

Curriculum Vita

Patrick A. McMurtry

Education:

Ph.D., Mechanical Engineering, University of Washington, Seattle, WA, March 1987.
M.S., Mechanical Engineering, University of Washington, December, 1983.
B.S., Engineering and Applied Science, with Honors. California Institute of Technology, Pasadena, CA, June, 1981.

Professional Experience:

Professor, Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, 7/00 - Present.
Associate Dean, Graduate School, University of Utah, Salt Lake City, UT, 11/99 - 5/04.
Associate Professor, Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, 7/94 - 6/00.
Assistant Professor, Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, 9/88-6/94.
Postdoctoral Research Scientist, Sandia National Laboratories, Livermore, CA, 9/87 - 8/88.
Predoctoral Lecturer, Fluid Mechanics, Department of Mechanical Engineering, University of Washington, Summer, 1985.
Engineer, Propulsion Technology, The Boeing Co., Seattle, WA, 9/81 - 9/82.

Principal Areas of Research Interest:

Fluid Mechanics; Turbulence Modeling; Numerical Simulation and algorithm development; Turbulent mixing processes; Multi-material flows; Supersonic flows; Large Eddy Simulations.

Academic Honors:

Marsh Scholar, University of Washington, 1982-1985
Honor Graduate, California Institute of Technology, 1981
Honorary Member, Pi Tau Sigma Mechanical Engineering Honor Society
National Science Foundation Young Investigator Award
U of Utah Mechanical Engineering Professor of the Year, 1993.

Professional Societies:

Member, American Society of Engineering Education
Member, American Physical Society.
Member, Cordell Expeditions.
Member, Explorer's Club.

Peer Reviewed Journal Publications:

1. McMurtry, P.A., Jou, W.-H., Riley, J.J. and Metcalfe, R.W. "Direct Numerical Simulations of a Reacting Mixing Layer with Chemical Heat Release," *AIAA Journal*, **24**, pp. 962–970, 1986.
2. Givi, P. and McMurtry, P.A. "Direct Numerical Simulations of the PDFs of a Passive Scalar in a Forced Mixing Layer," *Combust. Sci. and Tech.*, **57**, pp. 141–147, 1988.
3. Givi, P. and McMurtry, P.A. "Non-Premixed Reaction in Homogeneous Turbulence: Direct Numerical Simulations," *AIChE Journal*, **34**, pp. 1039–1042, 1988.
4. McMurtry, P.A. and Givi P., "Direct Numerical Simulations of a Non-Premixed Homogeneous Turbulent Flow," *Combustion and Flame*, **77**, pp. 171–185, 1989.
5. McMurtry, P.A., Riley J.J., and Metcalfe, R.W. "Effects of Heat Release on the Large Scale Structures in a Turbulent Reacting Mixing Layer," *Journal of Fluid Mechanics* **199**, pp. 297–332, 1989.
6. Ashurst, W.T. and McMurtry, P.A. "Flame Generation of Vorticity: Vortex Dipoles from Monopoles," *Combust. Sci. and Tech.*, **66**, pp. 17–37, 1989.
7. Soetrisno, M., Eberhart, S., Riley, J.J. and McMurtry, P.A. "A Study of Inviscid, Supersonic Mixing Layers Using a Second-Order Total Variational Diminishing Scheme," *AIAA Journal* **27**, pp. 1770–1778, 1989.
8. Son, S.F., McMurtry, P.A., and Queiroz, M. "The Effects of Heat Release on Various Statistical Properties of a Reacting Shear Layer," *Combustion and Flame*, **85**, pp. 51–67, 1991.
9. Chen, C., Riley, J.J., and McMurtry, P.A., "An Investigation of Favre Averaging in Turbulent Flows With Chemical Reaction," *Combustion and Flame*, **87**, pp. 257–277, 1991.
10. McMurtry, P.A. and Givi, P. "Direct Numerical Simulations of a Reacting, Turbulent Mixing Layer By A Pseudospectral-Spectral Element Method," *Finite Element Methods in Fluids*, **8**, pp. 355–378, 1992.
11. McMurtry, P.A., Menon, S. and Kerstein, A.R. "A Linear Eddy Subgrid Model for Turbulent Reacting Flows: Application to Hydrogen-Air Combustion," *Proceedings of the 24th (International) Symposium on Combustion* the Combustion Institute, pp. 271–278, 1992.
12. McMurtry, P.A., Gansauge, T. and Kerstein, A.R "Linear Eddy Simulations of Mixing and Reaction in A Homogeneous Turbulent Flow," *Phys. Fluids A*, **5**, pp. 1023–1034, 1993.
13. McMurtry, P.A. and Menon, S. "Linear Eddy Simulations of Turbulent Combustion," *J. Energy & Fuels*, **7**, pp. 817–826, 1993.
14. Frankel, S.K., Madnia, C.K., McMurtry, P.A., and Givi, P. "Binary Scalar Mixing in Homogeneous Turbulence: Some Linear Eddy Results," *J. Energy & Fuels*, **7**, pp. 827–834, 1993.
15. Menon, S., McMurtry, P.A., Kerstein, A.R., and Chen, J.-Y. "A New Unsteady Mixing Model to Predict NOx Production During Rapid Mixing In A Dual-Stage Combustor," *AIAA Journal of Propulsion and Power*, **10**, pp. 161–168, 1994.
16. Shirolkar, J.S., Queiroz, M. and McMurtry, P.A. "Statistical Properties of Passive Scalar and Temperature Dissipation in a Turbulent Reacting Shear Layer," *Transactions of the ASME Journal of Heat Transfer*, **116**, pp. 761-764, 1994.

17. Kerstein, A.R. and McMurtry, P.A. "Mean-Field Theories of Random Advection," *Physical Review E*, **49**, pp. 474–482, 1994.
18. Cremer, M., McMurtry, P.A., and Kerstein, A.R. "Effects of Turbulent and Scalar Length-Scale Distributions on Turbulent Mixing Processes," *Phys. Fluids A*, **6**, pp. 2143–2153, 1994.
19. Kerstein, A.R. and McMurtry, P.A. "Low Wavenumber Statistics of Randomly Advected Passive Scalars," *Physical Review E*, **50**, pp. 2057–2063, 1994.
20. Frankel, S.K., McMurtry, P.A., and Givi, P. "Linear Eddy Modeling of Reactant Conversion and Selectivity in Homogeneous Turbulence," *AIChE Journal*, **41**, pp. 258–266, 1995.
21. Kerstein, A.R., Cremer, M.A. and McMurtry, P.A. "Scaling Properties of Differential Molecular Diffusion Effects in Turbulence," *Physics of Fluids*, **7**, pp. 1999–2007, 1995.
22. McMurtry, P.A. "Vertical Water Temperature Profiles at Rocas Alijos," *Rocas Alijos*, R.W. Schmieder, ed., Kluwer Academic, pp. 123–134, 1995.
23. Guilkey, J.E., Gee, K.R., McMurtry, P.A. and Klewicki, J.C. "Use of Caged Fluorescent Dyes for the Study of Turbulent Passive Scalar Mixing," *Experiments in Fluids*, **21**, pp. 237–242, 1996.
24. Guilkey, J.E., Kerstein, A.R., McMurtry, P.A. and Klewicki, J.C. "Mixing Mechanisms in Turbulent Pipe Flow," *Physics of Fluids*, **9**, pp. 717–723, 1997.
25. Guilkey, J.E., Kerstein, A.R., McMurtry, P.A. and Klewicki, J.C. "Long-tailed Probability Distribution Functions in Turbulent Pipe Flow Mixing," *Physical Rev. E*, **56**, (2), 1753, 1997.
26. Krueger, S.K., Su, C.-W., and McMurtry, P.A. "Modeling Entrainment and Fine-Scale mixing in Cumulus Clouds," *Journal of the Atmospheric Sciences*, **54**, 2697–2712, 1997.
27. Maynes, D., Klewicki, J.C., McMurtry, P.A. and Robey, H. "Hydrodynamic Scalings in the Rapid Growth of Crystals From Solution," *J. Crystal Growth*, **178**, 545–558, 1997.
28. Guilkey, J.E., McMurtry, P.A. and Klewicki, J.C. "Effects of Initial Conditions on Scalar Statistics in Pipe Mixing," *AIChE Journal*, **43**, 8, 1947 – 1954 1997.
29. Maynes, D., Klewicki, J.C., McMurtry, P.A. "Time Resolved Torque of Rotating Bluff Bodies in a Cylindrical Tank," *J. Fluids Eng.*, **120**, 23–28, 1998.
30. Su, C-W., Krueger, S.K., McMurtry, P.A. and Austin, P.H., "Linear Eddy Modeling of Droplet Spectral Evolution During Entrainment and Mixing in Cumulus Clouds," *Atmospheric Research*, **47–48**, 41–58, 1998.
31. Cremer, M. and McMurtry, P.A. "A Model of Turbulent Mixing and Reaction for H₂-air Combustion," *Journal of Propulsion and Power*, **14**, 3, 309–317, 1998.
32. Maynes, D., Klewicki, J., and McMurtry, P.A. "Rotating Bluff Body Flow in a Tank," *Journal of Fluid Mechanics*, **388**, pp. 49–68, 1999.
33. Henderson, T.C., McMurtry, P.A., Smith, P.J., Voth, G.A. Wight, C.A. and Pershing, D.W. "Simulating Accidental Fires and Explosions," *Computing in Science and Engineering*, March-April, pp. 64–76, 2000.
34. Hansen, L., Guilkey, J.E., McMurtry, P.A. and Klewicki, J.C. "The Use of Photo Activatable Fluorophores in the Study of Turbulent Pipe Mixing: Effects of Inlet Geometry." *Measurement Science and Technology*, **11**, pp. 1235–1250, 2000.

35. Ayton, G., Bardenhagen, S., McMurtry, P., Sulsky, D., and Voth, G. "Interfacing Molecular Dynamics with Continuum Dynamics in Computer Simulation: Towards an Application to Biological Membranes," *IBM Journal of Research and Development*, **45** 3/4. pp. 417–425, 2001.
36. Ayton, G., Bardenhagen, S., McMurtry, P., Sulsky, D., and Voth, G. "Interfacing Continuum and Molecular Dynamics: An Application to Lipid Bilayers," *Journal of Chemical Physics*, **114**, pp. 6913–6924, 2001.
37. Ayton, G., Smondyrev, A., Bardenhagen, S., McMurtry, P. and Voth, G. "Calculating the Bulk Modulus for a Lipid Bilayer with Nonequilibrium Molecular Dynamics Simulation," *Biophysical Journal*, **82**, pp. 1226–1238, 2002.
38. Ayton, G., Smondyrev, A., Bardenhagen, S., McMurtry, P. and Voth, G. "Interfacing Molecular Dynamics and Macro-Scale Simulations for Lipid Bilayer Vesicles," *Biophysical Journal*, **83**, pp. 1026–1238, 2002.
39. Campbell, J.E., Coppom, R.W., Klewicki, J.C. and McMurtry, P.A. "Flow Phenomena and Time Resolved Concentration Measurements in an Axial Flow Mixer," *ASME Journal of Fluids Engineering*, **126**, 6, pp. 981–989, 2005.
40. Wei, T., Fife, P., Klewicki, J, and McMurtry, P.A. "Properties of the Mean Momentum Balance in Turbulent Boundary Layer, Pipe, and Channel Flow," *Journal of Fluid Mechanics*, **522**, pp. 303-327, 2005.
41. Fife, P., Wei, T., Klewicki, J.C., and McMurtry, P.A. "Stress Gradient Balance Layers in Wall Bounded Flows," *Journal of Fluid Mechanics*, **532**, pp. 165–189, 2005.
42. Ayton, G., McWhirter, J.L., McMurtry, P. and Voth, G. "Coupling Field Theory with Continuum Mechanics: A Simulation of Domain Formation in Giant Unilamellar Vesicles," *Biophysical Journal*, **88**, pp. 3855–3869, 2005.
43. Wei, T., Schmidt, R. and McMurtry, P.A. "Comment on the Clauser Chart Method for Determining the Friction Velocity," *Experiments in Fluids*, **38**, (5), pp. 695–699, 2005.
44. Fife, P., Klewicki, J.C., McMurtry, P.A., and Wei, T. "Multiscaling in the presence of indeterminacy: Wall induced turbulence," *SIAM Journal of Multi-scale Modeling and Simulation*, **4**, 3, pp. 936–959, 2005.
45. Wei, T., Fife, P., Klewicki, J, and McMurtry, P.A. "Scaling heat transfer in fully developed turbulent channel flow," *International Journal of Heat and Mass Transfer*, **48**, No. 25-26, pp. 5284–5296, 2005.
46. Wei, McMurtry, P., Klewicki, J, and Fife, P. "Meso Scaling of Reynolds Shear Stress in Turbulent Channel Flows and Pipes," *AIAA Journal*, **43**, 11, pp. 2350–2353, 2005.
47. Klewicki, J.C., Fife, P., Wei, T. and McMurtry, P.A. "Overview of a Methodology for Scaling the Indeterminate Equations of Wall Turbulence," *AIAA Journal*, **44**, 12, pp. 2475–2481, 2006.
48. Klewicki, J.C., Fife, P., Wei, T. and McMurtry, P.A. "A physical model of the turbulent boundary layer consistent with mean momentum balance structure," *Philosophical Transactions of the Royal Society A*, **365**, pp. 823–839, 2007.
49. Guilkey, J., Harman, T., Kashiwa, B., and McMurtry, P. "An Eulerian-Lagrangian Approach for Large Deformation Fluid Structure Interaction Problems," under review *Computational Methods in Applied Mechanics*, 2007.

Invited Reviews and Book Chapters:

1. Riley, J.J. and McMurtry, P.A. "The Use of Direct Numerical Simulation in the Study of Chemically-Reacting Turbulent Flows," in *Turbulent Reactive Flows*, R. Borghi and S.N.B. Murthy, Editors. pp. 486–514, Springer-Verlag, 1989.
2. McMurtry, P.A. and Givi, P. "Spectral Simulations of Reacting Turbulent Flows," *Numerical Approaches to Combustion Modeling*, E. S. Oran and J. P. Boris, Editors. AIAA Progress in Aeronautics and Astronautics, **135**, pp. 257–303, 1991.
3. Menon, S., McMurtry, P.A., and Kerstein, A.R. "A Linear Eddy Flamelet Subgrid Model for Large-Eddy Simulations of Turbulent Premixed Combustion," in *Large Eddy Simulations of Complex Engineering and Geophysical Flows*, B. Galperin, Editor. pp. 288–314, Cambridge University Press, 1993.
4. McMurtry, P.A. and Queiroz, M. "Turbulent Reacting Flows," in *Coal Combustion*, L.D. Smoot, Editor. pp. 511–566, Elsevier, 1993.
5. McMurtry, P.A. "Turbulence," in *Encyclopedia of Climate and Weather*, pp. 786–793, Oxford University Press, 1996.
6. Henderson, T.C., McMurtry, P.A., Pernice, M., Smith, P.J., Voth, G.A., Wight, C.A., and Pershing, D.W. "Utah Center for the Simulation of Accidental Fires and Explosions," *Computing in Science and Engineering*, March-April, pp. 64–76, 2000.

Conference Papers, Proceedings and Abstracts:

1. McMurtry, P.A., Corlett, R.C., Emery, A.F., and Mortazavi, H.R., "Comprehensive Numerical Model of Forward Combustion Along a Channel," Proceedings of the Ninth Underground Coal Conversion Symposium, DOE/METC/84-7, (1983).
2. Mortazavi, H.R., Emery, A.F., Corlett, R.C., and McMurtry, P.A., "Thermal Stability of Coal Cavities," Proceedings of the Ninth Underground Coal Conversion Symposium, DOE/METC/84-7, (1983).
3. McMurtry, P.A., Jou, W.-H., Riley, J.J., and Metcalfe, R.W., "Effects of Heat Release in Chemically-Reacting Turbulent Mixing Layers," Presented as paper AIAA-85-0143 at the AIAA 23rd Aerospace Sciences Meeting, January 14-17, (1985).
4. McMurtry, P. A. and Riley, J. J., "Effects of Heat Release in Chemically-Reacting Turbulent Mixing Layers," Presented as paper 248g at the AIChE Annual Symposium, November 4-7, (1986).
5. Givi, P. and McMurtry, P.A., "Numerical Experiments on Mixing and Chemical Reaction in a Homogeneous Turbulent Flow," Presented at the 1987 Division of Fluid Mechanics Annual Meeting of the American Physical Society, November 22-24, (1987).
6. McMurtry, P.A. and Givi, P., "Non-Premixed Reaction $A + B \rightarrow$ Products in Homogeneous Turbulent Flows: Direct Numerical Simulations," Presented at the Fall Technical Meeting of the Combustion Institute, Eastern States Section, Gaithersburg, MD, November 2-6, (1987).
7. Riley, J.J. and McMurtry, P.A., "Mechanisms by Which Heat Release Affects the Fluid Dynamics in Chemically-Reacting Flows," USA-France Workshop on Turbulent Reacting Flows, Rouen, France, July 6-10, (1987).
8. McMurtry, P.A. and Givi, P., "Direct Numerical Simulations of Scalar Dissipation in a Turbulent Mixing Layer," Presented as paper 77 at the SIAM Conference on Numerical Combustion, March 9-11, (1987).

9. McMurtry, P.A., Riley, J.J. and Metcalfe, R.W., "Mechanisms by Which Heat Release Affects the Fluid Dynamics in Chemically-Reacting Flows," Presented as Paper AIAA-87-0131 at the AIAA 25th Aerospace Sciences Meeting, January 12-15, (1987).
10. McMurtry, P.A. and Ashurst, W.T., "Flame Vortex Interactions in Premixed Combustion," The Twenty Second (International) Symposium on Combustion, Poster Presentation, Seattle Washington, August 14-18, (1988).
11. McMurtry, P.A. and Givi, P., "Stochastic and Direct Numerical Simulations of a Non-Premixed Reaction in Homogeneous Turbulence," Paper 155a of the 1988 Annual Meeting of the American Institute of Chemical Engineers, Washington, D.C., November 27-December 2, (1988).
12. McMurtry, P.A., "Mixing and Reaction in Turbulent Shear Flows: Direct Numerical Simulations," Presented at First International Congress on Toxic Combustion, Los Angeles, CA., August 2-4, (1989).
13. Clarksean, R. and McMurtry, P.A. "Direct Numerical Simulation of a Planar Mixing Layer Using the Spectral-Compact Finite Difference Technique," AIAA Paper 90-1495. Presented at the AIAA 21st Fluid Dynamics, Plasma Dynamics and Lasers Conference, June, 1990.
14. Decker, R., McMurtry, P.A. and Heinrich, J.C. "Models and Techniques in Computational Fluid Dynamics and their Application in Numerical Wind Engineering," Presented at the 9th ASCE Structures Conference, Indianapolis, IN, April 29-May1, 1990.
15. Krueger, S.K. and McMurtry, P.A. "Entrainment and Mixing in Status Clouds," Proceedings of the Conference on Cloud Physics, the American Meteorological Society. July 23-27, 1990.
16. Clarksean, R. and McMurtry, P.A. "Analysis of Mixing Within Two-Dimensional Planar Mixing layers Using Direct Numerical Simulation," Presented at the AIAA 10th Fluid Dynamics Conference, June, 1991.
17. McMurtry, P.A., and Gansauge, T. "Linear Eddy Modeling of Scalar Mixing in Homogeneous Turbulence," *Bull. Amer. Phys. Soc.* Vol. 36, No. 10, p. 2673. Presented at the 44th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Tempe Arizona, November, 1991.
18. Menon, S., McMurtry, P.A., and Kerstein, A.R. "Linear Eddy Modeling of Turbulent Premixed Combustion," *Bull. Amer. Phys. Soc.* Vol. 36, No. 10, p. 2641. Presented at the 44th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Tempe Arizona, November, 1991.
19. McMurtry, P.A., Menon, S. and Kerstein, A.R. "A Linear Eddy Subgrid Model for Turbulent Mixing and Reaction," Presentation at the 4th International Conference on Numerical Combustion, St. Petersburg, FL December 2, 1991.
20. Menon, S., McMurtry, P.A., Kerstein, A.R. "A Laminar Flamelet Subgrid Model of Turbulent Premixed Combustion," Presentation at the 4th International Conference on Numerical Combustion, St. Petersburg, FL December 2, 1991.
21. McMurtry, P.A., Menon, S. and Kerstein, A.R. "A New Subgrid Model for Turbulent Mixing and Reaction," AIAA Paper 92-0234, presented at the 30th AIAA Aerospace Sciences Meeting, January, 1992.
22. Menon, S., McMurtry, P.A., Kerstein, A.R., and Chen, J.-Y. "A New Unsteady Mixing Model to Predict NO_x production During Rapid Mixing In A Dual-Stage Combustor," AIAA Paper 92-0233, presented at the 30th AIAA Aerospace Sciences Meeting, January, 1992.

23. Krueger, S.K. and McMurtry, P.A. "Linear Eddy Modeling of Entrainment and Mixing in Stratus Clouds," Presented at the 11th International Conference on Cloud Physics, Montreal, Canada, August, 1992.
24. McMurtry, P.A., Gansauge, T. and Kerstein, A.R. "Linear Eddy Simulations of Mixing and Reaction in A Homogeneous Turbulent Flow," Presented at the 13th Symposium on Turbulence, Missouri-Rolla, Sept. 21-23, 1992.
25. McMurtry, P.A., Menon, S. and Kerstein, A.R. "On Subgrid Modeling of Turbulent Mixing," Presented at the 13th Symposium on Turbulence, Missouri-Rolla, Sept. 21-23, 1992.
26. McMurtry, P.A., Cremer, M., and Kerstein, A.R. "Effects of Turbulence Length-Scale Distribution on Scalar Mixing In Homogeneous Turbulence," *Bull. Amer. Physical Society*, **37** (8), November, 1992.
27. Cremer, M., Kerstein, A.R., and McMurtry, P.A. "A Clipped-Laminar-Profile Representation Of Scalar Mixing," *Bull. Amer. Physical Society*, **37** (8), November, 1992.
28. Menon, P.A., McMurtry, P.A. and Kerstein, A.R. "A Linear Eddy Subgrid Model for Turbulent Combustion: Application to Premixed Flames," AIAA Paper 93-0107, presented at the 31st AIAA Aerospace Sciences Meeting, January, 1993.
29. Frankel, S., McMurtry, P.A., and Givi, P. "Linear Eddy Modeling of Selectivity," Paper 93-044 1993 Spring Meeting of the Western States Section of the Combustion Institute, March 1993.
30. Cremer, M., McMurtry, P.A., and Menon, S. "Linear Eddy Modeling of Mixing in Plug Flow Reactors," Paper 93-040 Spring Meeting of the Western States Section of the Combustion Institute, March 1993.
31. Cremer, M., Kerstein, A.R. and McMurtry, P.A. "Stochastic Simulations of Differential Diffusion of Passive Scalars in Isotropic Turbulence," *Bull. Amer. Physical Society*, **38** (12), pg. 2243, November, 1993.
32. McMurtry, P.A. and Kerstein, A.R. "Low-wavenumber Statistics of Randomly Advected Passive Scalars," *Bull. Amer. Physical Society*, **38** (12), pg. 2243, November, 1993.
33. Frankel, S.K., McMurtry, P.A., and Givi, P. "Linear Eddy Modeling of Reactant Conversion and Selectivity in Homogeneous Turbulence," *Bull. Amer. Physical Society*, **38** (12), pg. 2213, November, 1993.
34. Smith, T.M., Menon, S. and McMurtry, P.A. "The Structure of Premixed Flames in Isotropic and Shear Driven Turbulent Flows," AIAA Paper # 94-0677, 32nd Aerospace Sciences Meeting, January, 1994.
35. McMurtry, P.A. and Kerstein, A.R. "Turbulent Mixing in a Verry Long Pipe," Invited presentation for the special session in honor of Professor Robert Brodkey's 65th birthday. AIChE Annual Meeting, San Francisco, CA 1994.
36. Cremer, M.A., Kerstein, A.R. and McMurtry, P.A. "Scaling Properties of Differential Molecular Diffusion Effects in Turbulence," *Bull. Amer. Physical Society*, **39** (9), pg. 1923, November, 1994.
37. Su, C.-W., Krueger, S.K. and McMurtry, P.A. "Linear Eddy Modeling of Droplet Spectral Evolution During Turbulent Mixing in Cumulus Clouds," *Preprints, Conference on Cloud Physics*, Dallas TX, American Meteorological Society, January, 1995.

38. Krueger, S.K., Su, C.-W. and McMurtry, P.A. "Linear Eddy Modeling of Entrainment and Mixing in Cumulus Clouds" *Preprints, Conference on Cloud Physics*, Dallas TX, American Meteorological Society, January, 1995.
39. Krueger, S.K. and McMurtry, P.A. "Dynamical Linear Eddy Modeling of Convective Boundary Layers," American Meteorological Society Conference 11th Symposium on Boundary Layers and Turbulence, March 27-31, 1995.
40. Guilkey, J., Gee, K., Klewicki, J.C., and McMurtry, P. "Caged Fluorescent Dye Based Studies of Turbulent Scalar Mixing," International Symposium on Optics, Imaging, and Instrumentation, The International Society for Optical Engineering, San Diego, CA, July, 1995.
41. Guilkey, J., Gee, K., McMurtry, P. and Klewicki, J.C., "A New Initialization Technique for Studies of Turbulent Scalar Mixing," *Bull. Amer. Physical Society*, **40** (12), pg. 1966, November, 1995.
42. McMurtry, P., Guilkey, J., Klewicki, J.C., and Kerstein, A.R. "Scalar Variance Decay in Turbulent Pipe Flow: Theory, Model, and Experimental Results," *Bull. Amer. Physical Society*, **40** (12), pg. 2043, November, 1995.
43. Maynes, D., McMurtry, P., Klewicki, J.C., Atherton, J. and Richardson, M. "Experimental Techniques used in the characterization of the Hydrodynamics Associated with Accelerated KDP Crystal Growth," *Bull. Amer. Physical Society*, **40** (12), pg. 2005, November, 1995.
44. Su, C.-W., Krueger, S.K., McMurtry, P.A. and Austin, P.H. "Linear Eddy Modeling of Droplet Spectral Evolution During Entrainment and Mixing in Cumulus Clouds," 12th International Conference on Clouds and Precipitation, Zurich, Switzerland August 19-23 1996.
45. Harmon, T., McMurtry, P.A. and Isaacson, L.K. "Investigation into Controlling Heat Flux From a Premixed Flame With a DC Electric Field," Presented at the DFD96 Meeting of the American Physical Society, 11/96.
46. Zheng, Q., Klewicki, J.C. and McMurtry, P.A. "Unsteady Sphere Wake Behavior at Intermediate Reynolds Number," Presented at the DFD96 Meeting of the American Physical Society, 11/96.
47. Maynes, D., Robey, H., Klewicki, J. and McMurtry, P.A. "Characteristics of Axial and Tangential Velocities Near a Rotating Bluff Body Platform," *Bull. Am. Phys. Soc.*, Vol. 42, P. 2253 (Presentation at 50th Annual Meeting of the American Physical Society, Division of Fluid Dynamics), 1997.
48. Maynes, D., Klewicki, J., and McMurtry, P.A. "Scaleup of Transient Rotating Bluff Body Flows in Geometrically Dissimilar Tanks," Presented at AIChE Annual Meeting, 1997.
49. McMurtry, P.A., Southerland, S., and Klewicki, J.C. "Design of Complex Continuum Systems." Paper 1526-30, Presented at the ASEE Annual Meeting, Charlotte, NC, June 20-23, 1999.
50. McMurtry, P.A., Guilkey, J. and Harman, T. "Modeling Fluid-Structure Interactions in Fires and Explosions," AIAA Paper 99-3647. Presented at the 30th AIAA Fluid Dynamics Conference, Norfolk, VA, June 28-July 1, 1999.
51. Zheng, Q.X., Klewicki, J.C. and McMurtry, P.A. "Near Wall Counter-Rotating Vortex Pair in the Wake Region of the Transverse Jet in Crossflow," presented at the 52nd Annual Meeting of the American Physics Society, Division of Fluid Dynamics, 1999.
52. DeVries, K.L., McMurtry, P.A., Roemer, R. and Van Moorhem, W.K. "A Chance to Teach," abstract submitted for the Annual Meeting of the American Society of Engineering Education."

53. McMurtry, P.A., Kittleson, J., Klewicki, J., and Southerland, S. "Design of Complex Continuum Systems: A New Senior Capstone Design Course and Educational Assessment of Group Interactions," Presented at the ASEE Annual Meeting, St. Louis, MO, June, 2000.
54. Tie, W. and McMurtry, P.A. "One-Dimensional Modeling of Turbulent Boundary Layers," Presented at the 55th Annual Meeting of the the American Physical Society, Division of Fluid Dynamics, Dallas, TX, 2002.
55. Guilkey, J., Harman, T., Kashiwa, B., Xia, A., and McMurtry, P.A. "An Eulerian-Lagrangian Approach for Large Deformation Fluid-Structure Interaction Problems, Part 1: Algorithm Development." Proceedings of the Second International Conference on Fluid-Structure interactions, Cadiz, Spain, June 24-26, 2003.
56. Harman, T., Guilkey, J., Schmidt, J., Kashiwa, B. and McMurtry, P.A. "An Eulerian-Lagrangian Approach for Large Deformation Fluid-Structure Interaction Problems, Part 2. Multi-Physics Simulation in a Modern Computational Environment." Proceedings of the Second International Conference on Fluid-Structure interactions, Cadiz, Spain, June 24-26, 2003.
57. Wei, T., Klewicki, J., and McMurtry, P. "Scaling properties of the mean momentum balance in turbulent wall flows," Paper AA.002, 56th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, The Meadowlands, New Jersey, Nov 22-25, 2003.
58. Fife, P. Wei, T., Klewicki, J., and McMurtry, P. "Asymptotic properties of the mean momentum balance in turbulent channel flow," Paper AA.003, 56th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, The Meadowlands, New Jersey, Nov 22-25, 2003.
59. Klewicki, J., Fife, P., Wei, T., and McMurtry, P. "Physical and Theoretical Implications of Turbulent Wall Flow Structure as Educued from the Mean Momentum Balance," Paper AA.004, 56th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, The Meadowlands, New Jersey, Nov 22-25, 2003.
60. McMurtry, P., Wei, T., Klewicki, J. and Fife, P. "Scaling Reynolds Number Dependence of Turbulence Statistics in Wall Bounded Flows" Paper AA.005, 56th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, The Meadowlands, New Jersey, Nov 22-25, 2003.
61. Klewicki, J., McMurtry, P., Fife, P., and Wei, T. "A Physical Model of the Turbulent Boundary layer Consonant with the Structure of the Mean Momentum Balance," 15th Australian Fluid mechanics Conference, The University of Sydney, Sydney, Australia, 13-17 December, 2004.

Other Publications:

1. McMurtry, P.A. "Queen Charlotte Straight: British Columbia's Floral Sea," *Western Boatman Magazine*, July, 1989.
2. Hall, D.L. and McMurtry, P.A. "Direct Numerical Simulations of Buoyantly Driven Turbulent Flows," *Journal of Undergraduate Research*, **1**, pp. 2-7.

Graduate Students:

1. Dr. Randy Clarksean, Ph.D. received Summer, 1990. Dissertation Title: The Spectral-Compact Finite Difference Technique for Direct Numerical Simulation of Turbulent Flows.
2. Mr. Daniel Lauterbach, M.S. received Spring, 1992. Thesis Title: Mixing of Jets in Crossflow.
3. Dr. Marc Cremer, Ph.D received Spring, 1995. Dissertation Title: Simulation of Turbulent Mixing in Reactive and Nonreactive Flows.
4. Dr. James Guilkey, Ph.D received Winter, 1997. Dissertation Title: On Pipe Mixing.
5. Dr. Daniel Maynes, Ph.D received Winter, 1997. Dissertation Title: On Rotating Bluff Body Flows (Co-advised with J. Klewicki).
6. Dr. Chen-Wei Su, Ph.D received Summer, 1997. Dissertation Title: Linear Eddy Modeling of Entrainment and Mixing in Cumulus Clouds.
7. Dr. Todd Harman, Ph.D. received Winter, 1998. Dissertation Title: Heat Flux Enhancement in a Hydrocarbon Flame By An Applied Electric Field.
8. Mr. Hari Duriseti, M.S. received Winter, 1998. Thesis Title: Numerical Simulations of a Material Test Facility.
9. Dr. Nader Pourhassen, Ph.D. received Spring, 1999. Dissertation Title: Direct Numerical Simulation of a Momentum Driven Reacting Flow.
10. Ms. Lisa Hansen, M.S. received Spring 1999. Thesis Title: Effects of Initial Conditions on Mixing in Pipe Flow.
11. Mr. Cheng-En Ho, M.S. received summer 1999. Thesis Title: Effects of the Boundary Layer on Downstream Mixing in Channel Flow.
12. Mr. Alan Buchanan, M.E. received summer 1999. Project Title: Thermal Stress Modeling in Electronic Packaging.
13. Mr. Victor Meile, M.S. received Fall, 2001. Thesis project: Heat transfer in turbulent flow around a circular cylinder.
14. Dr. Kelly Knight, Ph.D received Summer, 2001. Dissertation Title: Lagrangian Linear Eddy Modeling of Turbulent Mixing.
15. Mr. Brad Varoz, M.S. received Summer, 2003. Thesis Research: Life Cycle Optimization of Condenser Equipment.
16. Mr. Ian Fernandez, M.S. 2004. Thesis Title: Higher-order Interpolation in the Material Point Method.
17. Dr. Tie Wei, Ph.D. 2004. Dissertation Title: One-Dimensional Turbulence Modeling in Boundary Layers.
18. Mr. Abhijit Argade, M.E., Spring 2004. Project: Fluid-Structure Interaction Validation.
19. Ms. Angela Nay, M.S. ,2004. Thesis: Transient Shock Structure in Supersonic Nozzle Flow.
20. Dr. Amy Xi, Ph.D. Spring 2006. Dissertation Title: Fluid-Structure Interaction Modeling.

Postdoctoral Associates and Research Professors funded:

1. Dr. J. Guilkey, Research Assistant Professor, Department of Mechanical Engineering, 10/97 - present.
2. Dr. T. Harman, Research Assistant Professor, Department of Mechanical Engineering, 1/98 - present.
3. Dr. John Schmidt, Research Staff, Department of Mechanical Engineering, 10/98 - present.
4. Dr. Biswajit Banerjee, Postdoctoral Associate, Department of Mechanical Engineering, 9/02 - present.
5. Dr. Patrick Hu, Research Assistant Professor, Department of Mechanical Engineering, 3/15/03 - 12/31/05.
6. Dr. Daniel Maynes, Postdoctoral Associate, Department of Mechanical Engineering, 3/96 - 8/97.

Funded Research Projects:

Externally Funded:

1. *Center for the Simulation of Accidental Fires and Explosions*. Department of Energy. (PI: D. Pershing, Co-PIs: P. McMurtry, G. Voth, C. Wight, T. Henderson, and P. Smith. \$22,000,000. 12/02-9/07.
2. *ITR:ENG. A Simulation Approach for Physical Systems Involving Multi-Material Interaction Dynamics*. National Science Foundation ITR Program. \$330,000 9/02 - 8/06.
3. *A New Method for Biomembrane Simulations*. National Institute of Health. (PI: G. Voth, Co-PI: P. McMurtry.) \$1,060,000. 7/01 - 6/05. (Recently renewed through 2008.)
4. *Numerical Model Development for Exhaust Flow During Stage Separation*. Northrop Grummon. \$50,000. 12/03 - 10/04.
5. *Numerical Model Development for Exhaust Flow During Stage Separation*. TRW. \$99,975. 12/02 - 10/03.
6. *Computer Simulations of Rocket Motor Fast Cookoff Tests*. ATK-Thiokol. (PIs: C. Wight and P. McMurtry.) \$120,000. 5/02 - 9/03.
7. *Research Experience For Undergraduates in Experimental and Computational Fluid Dynamics*. National Science Foundation REU Program. \$12,000. 1/01 - 12/01.
8. *Integrated Simulation Capabilities*. Department of Energy, Lawrence Livermore National Laboratories. \$100,000. 3/99-10/99.
9. *Research Experience For Undergraduates in Experimental and Computational Fluid Dynamics*. National Science Foundation REU Program. \$10,000. 12/98 - 12/99.
10. *Research and Development of Engineering Designs Associated with Complex Continuum Systems*. National Science Foundation Combined Research-Curriculum Development Program. \$421,000 (\$300,000 from NSF, \$121,000 UofU matching) McMurtry and Klewicki, PI's; Southerland, Swanson, Adams, Johnson, Co-PI's. 9/98 - 8/2001.
11. *Center for the Simulation of Accidental Fires and Explosions*. Department of Energy. (PI: D. Pershing, Co-PIs: P. McMurtry, G. Voth, C. Wight, T. Henderson, and P. Smith. \$20,000,000. 10/97-9/02.
12. *Experimental Fluid Mechanic Investigation of Hydrodynamic Issues Associated with Rapid Crystal Growth*. Lawrence Livermore National Laboratory. J. Klewicki and P. McMurtry, Co-PIs. Award Amount: \$78,562. 3/97-12/97
13. *Surface Layer Turbulence and Environmental Science Test Facility*. National Science Foundation - (Total amount \$605,000 awarded through Utah State University. U of U subcontract amount \$302,500) PI: J. Klewicki, P. McMurtry is Co-PI of U of U portion. 9/96 - 8/99.
14. *Mixing and Reaction Models for Large-Scale Computer Simulations of Reactive Flows*. Faculty Research Fellowship Funded by Department of Energy through Associated Western Universities, Inc. Award Amount: \$16,000. 10/96 - 3/97.
15. *Material Test Facility Scale Model Tests*. PI: J. Klewicki, Co-PI: P. McMurtry. Funded by U.S. Army, Dugway Proving Ground. Award Amount: \$25,000 10/95 - 3/96.
16. *Material Test Facility Simulations*. Funded by U.S. Army, Dugway Proving Ground. Award Amount: \$30,000 10/95 - 9/96.

17. *Simultaneous, Noninvasive Multi-Point Measurements of Velocity, Concentration, and Temperature.* PI: P. McMurtry, Co-PI: J. Klewicki. Funded by the Petroleum Research Fund of the American Chemical Society. Award Amount: \$50,000 6/95 - 8/98.
18. *An Experimental Study of the Fluid Mechanics in the Rapid Solution Growth of KDP Crystals.* (With J. Klewicki) Funded by Lawrence Livermore National Laboratories. Award Amount: \$104,000 12/94-12/96.
19. *Experimental and Modeling Study of Turbulent Mixing Processes.* National Science Foundation Young Investigator. \$274,500 7/93 - 2/99.
20. *An Unsteady Mixing Model to Predict NO_x Production During Rapid Mixing.* Funded by NASA Lewis Research Center through a subcontract from Quest Industries. Award Amount \$55,000 9/92-9/94.
21. *Direct Numerical and Large Eddy Simulations of Unpremixed Turbulent Flames.* National Science Foundation, Division of Chemical and Thermal Systems. Award Amount: \$76,000. 1/91-12/93
22. *Entrainment and Mixing in Stratus-topped Boundary Layers.* Funded by Office of Naval Research, Division of Meteorology (PI S.K. Krueger, Dept. of Meteorology, Co-PI P.McMurtry). Award Amount: \$171,00 1/91-1/94.
23. *High Temperature Turbulence.* Subcontract from the Advanced Combustion Engineering Research Center, funded by National Science Foundation, Total Funding Received : \$988,000 (Including University matching) 9/88 - 5/97.
24. *LIMB Process Modeling.* Funded by the Environmental Protection Agency (PI: Jeoffrey Silcox, Dept. of Chemical Engineering, Co-PI P. McMurtry). Amount Awarded to P. McMurtry: \$ 30,600. 11/89-6/90

Internal University of Utah Funded:

1. *Refurbishment and Retrofitting the Wind Tunnel Facility.* Funded by The Research Support Committee, University of Utah (PI: R. Decker, Co-PI P.McMurtry and J. Klewicki) Total Award Amount: \$ 30,000
2. *Hydrodynamic Effects on the Distribution of Marine Life Around Rojas Alijos.* Funded by the University Research Committee, University of Utah. Award Amount: \$3,870 11/90-11/91.
3. *A Plan to Optimize Use of College of Engineering Fluid Mechanics Laboratory Space, Facilities, and Equipment Resources,* (PI: P. McMurtry, Co-Pi: J. Klewicki, L. K. Isaacson, R. Decker) Award Amount: \$6,000 (\$2,500 ME, \$2,000 CoE, \$1,500 CE), 1992.
4. *Fluid Mechanics Studies Utilizing LIPA, LIF, and CFI,* (PI: J. Klewicki, Co-Pi: P. McMurtry, P. M. Ligrani) University of Utah Research Equipment Support Funds, Award Amount: \$8,000 1993.
5. *University of Utah TA: TA Training in Integrated Experimental/Simulation Research and Development Based Design,* (PI: McMurtry, Co-Pi: J. Klewicki, S. Southerland) University of Utah Graduate School, Award Amount: \$7,500 1999-2000.
6. *"What Lights Nate,"* (PI: McMurtry, Co-Pi: M. Halbach) University of Utah Documentary Studies Program. Award Amount: \$8.900 2004=2005.

Other Funding Sources and Donations:

1. *Material Test Facility Simulations*. Summer Faculty Research and Engineering Program. Funded by U.S. Army, Dugway Proving Ground. Summer, 1995.
2. *Caged Fluorescence Donation*. Donation of \$60,000 of caged fluorescence for mixing experiments by Molecular Probes, Inc. 1995.
3. *Computational Fluid Dynamics*. Summer Faculty Research and Engineering Program. Funded by U.S. Army, Dugway Proving Ground. Summer, 1995.

Department, College and University Service:

1. Chair, Department of Mechanical Engineering Thermal Fluids Search Committee, 2006-2007.
2. Chair, Department of Mechanical Engineering RPT Committee, 2005 - present.
3. Member, College of Engineering RPT Committee, 2005 - 2006.
4. Member, Advisory Board for the Center for Teaching and Learning Excellence, 1999 - Present
5. Member, Graduate Committee, Department of Mechanical Engineering, 1993 - 1994, 2002-present.
6. Member, Executive Committee, Center for the Simulation of Accidental Fires and Explosions, 1997 - Present.
7. Co-Chair, University of Utah Strategic Planning Committee, 2003-2004.
8. Chair, University Graduate Admissions Committee, 2000 - 2004.
9. Member, University of Utah Graduate Fellowship Selection Committee, 1999, 2000.
10. Department Coordinator for TA Training, 1999-2000.
11. Member, University Graduate Council, University of Utah, 1998-1999.
12. Member, University Graduate Admissions Committee, 1998-2000.
13. Member, University of Utah Seed Grant Review Committee, 1999 - 2003.
14. Director of Graduate Studies, Department of Mechanical Engineering, University of Utah, 1994 - 2000.
15. Member, Executive Committee, Department of Mechanical Engineering, 1994 - 2000.
16. Reviewer, College of Engineering BEEF Grant proposals, 1998.
17. Member, Executive Committee, Advanced Combustion Engineering Research Center, 1988 - 1996.
18. Faculty Advisor for American Society of Mechanical Engineers Student Section, University of Utah 1988 - 1995.
19. Member, Thermal Fluids Search Committee, Department of Mechanical Engineering, 1989 - 1990.
20. Member, Department Chair Search Committee, Department of Mechanical Engineering, 1991 - 1992.
21. Chair, Thermal Fluids Search Committee, Department of Mechanical Engineering, 1991 - 1992.
22. Faculty Advisor, Pi Tau Sigma Mechanical Engineering Honor Society, 1991 - 1994
23. Member, College Council, College of Engineering, University of Utah, 1988 - 1991.
24. Member, Supercomputer Committee, University of Utah, 1988 - 1990.