

Henry McDonald

Education

D. Sc. Engineering, University of Glasgow (Scotland) 1965

B. Sc. Aeronautical Engineering, *with Honors*, University of Glasgow (Scotland) 1960

Employment

Director, Tennessee Higher Education Commission Center of Excellence in Applied Computational Science and Engineering, University of Tennessee at Chattanooga, 2005-present

Distinguished Professor, Chair of Excellence in Engineering, University of Tennessee at Chattanooga, 2002-present

Interim Vice President of Research, University of Tennessee System, June – December 2003

Center Director, NASA Ames Research Center, Moffett Field, California, 1996-2002

Professor of Computational Engineering, Mississippi State University, Starkville, Mississippi, 1997-2002

Professor of Mechanical Engineering and Assistant Director, Computational Sciences, Pennsylvania State University Applied Research Laboratory, University Park, Pennsylvania, 1991-1997

Founder, President and Chief Executive Officer, Scientific Research Associates, Inc., Glastonbury, Connecticut, 1976-1992

Co-Founder, Advanced Pulmonary Technologies, Inc., Glastonbury, Connecticut, 1988-1992

Professor in Residence, Mechanical Engineering, University of Connecticut, Storrs, Connecticut, 1985-1989

Chief, Gas Dynamics Section, United Technologies Research Center, East Hartford, Connecticut, 1972-1976

Supervisor, Theoretical Gas Dynamics Group, United Technologies Research Center, East Hartford, Connecticut, 1968-1972

Research Engineer, Theoretical Gas Dynamics Group, United Technologies Research Center, East Hartford, Connecticut, 1965-1968

Engineer, Aerodynamics Department, British Aircraft Corporation, Warton, England 1960-1965

Academic Specialties

Supercomputing

Information Technology

Artificial Intelligence Applications

Computational Fluid Dynamics

Bio/Information Nanotechnologies

Courses and Lectures

Invited Named Lectures:

Polytechnic University of Hong Kong Distinguished Lecture Series (1997)

The Shoda Memorial lecture, Glasgow, Scotland (1999)

The Quick-Goethert Memorial Lecture, Aachen, Germany, 2002

The Tom Davis Memorial Lecture, Cincinnati, Ohio

Short Courses/Continuing Education Courses:

Undergraduate, graduate, and postgraduate courses in Brussels, Belgium; Taipei, Taiwan; Tokyo, Japan; San Jose, California; Los Angeles, California; and Ames, Iowa.

Lecturer, ASME International Gas Turbine Institute Course on Turbomachinery

Seminars/Presentations (partial listing):

University of Glasgow

University of London/Imperial College

University of Waterloo, Canada

State University of New York, Buffalo
California State University, Long Beach
Massachusetts Institute of Technology
Iowa State University
Arizona State University
Pennsylvania State University
NASA Ames Research Center
NASA Langley Research Center
NASA Marshall Space Flight Center

Honors and Awards

American Institute of Aeronautics and Astronautics, Honorary Fellow, 2008
Royal Academy of Engineering, Fellow, 2003
National Academy of Engineering, 2001
NASA Distinguished Service Medal, 2001
NASA Outstanding Leadership Medal, 1997, 2000
NASA Group Achievement Award, Shuttle Independent Assessment Team, 2001
Honorary Doctor of Engineering Degree, University of Glasgow, 1997
Small Business of the Year Award for High Technology, State of Connecticut, 1989
Connecticut Academy of Science & Engineering, 1990
Honorary Member, American Society of Mechanical Engineers, 2001

Advisory Boards and Panels, Academic Appointments

Air Force Scientific Advisory Board, 2008
Chair of Excellence in Engineering, University of Tennessee at Chattanooga, 2002-present
NASA Senior Management Council, 1996–2002
Chair, Review of the Aerodynamics Issues on the V-22 Osprey, 2001
Chair, Space Shuttle Independent Assessment Team, 2000
Governor's Committee on High Technology, State of Connecticut
Advisory Committee, Department of Aeronautical Engineering, Stanford University
Advisory Committee for Faculty of Engineering, University of California at Davis
Special Review of the Titan IV Test Failure, U.S. Air Force/Martin Marietta, 1991
Advisory Group on Cold Flow Testing, NASA Marshall Flight Center, 1987-1991
Review Panel on Challenger AFT Field Joint CFD Predictions, NASA/Morton Thiokol, 1987
Special Review Panel on Blade Cracking in the SSME Turbine, NASA/Rocketdyne, 1986-1987
Visiting Faculty Member, Department of Mechanical Engineering, Hong Kong Polytechnic University
Visiting Faculty Member, Department of Mechanical Engineering, Imperial College, University of London
Engineering Research Center Advisory Board, Mississippi State University, 1996-2000
External Examiner, Department of Mechanical Engineering, University of Waterloo, Canada, 1986
Chair, Advisory Panel on Computational Continuum Dynamics, U.S. Army Ballistics Research Laboratory, 1979
Advisory Committee on Computational Fluid Dynamics of Turbomachinery, NASA Lewis Research Center, 1978
Senior Research Fellow, University of Glasgow, Scotland, 1975–1976
Tenure Review Committee, Department of Engineering, State University of New York, 1974

Professional Associations

Royal Academy of Engineering, Fellow, 2003
National Academy of Engineering, Peer Committee, Aerospace Engineering, 2003-Present
American Institute of Aeronautics and Astronautics, Fellow, Associate Technical Editor, AIAA Journal, 1981-1984
American Society of Mechanical Engineers, Fellow
Royal Aeronautical Society (UK), Fellow
Governors Advisory Council for High Technology, State of Connecticut, 1989–1990
Connecticut Innovations (a wholly owned State of Connecticut Corporation for funding high technology), Board of Directors

Reviewer

ASME Journal of Engineering

ASME Journal of Gas Turbines and Power,

ASME Journal of Fluids Engineering

ASME Journal of Heat Transfer

AIAA Journal

AIAA Journal of Propulsion and Power

Journal of Computational Physics

Journal of Fluid Mechanics

International Journal of Heat and Mass Transfer

The Aeronautical Quarterly

National Science Foundation

Department of Energy

Army Research Office

NASA

Strategic Defense Initiative, Office of Innovative Science and Technology

Publications

Book Chapters

1. Henry McDonald, "Observations on the Columbia Accident," *Organization at the Limit, Lessons from the Columbia Disaster*, Edited by W. H. Starbuck and M. Farjoun, Blackwell Publishing, pp. 336-346, 2005.
2. McDonald, H. and Briley, W.R.: A Survey of Some Recent Work on Interacted Boundary Layer Theory for Flow with Separation: *Numerical and Physical Aspects of Aerodynamic Flows II*, Edited by T. Cebeci, Springer Verlag, New York, pp. 141-162, 1984.
3. McDonald, H. and Briley, W.R.: Some Observations on Numerical Solution of the Three Dimensional Navier Stokes Equations: *Numerical and Physical Aspects of Aerodynamic Flows*, Edited by T. Cebeci, Springer Verlag, New York, pp. 99-120, 1982.
4. McDonald, H., Shamroth, S.J. and Briley, W.R.: Transonic Flows with Viscous Effects. Transonic, Shock, and Multidimensional Flows: *Advances in Scientific Computing*, Academic Press, Inc., 1982.
5. McDonald, H., "Combustion modeling in two and three dimensions – Some numerical considerations." *Progress in Energy and Combustion Science*, Vol 5, No. 2, (1979) pp. 97-122.

Journal Articles

1. Briley, W.R. and McDonald, H.: An Overview and Generalization of Implicit Navier-Stokes Algorithms and Approximate Factorization. *Computers and Fluids*, 30, pp. 807-828, 2001.
2. Thompson, B.E., Senald, J., Vafidis, C., Whitelaw, J.H., McDonald, H., "Flow in a model of the Space Shuttle Main Engine main injector bowl," *AIAA Journal of Spacecraft and Rockets*, vol. 29, (Mar-Apr 1992), p. 247-252.
3. Liu, N.S., Shamroth, S.J., McDonald, H., "Reciprocal interactions of hairpin-shaped vortices and a boundary layer," *AIAA Journal*, vol. 29, (May 1992), p. 720-727.
4. Govindan, T.R., Briley, W.R., McDonald, H., "General three-dimensional viscous primary/secondary flow analysis," *AIAA Journal*, vol. 29, (March 1991), p. 361-370.
5. Sabnis, J.S., Gibeling, H.J., McDonald, H., "Navier-Stokes analysis of solid propellant rocket motor internal flows," *Journal of Propulsion and Power*, Vol. 5, (Nov-Dec 1989), pp. 657-664.
6. Briley, W. R., and McDonald, H.: Three Dimensional Viscous Flows with Large Secondary Velocity. *Journal of Fluid Mechanics*, **144**: 47-77, 1984.
7. J. P. Kreskovsky, Briley, W.R. and McDonald, H.: Investigation of Mixing in a Turbofan Exhaust Duct, Part I: Analysis and Computational Procedure. *AIAA Journal*, **22**(3): 374-382, 1984.
8. S. J. Shamroth, McDonald, H. and Briley, W. R.: Prediction of Cascade Flow Fields Using the Averaged Navier Stokes Equations. *Journal of Engineering for Gas Turbines and Power*, **106**: 383-390, 1984.
9. Briley, W.R., McDonald, H., Shamroth, S.J., "A low Mach number Euler formulation and application to time-iterative LBI schemes (Linearized Block Implicit)." *AIAA Journal*, Vol. 21, (Oct. 1983), pp. 1467-1469.
10. Briley, W.R., McDonald, H., "On the structure and use of linearized block implicit schemes." *Journal of Computational Physics*, Vol. 34, (Jan 1980), pp. 54-73.
11. Briley, W.R., McDonald, H., "Solution of the multidimensional compressible Navier-Stokes equations by a generalized implicit method." *Journal of Computational Physics*, Vol. 24, (Aug. 1977), pp. 372-397.

12. McDonald, H., Briley, W.R. "Three-dimensional supersonic flow of a viscous or inviscid gas." *Journal of Computational Physics*, Vol. 19, (Oct. 1975), pp. 150-178.
13. Briley, W.R. and McDonald, H.: Numerical Prediction of Incompressible Separation Bubbles. *Journal of Fluid Mechanics*, **69**(4): 631-656, 1975.
14. Shamroth, S.J., McDonald, H., "Application of a transitional boundary-layer in the low hypersonic Mach number regime." *International Journal of Heat and Mass Transfer*, Vol. 18 (Nov. 1975), pp. 1277-1284.
15. McDonald, H., Kreskovsky, J.P., "Effect of free stream turbulence on the turbulent boundary layer." *International Journal of Heat and Mass Transfer*, Vol. 17, (Jul. 1974), pp. 705-716.
16. McDonald, H., Fish, R.W., "Practical calculations of transitional boundary layers." *International Journal of Heat and Mass Transfer*, Vol. 16, (Sept. 1973) pp. 1729-1744.
17. Shamroth, S.J., McDonald, H., "Application of a time-independent boundary-layer analysis to the problem of dynamic stall." *ASME, Transactions Journal of Applied Mechanics*, Vol. 39 (Sept. 1972), pp. 823-825.
18. Shamroth, S.J., McDonald, H., "A new solution of the turbulent near-wake recompression problem. (Crocco-Lee theory extension to flow behavior prediction for two dimensional supersonic turbulent near wake behind bluff body during recompression)." *Aeronautical Quarterly*, Vol. 23, (May 1972), pp. 121-130.
19. McDonald, H., Shamroth, S.J., "An analysis and application of the time-dependent turbulent boundary-layer equations (Two dimensional compressible turbulent boundary layer with time dependent mean velocity and density fields, deriving momentum and kinetic energy integral equations)." *AIAA Journal*, Vol. 9 (Aug. 1971), pp. 1553-1560.
20. McDonald H., "Linear stress distribution and the turbulent boundary-layer equations of motion." *Physics of Fluids*, Vol. 12, (Nov. 1969), pp. 2241-2247.
21. McDonald, H., "The departure from equilibrium of turbulent boundary layers." *Aeronautical Quarterly*, Vol. 19, (Feb. 1968), pp. 1-19.
22. Maise, G., McDonald, H., "Mixing length and kinematic eddy viscosity in a compressible boundary layer." *AIAA Journal*, Vol. 6 (Jan. 1968), pp. 73-80.
23. McDonald, H., "Turbulent shear layer re-attachment with special emphasis on the base pressure problem." *Aeronautical Quarterly*, Vol. 15, (Aug. 1964), pp. 247-280.

Conference Papers and Proceedings

1. McDonald, H., and Whitfield, D.L., "Self-Propelled Maneuvering Underwater Vehicles," Twenty-First Symposium on Naval Hydrodynamics, Trondheim, Norway, June 24-28, 1996.
2. DeJong, F.J., Sabnis, J.S., Buggeln, R.C., McDonald, H., "Hypersonic flow calculations with a hybrid Navier-Stokes/Monte Carlo method," AIAA paper 90-1691. AIAA/ASME 5th Thermophysics and Heat Transfer Conference, Seattle, WA, (June 18-20, 1990), p. 15.
3. Liu, N.S., Shamroth, S.J., McDonald, H., "Reciprocal interactions of hairpin-shaped vortices and a boundary layer," AIAA Paper No. 90-0017, AIAA, 28th Aerospace Sciences Meeting, Reno, NV, (Jan 8-11, 1990), p. 11.
4. Thompson, B.E., Senaldi, J., Vafidis, C., Whitelaw, J.H., McDonald, H., "Flow in a model of the SSME main injector bowl," Scientific Research Associates Report No. SE254832; Proceedings of the 1st Canadian Symposium of Aerodynamics, Ottawa, Canada, (Dec 1989), Canadian Aeronautics and Space Institute, 1989, p. 30-1 to 30-22
5. Sabnis, J.S., Madabhushi, R.K., Gibeling, H.J., McDonald, H., "On the use of k-epsilon turbulence model for computation of solid rocket internal flows," AIAA Paper No. 89-2558, AIAA/ASME/SAE/ASEE 25th Joint Propulsion Conference, Monterey, CA (July 10-13, 1989), p. 12.
6. Briley, W.R., Buggeln, R.C., McDonald, H., "Solution of the incompressible Navier-Stokes equations using artificial compressibility methods." Proceedings of the 11th International Conference on Numerical Methods in Fluid Dynamics, Berlin and New York, Springer-Verlag (1989), pp. 156-160.
7. Roscoe, D.V., Buggeln, R.C., Foster, J.A., McDonald, H., "A numerical investigation of fluid flow for disk pumping applications." Proceedings of the ASME Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, Netherlands, (June 88) p. 10.
8. Govindan, T.R., McDonald, H., "Computation of tip and corner region flows." AGARD Computation of Three-Dimensional Boundary Layers Including Separation, (Feb. 87) p. 20.
9. Sabnis, J.S., Gibeling, H.J., McDonald, H., "Navier-Stokes analysis of two- and three-dimensional flow field in solid rocket motors with segment joints." AIAA/SAE/ASME/ASEE, 23rd Joint Propulsion Conference, San Diego, CA (Jul. 1987), p. 11.

10. Sabnis, J.S., Gibeling, H.J., McDonald, H., "A combined Eulerian-Lagrangian analysis for computation of two-phase flows." AIAA Paper 87-1419, AIAA 19th Fluid Dynamics, and Lasers Conference, Honolulu, HI (Jun. 1987), p. 10.
11. Kim, Y.N., Buggeln, R.C., McDonald, H., "Numerical analysis of some supersonic viscous flows related to inlet and nozzle systems." AIAA Paper 86-1597, AIAA/ASME/SAE/ASEE 22nd Joint Propulsion Conference, Huntsville, AL (June 1986), p. 13.
12. Brondum, D.C., Bennett, J.C., Weinberg, B.C., McDonald, H., "Numerical and experimental investigation of nonswirling and swirling confined jets." AIAA 24th Aerospace Sciences Meeting, Reno, NV, (Jan. 1986), p. 15.
13. Buggeln R.C., Briley, W.R., Shamroth, S.J. and McDonald, H.: Solution of the Three Dimensional Navier Stokes Equations for Turbine Flows. 1st World Congress on Computational Mechanics (Univ. Texas, Austin TX), 1986.
14. Liu, N.S., Shamroth, S.J., McDonald, H., "On hairpin vortices as model of wall turbulence structure." Proceedings of the 5th Symposium on Turbulent Shear Flows, University Park, PA. (1985) p. 2.1-2.6.
15. Weinberg, B.C., Yang, R.J., McDonald, H., Shamroth, S.J., "Calculations of two and three-dimensional transonic cascade flow fields using the Navier-Stokes equation." ASME paper 85-GT-66, ASME 30th International Gas Turbine Conference and Exhibit, Houston, TX, (Mar 1985) p. 10.
16. Roscoe, D.V., Gibeling, H.J., McDonald, H., Shamroth, S.J., "Development of a Navier-Stokes analysis to investigate the mechanism of shock/wave boundary layer interactions." AIAA 3rd Symposium on Numerical and Physical Aspects of Aerodynamic Flows, Long Beach, CA (Jan. 1985), p.p. 4-15 – 4-23.
17. Briley, W.R., Buggeln, R.C., McDonald, H., "Solution of the three-dimensional Navier-Stokes equations for a steady laminar horseshoe vortex flow." Proceedings of the AIAA 7th Computational Fluid Dynamics Conference, Cincinnati, OH (July 1985), pp. 299-312.
18. Lin, S.J., Briley, W.R., McDonald, H., "Numerical study of three-dimensional viscous flows with system rotation." AIAA 18th Fluid Dynamics and Plasmadynamics and Lasers Conference, Cincinnati, OH (Jul. 1985), p. 13.
19. Sabnis J.S., Gibeling, H.J., McDonald, H., "Calculation of solid propellant rocket motor internal flow field using an implicit Navier-Stokes procedure." AIAA 18th Fluid Dynamics and Plasmadynamics and Lasers Conference, Cincinnati, OH (Jul. 1985), p. 7.
20. Weinberg, B.C., McDonald, H., Shamroth, S.J., "A solution procedure for two- and three-dimensional unsteady viscous flows." AIAA 23rd Aerospace Sciences Meeting, Reno, NV (Jan. 1985), p. 15.
21. Sabnis, J.S., Gibeling, H.J., McDonald, H., "Internal fluid mechanism of solid propellant rocket motors. " Proceedings of 21st JANNAF Combustion Meeting, (Oct 1984) Vol. 1 p.p. 195-205
22. Briley, W.R. and McDonald, H.: Three Dimensional Viscous Flows with Large Secondary Velocity. *ASME Symposium on Computation of Internal Flows: Methods and Applications* (New Orleans, LA), 1984.
23. Liu, N.S., Shamroth, S.J., McDonald, H., "Numerical solution of the Navier-Stokes equations for compressible turbulent two/three dimensional flows in the terminal shock region of an inlet/diffuser." AIAA Paper 83-1892, AIAA 6th Computational Fluid Dynamics Conference, Danvers, MA (Jul. 1983), pp. 61-71. 45.
24. Levy, R., Briley, W.R. and McDonald, H.: Viscous Primary/Secondary Flow Analysis for Use with Nonorthogonal Coordinates, *AIAA Paper No. 83 0556* (21st Aerospace Sciences Meeting, Reno, NV), 1983.
25. Shamroth, S.J., McDonald, H. and Briley, W.R.: Application of a Navier Stokes Analysis to Transonic Cascade Flow Fields. *ASME Paper 82 GT 235*, 1982.
26. Kreskovsky, J.P., Briley, W.R, McDonald, H., "Analysis and computation of three-dimensional flow in strongly curved ducts." ASME Winter Annual Meeting, Washington, D.C., (Nov 1981) (A82-29001 13-02); American Society of Mechanical Engineers, (1981) pp. 129-140.
27. R. Levy, H. McDonald and W. R. Briley: A Three Dimensional Turbulent Compressible Subsonic Duct Flow Analysis for Use with Constructed Coordinate Systems. *AIAA Paper No. 80 1398*, AIAA 13th Fluid and Plasma Dynamics Conference (Snowmass, CO), 1980.
28. Briley, W.R., McDonald, H., "Computation of three-dimensional horseshoe vortex flow using the Navier Stokes equations." 7th International Conference on Numerical Methods in Fluid Dynamics, Stanford and Moffett Field, CA (Jun. 1980). Published Berlin and New York, Springer-Verlag (1981) pp. 91-98.
29. Buggeln, R.C., Briley, W.R., McDonald, H., "Solution of the Navier-Stokes equations for three-dimensional turbulent flow with viscous sublayer resolution." AIAA paper 81-1023, Proceedings of the AIAA 5th Computational Fluid Dynamics Conference, Palo Alto, CA, June 1981. Collection of Technical Papers (1981), pp. 247-256.

30. Shamroth, S.J., Gibeling, H.J., McDonald, H., "A Navier-Stokes solution for laminar and turbulent flow through a cascade of airfoils." Proceedings of the AIAA 13th Fluid and Plasma Dynamics Conference, Snowmass, CO, (Jul. 1980), p. 14.
31. Levy, R., McDonald, H., Briley, W.R., Kreskovsky, J.P., "A three-dimensional turbulent compressible subsonic duct flow analysis for use with constructed coordinate systems." AIAA paper 80-1398, AIAA 13th Fluid and Plasma Dynamics Conference, Snowmass, CO, (Jul. 1980), p. 10.
32. Buggeln, R.C., McDonald, H., Kreskovsky, J.P., Levy, R., "Computation of three-dimensional viscous supersonic flow in inlets." AIAA Paper 80-0194, AIAA 18th Aerospace Sciences Meeting, Pasadena, CA, (Jan 1980), p. 12.
33. McDonald, H., Briley, W.R., "Computational fluid dynamic aspects of internal flows." AIAA 79-1445, AIAA Computational Fluid Dynamics Conference, Williamsburg, VA, (Jul. 1979); Collection of Technical Papers (1979), P. 266-283.
34. Briley, W.R., McDonald, H., "Analysis and computation of viscous subsonic primary and secondary flows." AIAA 79-1453, AIAA Computational Fluid Dynamics Conference, Williamsburg, VA, (Jul. 1979), pp. 7-78
35. Levy R., McDonald, H., Briley, W.R., "Calculation of three-dimensional turbulent subsonic flow in transition ducts." Proceedings of 6th International Conference on Numerical Methods in Fluid Dynamics, Tiflis, GA (Jun. 1978), pp. 361-369.
36. Kreskovsky, J.P., Shamroth, S.J., McDonald, H., "Application of a general boundary layer analysis to turbulent boundary layers subjected to strong favorable pressure gradients." ASME paper 75-FE-16, ASME, Joint Fluids Engineering and Lubrication Conference, Minneapolis, MN, (May, 1975), p. 12.
37. Briley, W.R., McDonald, H., "Solution of the three-dimensional compressible Navier-Stokes equations by an implicit technique." Proceedings of 4th International Conference on Numerical Methods in Fluid Dynamics, New York, NY, (Jun. 1974), pp. 105-110.
38. McDonald, H., Fish, R. W., "Practical calculations of transitional boundary layers (finite difference procedure for computing behavior of two-dimensional boundary layers and turbulence model to predict location and extent of transition region." Published in AGARD Boundary Layer Effects in Turbomachines (Dec. 1972), pp. 29-53.
39. McDonald, H., "A new solution of the turbulent near-wake recompression problem (Two dimensional supersonic turbulent near wake saddle point singularity during recompression analyzed by including transverse momentum integral equation)." AIAA Paper 70-228, AIAA 8th Aerospace Sciences Meeting, New York, N.Y., (Jan. 1970) p. 12.
40. McDonald, H., "The effect of pressure gradient on the law of the wall in turbulent flow." *Journal of Fluid Mechanics*, Vol. 35, (Feb. 1969), pp. 311-336.
41. Camarata, F.J., McDonald, H., "An extended mixing length method for computing turbulent shear stress distribution required in calculating two dimensional incompressible turbulent boundary layer." Stanford University, Department of Mechanical Engineering, Thermosciences Div. (1969) p. 16; and Volume 1 – Methods, Predictions, Evaluation and Flow Structures (Aug. 1968), pp. 83-98.

Reports

1. Govindan, T.R., DeJong, F.J., Briley, W.R., McDonald, H., "Rotating flow in radial turbomachinery, Scientific Research Associates, Report No. AD-A222885; SRA-R930011-F; ARO-22360.4-EG-S, (May 1990).
2. Briley, W.R., Govindan, T.R., and McDonald, H.: Efficient Navier Stokes Flow Prediction Algorithms, SRA Report R90 900068 F, 1990.
3. Liu, N.S., Shamroth, S.J., McDonald, H., "Reciprocal interactions of hairpin-shaped vortices and a boundary layer," Scientific Research Associates, Inc., Final Report, (Feb. 1, 1986 – Dec. 31, 1988).
4. Liu, N.S., Shamroth, S.J., McDonald, H., "Flow dynamics stimulation by hairpin-like vortices in initially laminar boundary layers." Published in Scientific Research Associates, Inc., Annual Report (Mar 1988).
5. Govindan, T.R., Briley, W.R., and Levy, R.: Computation of Flow Around Maneuvering Submerged Bodies. SRA Report R88 920029 F, 1988.
6. Buggeln, R. C., Briley, W.R., McDonald, H., Shamroth, S.J., Weinberg, B.C., "Two- and three-dimensional turbine blade row flow field simulations," Scientific Research Associates, Inc., SE254832. Published by NASA Lewis Research Center in Turbine Engine Hot Section Technology Report, (Oct. 1987) pp. 199-209.
7. Sabnis, J.S., Gibeling, E.J., McDonald, H., "Solid rocket motor aft field joint flow field analysis." Published in Scientific Research Associates, Inc., Final Report (Sept. 1987).
8. Chan, Y.T., Buggeln, R.C., McDonald, H., "Three-dimensional dynamic labyrinth seal analysis." Published in Scientific Research Associates, Inc., Final Report (Jan. 1987), p. 50.

9. Liu, N.S., Shamroth, S.J., McDonald, H., "Flow dynamics stimulated by hairpin-like vortices in initially laminar boundary layers." Published in Scientific Research Associates, Inc., Annual Report, (Feb 1987), p. 22.
10. Buggeln, R.C., Briley, W.R., Shamroth, S.J., McDonald, H., "Turbine stator flow field simulations," Published by NASA Lewis Research Center in Turbine Engine Hot Section Technology Report (Oct. 1986), pp. 233-235.
11. Briley, W.R., Govindan, T.R., Levy, R., McDonald, H., "Numerical study of three-dimensional laminar and turbulent flows with system rotation." Published in Scientific Research Associates, Inc., Final Report (1986), p. 46.
12. Gibeling, H.J., Weinberg, B.C., Shamroth, S.J., McDonald, H., "Flow through a compressor state." Published in Scientific Research Associates, Inc., Final Report (Jun 1983 – May 1986), p. 55.
13. Buggeln, R.C., Kim, Y.N., McDonald, H., "Computation of multi-dimensional viscous supersonic flow." Published in Scientific Research Associates, Inc., Final Report, (Oct. 1986), p. 194.
14. Kim, Y.N., Buggeln, R.C., McDonald, H., "Computation of multi-dimensional viscous supersonic jet flow." Published in Scientific Research Associates, Inc., Final Report (Oct 1986), p. 128.
15. Yang, R.J., Weinberg, B.C., Shamroth, S.J., McDonald, H., "Numerical solutions of the Navier-Stokes equations for two- and three-dimensional turbine cascades with heat transfer." Published in General Motors Corp, Final Report (Jul. 1985), p. 160.
16. Weinberg, B.C., Yang, R.J., Shamroth, S.J., McDonald, H., "Calculation of two- and three-dimensional transonic cascade flow field using the Navier-Stokes equations." Published by NASA Lewis Research Center's Turbine Engine Hot Section Technology Report (Oct. 1984), p. 8.
17. Lui, N.S., Shamroth, S.J., McDonald, H., "Numerical simulation of unsteady three-dimensional turbulent structures in boundary layer flow." Published in Scientific Research Associates, Inc., Final Report (Nov. 1984 – May 1985), p. 45.
18. Weinberg, B.C., McDonald, H., "Influence of large-scale motion on turbulent transport for confined coaxial jets. Volume 2: Navier-Stokes calculation of swirling and nonswirling confined coaxial jets." Published in Scientific Research Associates, Inc., Final Report (Jan. 1986) p. 57.
19. Buggeln, R.C., Briley, W.R., McDonald, H., "Solution of the three-dimensional Navier Stokes Equations for a turbulent horseshoe vortex flow." Published in Scientific Research Associates, Inc. Final Report (Oct 1985 – Sept. 1986) p. 36.
20. Briley, W.R. and McDonald, H.: Accuracy and Iterative Convergence Rate of ADI Schemes for Scalar Convection, SRA Report R86 900050 F, 1986.
21. Kim, Y.N., Buggeln, R.C., McDonald H., "Development of a Navier-Stokes analysis for the flow in disk pumps." Published in Scientific Research Associates, Inc. Final Report (Sep. 1984 – Mar. 1985), p. 45.
22. Briley, W.R., McDonald, H., and Buggeln, R.C.: Observations on Three Dimensional Viscous Turbine Flow Analysis Methods, SRA Report R85 900029 F, 1985.
23. Briley, W. R., Buggeln, R.C., McDonald, H., "Solution of the three-dimensional Navier-Stokes equations for a steady laminar horseshoe vortex flow." Scientific Research Associates, Inc., Final Report (Jun 1982 – Jun. 1984), p. 43.
24. Shamroth, S.J., McDonald, H., Weinberg, B.C., Roscoe, D.V., "Development of a Navier-Stokes rotor and stator analysis." Scientific Research Associates, Inc., Annual Report, (Jun. 1984), p. 39.
25. Shamroth, S.J., Yang, R.J., McDonald, H., "Further development of a transonic cascade analysis, Scientific Research Associates, Inc., Final Report, (Aug. 1983), p. 49.
26. Gibeling, H.J., Briley, W.R., Kreskovsky, J.P., Shamroth, S.J., McDonald, H., "Computation of discrete slanted hole film cooling flow using the Navier-Stokes equations." Scientific Research Associates, Inc., Final Report (Sept. 1983), p. 63.
27. Lin, S.J., Kreskovsky, J.P., Briley, W.R., McDonald, H., "Further development of a method for computing three-dimensional subsonic viscous flows in turbofan lobe mixers." Scientific Research Associates, Inc., Final Report (Nov. 1983) p. 66.
28. Kreskovsky, J.P., Briley, W.R., McDonald, H., "Turbofan forced mixer-nozzle internal flowfield. Volume 3; A computer code for 3-D mixing in axisymmetric nozzles." Published in Scientific Research Associates, Inc., Final Report (Apr. 1982), Vol. 3, p. 129.
29. Briley, W.R., and McDonald, H.: Computation of Turbulent Horseshoe Vortex Flow Past Swept and Unswept Leading Edges. SRA Report R82 920001 F, 1982.
30. Briley, W.R., Buggeln, R.C. and McDonald, H.: Computation of Laminar and Turbulent Flow in 90 Degree Square Duct and Pipe Bends Using the Navier Stokes Equations. SRA Report R82 920009 F, 1982.

31. Levy, R., McDonald, H., Briley, W.R., Kreskovsky, J.P., "A three-dimensional turbulent compressible subsonic duct flow analysis for use with constructed coordinate systems." Scientific Research Associates, Inc., Final Report (1981), p. 40.
32. Kreskovsky, J.P., Briley, W.R., McDonald, H., "Prediction of laminar and turbulent primary and secondary flows in strongly curved ducts." Scientific Research Associates, Inc., Final Report, (Feb 1981), p. 59.
33. Gibeling, H.J., Kreskovsky, J.P., Briley, W.R., McDonald, H., "Computation of discrete hole film cooling flow using the Navier-Stokes equations." Published in Scientific Research Associates, Inc., Annual Report (Apr 1980 – Mar 1981), p. 28.
34. Buggeln, R.C., Briley, W.R., McDonald, H., "Computation of laminar and turbulent flow in curved ducts, channels, and pipes using the Navier-Stokes equations." Scientific Research Associates, Inc., Final Report (Dec. 1980), p. 42.
35. Kreskovsky, J.P., Briley, W.R., McDonald, H., "Computation of discrete hole film cooling flow." Scientific Research Associates, Inc., (May 1980), p. 24.
36. Buggeln, R.C., McDonald, H., Levy, R., Kreskovsky, J.P., "Development of a three-dimensional supersonic inlet flow analysis." Scientific Research Associates, Inc., Final Report (Jan. 1980), p. 122.
37. Levy, R., Briley, W.R., McDonald, H., "Viscous flow in the region of a rounded trailing edge." Scientific Research Associates, Inc., Final Report (Jul 1978 – Jun 1979), p. 41.
38. McDonald H., "Computational aspects of viscous flows (numerical analysis of viscous flow and the relationship of the boundary layer equations to the Navier-Stokes equation." Scientific Research Associates, Inc., Published in Von Karman Institute for Fluid Dynamics Application of Numerical Methods to Flow Calculations in Turbomachines (1979), p. 192.
39. Kreskovsky, J.P., Briley, W.R., McDonald, H., "Computation of discrete hole film cooling flow using the Navier-Stokes equations (gas turbine blades)." Scientific Research Associates, Inc., Final Report (Jul. 1979), p. 17.
40. Eiseman, P.R., Levy, R., McDonald, H., Briley, W.R., "Development of a three-dimensional turbulent duct flow analysis." United Technologies Research Center, East Hartford, CT., Final Report (Nov. 1978), p. 117.
41. McDonald, H., and Briley, W.R.: A Review of Computational Methods for the Compressible Navier Stokes Equations in Turbomachinery Applications. SRA Report 78 2, Detroit Diesel Allison, April 1978.
42. Anderson, O. L., Briley, W.R., McDonald H., "Derivation and evaluation of an approximate analysis for three-dimensional viscous subsonic flow with large secondary velocities (finite difference method)." United Technologies Research Center, East Hartford, CT, Final Report, (Oct. 1978), p. 84.
43. Eiseman, P.R., Levy, R., McDonald, H., "A method for computing flows over an ogival body." United Technologies Research Center, East Hartford, CT. Final Report (Jul. 1977), p. 51.
44. Hall, G.F., Shamroth, S.J., McDonald, H., Briley, W.R., "The inviscid pressure field on the tip of a semi-infinite wing and its application to the formation of a tip vortex." United Technologies Research Center, East Hartford, CT, Final Report (Oct. 1976), p. 84.
45. Gibeling H. J., Briley, W.R. and McDonald, H.: Development of a Three Dimensional Combustor Flow Analysis, Vol. I: Theoretical Studies. AFAPL TR 75 59, 1975.
46. Gibeling, H.J., McDonald, H., "Development of a three-dimensional combustor flow analysis. Volume 2: Theoretical studies." United Technologies Research Center, East Hartford, CT., Final Report (Jun. 1975 – Oct 1976) p. 61.
47. Levy, R., Shamroth, S.J., Gibeling, H.J., McDonald, H., "A study of the turbulent shock wave boundary layer interaction." United Technologies Research Center, East Hartford, CT., Final Report (Jul. 1973 – Oct. 1976), p. 80.
48. Briley, W. R., McDonald, H., Gibeling, H.J., "Solution of the multidimensional compressible Navier-Stokes equations by a generalized implicit method." United Technologies Research Center, East Hartford, CT, Final Report (Mar. 1972 – Dec. 1975), p. 63.
49. Kreskovsky, J.P., Shamroth, S.J., McDonald, H., "Parametric study of relaminarization of turbulent boundary layers on nozzle walls." United Technologies Research Center, East Hartford, CT., Final Report (Jun. 1974), p. 93.
50. Anasoulis, R.F., McDonald, H., Buggeln, R.C., "Development of a combustor flow analysis. Part 1: Theoretical studies." United Technologies Research Center, East Hartford, CT., Final Report (Apr. 1974), p. 91.
51. Anasoulis, R.F., McDonald, H., "A study of combustor flow computations and comparison with experiment." United Technologies Research Center, East Hartford, CT., Final Report (Dec. 1973), p. 97.

52. Anasoulis, R.F., McDonald, H., "Development of a combustor flow analysis. Part 2; Experimental studies." United Technologies Research Center, East Hartford, CT. Final Report (Jun. – Sep. 1973), p. 38.
53. Briley, W.R., McDonald, H., "An implicit numerical method for the multidimensional compressible Navier-Stokes equations (application to three dimensional subsonic flow)." United Technologies Research Center, East Hartford, CT. Report (Nov. 1973), p. 56.
54. Shamroth, S.J., McDonald H., "Assessment of a transitional boundary layer theory at low hypersonic Mach numbers (Accuracy of transitional boundary layer theory in low hypersonic Mach number range)." United Technologies Research Center, East Hartford, CT. Report (Nov. 1972), p. 69.
55. Weinberg, B.C., McDonald, H., "Solution of 3-dimensional time-dependent viscous flows. Part 1: Investigation of candidate algorithms (1979); Part 2: Development of computer code (1980); Part 3: Application to turbulent and unsteady flows (1982) " Scientific Research Associates, Inc. Report Number NASA-CR-166565-PT-1, (Apr. 1979), p. 86.