Langley Research Center, \$159,367. (January 1, 2001 – December 31, 2003), Principal Investigator.

“Force Protection Simulations Using Parallel Eulerian and Lagrangian Methods for Fluid-Structure Interactions,” Army Protective Technology Center Task, \$207,535 (\$65,052 University Matching), (March 2001 – February 2003), co-Principal Investigator.

“The Prediction of Jet Noise From CFD Data,” NASA Glenn Research Center, \$59,082, (June 2001 – June 2002), Principal Investigator.

“Simulation of Nonlinear Acoustic Streaming,” Office of Naval Research, \$110,000 (January 1, 2002 – June 30, 2003), co-Principal Investigator.

“The Prediction of Noise Generated by Internal Mixers,” Aeroacoustics Research Consortium, \$101,702 (July 1, 2001 – March 31, 2004), Principal Investigator.

“Analysis of Joint Strike Fighter Flyover Noise Data,” Veridian, \$96,101 (July 17, 2002 – July 30, 2003), co-Principal Investigator.

“Advanced Acoustic Models for Military Aircraft Noise,” Strategic Environmental Research and Development Program, \$418,261 (July 1, 2002 – September 30, 2005), co-Principal Investigator.

“Computational Aeroacoustic Analysis of Wind Turbine Noise,” National Renewable Energy Laboratory, \$482,011 (\$47,908 Phase I awarded), (May 15, 2003 – March 24, 2007), co-Principal Investigator.

“A Component-Based Model for the Prediction of Landing Gear Noise,” NASA Langley Research Center, \$422,661 (March 1, 2003 – February 28, 2006), co-Principal Investigator.

“The Development of Aeroacoustic Prediction Modules for Star-CD and Related Software Applications,” CD-adapco, \$109,740 (June 1, 2003 – May 31, 2006), co-Principal Investigator.

“Development of a Plan for Wake Vortex Detection Using RASS,” NASA Langley Research Center, \$73,140 (October 1, 2003 – June 30, 2004), co-Principal Investigator.

“Computational Methods for the Analysis of Hydrodynamically Induced Sound Generation,” General Dynamics Electric Boat Corporation, \$20,000 (December 23, 2002 – December 23, 2004), Principal Investigator.

“A Proposal to Predict the Propagation and Radiation of Fan Exhaust Noise,” Aeroacoustics Research Consortium, \$160,730 (April 1, 2004 – July 31, 2007), Principal Investigator.

“Revolutionary Physics-Based Design Tools for Quiet Helicopters,” Defense Advanced Research Projects Agency, \$1,223,090 (October 1, 2004 – September 30, 2006), co-Principal Investigator.

“Experimental and Computational Study of High Speed Jet Noise,” The Boeing Company, \$50,000 (August 1, 2006 – August 31, 2007), co-Principal Investigator.

“The Prediction of Ducted Rotor Noise,” Penn State University Applied Research Laboratory, Educational and Foundational Grant, \$40,000/year (August 15, 2006 – August 14, 2009), co-Principal Investigator.

“The Prediction of Contaminant Dispersal in Urban Areas,” Penn State University Applied Research Laboratory, Educational and Foundational Grant, \$40,000/year (August 15, 2006 – August 14, 2009), co-Principal Investigator.

“A Comprehensive Model for the Prediction of Supersonic Jet Noise,” NASA Glenn Research Center, \$667,544 (December 28, 2006 – December 27, 2009), co-Principal Investigator.

“High Fidelity CFD Analysis and Validation of Rotorcraft Gearbox Aerodynamics under Operational and Oil-Out Conditions,” NASA Glenn Research Center, \$600,000 (January 1, 2007 – December 31, 2010), co-Investigator.

“The Reduction of Advanced Military Aircraft Noise,” Strategic Environmental Research and Development Program, \$1,930,628 (Jan 1, 2007 – March 31, 2010), Principal Investigator.

"High Fidelity CFD Analysis and Validation of Rotorcraft Gearbox Aerodynamics under Operational and Oil-Out Conditions," NASA Glenn Research Center, \$600,000.00 (January 2007-December 2010) Co-PI (5%)

"Wind Turbine Noise Validation Study," GE Energy, \$25,939.00 (February 2007-August 2007) Principal Investigator (100%)

"Wind Turbine Aeroacoustic and Aerodynamic Analysis," Sandia National Laboratories, \$398,456.00 (April 2007-September 2011) Co-Principal Investigator (50%)

"A Design-Oriented Approach for Landing Gear Noise Prediction," The Boeing Company, \$276,000.00 (July 2007-June 2010) Co-Principal Investigator (50%)

"Experimental and Computational Study of High Speed Jet Noise," The Boeing Company, \$50,000.00 (August 2007-August 2008) Principal Investigator (100%)

"Multipoint flow and acoustic diagnostic experiments for source modeling in supersonic jets," NASA Glenn Research Center, \$211,902.00 (January 2008-June 2009) Co-Principal Investigator (33%)

"Support of Development of an Acoustic Holography System," ATA Engineering, \$106,994.00 (February 2008-January 2010) Co-Investigator (50%)

"High Resolution CFD Analysis of Rotorcraft Rotor Icing," NASA Glenn Research Center, \$200,000.00 (July 2008-June 2010) Co-Principal Investigator (10%)

"Large Eddy Simulations of Dual Stream Jets," Pratt & Whitney, Inc., \$260,000.00 (January 2009-December 2011) Principal Investigator (100%)

"Large Eddy Simulations of Hot Supersonic Jets for Aeroacoustics," Innovative Technology Applications Company, \$30,927.00 (July 2009-February 2010) Principal Investigator (100%)

"Large Eddy Simulations of Hot Supersonic Jets for Aeroacoustics," Innovative Technology Applications Company, \$226,585.00 (September 2010-March 2012) Principal Investigator (100%)

"High Fidelity CFD Analysis and Validation of Rotorcraft Gearbox Aerodynamics," NASA, \$414,380.00 (September 2010-August 2012) Co-Investigator (9%)

"Method for the Prediction of Jet Noise," The Boeing Company, \$50,000.00 (November 2010-December 2011) Principal Investigator (100%)

"DURIP: Experimental and Computational Instrumentation for Fundamental Research on the Noise Sources in High Performance Military Jet Engines," Office of Naval Research, \$333,689 (September 2011-August 2012) co-Principal Investigator (33%)

"Numerical simulations and experiments on a novel approach to noise reduction of hot supersonic jets," Office of Naval Research, \$468,777 (October 2011-September 2014) Co-Principal Investigator (50%).

LIST OF COURSES TAUGHT

Faculty members in the Department of Aerospace Engineering teach courses to third and fourth year undergraduates and graduate students. The course numbering system is: 300-level, third year undergraduate; 400-level, fourth year undergraduate; 500-level, graduate course.

- AERSP 306: **AERONAUTICS** Lift and Drag characteristics of aircraft, propulsion systems, airplane performance, and introduction to stability and control.

- AERSP 312: **AERODYNAMICS II** Fluid mechanics of viscous and compressible flows, laminar boundary layers, turbulent flows, isentropic flows, shock waves, supersonic lift and drag.

- AERSP 313: **AEROSPACE ANALYSIS** Mathematical methods applied to aerospace engineering: Fourier series, ordinary and partial differential equations, complex variables, numerical methods.

- AERSP 412: **TURBULENT FLOW** Homogeneous turbulence, spectral transfer of energy, viscous dissipation: turbulent shear flow: mixing length theory, eddy viscosity, scaling laws, energy budget.

- AERSP 423: **INTRODUCTION TO NUMERICAL METHODS IN FLUID DYNAMICS** finite difference methods applied to solving viscid/inviscid fluid dynamics problems, error control, numerical stability.

- AERSP 444: **INTRODUCTION TO AEROACOUSTICS** Noise generated by turbulent flows and rotating devices: sound propagation in shear flows.

- AERSP 508: **FOUNDATIONS OF FLUID DYNAMICS** Mathematical review, fluid properties, kinematics, conservation laws, constitutive relations, similarity principles, the boundary layer, inviscid flow, vorticity dynamics, wave motion.

- AERSP 511: **AERODYNAMICALLY INDUCED NOISE** Review of fluid mechanics. General theory of aerodynamic sound. Noise radiation from jets, boundary layers, rotors and fans. Structural response.

- AERSP 512: **VISCOUS FLOW** Stress-deformation relations; Newtonian fluids, Navier-Stokes equations; exact, asymptotic laminar solutions; instability, transition and turbulent boundary layer.

- AERSP 514: **STABILITY OF LAMINAR FLOWS** The stability of laminar motions in various geometries as influenced by boundary conditions and body forces of various kinds.

- AERSP 524: **STATISTICAL THEORIES OF TURBULENCE** Statistical analysis of random scalar and vector fields. Homogeneous turbulence: similarity, correlation, and spectral descriptions; spectral transfer; production and dissipation.

LIST OF COURSES TAUGHT (continued)

AERSP 525: **INHOMOGENEOUS TURBULENCE** Flow instability and transition; description of structural hypotheses and energy budgets for classical flows; closure models; role of turbulence measurements.