

## PUBLICATIONS OF ROBERT M. KERR

### Books

2. Kerr, R.M. & P. Fox (editors) 2000: *Geophysical and Astrophysical Convection* Gordon and Breach.
1. Kerr, R.M., & Y. Kimura (editors) 2000: *Developments in Geophysical Turbulence*. Proceedings of the IUTAM symposium at the National Center for Atmospheric Research, Boulder, CO 16-19 June 1998. Kluwer Academic Publishers, Dordrecht.

### Thesis, Refereed Publications

- 42 Gibbon, J.D., M.D. Bustamante, R.M. Kerr 2008: The three-dimensional Euler equations: singular or non-singular?, *Nonlinearity* **21**, T123-T129.
- 41 Bustamante, M.D. & R. M. Kerr 2008: 3D Euler about a 2D symmetry plane. *Physica D*, **237**, 1912-1920.
- 40 Liu, Y., P.G. Tucker and R.M. Kerr 2008: Linear and nonlinear model large-eddy simulations of a plane jet. *Computers and Fluids* **37**, 439-449.
- 39 Holm, D.D. and R.M. Kerr 2007: Helicity in the formation of turbulence *Phys Fluids* **19**, 025101.
- 38 Gibbon, J.D., D.D. Holm, R.M. Kerr, I Roulstone 2006: Quaternions and particle dynamics in the Euler fluid equations, *Nonlinearity* **19**, 1969-1983.
- 37 Kerr, R.M., 2005: Velocity and scaling of collapsing Euler vortices *Phys. Fluids* **17**, 075103.
- 36 Kerr, R.M., 2005: Vortex collapse and turbulence *Fluid Dyn Res* **36**, 249-260.
- 35 Holm, D.D. and Kerr, R.M., 2002: Transient vortex events in the initial value problem for turbulence, *Phys. Rev. Lett.* **88** 244501.
- 34 Kerr, R.M., Meneguzzi, M., and Gotoh, T., 2001: An inertial range length scale in structure functions. *Phys. Fluids* **13**, 1985-1994.
- 33 Kerr, R.M., 2001: The energy budget in Rayleigh-Bénard convection, *Phys. Rev. Lett.* **87** 244502.
- 32 Kerr, R.M. and Herring, J. 2000: Prandtl number dependence of Nusselt number in DNS. *J. Fluid Mech.* **419**, 325-344.
- 31 Clark, T.L., Hall, W.D., Kerr, R.M., Middleton, D., Radke, L., Ralph, F.M., and Neiman, P.J., Levinson, D. 2000: On the origins of aircraft damaging clear-air turbulence during the 9 December 1992 Colorado downslope windstorm: Numerical simulations and comparison with observations. *J. Atmos. Sci* **57**, 1105-1131.
- 30 Kerr, R.M. and Brandenburg, A. 1999: Evidence for a singularity in ideal magnetohydrodynamics: implications for fast reconnection. *Phys. Rev. Lett.* **83**, 1155-1158.
- 29 Chang, T., Hertzberg, J., & Kerr. R. M. 1997: Three-dimensional vortex/wall interaction: Entrainment in numerical simulation and experiment. *Phys. Fluids* **9**, 57-66.
- 28 Kerr, R. M. 1996: Rayleigh Number Scaling in Numerical Convection. *J. Fluid Mech.* **310**, 139-179.

- 27 Swaminathan, N., S. Mahalingam, & R. M. Kerr 1996: Structure of nonpremixed reaction zones in numerical isotropic turbulence. *Theoretical and Computational Fluid Dynamics* **8**, 1-17.
- 26 Kerr, R. M., J.A. Domaradzki, & G. Barbier 1996: Small-scale properties of nonlinear interactions and subgrid-scale energy transfer in isotropic turbulence. *Phys. Fluids* **8**, 197.
- 25 Kerr, R.M. 1996: Cover illustration: vortex structure of Euler collapse. *Nonlinearity* **9** 271-272.
- 24 Kerr, R. M., Herring, J. R., & Brandenburg, A. 1995: Large-scale structure in Rayleigh-Bénard convection with impenetrable sidewalls. *Chaos, Solitons, and Fractals* **5**, 2047.
- 23 Virk, D., Hussain, F. & Kerr, R. M., 1995: Compressible vortex reconnection. *J. Fluid Mech.* **304**, 47-86.
- 22 Biferale, L. & Kerr, R. M. 1995: On the role of inviscid invariants in shell models of turbulence. *Phys. Rev. E* **52**, 6113-6122.
- 21 Leonard, A. D., Hamlen, R. C., Kerr, R. M. & Hill, J. C. 1995: Evaluation of closure models for turbulent reacting flows. *Industrial & Engineering Chemistry Research* **34**, 3640-3652. [published by the American Chemical Society; special issue honoring 35 years of the text "Transport Phenomena" by Bird, Stewart, & Lightfoot]
- 20 Chakrabarti, M., Kerr, R. M., & Hill, J. C. 1995: Direct numerical simulation of chemical selectivity in homogeneous turbulence. *AIChE Journal* **41** (11), 2356-2370.
- 19 Herring, J.R., R. M. Kerr, & R. Rotunno 1994: Ertel's potential vorticity in unstratified turbulence. *J. Atmos. Sci.* **51**, 35.
- 18 Sullivan, N. P., S. Mahalingam, & R. M. Kerr 1994: Deterministic forcing of homogeneous, isotropic turbulence. *Phys. Fluids* **6** 1612.
- 17 Herring, J.R., & R. M. Kerr 1993: Development of enstrophy and spectra in numerical turbulence. *Phys. Fluids* **A5**, 2792.
- 16 Kerr, R. M. 1993: Evidence for a singularity of the three-dimensional incompressible Euler equations. *Phys. Fluids* **A5**, 1725.
- 15 Wu, W.-S., D. K. Lilly, & R. M. Kerr 1991: Helicity and thermal convection with shear. *J. Atmos. Sci.* **49**, 1800.
- 14 Kerr, R. M., 1990: Velocity, scalar and transfer spectra in numerical turbulence. *J. Fluid Mech.*, **211**, 309.
- 13 Chen, H., J. R. Herring, R. M. Kerr, & R. Kraichnan, 1989: Non-Gaussian statistics in isotropic turbulence. *Phys. Fluids A*, **1**, 1844.
- 12 Kerr, R. M., & F. Hussain, 1989: Simulation of vortex reconnection. *Physica D*, **37**, 474.
- 11 Kerr, R. M., 1988: Simulation of Rayleigh-Taylor flows using vortex blobs. *J. Comp. Phys.*, **76**, 48.
- 10 Kerr, R. M., 1987: Histograms of helicity and strain in numerical turbulence. *Phys. Rev. Lett.*, **59**, 783.
- 9 Pumir, A. and R. M. Kerr, 1987: Numerical simulation of interacting vortex tubes. *Phys. Rev. Lett.*, **58**, 1636.

- 8 Ashurst, W. T., A. R. Kerstein, R. M. Kerr, and C. H. Gibson, 1987: Alignment of vorticity and scalar gradient with strain rate in simulated Navier–Stokes turbulence. *Phys. Fluids*, **30**, 2343.
- 7 Kerr, R. M., 1985: Higher order derivative correlations and the alignment of small-scale structures in isotropic numerical turbulence. *J. Fluid Mech.*, **153**, 31.
- 6 Herring, J. R., and R. M. Kerr, 1982: Comparison of direct numerical simulation with prediction of two-point closures. *J. Fluid Mech.*, **118**, 205.
- 5 Kerr, R. M., 1981: Theoretical investigation of a passive scalar such as temperature in isotropic turbulence. Ph.D. thesis, Cooperative Thesis No. 64, Cornell University and NCAR.
- 4 Nelkin, M., and Kerr, R. M., 1981: The decay of scalar variance in terms of a modified Richardson law for pair dispersion. *Phys. Fluids*, **24**, 1754–1756.
- 3 Kerr, R. M., and M. Nelkin, 1980: Self-similar decay of turbulent kinetic energy in a model with only local energy transfer. *Phys. Fluids*, **23**, 1916–1918.
- 2 Kerr, R. M., and E. D. Siggia, 1978: Cascade model of fully developed turbulence. *J. Stat. Phys.*, **19**, 543.
- 1 Fisher, M. E., and R. M. Kerr, 1977: Partial differential approximates for multicritical singularities. *Phys. Rev. Lett.*, **39**, 667.

## Reviewed Conference Proceedings

- 7 Kerr R.M. 2005: Helicity generation in 3D Euler and turbulence In Elementary Vortices and Coherent Structures Proceedings of the IUTAM Symposium Kyoto October 2004.
- 6 Kerr, R.M. and P.G. Tucker, 2005: Nonlinear LES for DES suitable flows AIAA-2005-0668, 43rd Aerospace Sciences Meeting and Exhibit Conference, AIAA, Reno, NV
- 5 Kerr, R.M. 2000: Common threads to atmospheric, astrophysical and laboratory convection. In *Geophysical and Astrophysical Convection*. Proceedings of meeting at the National Center for Atmospheric Research, October 1995. (eds. R.M. Kerr & P. Fox). Gordon and Breach.
- 4 Saiki, E.M., Kerr, R.M., and Large, W. 2000: Numerical simulation of three-dimensional thermohaline fingering. In *Developments in Geophysical Turbulence*. Proceedings of the IUTAM symposium at the National Center for Atmospheric Research, Boulder, CO 16-19 June 1998. (eds. R.M. Kerr & Y. Kimura). Kluwer Academic Publishers, Dordrecht. pp. 67-80.
- 3 Kerr, R.M. 1997: Euler Singularities and Turbulence. In 19th ICTAM Kyoto '96. (eds. T. Tatsumi, E. Watanabe & T. Kambe). Elsevier Science.
- 2 Kerr, R. M. 1992: Evidence for a singularity of the three-dimensional incompressible Euler equations. In *Topological aspects of the dynamics of fluids and plasmas*. Proceedings of the NATO-ARW workshop at the Institute for Theoretical Physics, University of California at Santa Barbara (eds. H.K. Moffatt, G.M. Zaslavsky, M. Tabor & P. Comte). Kluwer Academic Publishers, Dordrecht, Netherlands.
- 1 Kerr, R. M., D. Virk, & F. Hussain, 1990: Effects of incompressible and compressible vortex reconnection. In *Topological Fluid Mechanics*. Proceedings of the IUTAM meeting at Cambridge University. (eds. H. K. Moffatt & A. Tsinober). Cambridge University Press, Cambridge, England.

## Unrefereed Publications

- 15 Kerr, R.M. 2001: A new role for vorticity and singular dynamics in turbulence. In *Nonlinear Instability Analysis Volume II*. (ed. L. Debnath), WIT Press, Southhampton, United Kingdom, pp 15–68.
- 14 Kerr, R.M., 2001: Is there a 2D cascade in 3D convection. In *Advances in Wave Interaction and Turbulence*, (eds. P. Milewski, L. Smith, E. Tabak, F. Waleffe), part of the Contemporary Mathematics Series published by the American Mathematics Society.
- 13 Brandenburg, A. and R. M. Kerr, 2001: Helicity in Hydro and MHD Reconnection. In *Quantized Vortex Dynamics and Superfluid Turbulence*, (eds. C.F. Barenghi, R.S. Donnelly, J. Vinen) Cambridge University Press.  
  
R.M. Kerr, 2000: Reconnection and the road to turbulence. In *Coherent vortical structure — its role in turbulence dynamics* (ed. S. Kida).
- 12 Gibbon, J., Galanti, B., and Kerr, R.M. 2000: Stretching and compression of vorticity in the 3D Euler equations. In *Turbulence Structure and Vortex Dynamics*. (ed. J.C.R. Hunt & J.C. Vassilicos), Cambridge University Press, Cambridge.
- 11 Kerr, R. M. 1999: The Outer Regions in Singular Euler. In *Fundamental problematic issues in turbulence*. (eds. Tsinober and Gyr) Birkhauser.
- 10 Kerr, R.M. 1999: Dynamic estimation tests of decaying isotropic turbulence. In *Direct and Large-Eddy Simulation: 3rd ERCOFTAC Workshop*. (eds. P.R. Voke, N.D. Sandham and L. Kleiser), Kluwer Academic Publishers, Dordrecht, Netherlands.
- 9 Swaminathan, N., S. Mahalingam, & R. M. Kerr 1995: Some conditional statistics in reacting numerical turbulence. Presented at the 12th Australian Fluid Mechanics Conference, December 10-15.
- 8 Kerr, R. M. 1995: The role of singularities in Euler. In *Small-scale structure in hydro and magnetohydrodynamic turbulence*. (eds. A. Pouquet, P.-L. Sulem) Lecture Notes, Springer-Verlag.
- 7 Kerr, R. M. 1993: Scaling of a singularity of Euler. In *Singularities in Fluids, Plasmas and Optics*. Proceedings of the NATO-ARW, Heraklion, Greece. (eds. R. E. Caflisch and G. C. Papanicolaou). Kluwer Academic Publishers, Dordrecht, Netherlands.
- 6 Kerr, R. M. 1993: The role of singularities in turbulence. In *Unstable and Turbulent Motion of Fluid*. (ed. S. Kida). World Scientific Publishing, Singapore.
- 5 Swaminathan, N., S. Mahalingam, & R. M. Kerr 1993: Direct numerical simulation of reversible and irreversible chemical reactions in turbulent nonpremixed flames. Presented in 31st Aerospace Science Meeting & Exhibit, January, 11-14, 1993, Reno, Nevada.
- 4 Herring, J.R., & R. M. Kerr 1991: Some contributions of two-point closure to large-eddy simulations. *Proceedings of the International Workshop on "Large-Eddy Simulation: Where Do We Stand?"*, University of South Florida, Tallahassee, B. Galperin, Ed., Cambridge University Press, MA.
- 3 Herring, J.R., & R. M. Kerr 1991: Small-scale structures in turbulence: their implications for turbulence closures. Monte Verità Colloquium on Turbulence, Th. Dracos and A. Tsinober Eds., Birkhäuser, Bale Publishers.
- 2 Kerr, R. M., T. Nakano, and M. Nelkin, 1985: Decay of a coherent scalar disturbance in a turbulent flow. NASA Technical Memo 86700.
- 1 Kerr R.M. 1983: Higher-order derivative correlations and the alignment of small-scale structures in isotropic numerical turbulence. NASA Technical Memo 84407.

## Web Publications

Kerr, R.M., 2006: Computational Euler History. <http://arxiv.org/abs/physics/0607148>

## MEETINGS (primary organizer)

- 2006: 13-17March/2006 Warwick Turbulence Symposium, Workshop on Environmental Turbulence.
- 2005: 9-17/September/05 Warwick Turbulence Symposium, Workshop on Singularities, Coherent Structures and Their Role in Intermittent Turbulence
- 2005: 25/April/2005, Turbulence Prelude, MIRW Co-organiser
- 2004: 18/October/2004 Singular Euler Dynamics MIRW Warwick. Co-organiser and speaker
- 2003: Co-convenor of Institute for Advanced Study, Princeton conference on Turbulence. Session on 22/March/2003.
- 1998: Co-convenor of IUTAM/IUGG symposium on Developments in Geophysical Turbulence
- 1996: Co-convenor of mini-symposium on Vortex Dynamics and Turbulence at the International Congress on Theoretical and Applied Mechanics, Kyoto.
- 1995: Co-convenor of NCAR/GTP workshop on Geophysical and Astrophysical Convection.
- 1994: Co-convenor of NCAR/GTP mini-symposium on Magnetic helicity.
- 1994: Convenor of NCAR/GTP mini-symposium on DNS and LES.