

## **RESUME** - Richard Steven Miller

Associate Professor  
Department of Mechanical Engineering  
Clemson University  
Clemson, South Carolina 29634-0921  
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September 22, 1969  
Smithtown, New York  
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## **EDUCATION**

Ph.D., State University of New York at Buffalo, June, 1995, Mechanical Engineering  
M.S., State University of New York at Buffalo, June, 1993, Mechanical Engineering  
B.S., State University of New York at Buffalo, January, 1992, Mechanical Engineering

## **PROFESSIONAL EXPERIENCE**

Clemson University, 2005-, Associate Professor of Mechanical Engineering  
Clemson University, 1999-2005, Assistant Professor of Mechanical Engineering  
Jet Propulsion Laboratory, 1995-1999, Caltech Postdoctoral Scholar  
State University of New York at Buffalo, 1992-1995, Graduate Research Assistant  
State University of New York at Buffalo, 1991-1992, Undergraduate Research Assistant  
State University of New York at Buffalo, 1991, Teaching Assistant

## **MEMBERSHIPS**

Senior Member, American Institute of Aeronautics and Astronautics, AIAA (1991- )  
Member, American Physical Society, APS (1999- )  
Member, The Combustion Institute, (1992- )

## **PROFESSIONAL ACTIVITIES**

Technical Committee Member, Institute of Liquid Atomization and Spray Systems, ILASS,  
Computational and Modeling Committee, (1996-1998)

Technical Committee Member, Institute of Liquid Atomization and Spray Systems, ILASS  
Propulsion (Gas Turbines and Rockets) Committee, (1998)

## **PUBLICATIONS**

### **Books and Monographs**

Jaberi, F.A., Miller, R.S., and Givi, P., "Conditional Expected Dissipation and Diffusion in Turbulent Scalar Mixing and Reaction," chapter in *Transport Phenomena in Combustion*, Edited by Chan, S.H., Taylor & Francis, Washington, D.C., pp. 885-896, 1996.

Miller, R.S., "Fundamentals of High Pressure Combustion," chapter in *High Pressure Processes in Chemical Engineering*, Edited by Maximillian Lackner, ProcessEng Engineering GmbH, In press, 2009.

### **Refereed Journal Publications**

- Miller, R.S., Frankel, S.H., Madnia, C.K., and Givi, P., "Johnson-Edgeworth Translation for Probability Modeling of Binary Scalar Mixing in Turbulent Flows," *Combustion Science and Technology*, **91**(1-3), 21-53, 1993.
- Miller, R.S., Madnia, C.K., and Givi, P., "Structure of a Turbulent Reacting Mixing Layer," *Combustion Science and Technology*, **99**(1-3), 1-36, 1994.
- Miller, R.S., Madnia, C.K., and Givi, P., "Numerical Simulation of Non-Circular Jets," *Computers & Fluids*, **24**(1), 1-25, 1995.
- Miller, R.S., Jaber, F.A., Madnia, C.K., and Givi, P., "The Structure and the Small-Scale Intermittency of Passive Scalars in Homogeneous Turbulence," *Journal of Scientific Computing*, **10**(1), 151-180, 1995.
- Jaber, F.A., Miller, R.S., and Givi, P., "Conditional Statistics in Turbulent Scalar Mixing and Reaction," *AIChE Journal*, **42**(4), 1149-1152, 1996.
- Miller, R.S., Mashayek, F., Adumitroaie, V., and Givi, P., "Structure of Homogeneous Non-Helical Magneto-hydrodynamic Turbulence," *Physics of Plasmas*, **3**(9), 1-14, 1996.
- Jaber, F.A., Miller, R.S., Madnia, C.K., and Givi, P., "Non-Gaussian Scalar Statistics in Homogeneous Turbulence," *Journal of Fluid Mechanics*, **313**, 241-282, 1996.
- Miller, R.S., and Bellan, J., "Analysis of Reaction Products and Conversion Time in the Pyrolysis of Cellulose and Wood Particles," *Combustion Science and Technology*, **119**, 331-373, 1996.
- Mashayek, F., Jaber, F.A., Miller, R.S., and Givi, P., "Dispersion and Polydispersity of Droplets in Stationary Isotropic Turbulence," *International Journal of Multiphase Flow*, **23**(2), 337-355, 1997.
- Jaber, F.A., Miller, R.S., Mashayek, F., and Givi, P., "Differential Diffusion in Binary Scalar Mixing and Reaction," *Combustion and Flame*, **109**(4), 561-577, 1997.
- Harstad, K.G., Miller, R.S., and Bellan, J., "Efficient High Pressure State Equations," *AIChE Journal*, **43**(6), 1605-1610, 1997.
- Miller, R.S., and Bellan, J., "A Generalized Biomass Pyrolysis Model Based on Superimposed Cellulose, Hemicellulose and Lignin Kinetics," *Combustion Science and Technology*, **126**(1-6), 97-138, 1997.
- Miller, R.S., and Bellan, J., "Tar Yield and Collection from the Pyrolysis of Large Biomass Particles," *Combustion Science and Technology*, **127**(1-6), 97-118, 1997.
- Miller, R.S., and Bellan, J., "Numerical Simulation of Vortex Pyrolysis Reactors for Condensable Tar Production from Biomass," *Energy and Fuels*, **12**(1), 25-40, 1998.
- Miller, R.S., Harstad, K.G., and Bellan, J., "Evaluation of Equilibrium and Non-Equilibrium Evaporation Models for Many-Droplet Gas-Liquid Flow Simulations," *International Journal of Multiphase Flow*, **24**(6), 1025-1055, 1998.
- Miller, R.S., and Bellan, J., "Direct Numerical Simulation of a Confined Three-Dimensional Gas Mixing Layer with One Stream Laden with Evaporating Hydrocarbon Droplets," *Journal of Fluid Mechanics*, **384**, 293-338, 1999.

- Miller, R.S., and Bellan, J., “Direct Numerical Simulation and Subgrid Analysis of a Transitional Droplet Laden Mixing Layer,” *Physics of Fluids*, **12**(3), 650-671, 2000.
- Miller, R.S., “Long Time Mass Fraction Statistics in Stationary Compressible Isotropic Turbulence at Supercritical Pressure,” *Physics of Fluids*, **12**(8), 2020-2032, 2000.
- Miller, R.S., Harstad, K.G., and Bellan, J., “Direct Numerical Simulations of Supercritical Fluid Mixing Layers Applied to Heptane-Nitrogen,” *Journal of Fluid Mechanics* **436**, 1-39, 2001.
- Miller, R.S., “Effects of Non-Reacting Solid Particle and Liquid Droplet Loading on an Exothermic Reacting Mixing Layer,” *Physics of Fluids*, **13**(11), 3303-3320, 2001.
- Lou, H., and Miller, R.S., “On the Scalar Probability Density Function Transport Equation for Binary Mixing in Isotropic Turbulence at Supercritical Pressure,” *Physics of Fluids*, **13**(11), 3386-3399, 2001.
- Miller, R.S., Cao, G., and Grujicic, M., “Monte Carlo Simulation of Three-Dimensional Non-Isothermal Grain-Microstructure Evolution: Application to LENS Rapid Fabrication,” *Journal of Materials Synthesis and Processing* **9**(6), 329-345, 2001.
- Grujicic, M., Cao, G., and Miller, R.S., “Computer Modeling of the Evolution of Dendrite Microstructure in Binary Alloys During Non-Isothermal Solidification,” *Journal of Materials Synthesis and Processing*, **10**(4), 191-203, 2002.
- Khatumria, V., and Miller, R.S., “Numerical Simulation of a Fuel Droplet Laden Exothermic Reacting Mixing Layer,” *International Journal of Multiphase Flow*, **29**, 771-794, 2003.
- Lou, H., and Miller, R.S., “On Ternary Species Mixing and Combustion in Isotropic Compressible Turbulence at Supercritical Pressure,” *Physics of Fluids*, **16**(5), 1423-1438, 2004.
- Srinivasan, S., Marotta, E., and Miller, R.S., “Parallel Computation of the Boltzmann Transport Equation for Microscale Heat Transfer in Multilayered Thin Films,” *Numerical Heat Transfer Part B: Fundamentals*, **46**(1), 31-58, 2004.
- Varanasi, K., Clack, H., and Miller, R.S., “On Preferential Diffusion of Binary Component Liquid Droplets Evaporating in a Two-Phase Mixing Layer,” *International Journal of Multiphase Flow*, **30**(10), 1235-1257, 2004.
- Palle, S., Nolan, C., and Miller, R.S., “Molecular Transport Effects on Real Gas Laminar Diffusion Flames at Large Pressure,” *Physics of Fluids*, **17**(10), 103601-103601-19, 2005
- Grujicic, M., Zhao, C., Dusel, E., Morgan, E., Miller, R.S., and Beasley, D., “Computational Analysis of the Thermal Conductivity of the Carbon-Carbon Composite Materials,” *Journal of Materials Science*, **41**(24), 8244-8256, 2006.
- Srinivasan, S. and Miller, R.S., “On Parallel Nonequilibrium Molecular Dynamics Simulations of Heat Conduction in Heterogeneous Materials with Three Body Potentials: *Si/Ge* Superlattice,” *Numerical Heat Transfer Part B: Fundamentals*, **52**, 297-321, 2007
- Palle, S., and Miller, R.S., “Analysis of High Pressure Hydrogen, Methane, and Heptane Laminar Diffusion Flames: Thermal Diffusion Factor Modeling,” *Combustion and Flame*, **151**, 581-600, 2007.

Acampora, K., Miller, R.S., Langan, E.M., and LaBerge, M., "Development of a Novel Vascular Simulator and Injury Model to Evaluate Smooth Muscle Cell Response Following Balloon Angioplasty," *The Annals of Vascular Surgery*, **21**(6), 734-741, 2007

Miller, R.S. and Beasley, D.E., "On Stairwell and Elevator Shaft Pressurization for Smoke Control in Tall Buildings," *Building and Environment*, **44**, 1306-1317, 2009.

Ammigan, K., Miller, R.S., and Clack, H.L., "Vaporization of Bicomponent Droplets Exposed to Asymmetric Radiant Heating," *Combustion Science and Technology*, Submitted, 2009.

### **Conference Proceedings (Reviewed)**

Jaberi, F.A., Miller, R.S., and Givi, P., "Modeling and Simulation of Conditional Scalar Statistics in Turbulent Mixing and Reaction," in *Tenth Symposium on Turbulent Shear Flows*, University Park, Pennsylvania, August 14-16, Vol. 2, 1995.

Jaberi, F.A., Miller, R.S., Madnia, C.K. and Givi, P., "Non-Gaussian Scalar Statistics in Homogeneous Turbulence," in *Tenth Symposium on Turbulent Shear Flows*, University Park, Pennsylvania, August 14-16, Vol. 3, 1995.

Miller, R.S., and Bellan, J., "On the Validity of the Assumed PDF Method for Modeling Binary Mixing/Reaction of Evaporated Vapor in Gas/Liquid-Droplet Turbulent Shear Flow," *Proceedings of the 27th International Symposium on Combustion*, pp. 1065-1072, 1998.

R. Sass, W.V. Kritikos, A.G. Schmidt, P. Beeravolu, K. Datta, D. Andrews, R.S. Miller, and D. Stanzione, "Reconfigurable Computing Cluster (RCC) Project: Investigating the Feasibility of FPGA-Based Petascale Computing," In *FCCM '07: Proceedings of the 13th Annual IEEE Symposium on Symposium on Field-Programmable Custom Computing Machines* (April 23-25, Napa Valley, CA, 2007), pp. 127-140 (IEEE Computer Society, Washington, DC, 2007).

### **Conference Proceedings (Unreviewed)**

Miller, R.S., and Frankel, S.H., "On Mathematical Modeling of Isotropic Reacting Turbulence: Stochastic Distributions and Conditional Dissipation," Presented at the *AIAA Northeast Regional Student Conference*, Buffalo, New York, April 1992.

Miller, R.S., "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer," Presented at the *AIAA Northeast Regional Student Conference*, Buffalo, New York, April 1992 (received 1st prize).

Madnia, C.K., Miller, R.S., Frankel, S.H., and Givi, P., "Method of Translation for Stochastic Modeling of Binary Scalar Mixing in Isotropic Turbulence," *Bulletin of the American Physical Society*, **37**(8) p. 1756, 45th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Tallahassee, Florida, November 22-24, 1992.

Miller, R.S., Madnia, C.K., and Givi, P., "Laminar Diffusion Flamelet Modeling for Turbulent Reacting Flows," *Bulletin of the American Physical Society*, **37**(8) p. 1755, 45th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Tallahassee, Florida, November 22-24, 1992.

Miller, R.S., "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer," AIAA Paper 93-0011, AIAA Aerospace Sciences Meeting, Reno, Nevada, January 8-11, 1993 (by invitation as winner of northeast regional student competition).

Miller, R.S., Madnia, C.K., and Givi, P., "Near Field Entrainment and Mixing in Non-Circular Jets," *Bulletin of the American Physical Society*, **38**(12) p. 2281, 46th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Albuquerque, New Mexico, November 21-23, 1993.

Miller, R.S., "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer," ICAS paper 94-10.1.4. In *The Proceedings of the 19th Congress of the International Council of the Aeronautical Sciences* (received 1st prize, ICAS/McCarthy Award), Anaheim, California, September 19-23, 1994.

Jaberi, F.A., Miller, R.S., and Givi, P., "Conditional Statistics in Turbulent Scalar Mixing and Reaction," *Bulletin of the American Physical Society*, 47th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Atlanta, Georgia, November 20-22, 1994.

Garrick, S.C., Miller, R.S., and Givi, P., "Large Eddy Simulation of Reacting Turbulent Flows," Proceedings of the 28th Fall Technical Meeting of the Combustion Institute, Eastern States Section, in *Chemical and Physical Processes in Combustion*, Clearwater Beach, Florida, December 4-7, 1994.

Miller, R.S., Jaberi, F.A., and Givi, P., "Conditional Expectations in Turbulent Scalar Mixing and Reaction," Proceedings of the 28th Fall Technical Meeting of the Combustion Institute, Eastern States Section, in *Chemical and Physical Processes in Combustion*, Clearwater Beach, Florida, December 4-7, 1994.

Miller, R.S., Mashayek, F., Adumitroaie, V., and Givi, P., "Structure of Isotropic and Homogeneous Shear Magnetohydrodynamic Turbulence," *Bulletin of the American Physical Society*, 48th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Irvine, California, November 19-21, 1995.

Miller, R.S., and Bellan, J., "Analysis of Reaction Products and Conversion Time in the Pyrolysis of Cellulose and Wood Particles," Poster session of the *26th International Symposium on Combustion*, Napoli, Italy, July 28 - August 2, 1996.

Miller, R.S., and Bellan, J., "A Generalized Biomass Pyrolysis Model Based on Superimposed Cellulose, Hemicellulose and Lignin Kinetics," *Proceedings of the 1996 Technical Meeting of the Western States Section of the Combustion Institute*, Los Angeles, California, October 28-29, 1996.

Miller, R.S., and Bellan, J., "An Idealized Direct-Contact Biomass Pyrolysis Reactor Model," *Proceedings of the 1997 Technical Meeting of the Western States Section of the Combustion Institute*, Sandia National Laboratories, California, April 14-15, 1997.

Miller, R.S., Harstad, K., and Bellan, J., "Evaluation of Equilibrium and Non-Equilibrium Evaporation Models for Many-Droplet Gas-Liquid Flow Simulations," *Proceedings of the 1997 Technical Meeting of the Western States Section of the Combustion Institute*, Diamond Bar, California, October 23-24, 1997.

Miller, R.S., and Bellan, J., "Numerical Simulation of Vortex Pyrolysis Reactors for Condensable Tar Production from Biomass," *Proceedings of the 1997 Fall Technical Meeting of the Western States Section of the Combustion Institute*, Diamond Bar, California, October 23-24, 1997.

Miller, R.S., and Bellan, J., "On the Validity of the Assumed PDF Method for Modeling Binary Mixing/Reaction of Evaporated Vapor in Gas/Liquid-Droplet Turbulent Shear Flow," *Proceedings of the 1998 Spring Technical Meeting of the Western States Section of the Combustion Institute*, Berkeley, California, March 23-24, 1998.

Miller, R.S., and Bellan, J., "Direct Numerical Simulation of a Confined Three-Dimensional Gas Mixing Layer with One Evaporating Hydrocarbon Droplet Laden Stream," *Proceedings of the 11th Annual Conference on Liquid Atomization and Spray Systems*, Sacramento, California, May 17-20, 1998.

Miller, R.S., and Bellan, J., "Evolution of Single-Phase and Droplet Laden Transitional Mixing Layers," Poster presented at the *Joint Meeting of the United States Sections: The Combustion Institute*, March 15-17, 1999.

Miller, R.S., and Bellan, J., "Evolution of Single-Phase and Droplet Laden Transitional Mixing Layers," *Proceedings of the 12th Annual Conference on Liquid Atomization and Spray Systems*, Indianapolis, Indiana, May 16-19, 1999.

Miller, R.S., Harstad, K.G., and Bellan, J., "Direct Numerical Simulations of Supercritical Mixing Layers: Heptane-Nitrogen Mixing," *Proceedings of the 12th Annual Conference on Liquid Atomization and Spray Systems*, Indianapolis, Indiana, May 16-19, 1999.

Miller, R.S., "Direct Numerical Simulation of Forced Isotropic Turbulence at Supercritical Pressure: Nitrogen-Hydrocarbon Mixtures," *Proceedings of the Eastern States Section of the Combustion Institute*, Fall 1999 Technical Meeting, October 11-13, Raleigh, North Carolina, 1999.

Miller, R.S., "Concentration Fluctuations in Compressible Turbulent Nitrogen-Hydrocarbon Mixing at Supercritical Pressure," *Bulletin of the American Physical Society*, 52th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, New Orleans, Louisiana, November 21-23, 1999.

Miller, R.S., Harstad, K., and Bellan, J., "Direct Numerical Simulation of a Supercritical Mixing Layer," *American Institute of Aeronautics and Astronautics Paper # 2000-0195*, 38th Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 2000.

Lou, H., and Miller, R.S., "Direct Numerical Simulation of Isotropic Turbulent Mixing at Supercritical Pressure," *Proceedings of the 37th Annual Technical Meeting of the Society of Engineering Science, Inc.*, Columbia, South Carolina, October 23-25, 2000.

Miller, R.S., and Lou, H., "Effects of Soret and Dufour Diffusion on Conditional Expectations in Isotropic Turbulent Mixing at Supercritical Pressure," *Bulletin of the American Physical Society*, 53th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Washington, D.C., November 19-21, 2000.

Miller, R.S., "Turbulence-Flame Modification in Particle Laden Reacting Shear Flow," *American Institute of Aeronautics and Astronautics* Paper # 2001-0193, 39th Aerospace Science Meeting, Reno, Nevada, January 8-11, 2001.

Miller, R.S., and Lou, H., "Effects of Soret and Dufour Diffusion on Ternary Mixing and Reaction in Isotropic Turbulence at Supercritical Pressure," *Bulletin of the American Physical Society*, 54th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, San Diego, California, November 20-22, 2001.

Khatumria, V.C., and Miller, R.S., "On the Effects of Reacting Liquid Fuel Droplet Loading on an Exothermic Reacting Mixing Layer," *Proceedings of the Eastern States Section of the Combustion Institute*, Fall 2001 Technical Meeting, October 13-15, Hilton Head, South Carolina, 2001.

Srinivasan, S., Marotta, E., Ochterbeck, J.M., Schwartz, R.W., and Miller, R.S., "On Microscale Heat Transfer in Thin Film Pyroelectric Sensors," *American Institute of Aeronautics and Astronautics*, 40th Aerospace Sciences Meeting, Reno, Nevada, January 14-17, 2002, AIAA Paper 2002-0498.

Khatumria, V.C., and Miller, R.S., "Effects of Liquid Fuel Droplet Loading on an Exothermic Reacting Mixing Layer," *Bulletin of the American Physical Society*, Dallas, Texas, November 24-26, 2002.

Lou, H., and Miller, R.S., "Ternary Species Mixing and Reaction in Compressible Isotropic Turbulence at Supercritical Pressure," *Proceedings of the Third Joint Meeting of the U.S. Sections of the Combustion Institute*, Chicago, Illinois, March 16-19, 2003.

Miller, R.S., Palle, S., and Nolan, C., "Effects of Soret and Dufour Diffusion on Laminar Diffusion Flames at Large Pressures," *Bulletin of the American Physical Society*, Meadowlands, New Jersey, November 23-25, 2003.

Srinivasan, S., and Miller, R.S., "Parallel Computation of Microscale Heat Conduction in Thin Films," *American Institute of Aeronautics and Astronautics*, 42th Aerospace Sciences Meeting, Reno, Nevada, January 14-17, AIAA paper # 2004-0498, 2004.

Rack, H.J., Fadel, G., Miller, R.S., Wood, J., Brown, P., and Luzinov, I., "Ultrasonic Consolidation of Advanced Materials and Composites," *Proceedings of the 2005 Design, Service and Manufacturing Research and Grantees Conference*, Scottsdale, Arizona, January 3-6, 2005.

Molz, F.J., Kozubowski, T.J., Miller, R.S., and Podgorski, K., "Scaling of  $\ln(\text{Permeability})$  in Sediments and Velocity Distributions in Turbulence: The Possibility of an Analogy," *Proceedings of the 2005 Fall Annual Meeting of the American Geophysical Union*, San Francisco, California, December 5-9, 2005.

Molz, F.J., Kozubowski, T.J., and Miller, R.S., "The Mathematical Statistics of a Second-Order Stationary Process, With Potential Applications to Permeability ( $k$ ) of Heterogeneous Sediments and Velocity ( $v$ ) in Turbulent Flows," *Proceedings of the International Symposium on Fractional Calculus*, Otago, New Zealand, January 9-13, 2006.

Acampora, K.B., Yao, H., Miller, R.S., Langan, E., and LaBerge, M., "2D CFD Characterization of a Concurrent Force in Vitro Vascular Simulator," Proceedings of the 2006 Biomedical Engineering Society Meeting, Chicago, Illinois, October 11-14, 2006.

Acampora, K.B., Langan, E.M., Miller, R.S., and LaBerge, M., "Development of a Novel Vascular Simulator and Injury Model to Evaluate Smooth Muscle Cell Response Following Balloon Angioplasty," Proceedings of the 17th Annual Winter Meeting of the Peripheral Vascular Surgery Society, Steamboat Springs, Colorado, January 26-28, 2007.

R. Sass, W.V. Kritikos, A.G. Schmidt, P. Beeravolu, K. Datta, D. Andrews, R.S. Miller, and D. Stanzione, "Reconfigurable Computing Cluster (RCC) Project: Investigating the Feasibility of FPGA-Based Petascale Computing," In FCCM '07: Proceedings of the 13th Annual IEEE Symposium on Symposium on Field-Programmable Custom Computing Machines (April 23-25, Napa Valley, CA, 2007), pp. 127-140 (IEEE Computer Society, Washington, DC, 2007).

Miller, R.S., and Beasley, D., "On Elevator Shaft Pressurization for Smoke Control in Tall Buildings," Presented at the Society of Fire Protection Engineers Professional Development Conference and Exposition: The Annual Meeting, Charlotte, North Carolina, October 13-14, 2008.

Bowers, D., Ellison, J. Beasley, D.E., and Miller, R.S., "Numerical Study of Elevator and Stairwell Shaft Pressurization Systems Using Detailed Building Models," To be presented at the Society of Fire Protection Engineers Eighth International Conference on Performance-Based Codes and Fire Safety Design Methods, Lund, Sweden, June 16-18, 2010 (Accepted).

Beasley, D.E., and Miller, R.S., "Modeling Smoke Control with Stairwell and Elevator Shaft Pressurization," To be presented at the National Fire Protection Association's 2010 Conference and Exposition, Las Vega, Nevada, June 7-10, 2010 (Submitted).

### **Other Scholarly Publications**

Miller, R.S., and Beasley, D., "On Elevator Shaft Pressurization System Standards and Codes for Smoke Control in Tall Buildings," *Fire Protection Engineering*, (Accepted), 2009

Miller, R.S. and Beasley, D., "Smoke Control by Pressurization in Stairwells and Elevator Shafts," *The Singapore Engineer*, 6-11, February, 2009.

Miller, R.S., "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer," *AIAA Student Journal*, **31**(4), 12-22, 1994. (published as recipient of the *Abe M. Zarem Award*).

### **PRESENTATIONS**

Miller, R.S., "Computer Applications in Mechanical and Aerospace Engineering," Presented at the 12th Annual Science Exploration Day for Western New York High School Students, Buffalo, New York, May 23, 1995.

Miller, R.S., and Bellan, J., "A Model of Biomass Pyrolysis in a Vortex Reactor," Presented at the National Renewable Energy Laboratory, Golden, Colorado, December 19, 1995.

Miller, R.S., and Bellan, J., "Hydrogen Production from Biomass Pyrolysis: Particle Model and Kinetics Assessment," Presented at the National Renewable Energy Laboratory, Golden, Colorado, April 2, 1996.

Miller, R.S., and Bellan, J., "Hydrogen Production from Biomass Pyrolysis: Generalized Kinetics and Idealized Reactor Model," Presented at the National Renewable Energy Laboratory, Golden, Colorado, January 23, 1997.

Miller, R.S., "Progress on the Simulation and Modeling of Turbulent Combustion at Large Pressure," Department of Mechanical Engineering Invited Seminar, University of Minnesota, September 19, 2007.

## **HONORS AND AWARDS**

Clemson University Board of Trustees Award for Faculty Excellence, 2000.

*National Science Foundation Early Career Development (CAREER) Award*, June 2000.

*NASA Certificates of Recognition*: (1997) Ten separate certificates for research performed at Jet Propulsion Laboratory.

*McCarthy Award*: First prize winner in the international student paper competition of the 19th Congress of the International Council of the Aeronautical Sciences, Anaheim, California September 19-23, 1994. This competition included 28 contestants from 11 countries with leading aerospace programs. Title of paper: "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer," ICAS paper 94-10.1.4.

*Abe M. Zarem Award* for Distinguished Achievement in Aeronautics. This national award is in relation to AIAA paper 93-0011 entitled: "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer." The award was presented at the AIAA Aerospace Sciences Meeting, Reno, Nevada, January 15-18, 1994.

*First Prize Winner* at the AIAA Technical Paper Competition, Northeast Regional Student Conference held at the State University of New York at Buffalo, Buffalo, NY, April 1992. Title of paper: "The Manifestation of Eddy Shocklets and Laminar Diffusion Flamelets in a Shear Layer."

Paper entitled "Structure of a Turbulent Reacting Mixing Layer," (by R.S. Miller, Madnia, C.K., and Givi, P., *Combustion Science and Technology*, **99**, pp. 1-36, 1994) selected for inclusion in the book *ONR Investing in the Future 1946-1996*, pp. 581-617, in celebration of the 50th Anniversary of the Office of Naval Research, Washington, DC, May 1996.

Announcement including article and photograph of *ICAS/McCarthy Award* and presentation ceremony appeared in *AIAA Student Journal*, p. 38, Winter 1995.

Announcement including article and photograph of *Abe M. Zarem Award* presentation ceremony appeared in *AIAA Student Journal*, pp. 19-20, Spring 1994 and *AIAA Student Journal*, p. 10, Fall 1993.

## **GRADUATE STUDENT ADVISING**

### **Doctoral Graduates:**

Lou, H., "On Binary and Ternary Species Mixing and Combustion in Compressible Isotropic Turbulence at Supercritical Pressure," (2002).

Srinivasan, S., "On the Heat Conduction in Semiconducting Films at Micron and Nanometer Length Scales Through Parallel Simulations of the Boltzmann Transport Equation and Molecular Dynamics," (2006).

Palle, S., "On Real Gas and Molecular Transport Effects in High Pressure Mixing and Combustion," (2006).

### **M.S. Graduates:**

Varanasi, K., "Direct Numerical Simulation of Multicomponent Fuel Droplet Laden Mixing Layers," (2001).

Srinivasan, S., "On the Numerical Simulation of Microscale Heat Transfer in Multilayered Thin Films," (2002).

Khatumria, V., "Numerical Simulation of a Fuel Droplet Laden Reacting Mixing Layer," (2002).

Madabushi, P., "Numerical Investigation of Fluid Exchange in Blind Holes and Vias," (2003).

Jones, M., "Analysis of an Anti-Matter Initiated Fusion Rocket Propulsion System," (2004).

Vasudevan, R., (M.S.), "Molecular Transport Effects in Real Gas Laminar and Turbulent Diffusion Flames," (2007).

Foster, J., (M.S.), "A Priori Analysis of Subgrid Scalar Phenomena and Mass Diffusion in Turbulent Hydrogen-Oxygen Flames," (2009).

### **Current Graduate Advising**

Lowe, D., (M.S.), "Simulation of High Pressure Turbulent Flames," (May 2010).

Dave, P., (M.S.), "Subgrid Analysis of Hydrogen-Oxygen Flames," (May 2010).

Gaulden, T., (M.S.), "Physics of Heat Transfer in Micro-Channels," (May 2010).

### **TEACHING**

#### **Courses Taught (Beginning Fall 1999)**

ME 203, Foundations of Thermal and Fluid Systems, S03, Sum04, Sum05, F05, Summer06, F06, Summer07, S08, Summer08, Summer09.

ME 205, Computer Methods in Engineering, F03, S04, F04, S05.

ME 303, Thermodynamics, F04, Sum05, S06, Summer06, S07, F07, Summer 09.

ME 308, Fluid Mechanics, F00, F01, S02, Summer02, Summer07, Summer08.

ME 401, Mechanical Engineering Design, F08, S09.

ME 402, Senior Design Project, S99, F00, F04, F08.

ME 493, Computational Methods in Fluid and Thermal Sciences, S01.

ME 814, Concepts in Turbulent Flow, F99, F01, F02, F03, F05, F06, F07.

ME 819, Computational Fluid Dynamics, S00, S01, S02, S03, S04, S05, S06, S07, S08, S09.

### **New Course Development**

ME 493, Computational Methods in Fluid and Thermal Sciences, This course was introduced and taught by Dr. Miller as an undergraduate technical elective in S01.

## **UNIVERSITY AND PUBLIC SERVICE**

### **Committees**

Department : Member, Faculty Search Committee (TFS) (F05 - S06)

Department: Chair, Graduate Research Committee (F05 - S08)

Department: Member, Graduate Research Committee (F03 - )

Department: Member, Computer Utilization Committee (F05 - )

Department: Chair, Computer Utilization Committee (F99 - F05)

Department: Member, Scholarships, Honors and Awards (S99)

Department: Member, Reappointment Review of Department Chair Committee (F05)

Department: Member, Tienken Professorship Selection Committee (F01)

College: Member, Executive Computer Committee (F99 - F05)

### **Other Service**

Graduate Program Coordinator, Department of Mechanical Engineering, (F05 - )

Chair, Thermal and Fluid Sciences (TFS) ME group (F05 - S08)

System Administrator, Department of Mechanical Engineering Beowulf parallel computing clusters. This 48 processor parallel computing cluster was constructed by Dr. Miller for the Department of Mechanical Engineering using funds contributed by the Department, several faculty members through incentive funds, and by NSF funds obtained through an equipment grant by Dr. Miller. This cluster has greatly enhanced the computing power available to the Department and has introduced seven faculty members to parallel computing. A new 32 processor cluster was added to the Department in August of 2006.

## **MISCELLANEOUS**

### **Undergraduate Research Advising**

Nolan, Christopher, "Real Gas State Equation Effects for Turbulent Flow Simulations," Supported by the National Science Foundation, (2000 - 2004).

Taylor, Scott "Simulation of Fluid Flow Over Printed Circuit Boards," Project Supported by Shipley Corporation, Student enrolled in ME 415H (with Thesis), (2002 - 2003).

Nakamura, Koichiro, "Simulation of Fluid Flow Over Printed Circuit Boards," Project Supported by Shipley Corporation, Student enrolled in ME 415H (with Thesis), (2002 - 2003).

Shull, James, "Real Gas State Equation Effects for Turbulent Flow Simulations," Supported by the National Science Foundation, (2000 - 2002).

Thompson, Brian, "Simulation of Fluid Flow Over Printed Circuit Boards," Project Supported by Shipley Corporation, Student enrolled in ME 415, (2002 - 2002).

Howison, Jason, "Investigation of Lewis Number Effects in Real Gas Laminar Diffusion Flames," ME 415, Spring 2006.

Stowe, David, "Molecular Transport Effects in Real Gas Laminar Diffusion Flames," ME 415H, Spring 2006 - Fall 2006.

Lowe, Daniel, "Analysis of High Pressure Flames," ME 415, Fall 2007 - Spring 2008.

Bowers, Daniel, "Shaft Pressurization for Smoke Control in Tall Buildings," ME 415, Spring 2009 - Fall 2009.

Ellison, Joel, "Analysis of Shaft Pressurization Systems in a Seventy Story Residential Building," ME 415H, Spring 2009 - Fall 2009.

### **Conference Session Chairperson**

Western States Section of the Combustion Institute, WSSCI, Fall Meeting, Theory and Numerical Modeling Session, October 23, 1997

Western States Section of the Combustion Institute, WSSCI, Spring Meeting, Theory and Numerical Modeling Session, March 18, 1998

Institute of Liquid Atomization and Spray Systems, ILASS, Americas 1998 meeting, Spray Modeling Session, May 18, 1998

1999 Joint Meeting of the United States Sections of the Combustion Institute, Droplets and Spray Combustion Session, March 15, 1999

Eastern States Section of the Combustion Institute, ESSCI, Fall Meeting, Solid Fuels and Processes Session, October 12, 1999

54th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, November 20-22, 2001, Turbulent Mixing I

Eastern States Section of the Combustion Institute, ESSCI, 2001 Technical Meeting, Flame Systems: Experiments and Computation Session, December 4, 2001

55th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, November 24-26, 2002, Multiphase and Particle Laden Flows II.

### **Refereed Journal Reviews**

AIAA Journal

AIAA Journal of Propulsion and Power

Applied Mathematics Letters

ASME Journal of Fluids Engineering

Building and Environment

Chemical Engineering Science

Combustion and Flame

Combustion Science and Technology

Environmental Science and Technology

Journal of Analytical and Applied Pyrolysis

Journal of Fluid Mechanics

Journal of Turbulence

International Journal of Heat and Fluid Flow

International Journal of Heat and Mass Transfer

International Journal of Hydrogen Energy

International Journal of Multiphase Flow

International Journal for Numerical Methods in Engineering

International Journal for Numerical Methods in Fluids

Physics of Fluids

Physics of Plasmas

### **Proposal Reviews**

National Science Foundation (individual proposal reviewer)

Department of Energy Panel Review Member: SciDAC-2 Petascale Computing Initiative (\$1M - \$15M), (2006).

National Science Foundation Panel Review Member: Information Technology - Small, (2001)

National Science Foundation Panel Review Member: Information Technology - Small, (2002)

National Science Foundation CAREER Panel Review Member (Chemical Transport Systems), (2005)

Swiss Federal Institute of Technology Zurich

International Science and Technology Center

### **Other Reviews**

McGraw Hill Publishers (Undergraduate Fluid Mechanics text review), (2003 - 2004)

*Updated* September 2, 2009