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PROFESSIONAL POSITIONS

Professor	University of Wisconsin - Madison	1999 – Present
	Associate Chair, Dept. of Mechanical Engineering	2008 – Present
	Director of Engine Research Center	2003 – 2007
Associate Professor	University of Wisconsin - Madison	1995 – 1999
Assistant Professor	University of Wisconsin - Madison	1989 – 1995
Research Assistant	Stanford University, Stanford, CA	1984 – 1989
Research Engineer	Flow Research Company, Kent, WA.	1982 – 1984

EDUCATION

Ph.D.	Mechanical Engineering	Stanford University, Stanford, CA	1989
M.S.M.E.	Mechanical Engineering	Stanford University, Stanford, CA	1986
B.S.M.E.	Mechanical Engineering	University of Texas, Austin, TX	1981
B.A.	Psychology	Austin College, Sherman, TX	1975

HONORS

ASME Fellow, 2006
SAE Fellow, 2003
ASME ICE Division Service Award, 1998
Pi Tau Sigma Distinguished Professor of Mechanical Engineering Award, 1996
Best Paper: Technical Meeting of the Combustion Institute Central States Meeting, June 1994
NSF National Young Investigator Award, 1993
SAE International Off-Highway & Powerplant Oral Presentation Award, 1993
SAE Teetor Award, 1992

PROFESSIONAL SOCIETIES

Society of Automotive Engineers, Fellow (SAE) American Physical Society (APS)
American Society of Mechanical Engineers, Fellow (ASME) The Combustion Institute
Senior Member of American Institute of Aeronautics and Astronautics (AIAA)
Society for Industrial and Applied Mathematics (SIAM)

PROFESSIONAL SERVICE

Reviewer for: American Society of Mechanical Engineers, Combustion Institute - International Symposia, Combustion and Flame, Combustion Science and Technology, AIAA Journal of Propulsion and Power, Physics of Fluids, Journal of Fluid Mechanics, Atomization & Sprays, Army Research Office, Petroleum Research Fund, National Science Foundation, Air Force Office of Scientific Research, Department of Energy

CURRENT RESEARCH PROJECTS

Development of large eddy simulation (LES) models for internal combustion engine calculations
Development of flamelet combustion models for diesel engine combustion
Development of spray and collision models for LES simulations
Development of diesel aftertreatment models for system simulations
Simulation studies of intake flow effects on HCCI diesel combustion
Comparison of turbulence model performance for engine simulations
DNS and LES studies of forced turbulence in rotating frames

PUBLICATIONS

1. Metcalfe, R. W., Rutland, C. J., Duncan, J. H., & Riley, J. J., 1986, "Numerical simulations of active stabilization of laminar boundary layers," *AIAA Journal*, 24, #9, pp. 1494-1501.
2. Rutland, C. J. & Ferziger, J. H., 1989, "Interaction of a vortex structure and a premixed flame," AIAA Report 89-0127.
3. Rutland, C. J., El Tahry, S. H., & Ferziger, J. H., 1989, "Effects of strain rate on turbulent premixed flames and transient one-dimensional flames," Seventh Symposium on Turbulent Shear Flows, Stanford University.
4. El Tahry, S. H., Rutland, C. J., & Ferziger, J. H., 1990, "Structure and propagation of turbulent premixed flames - a numerical study," *Combustion and Flame*, 83, pg 146.
5. Rutland, C. J., Ferziger, J. H., & El Tahry, S. H., 1990, "Full numerical simulations and modeling of turbulent premixed flames," *Twenty-Third Symposium (International) on Combustion*, the Combustion Institute, pp. 621-627.
6. Rutland, C. J. & Ferziger, J. H., 1990, "Unsteady strained premixed laminar flames," *Combustion Science and Technology*, 73, p. 305.
7. Rutland, C. J. & Ferziger, J. H., 1991, "Simulations of Flame-Vortex Interactions," *Combustion and Flame*, 84, pg 343.
8. Reitz, R.D. and Rutland, C.J., 1991, "3-D Modeling of Diesel Engine Intake Flow Combustion and Emissions," SAE Paper 911789, *1991 SAE Transactions, Vol. 100, Journal of Engines*, Sec. 3, pg. 1513-152.
9. Reitz, R.D., Rutland, C.J., Ayoub, N., Gonzalez, M., Hessel, R., Kong, S., Lian, J., Pieper, C., 1992, "Improvements in 3-D Modeling of Diesel Engine Intake Flow and Combustion," SAE Paper 921627, *1992 SAE Transactions, Vol. 101, Journal of Engines*, Sec. 3, pg. 1624-1633.
10. Reitz, R.D., Giangregorio, R., Hampson, G., Hessel, R., Kong, S., Liu, A., Mather, D., Nehmer, D., Patterson, M., Pieper, C., Tow, T., Zhu, Y., & Rutland, C.J., 1993, "Progress in Diesel Engine Intake Flow and Combustion Modeling," SAE Paper 932458, *SAE Transactions, Vol. 102, Journal of Engines*, Sec. 3, pg. 2062-2072.
11. Rutland, C. J. & Trouvé, A., 1993, "Direct Simulations of Premixed Turbulent Flames with Non-unity Lewis Numbers," *Combustion & Flame*, 94, pg 41-57.
12. Hessel, R.P. & Rutland, C.J., 1995, "Intake Flow Modeling in a Four Stroke Diesel Using KIVA3," *Journal of Propulsion and Power*, Vol 11, No. 2, pp 378-384.
13. Rutland, C.J., Eckhause, J., Hampson, G., Hessel, R., Kong, S., Patterson, M., Pierpont, D., Sweetland P., Tow T., and Reitz, R.D., 1994 "Predictive Modeling of Diesel Engine Intake Flow, Combustion, and Emissions," SAE Paper 941897, *SAE Transactions Journal of Engines*, Vol. 103, pp. 602-620.
14. Musculus, M.P. & Rutland, C.J., 1995, "An Application of the Coherent Flamelet Model to Diesel Engine Combustion," SAE Paper 950281, *SAE Transactions Journal of Engines*, Vol. 104, pp 531-549.
15. Stephenson, P.W. & Rutland, C.J., 1995, "Modeling the Effects of Intake Flow Characteristics on Diesel Engine Combustion," SAE Paper 950282.
16. Musculus, M.P. & Rutland, C.J., 1995, "Coherent Flamelet Modeling of Diesel Engine Combustion," *Combustion Science & Technology*, 104, 4-6, pp. 295-337.

17. Rutland, C.J., Ayoub, N., Han, Z., Hampson, G., Kong, S.-C., Mather, D., Montgomery, D., Musculus, M., Patterson, M., Pierpoint, D., Ricart, L., Stephenson, P., and Reitz, R.D., "Diesel Engine Model Development and Experiments," 1995, SAE paper 951200, 1995 SAE Earth Moving Conference, April 4-5, Peoria, Ill., *SAE Transactions Journal of Engines*, Vol. 104, pp. 1688-1706.
18. Rutland, C.J., Ayoub, N., Han, Z., Hampson, G., Kong, S.-C., Mather, D., Musculus, M., Patterson, M., Ricart, L., Stephenson, P., and Reitz, R.D., 1995, "Progress Towards Diesel Combustion Modeling," SAE Paper 952429. SAE Fuels and Lubricants Meeting, Oct. 16-19, 1995, Toronto, Ontario, *SAE Transactions Journal of Fuels and Lubricants*, Vol. 104, pp 1317-1329.
19. Zhang, S. & Rutland, C.J., 1995, "Premixed Flame Effects on Turbulence and Pressure Related Terms," *Combustion and Flame*, Vol. 102, pp. 447-461.
20. Stephenson, P.W. & Rutland, C.J., 1995, "Modeling the Effects of Valve Lift Profile on Intake Flow and Emissions Behavior in a DI Diesel Engine" SAE Paper 952430, 1995 SAE Fuels and Lubricants Meeting, Oct. 16-19, Toronto, Ontario.
21. Reitz, R.D. & Rutland, C.J., 1995, "Development and Testing of Diesel Engine CFD Models," *Prog. Energy Combust. Sci.* Vol. 21, pp. 173-196.
22. McLandress, A.S., Emerson, R.G., McDowell, P., & Rutland, C.J., 1996, "Intake and In-Cylinder Flow Modeling Characterization of Mixing and Comparison with Flow Bench Results," SAE Paper 960635, 1996 SAE International Congress, Feb. 26-29, *SAE Transactions Journal of Engines*, Vol. 105, pp 868-881.
23. Stephenson, P.W. & Rutland, C. J., 1996, "Modeling the Effects of Intake Generated Turbulence and Resolved Flow Structures on Combustion in DI Diesel Engines," SAE Paper 960634, 1996 SAE International Congress, Feb. 26-29, *SAE Transactions Journal of Engines*, Vol. 105, pp 853-867.
24. Stanton. D.W. & Rutland, C.J., 1996, "Modeling Fuel Film Formation and Wall Interaction in Diesel Engines," SAE Paper 960628, 1996 SAE International Congress, Feb. 26-29, *SAE Transactions Journal of Engines*, Vol. 105, pp 808-824.
25. Han, Z., Reitz, R.D., Claybaker, P.J., & Rutland, C.J., 1996, "Modeling the Effects of Intake Flow Structures on Fuel/Air Mixing in a Direct-Injected Spark-Ignition Engine," SAE Paper 961192, 1996 International Spring Fuels and Lubricants Meeting, May 6-8, Dearborn, MI. *SAE Transactions Journal of Fuels and Lubricants*, Vol. 105, pp 960-977.
26. Schmidt, D., Rutland, C.J., & Corradini, M., 1997, "A Numerical Study of Cavitating Flow Through Various Nozzle Shapes," SAE Paper 971597, 1997 SAE Fuel and Lubricants Meeting, Detroit, MI, May 5-7, 1997, *SAE Transactions Journal of Engines*, Vol. 106, pp. 1664-1673
27. Fuchs, T. and Rutland, C.J., 1998, "Intake Flow Effects on Combustion and Emissions in a Diesel Engine," SAE Paper 980508, 1998 SAE International Congress, Detroit, Feb. 23-26, *SAE Transactions Journal of Engines*, Section 3, Vol 107, pgs 566-582, 1998
28. Stanton, D.W. and Rutland, C.J., "Multi-dimensional Modeling of Heat and Mass Transfer of Fuel Films Resulting From Impinging Sprays," SAE Paper 980132, 1998 SAE International Congress, Detroit, Feb. 23-26 1998. *SAE Transactions Journal of Engines*, Section 3, Volume 107, pgs 44-59, 1998
29. Stanton, D.W., Senecal, P.K., Hung, C.C, Rutland, C.J., & Reitz, R.D., 1998, "Methodology for Model Discrimination and Criticism for Liquid Atomization Data," *Atomization and Sprays*, Vol. 8, pp. 363-392.
30. Stanton, D.W. and Rutland, C.J. 1998, "Multi-Dimensional Modeling of Thin Liquid Films and Spray-Wall Interaction Resulting from Impinging Sprays," *Int. J. Heat Mass Transfer*, Vol. 41, pp. 3037-3054.

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32. Alshaalan, T. and Rutland, C.J., 1998, "Turbulence, Scalar Transport, and Reaction Rates in Flame – Wall Interaction," 27th International Symposium on Combustion, Boulder, CO. August 3-7, 1998
33. Schmidt, D.P, Nouar, I., Senecal, P.K., Hoffman, J., Rutland, C.J., Martin, J.K., Reitz, R.D., 1999, "Pressure-Swirl Atomization in the Near Field," SAE Paper 1999-01-0496, SAE International Congress, Feb. 1999. *SAE Transactions, Journal of Engines*, vol. 108, Sect. 3, pp. 471-484
34. Schmidt, D.P, Rutland, C.J., Corradini, M.L., Roosen, P., and Genge, O., 1999, "Cavitation in Two-Dimensional Asymmetric Nozzles," SAE Paper 1999-01-0518, SAE International Congress, Feb. 1999. *SAE Transaction, Journal of Engines*, vol. 108, Sect. 3, pp. 613-629
35. Schmidt, D.P, Rutland, C.J., and Corradini, M.L., 1999, "A Two-Dimensional, Non-Equilibrium, Model of Flashing Nozzle Flow," 3rd ASME/JSME Fluids Engineering Division Annual Summer Meeting.
36. Schmidt, D.P., Rutland, C.J., & Corradini, M.L., 1999, "A Fully Compressible Two-Dimensional Model of High Speed Cavitating Nozzles", *Atomization and Sprays*, Vol. 9, n.3, pp. 255-276, 1999.
37. Lee, D. and Rutland, C.J., 2000, "Multidimensional Modeling of a Six-Mode Diesel Test Cycle using PDF Combustion Model," SAE Paper 2000-01-0585, SAE International Congress, March 2000.
38. Mason, S.D. and Rutland, C.J., 2000 "Turbulence Transport in Spatially Developing Reacting Shear Layers." *Proc. Combust. Inst. 28th International Symposium on Combustion*, Edinburgh Scotland. July 31- Aug. 4, 2000
39. Lippert, A.M., Stanton, D.W., Rutland, C.J., Hallett, W.L.H., Reitz, R.D., 2000, "Multidimensional simulation of diesel engine cold start with advanced physical submodels," *Int. J. Engine Research*, Vol. 1, no. 1. pp. 1-27.
40. Schmidt, D.P. and Rutland, C.J., 2000, "A New Droplet Collision Algorithm," *J. of Computational Physics*, Vol. 164, pp. 62-80.
41. Bedford, F., Rutland, C.J., Dittrich, P., Raab, A., and Wirbeleit, F., 2000, "Effects of Direct Water Injection on DI Diesel Engine Combustion," SAE Paper 2000-01-2938, SAE Fuels and Lubricants Meeting, Baltimore, MD. October, 2000.
42. Zuo, B., Gomes, A.M., and Rutland, C.J., 2000, "Modeling Superheated Fuel Sprays and Vaporization," *Int. J. Engine Research*, Vol 1., no. 4, pg. 321-336.
43. He, Y. and Rutland, C.J., 2000, "Application of Artificial Neural Network for Integration of Advanced Engine Simulation Methods," ASME ICE Division Fall 2000 Technical Meeting September 25-27, 2000, Peoria, IL
44. Rao, S., Pomraning, E., and Rutland, C. J., 2001, "Development of Advanced Combustion models for Diesel Engines using Large Eddy Simulation," Second Joint Meeting of the US Sections of the Combustion Institute, Oakland, CA March 26-28, 2001.
45. Zuo, B. and Rutland, C.J., 2001, "Multicomponent Fuel Spark Ignition and Combustion Models," SAE Paper 2001-01-3605, SAE Fall Fuel and Lubes Meeting, Sept. 24-27, San Antonio, TX, 2001 SAE Transactions, *Journal of Engines*, vol. 111, Sect. 4, pp. 2078-2085.
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48. Alshaalan, T. and Rutland, C.J., 2002, "Wall Heat Flux in Turbulent Premixed Reacting Flow," *Combustion Science and Technology*, Vol. 174 (1), pp. 135-165.
49. Lee, D., Pomraning, E., Rutland, C.J., 2002, "LES Modeling of Diesel Engines," SAE Paper 2002-01-2779, SAE 2002 Powertrain and Fluid Systems Conference, Oct. 21-24, San Diego, CA, *2002 SAE Transactions, Journal of Engines*, pp. 2566-2578.
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51. Lee, D. and Rutland, C.J., 2002, "Probability Density Function Combustion Modeling of Diesel Engines," *Combustion Science and Technology*, Vol. 174 (10), pp. 19-54.
52. Provenzano, P.P. and Rutland, C.J., 2002, "A Boundary Layer Model for Wall Shear Stress in Arterial Stenosis," *Biorheology*, Vol. 39, Issue 6, Pages 743-754
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54. Rao, S. and Rutland, C.J., 2003, "A Flamelet Time Scale Model for Non-Premixed Combustion Including Unsteady Effects," *Comb. and Flame*, Vol 133, pp. 189-191.
55. Rao, S., Fiveland, S.B., and Rutland, C.J., 2003, "A computationally efficient method for the solution of methane – air chemical kinetics with application to HCCI combustion," SAE Paper 2003-01-1093, SAE 2003 International Congress, March 2-6, Detroit, MI, *SAE 2003 Transactions Journal of Engines*, pp. 1522-1532.
56. Chumakov, S., Rao, S., and Rutland, C. J., (2003), "Subgrid Scalar Mixing and Combustion Models for Large-Eddy Simulation." presented at Third Joint Meeting of the U.S. Sections of The Combustion Institute, Univ. of Illinois at Chicago March 16-19.
57. He, Y, and Rutland, C.J., 2003, "Neural Cylinder Model and Its Applications in Transient Engine Simulations," SAE Paper 2003-01-3232, Powertrain and Fluid Systems Conference, Oct.27-30, Pittsburgh, Pennsylvania.
58. Brahma, I. and Rutland, C.J., 2003, "Improvement of neural network accuracy for engine simulations," SAE Paper 2003-01-3227, Powertrain and Fluid Systems Conference, Oct.27-30, Pittsburgh, Pennsylvania.
59. Brahma, I. and Rutland, C.J., 2003, "Optimization of diesel engine operating parameters using neural networks," SAE Paper 2003-01-3228, Powertrain and Fluid Systems Conference, Oct.27-30, Pittsburgh, Pennsylvania, *SAE 2003 Transactions Journal of Fuels and Lubricants*, pp. 2521-2529.
60. He, Y, and Rutland, C.J., 2004, "Application of Artificial Neural Networks in Engine Modeling," *J. of Engine Research*, Vol. 5, No. 2, pp 281-296.
61. Schmidt. D. and Rutland, C.J., 2004, "Reducing Grid Dependency in Droplet Collision Modeling," *ASME J. of Engineering for Gas Turb. and Power*, Vol. 126, pp. 227-233.
62. Chumakov, S. and Rutland, C. J., 2004, "Dynamic Structure Models for Subgrid Scalar Flux and Dissipation in Large Eddy Simulation," *AIAA Journal*, Vol. 42, No. 6, pp. 1132-1139
63. Debusschere, B, and Rutland, C.J., 2004, "Turbulent Scalar Transport Mechanisms in Plane Channel and Couette Flows," *International Journal of Heat and Mass Transfer* Vol. 47: pp. 1771-1781.

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67. Wang, Y. and C. J. Rutland, 2005, "Effects of temperature and equivalence ratio on the ignition of n-heptane fuel droplets in turbulent flow." *Proceedings of the 30th International Symposium on Combustion (2005)*, Chicago, July 26-29, 2004.
68. Jhavar, R. and C.J. Rutland, 2005, "Effects of Mixing on Early Injection Diesel Combustion," SAE Paper 2005-01-0154, SAE 2005 International Congress, April 11-14, 2005.
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71. Piscaglia, F., C.J. Rutland, D.E. Foster, 2005, "Development of a CFD Model to Study the Hydrodynamic Characteristics and the Soot Deposition Mechanism on the Porous Wall of a Diesel Particulate Filter," SAE Paper 2005-01-0963, SAE 2005 International Congress, April 11-14, 2005.
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77. Narayanaswamy, K., and C.J. Rutland, 2006 "A Modeling Investigation of Combustion Control Variables during DI-Diesel HCCI Engine Transients," SAE Paper 2006-01-1084, SAE International Congress, April 3-6, 2006, Detroit, MI
78. Hu, B. and C. J. Rutland, 2006 "Flamelet Modeling with LES for Diesel Engine Simulations," SAE Paper 2006-01-0058, SAE International Congress, April 3-6, 2006, Detroit, MI
79. Jhavar, R. and C.J. Rutland, 2006 "Using Large Eddy Simulations to Study Mixing Effects in Early Injection Diesel Engine Combustion," SAE Paper 2006-01-0871, SAE International Congress, April 3-6, 2006, Detroit, MI

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86. Hu, Bing, Rahul Jhavar, Satbir Singh, Rolf D. Reitz, and C.J. Rutland, 2007, "LES Modeling of Diesel Combustion under Partially Premixed and Non-premixed Conditions," SAE Paper 2007-01-0163, SAE International Congress, Detroit, MI April 2007.
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92. Hu, B., C.J. Rutland, T. Shethaji, 2008, "Combustion Modeling of Conventional Diesel-type and HCCI-type Diesel Combustion with Large Eddy Simulation," SAE Paper 2008-01-0958, SAE International Congress, Detroit, MI April 2008.
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