MICHAEL PATTERSON

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Present Appointment

- **University of Bristol** — Department of Mechanical Engineering
  - July 2013 - to date, University Lecturer

Previous Appointments

- **University of Bath** — Department of Civil Engineering
  - July 2008 - June 2013, University Lecturer
- **Yale University** — Department of Geology and Geophysics
  - June 2006 - May 2008, Associate Research Scientist
  - Sept. 2007 - May 2008, Fellow Jonathan Edwards College.
- **University of Cambridge** — Department of Applied Mathematics and Theoretical Physics
  - Sept 2005 - June 2006, Director of Graduate studies in Mathematics at Darwin College.
  - Sept 2002 - June 2006, Post-Doctoral Research Associate

Academic Qualifications

- **University of Bristol** — Mathematics Department
  - 1996 - 2001, Ph.D. Applied Mathematics
- **Universidad de Cantabria (Spain)** — Civil Engineering Department
  - 1995 - 1996, M.Sc. Coastal Engineering
- **Loughborough University** — Civil Engineering Department
  - 1994 - 1995, M.Sc European Construction Engineering
- **University of Plymouth** — Civil Engineering Department
  - 1990 - 1994, B.Eng. Civil Engineering.

Special Awards, Honours & Distinctions

- **Higher Education Academy** — Fellow
  - January 2010 - to date

Skills

- **Research**
  - International Reputation: I am known as an innovative experimentalist in the field of fluid mechanics. Over the last year I have been responsible for the planning, development and construction of a $1m fluids laboratory at the University of Bristol. I have also spoken at a range of lnternational workshops, conferences and meetings including Woods Hole Oceanographic Institution (USA - July 2013), a UK/Norwegian Met. Office workshop (Norway - September, 2013) and UCL (London - February 2014), Oxford (September 2014) and DFD (November 2014).

- **Teaching**
  - I have six years experience designing, implementing and monitoring the quality of teaching. I have recently taught a range of courses including Computer modelling, Fluid Mechnics and Computational Fluid Dynamics.

Grant Capture

- **I am involved in the development of renewable energy devices and have attracted funding from several sources including:**
  - 2005 - Cambridge Challenge fund - 10,000 GBP
  - 2007 - Slaney Ltd - 80,000 GBP
  - 2011 - Bath Ventures - 7,000 GBP

Publications

—Rotating fluids—

- Li, L., Patterson, M.D. Zhang, K. & R. R. Kerswell, Spin-up and spin-down in a half cone: A pathological situation or not? - Physics of Fluids (in press)
- Zhong, J. Q., Patterson, M. D. & Wettlaufer, J. S., 2010. Streaks to rings to vortex grids: generic patterns in transient convective spin up of an evaporating fluid. Physical Review Letters (PRL), 105 (4), 044504.

—Gravity currents—

- Robinson F, Patterson, M.D. & S. Sherwood, A numerical modeling study of the propagation of idealized sea-breeze density currents - Journal of Atmospheric Science (in press)
- M. D. Patterson , J. E . Simpson, S. B. Dalziel & G. J. F. van Heijst, 2006. The development of an axisymmetric gravity current from a fixed volume release. – Phys. Fluids 18, 046601. doi:10.1063/1.2174717.
- M. D. Patterson , J. E . Simpson, S. B. Dalziel & N. Nikiforakis, 2004. Numerical simulations of two-dimensional and axisymmetric gravity currents. International Journal for Numerical Methods in Fluids, Vol. 47, 1221-1227.

—Mixing—

- Dalziel, S. B., Patterson, M. D., Caulfield, C. P. & Coomaraswamy, I. A., 2008. Mixing efficiency in high-aspect-ratio Rayleigh-Taylor experiments. Physics of Fluids, 20, 065106.
- M. D. Patterson, C. P. Caulfield, J. N. McElwaine & S. B. Dalziel, 2006. Time-dependent mixing in stratified Kelvin-Helmholtz billows: Experimental observations. – Geophys. Res. Lett., 33, L15608, doi:10.1029/2006GL026949
- M. D. Patterson, C. P. Caulfield & S. B. Dalziel, 2006. Buoyant mixing of unstably stratified fluids in a vertical square tube, In Proceedings of the 6th International Symposium on Stratified Flows, Perth.

—Internal and free surface waves—

- Dalziel, S. B., Patterson, M. D. C. P. Caulfield & Le Brun, S, 2011 The structure of low Froude number lee waves over an isolated obstacle. Journal of Fluid Mechanics, 689, pp. 3-31

- M. D. Patterson, D. H. Peregrine & J. Loveless (2000), 'Water wave action with coarse sediment', 27th ICCE, Sydney, Australia.
- O. Bokhove, M. D. Patterson & D.H.Peregrine (2000), 'Breaking shallow water wave simulations in the surf zone', 27th ICCE, Sydney, Australia.
- Losada I. J., M. D. Patterson & M. A. Losada, 1997. Harmonic generation over a submerged porous step. Coastal Engineering, Vol. 31, 281-304.

  —Experimetal techniques—

- Patterson, M. D. and Wettlaufer, J. S., 2010. Scanned multi-light-emitting-diode illumination for volumetric particle image velocimetry. Review of Scientific Instruments, 81 (9), 096101.

Conferences & Proceedings

- Dalziel, S. B., Patterson, M., Caulfield, C. P. and Le Brun, S., 2011. Lee waves: new understanding of a classical problem. In: 7th International Symposium on Stratified Flows, 22-26 August 2011, Rome, Italy.
- Dalziel, S. B., Patterson, M., Caulfield, C. P. and Le Brun, S., 2010. Lee waves: new understanding of a classical problem. In: 2nd Norway-Scotland Internal Waves Symposium, 1-2 November 2010, Royal Society of Edinburgh, Scotland.
- Patterson, M. D., Li, L., Zhang, K. and Kerswell, R. R., 2010. Spin-up and spin-down in a half cone. In: 63rd Annual Meeting of the APS Division of Fluid Dynamics, 21-23 November 2010, Long Beach, California, USA.
- Patterson, M. and Aspden, A., 2009. Gravity currents in a stratified ambient fluid. In: 62nd Annual Meeting of the APS Division of Fluid Dynamics, 22-24 November 2009, Minneapolis, Minnesota. Paper No. BAPS.2009.DFD.MS.6.
- Zhong, J.-Q., Patterson, M. and Wettlaufer, J., 2009. Rotating spin-up in three dimensions. In: 62nd Annual Meeting of the APS Division of Fluid Dynamics, 22-24 November 2009, Minneapolis, Minnesota. Paper No. BAPS.2009.DFD.MR.2.
- Patterson, M., Caulfield, C. and Dalziel, S., 2008. Experimental measurements of lee wave interaction with wind shear, wakes, and boundary layers. In: 61st Annual Meeting of the APS Division of Fluid Dynamics, 23-25 November 2008, San Antonio, Texas. Paper No. BAPS.2008.DFD.BV.6.
- Patterson, M. D., Wettlaufer, J. S., 2007. Ice growth and oceanic buoyancy forcing In: European Geosciences Union General Assembly, 15-20 April 2007, Vienna, Austria.
- Dell, R. W., Patterson, M. D., Caulfield, C. P., Dalziel, S. B., 2007. Internal gravity waves generation by isolated topography in the laboratory: Lee waves and lee mountains In: European Geosciences Union General Assembly, April 2007, Vienna, Austria.
- Patterson, M. D., 2007. Three dimensional vortex dynamics in rotating fluids In: American Physical Society, Divison of Fluid Dynamics, November 2007, Salt Lake City, Utah.
- Dell, R. W., Patterson, M. D., Caulfield, C. P., Dalziel, S. B., 2006. Internal gravity wave generation by isolated topography in the laboratory: Limitations of linear theory In: 59th Annual Meeting of the APS Division of Fluid Dynamics, 19-21 November, 2006, Tampa Bay, Florida.

- M. D. Patterson, C. P. Caulfield & S. B. Dalziel, 'Mixing by merging Kelvin-Helmholtz billows'. accepted in Euromech Fluid Mechanics Conference, EFMC 6. Stockholm, Sweden, 26 - 30 June 2006.
- C. P. Caulfield, M. D. Patterson, J. N. McElwaine & S. B. Dalziel, 'Mixing and merging of Kelvin-Helmholtz billows'. European Geosciences Union General Assembly, Vienna, Austria, 2 - 7 April 2006.
- C. P. Caulfield & M. D. Patterson, 'Stratified mixing: Quantitative comparison of numerical simulations and laboratory experiments'. Fundamental of Fluid Flows, BP Institute, Cambridge, December 14-15, 2005.
- C. P. Caulfield, M. D. Patterson, J. N. McElwaine & S.B. Dalziel, 'Mixing efficiency in lock release gravity currents'. APS Division of Fluid Dynamics 58th Annual Meeting (DFD05), Chicago, November 20-22, 2005.
- M. D. Patterson & S.B. Dalziel, 'Gravity currents is a stratified ambient fluid'. The International Conference on Fluxes and Structures in Fluids. Moscow. June 20 - 23, 2005.
- J. N. McElwaine & M. D. Patterson, (2004), 'Lobe and cleft formation at the head of a gravity current'. XXI ICTAM, Warsaw, Poland.
- M. D. Patterson , J. E . Simpson, S. B. Dalziel, & G. J. F. van Heijst, (2004), 'The development of an axisymmetric gravity current'. XXI ICTAM, Warsaw, Poland.
- M. D. Patterson , J. E . Simpson, S. B. Dalziel, & N. Nikiforakis (2004),'Numerical simulations of two-dimensional and axisymmetric gravity currents'. ICFD Conference on Numerical Methods for Fluid Dynamics University of Oxford
- D. H. Peregrine, M. D. Patterson & Guoqing. Hu (2003)'Spurious generation of Vorticity in the surf zone', Computational Challenges in Partial Differential Equations, Isaac Newton Institute for Mathematical Sciences. Cambridge, U.K.
- D. H. Peregrine, M. D. Patterson & Guoqing. Hu (2003), 'Vorticity generation by bores in shallow water', 5th Euromech Fluid Mechanics Conference. Toulouse, France.
- Patterson, M.D. & I. J. Losada (1997). 'Comportamiento de estrusturas sumergidas bajo la accion del oleaje' IV Jornadas de Ingenieria de Puertos, Mayo 1997, Cadiz, Spain.