CURRICULUM VITAE
(abbreviated)

James J. Riley

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General biographical information

Basic Data

Name: James J. Riley
Professor Emeritus, Mechanical Engineering

Educational History

Degrees: Ph.D., Fluid Mechanics, The Johns Hopkins University, 1972
Thesis supervisor: Stanley Corrsin
B.A., Physics, Rockhurst College, 1965

Employment History

Acting chair, Mechanical Engineering, University of Washington, 1997 to 1999
Professor Emeritus, Mechanical Engineering, University of Washington, 2018 to present
Professor, Mechanical Engineering, University of Washington, 1985 to 2018
Adjunct Professor, Applied Mathematics, University of Washington, 1985 to 2018
Adjunct Professor, Aeronautics & Astronautics, University of Washington, 2011 to present
Associate Professor, Mechanical Engineering, University of Washington, 1983 to 1985
Department Manager and Program Manager, Flow Industries, Inc., 1977 to 1983
Senior Research Scientist, Flow Industries, Inc., 1975 to 1983
Research Scientist, Flow Industries, Inc., 1973 to 1975
Research Physicist, Naval Research Laboratory, 1972 to 1973
Post-Doctoral Visiting Scientist, National Center for Atmospheric Research, 1971 to 1972
Chaire de Mathematiques Industrielles, l'Université Joseph Fourier, Grenoble, France, 1989 to 1992 (part-time, visiting chaired position)

Awards/Honors:

National Academy of Engineering
Washington State Academy of Sciences
Senior Visiting Fellow, Isaac Newton Institute,
Cambridge University, Cambridge, U.K.
NATO Research & Technology Organization Lecturer,
Universidad Politecnica de Madrid, Spain
Director's Award, US Geological Service (2010)
Invited lecturer, Midwest Universities Lecture Tour (twice)
Visiting Award from Université Paul Sabatier,
Toulouse, France (twice)
PACCAR Professor of Engineering
Fellow, American Physical Society (1988)
Chair, Division of Fluid Dynamics, American Physical Society (twice)
Fellow, American Society of Mechanical Engineers (2003)
Fellow, American Association for the Advancement of Science (2018)
Fellow, Institute of Physics (2004)
Senior Scientific Fellow, Battelle Pacific Northwest National
Laboratories (1989)
Chaire de Mathematiques Industrielles, l'Université Joseph Fourier,
Grenoble, France (visiting chaired professorship)
Fellow, Center for Turbulence Research (Stanford/NASA Ames)
German Government Sabbatical Leave Fellowship
Australian Government Gleddon Visiting Fellowship
2016 Success Story, U. S. Navy
High Performance Computing Program
Honored in Special Session,
International Symposium on Stratified Flows (2016)
College of Engineering Faculty Research Award (2018)
Member, Johns Hopkins University Society of Scholars (2021)

Consulting:

Nu Power Technologies (board of advisors), May, 2002 to 2005
Midwest Dental Products, March, 2000 to March, 2001
Northwest Research Associates, 1990 to present
Battelle Pacific Northwest National Laboratories, 1989 to present
Corbis, Inc., 1995
Los Alamos National Laboratory, 1992
Flow Industries, Inc., 1983 to 1985

Publications

Refereed Archival Journal Publications

Mashayek, A., J. Gula, L. E. Baker, A. C. Naveira Garabato, L. Cimoli, and J. J. Riley. 2024. "On the role of seamounts in upwelling deep-ocean waters through turbulent mixing", *Proc. Nat. Acad. Sci.*, **121**(27):e2322163121.

Riley, J. J. , M. M. P. Couchman, and S. M. de Bruyn Kops. 2023. "The effect of Prandtl number on decaying stratified turbulence", *J. Turb.*, **24**(6-7):330-348.

Blakeley, B. C. B. J. Olson, and J. J. Riley. 2023. "On the evolution of scalar iso-surface area density in a turbulent mixing layer", *J. Fluid Mech.*, **966**:A33.

Tiwari, A., S. Devasia, and J. J. Riley. 2023. "Low-distortion information propagation with noise suppression in swarm networks", *Proc. Nat. Acad. Sci.*, **121**(11):e2219948120.

Riley, J. J. 2022. "How does turbulence mix a stratified fluid?", *J. Fluid Mech.*, **952**: F1.

Blakeley, B. C., B. J. Britton, and J. J. Riley. 2022. "Self-similarity of scalar iso-surface area in a temporal mixing layer", *J. Fluid Mech.*, **951**, A44.

Shete, K. P., D. J. Boucher, J. J. Riley, and S. de Bruyn Kops. 2022. "Effects of viscous-convective subrange on passive scalar statistics at high Reynolds number", *Phys. Rev. Fluids*, **7**(2): 024601.

Guan, Y., J. J. Riley, and I. Novosselov. 2020. "Three-dimensional electroconvective vortices in cross flow", *Phys. Rev. E*, **101**(3):033103.

Perfect, B., N. Kumar, and J. J. Riley. 2020. "Energetics of seamount wakes. Part II: Wave fluxes", **50**(5):1383-1398.

Perfect, B., N. Kumar, and J. J. Riley. 2020. "Energetics of seamount wakes. Part I: Energy exchange", *J. Phys. Ocean*, **50**(5):1365-1382.

Guan, Y., J. J. Riley, and I. Novosselov. 2020. "Three-dimensional electroconvective vortices in cross flow", *Phys. Rev. E*, **101**(3): 033103.

Watanabe, T., J. J. Riley, K. Nagata, K. Matsude, alnd R. Onishi. 2019. "Hairpin vortices and highly elongated flow structures in a stably-stratified shear layer", *J. Fluid Mech.*, **878**:37-61.

Blakeley, B. C., W. Wang, and J. J. Riley. 2019. "On the kinematics of scalar iso-surfaces in decaying homogeneous, isotropic turbulence", *J. Turb.*, **20**(10): 661-680.

de Bruyn Kops, S. M., and J. J. Riley. 2019. "The effects of stable stratification on the decay of initially isotropic homogeneous turbulence", *J. Fluid Mech.*, **860**: 787-821.

Perfect, B. H., J. J. Riley, and N. Kumar. 2018. "Vortex structures in the wake of an idealized seamount in stratified, rotating flow", *Geophys. Res. Ltrs.*, **45**(17): 9098-9105.

Watanabe, T., J. J. Riley, K. Nagata, R. Onishi, and K. Matsuda. 2018. "A localized turbulent mixing layer in a uniformly stratified environment", *J. Fluid Mech.*, **849**: 245-276.

Gregg, M. C. E. A. D'Asaro, J. J. Riley, and E. Kunze. 2018. "Mixing efficiency in the ocean", *Annu. Rev. Mar. Sci.*, bf 10:443-474, 2018.

Watanabe, T., J. J. Riley, and K. Hagata. 2017. "Turbulent entrainment across turbulent/nonturbulent interfaces in stably stratified mixing layers", *Phys. Rev. Fluids*, **2**(10): 104803.

Riley, J. J., O. Flores, and A. R. Horner-Devine. 2017. "On the dynamics of turbulence near a free surface", *J. Fluid Mech.*, **821**:248-265.

Watanabe, T., J. J. Riley, and K. Nagata. 2016. "Effects of stable stratification on turbulent/non-turbulent interfaces in turbulent mixing layers", *Phys. Rev. Fluids*, **1**:044301.

Watanabe, T., J. J. Riley, S. M. de Bruyn Kops, P. J. Diamessis, and Q. Zhou. 2016. "Turbulent/non-turbulent interfaces in wakes in stably stratified fluids", *J. Fluid Mech.*, **797**:R1.

Sudharsan, M., S. L. Brunton, and J. J. Riley. 2016. "Lagrangian coherent structures and inertial particle dynamics", *Phy. Rev. E*, **93**(3):033108.

Thyng, K. M., J. J. Riley, and J. Thomson. 2013. "Inference of turbulence parameters from a ROMS simulation using the k-ϵ closure scheme", *Ocean Modeling*, **72**:104-118.

Hinz, D. F., T.-Y. Kim, J. J. Riley, and E. Fried. 2013. "*a priori* testing of α-regularisation models as subgrid-scale closures for large-eddy simulations", *J. Turbulence*, **14**(6):1-20.

McGah, P. M., D. F. Leotta, K. W. Beach, R. E. Zierler, J. J. Riley, and A. Aliseda. 2012. "Hemodynamic conditions in a failing peripheral artery bypass graft", *J. Vasc. Surg.*, **56**(2):403-409.

Kim, J. H., et al. 2012. "Immunosensor towards low-cost, rapid doagnosis of tuberculosis", *Lab on a Chip*, **12**(8):1437-1440.

Lee, H. B., et al. 2012. "Enhanced bioreaction efficiency of a microfluidic mixing toward high-throughput and low-cost bioassays, **12**(1-4):143-156.

Kongthon, J., J. H. Chung, J. J. Riley, and S. Devasia. 2011. "Dynamics of cilia-based microfluidic devices", **133**(5):051012.

Flores, O., and J. J. Riley. 2011. "Analysis of turbulence collapse in the stably stratified surface layer using direct numerical simulation", *Bound. Layer Meteor.*, **139**(2):241-259.

McGah, P. M., D. F. Leotta, K. W. Beach, J. J. Riley, and A. Aliseda. 2011. "A longitudinal study of remodeling in a revised peripheral artery bypass graft using 3D ultrasound imaging and computational hemodynamics", *J. Biomech. Engr.–Trans. ASME*, **133**(4):041008.

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Oh, K., B. Smith, S. Devasia, J. J. Riley, and J. H. Chung. 2010. "Characterization of mixing performance for bio-mimetic silicone cilia", *Microfluid. Nanofluid.*, **9**(4-5):645-655.

Oh, K., J. H. Chung, S. Devasia, and J. J. Riley. 2009. "Bio-mimetic silicone cilia for microfluidic manipulation", *Lab on a Chip*, **9**(11):1561-1566.

Schwarzkopf, J. D., C. T. Crowe, J. J. Riley and S. Wetchagarun. 2009. "Direct numerical simulation of stationary particles in homogeneous turbulence decay: Application of the k-epsilon model", *Int. J. Multiphase Flow*, **35**(5):411-416.

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E. Lindborg and J. J. Riley. 2007. "A condition on the average Richardson number for weak nonlinearity of internal gravity waves", *Tellus Series A – Dyn. Meteorol. and Ocean.*, **59**(5), pp. 781-784.

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Oh, K., J.-H. Chung, J. J. Riley, Y.-L. Liu, and W.-K. Liu. 2007. "Fluid flow-assisted dielectrophoretic assembly of nonowires", *Langmuir*, **23**(23), pp. 11932-11940.

Nichols, J. W., P. J. Schmidt, and J. J. Riley. 2007. "Self-sustained oscillations in variable-density jets", *J. Fluid Mech.*, **582**, pp. 341-376.

Riley, J. J. 2006. "Review of large-eddy simulation of non-premixed turbulent combustion", *J. Fluids Engr. – Trans. ASME*, Vol. 128(2), pp. 209-215.

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Mitarai, S., G. Kosály, and J. J. Riley. 2004. "A new Lagrangian flamelet model for local flame extinction and re-ignition", *Comb. Flame*, Vol. 137(3), pp. 306-319.

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Mitarai, S., J. J. Riley, and G. Kosály. 2003. "A Lagrangian study of scalar diffusion in isotropic turbulence with chemical reaction", *Phys. Fluids*, Vol. 15, pp. 3856-3866.

Martin, S. M., G. Kosály, J. C. Kramlich, and J. J. Riley. 2003. "The premixed conditional moment closure method applied to idealized lean premixed gas turbine combustors", *J. Engr. for Gas Turbines and Power*, Vol. 125, pp. 895-900.

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Cook, A. W., J. J. Riley, and G. Kosály. 1997. "A laminar flamelet approach to subgrid-scale chemistry in turbulent flows", *Comb. Flame*, Vol. 109, pp. 332-341.

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Montgomery, C. J., G. Kosály, and J. J. Riley. 1997. "Direct numerical simulation of turbulent nonpremixed combustion with multistep hydrogen-oxygen kinetics", *Comb. Flame*, Vol. 109, pp. 113-144.

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Cook, A. W., and J. J. Riley. 1994. "A subgrid model for equilibrium chemistry in turbulent flows", *Phys. Fl.*, Vol. 6(8), pp. 2868-2870.

Mell, W. E., V. Nilsen, G. Kosály, and J. J. Riley. 1994. "Investigation of closure models for nonpremixed turbulent reacting flows", *Phys. Fl.*, Vol. 6(3), pp. 1331-1356.

Mell, W. E., V. Nilsen, G. Kosály, and J. J. Riley. 1993. "Direct numerical simulation investigation of the conditional moment closure model for nonpremixed turbulent reacting flows", *Combust. Sci. Tech.*, Vol. 91, pp. 179-186.

Yanase, S., C. Flores, O. Métais, and J. J. Riley. 1993. "Rotating free shear flows. Part 1: linear stability analysis", *Phys. Fl.*, Vol. 5(11), pp. 2725-2737.

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Winters, K. B., and J. J. Riley. 1992. "Instability of internal waves near a critical level", *Dynam. Atmos. Oceans*, Vol. 16, pp. 249-278.

Chen, C., J. J. Riley, and P. A. McMurtry. 1991. "An investigation of Favre averaging in turbulent flows with chemical reaction", *Combust. Flame*, Vol. 87, pp. 257-277.

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Herring, J. R., J. J. Riley, G. S. Patterson, Jr., and R. H. Kraichnan. 1973. "Growth of Uncertainty in Decaying Isotropic Turbulence", *J. Atmos. Sci.*, Vol. 30, pp. 997-1006.

Chapters of Books:

Riley, J. J. 2023. "Turbulent Mixing", to appear in *Turbulent Flows in Natural and Human-Made Environments*, E. R. Bou-Zeid and S. Sarkar, editors, Elsevier.

Riley, J. J. 2021. "Turbulence in stably stratified fluids", in *Advanced Approaches in Turbulence*: 483-523, P. Durbin, editor, Elsevier.

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Riley, J. J., and R. W. Metcalfe. 1980. "Direct Numerical Simulations of a Perturbed, Turbulent Mixing Layer", AIAA-80-O274, presented at the 18th Aerospace Sciences Meeting, January, 30 pages.

Miscellaneous

Adrian, R. J., C. Meneveau, R. D. Moser and J. J. Riley. 2000. "Final Report on 'Turbulence Measurements for LES' Workshop", available on the World Wide Web at: www.me.washington.edu/les.

Contributor to the CD-ROM entitled *Leonardo da Vinci*, published by Corbis, Inc., 1996

Additional

Numerous other papers in the proceedings of meetings, conferences, workshops and symposia; numerous industrial reports

Other Scholarly Activities

Invited Seminars

Brown University, May, 2023
University of California, Irvine, September, 2022
University of Pittsburgh, January, 2020
Woods Hole Oceanographic Institute, July, 2019
Stanford University, February, 2019
University of California, San Diego, April, 2018
University of Notre Dame, April, 2018
University of Southern California, November, 2017
University of Toronto, April, 2017
Texas Tech University
President's Distinguished Lecture Series, October, 2015.
University of Houston, November, 2013
University of British Columbia, January, 2012
Okinawa Institute for Science and Technology, July, 2011.
National Center for Atmospheric Research, Boulder, June, 2010.
University of Texas, Austin, March, 2010.
Stanford University, March, 2010.
St. Andrews University, December, 2008.
Cambridge University, November, 2008.
Imperial College London, October, 2008.
Northwestern University, March, 2008.
University of Notre Dame, March, 2008.
Illinois Institute of Technology, March, 2008.
University of Illinois CU, March, 2008.
Purdue University, March, 2008.
Washington State University, November, 2007.
University of Michigan, September, 2007.
Michigan State University, September, 2007.
Iowa State University, September, 2007.
University of Wisconsin, September, 2007.
University of Minnesota, September, 2007.

Institut de Recherche sur les Phénomenes Hors Equilibre,
Marseille, France, July, 2007.
Institut de Mecanique des Fluides, Toulouse, France, July, 2006
Northwest Research Associates, Bellevue, Washington, September, 2005
University of Western Australia, Perth, Australia, June, 2004
Royal Melbourne Institute of Technology, Melbourne, Australia, June, 2004
Monash University, Melbourne, Australia, June, 2004
Curtin University of Technology, Perth Western Australia, May, 2004
University of Western Australia, Perth, Western Australia, April, 2004
California Institute of Technology, November, 2003
Technische Universität Berlin, June, 2003
Politecnico di Milano, May, 2003
Institut für Technische Mechanik, RWTH Aachen, May, 2003
Technische Universität München, April, 2003
University of Washington, Aeronautics & Astronautics, January, 2003
Arizona State University, April, 2001
University of California, San Diego, April, 2001
Stanford University, March, 2001
Lawrence Livermore National Laboratory, July, 1999
California Institute of Technology, January, 1999
Stanford University, July, 1998
Lawrence Livermore National Laboratory, July, 1998 (2 seminars)
Battelle PNNL, August, 1997
University of Washington, Civil Engineering, January, 1997
Johns Hopkins University, May, 1996
University of Maryland, May, 1996
University of California, Irvine, April, 1996
University of California, San Diego, April, 1996
Midwest Lecture Tour: Notre Dame U., Illinois Institute of Technology,
U. Illinois, Champagne-Urbana, Purdue U., March, 1996
Midwest Lecture Tour: U. Michigan, Michigan St. U., Northwestern U.,
U. Minnesota, October, 1995
University of Southern California, March, 1995
University of Western Australia, Perth, September, 1994
University of Sydney, Australia, September, 1994
California Institute of Technology, January, 1992
University of Southern California, January, 1992
Los Alamos National Laboratory, November, 1991
Lawrence Livermore National Laboratory, May, 1991
Universidad de Zaragoza, Spain, September, 1990
Centre National de Recherches Meteorologiques, Toulouse, France,
August, 1990
École Centrale de Lyon, France, July, 1990
Politecnico di Torino, Italy, June, 1990 (2 seminars)

Institut de Mécanique de Grenoble, France, May, 1990
University of Houston, February, 1990
Boeing Commercial Airplane Company, October, 1989
Arizona State University, September, 1989
University of Arizona, August, 1989
Northwest Research Associates, January, 1989
Stanford University Series on Turbulence in the Environment,
February, 1988
Battelle PNNL, December, 1987
Arizona State University, October, 1987

Invited Presentations at Meetings/Workshops

Fundamental Aspects of Geophysical Turbulence
Nagoya, Japan, March, 2018
International Symposium on Stratified Flows
San Diego, August, 2016
Keynote Speaker, Canadian Society of Mechanical Engineering
Annual Meeting, July, 2016
Stratified Turbulence in the 21st Century
The Royal Society
The Royal Society at Chicheley Hall, UK, March, 2016
Waves and Turbulence in Rotating,
Stratified and Electrically-Conducting Fluids
Oxford, UK, September, 2015
Fundamental Aspects of Geophysical Turbulence
National Center for Atmospheric Research
Boulder, CO, August, 2015
International Centre for Mechanical Sciences
Mixing and Dispersion in Flows Dominated by
Rotation and Buoyancy
Series of Lectures
Udine, Italy, July, 2015
Keynote Speaker, Euromech Colloquium 567
Turbulent Mixing in Stratified Flows
Cambridge University, Cambridge, UK, March, 2015
Waves and Turbulence in Geophysics
Cambridge University, Cambridge, UK, July, 2014
Fundamental Aspects of Geophysical Turbulence
Nagoya, Japan, March, 2014
Los Alamos Ocean Turbulence Conference
Sante Fe, NM, June, 2013.
International Conference on Theoretical and Applied Mechanics
Beijing, China, August, 2012
European Turbulence Conference

Warsaw, Poland, September, 2011

Plenary Speaker, ASME-JSME-KSME
Joint Fluids Engineering Conference
Hamamatsu, Japan, July, 2011

Plenary speaker, Annual Meeting of the Division of
Fluid Dynamics of the American Physical Society,
November, 2010.

Keynote speaker, NCAR Geophysical Turbulence Workshop,
National Center for Atmospheric Research
Boulder, CO, August, 2010

Euromech Colloquium on Small-Scale Turbulence,
Turin, Italy, October, 2009.
Could not attend, health-related issue.

International Symposium on Turbulence,
Beijing, November, 2009.
Could not attend, health-related issue.

Plenary Speaker, 12th European Turbulence Conference,
Marberg, Germany, September, 2009.
Could not attend, health-related issue.

Workshop on Inertial Range Dynamics and Mixing,
Cambridge, UK, September, 2008.

IUTAM Workshop: Rotating Stratified Turbulence and
Turbulence in the Atmosphere and Oceans,
Cambridge, UK, December, 2008.

Keynote speaker, Density Effects in Fluid Dynamics Workshop,
Los Alamos National Laboratory, December, 2007

Institute for Mathematical Sciences Turbulence Workshop,
Imperial College London, March, 2007

Keynote speaker, Sedona International Workshop on Stable
Atmospheric Boundary Layers, November, 2006

Spontaneous Imbalance Workshop, Seattle, August, 2006

Keynote speaker, Geophysical Turbulence Workshop,
National Center for Atmospheric Research,
Boulder, July, 2005

LES/SGS Workshop, California Institute of Technology, November, 2003

31st AIAA Fluid Dynamics Conference, June, 2001

IUTAM 2001, invited session chair and discussion moderator, June

ASME Fluids Engineering Summer Meeting, Symposium on the
Role of Industry in Developing Fluid Power Generating Systems,
May, 2001

European Geophysical Society, April, 2000, Nice, France

NSF Workshop on Turbulence Measurements for LES, October, 1999

Second AFOSR Conference on DNS and LES, June, 1999, Rutgers

Workshop on the Role of DNS in Turbulence Research, March, 1999,
University of California, Santa Barbara
Mexican Physical Society, Annual Meeting, October, 1998
Sandia National Laboratory, June, 1998,
DOE Scientific Simulation Initiative Workshop
European Summer School on Turbulence, June, 1998, Stockholm
(series of lectures)
Lawrence Livermore National Laboratory, June, 1997,
Workshop on Turbulent Transport and Numerical Modeling
Sandia National Laboratory, Combustion Modeling Workshop,
September, 1997
Los Alamos National Laboratory, June, 1997,
Workshop on Turbulence and Transport Modeling
Workshop on Computing the Future II, June, 1997
National Center for Atmospheric Research, August, 1996,
Workshop on Stratified and Rotating Turbulence
American Water Resource Association, November, 1996,
Annual Meeting
American Physical Society, November, 1995
48th Meeting of the Division of Fluid Dynamics
Los Alamos National Laboratory, May, 1995
Nonlinear Phenomena in Ocean Dynamics
EUROMECH 339, Internal Waves, Turbulence and Mixing
in Stratified Fluids, Lyon, France, September, 1995
EUROMECH Course on Computational Fluid Mechanics, Les Houches,
France, June, 1993 (series of lectures)
Thirteenth Symposium on Turbulence
University of Missouri, Rolla, September 1992
Los Alamos National Laboratory, Reactive Turbulence Workshop,
Center for Nonlinear Studies (2 papers), August, 1992
University of Hawaii Workshop on the Dynamics of Oceanic Internal
Gravity Waves, January, 1991
NASA Langley Research Center/ICASE Combustion Workshop,
October, 1989
American Meteorology Society, April, 1989
Seventh Conference on Atmospheric and Oceanic Waves
and Stability
American Physical Society, November, 1998
41st Meeting of the Division of Fluid Dynamics
Brown University/Yale University Free Shear Flows Conference, June, 1988
United States-France Joint Workshop on Turbulent Reacting Flows,
Rouen, France, July, 1987
Symposium on Prospects of Turbulence Research, the National Center for
Atmospheric Research, June, 1987

American Institute of Aeronautics and Astronautics
Fluid Dynamics and Plasma Dynamics Meeting, June, 1987
Second International Symposium on Stratified Flows, Caltech, January, 1987
American Meteorology Society, November, 1985
Seventh Symposium on Turbulence and Diffusion
Société Francaise de Physique Congres National, Nice, September, 1985
International Workshop: Puzzles in Free Shear Layers, Brown University, November, 1984
Conference on Fundamentals in Fluid Mechanics, Northwestern University, June, 1984

Additional

Numerous other presentations at meetings, conferences, workshops and symposia

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