Oliver Buxton

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Education

- **October 2007 - May 2011** Ph.D, Department of Aeronautics, Imperial College London, U.K. Thesis title: "Fine scale features of turbulent shear flows". Awarded November 2011.
- **October 2003 - June 2007** M.A./M.Eng., Department of Engineering, The University of Cambridge, U.K.

Appointments held

- **May 2013 - present** Lecturer of experimental aerodynamics, Department of Aeronautics, Imperial College London, U.K.
- **May 2011 - May 2013** Post-doctoral research fellow, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, U.S.A.

Honours and awards

- **2011** Royal Aeronautical Society Centennial scholarship
- **2010** Winner ERCOFTAC da Vinci award
- **2007** College prize and Townsend scholarship (St. John's College, The University of Cambridge, U.K.)
- **2006** College prize and Lady Somerset scholarship (St. John's College, The University of Cambridge, U.K.)

Professional affiliations and activities

- Journal referee: *J. Fluid Mech.*, *Exp. Fluids*, *Phys. Fluids*, *Flow Turbul. Combust.*, *J. Hydrodyn.*
- Professional memberships: American Physical Society (APS), Euromech, Royal Aeronautical Society, American Institute of Aeronautics and Astronautics (AIAA)
- Ph.D *viva voce* external examiner (University of Southampton, August 2015)

Grants

4. **December 2014 - December 2016** EPSRC Grant EP/L023520/1, "Fractal forcing of axisymmetric turbulent jets; both fully developed and impulsively forced", Value £101,096 (Sole principal investigator)

3. **February 2010 - August 2010** EPSRC HECToR RAP proposal "Fine-scale turbulence in mixing layers: simulation and modelling", Value 1.27×10^6 AUs (Co-investigator)

2. **June 2009** Royal Academy of Engineering international travel grant, "Investigation of enstrophy production in the far field of an axisymmetric turbulent jet", Value £1,500 (Sole principal investigator)

1. **June 2009** IC Trust travel grant, "Investigation of enstrophy production in the far field of an axisymmetric turbulent jet", Value £1,000 (Sole principal investigator)

Research supervision

Ph.D. students

6. **October 2014 - present** Massimiliano Breda, Proposed thesis title "Fractal forcing of axisymmetric turbulent jets; both fully developed and impulsively forced"

5. **February 2014 - present** Paweł Baj, Proposed thesis title "Mixing enhancement with multi-scale static mixers"

4. **October 2013 - present** Simon Prigent, Proposed thesis title "Multi-scale periodic trailing edge geometries for a lifting aerofoil"

3. **September 2013 - present** Marilia Graca Avelar Camarinha, Proposed thesis title "Fundamental flow physics in the near wake region of square cylinders"

2. **September 2013 - present** Eduardo Rodríguez López, Proposed thesis title "The perturbation of turbulent boundary layers by fractal grids"

1. **September 2013 - present** Konstantinos Steiros, Proposed thesis title "Fractal blades for enhanced dynamic mixing"

M.Sc. students

6. **2015** Zhi Zou

5. **2015** Alfonso del Carre

4. **2015** Loïc Chevalier

3. **2014** Mel Chamand

2. **2014** Guillaume Weingertner

1. **2014** Lawrence Meire

Teaching

- **February 2015 - present** Centre for doctoral training "Fluids Dynamics Across Scales" AE9-MRFD CC04 Core experimental fluid mechanics
- **November 2014 - present** AE3-412 Introduction to turbulence
- **February 2014 - present** AE3-419 Design of experiments
- **February 2014 - present** AE2-211 Mechanics of flight
- **October 2013 - present** AE3-301 Aircraft aerodynamics

Administrative responsibilities

- **October 2014 - present** Laboratory coordinator for undergraduate aerodynamics laboratories
- **March 2014 - present** Aerodynamics section representative on the departmental health and safety committee

Outreach

- **December 2013** Imperial Fringe Festival "Fluid Thinking", "Turbulence in snow globes"

Publications

Journal articles

13. Baj, P., Bruce, P.J.K. & Buxton, O.R.H. (2015) On a PLIF quantification methodology in a nonlinear dye response region, *Submitted, Exp. Fluids*
12. Rodríguez-López, E., Bruce, P.J.K. & Buxton, O.R.H. (2015) On the formation mechanisms of artificially generated high Reynolds number turbulent boundary layers, *To appear, Bound.-Lay. Meteorol.*
11. Buxton, O.R.H. (2015) Modulation of the velocity gradient tensor by concurrent large-scale velocity fluctuations in a turbulent mixing layer, *J. Fluid Mech.* **777**, R1:1-12
10. Baj, P., Bruce, P.J.K. & Buxton, O.R.H. (2015) The triple decomposition of a fluctuating velocity field in a multiscale flow, *Phys. Fluids* **27**(7), 075104:1-24
9. Rodríguez-López, E., Bruce, P.J.K. & Buxton, O.R.H. (2015) A robust post-processing method to determine skin friction in turbulent boundary layers from the velocity profile, *Exp. Fluids* **56**(4), 68:1-16
8. Rabey, P.K., Wynn, A. & Buxton, O.R.H. (2015) The kinematics of the reduced velocity gradient tensor in a fully developed turbulent shear flow, *J. Fluid Mech.* **767**, 627-658
7. Buxton, O.R.H. & Ganapathisubramani, B. (2014) Concurrent scale interactions in the far-field of a turbulent mixing layer, *Phys. Fluids* **26**(12), 125106:1-19
6. Buxton, O.R.H., de Kat, R. & Ganapathisubramani, B. (2013) The convection of large and intermediate scale fluctuations in a turbulent mixing layer, *Phys. Fluids* **25**(12), 125105:1-23

5. Hearst, R.J., Buxton, O.R.H., Ganapathisubramani, B. & Lavoie, P. (2012) Experimental estimation of fluctuating velocity and scalar gradients in turbulence, *Exp. Fluids* **53**(4), 925-942

4. Buxton, O.R.H., Laizet, S. & Ganapathisubramani, B. (2011) The interaction between strain-rate and rotation in shear flow turbulence from inertial range to dissipative length scales, *Phys. Fluids* **23**(6), 061704:1-4

3. Buxton, O.R.H., Laizet, S. & Ganapathisubramani, B. (2011) The effects of resolution and noise on kinematic features of fine-scale turbulence, *Exp. Fluids* **51**(5), 1417-1437

2. Buxton, O.R.H. & Ganapathisubramani, B. (2011) PIV measurements of convection velocities in a turbulent mixing layer, *J. Phys. Conf. Series* **318**, 052038:1-10

1. Buxton, O.R.H. & Ganapathisubramani, B. (2010) Amplification of enstrophy in the far field of an axisymmetric turbulent jet, *J. Fluid Mech.* **651**, 483-502

Conference papers

6. Prigent, S.L., Buxton, O.R.H. & Bruce, P.J.K. (2016) Experimental investigation of the wake of a lifting wing with cut-in sinusoidal trailing edges, *54$^{\text{th}}$ AIAA Aerospace Science Meeting, AIAA Science and Technology Forum and Exposition 4-8 January 2016*

5. Buxton, O.R.H. & Ganapathisubramani, B. (2013) Scale interactions in the far field of a turbulent mixing layer, *Eighth International Symposium on Turbulence and Shear Flow Phenomena (TSFP8) 28-30 August 2013*

4. Buxton, O.R.H., Burns, R.A. & Clemens, N.T. (2013) Simultaneous krypton PLIF, LII and PIV measurements in a sooting jet flame, *51$^{\text{st}}$ AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition 7-10 January 2013*

3. Buxton, O.R.H., Lochman, B.J., Sharma, M. & Clemens, N.T. (2012) Simultaneous PIV and PLIF imaging of low temperature ablation in a Mach 5 turbulent boundary layer, *50$^{\text{th}}$ AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition 9-12 January 2012*

2. Buxton, O.R.H. & Ganapathisubramani, B. (2009) Investigation of enstrophy production in the far field of an axisymmetric turbulent jet, *Sixth International Symposium on Turbulence and Shear Flow Phenomena (TSFP6) 22-24 June 2009*

1. Buxton, O.R.H. & Ganapathisubramani, B. (2009) The classification and composition of fine scale eddies in a turbulent jet, *47$^{\text{th}}$ AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition 5-8 January 2009*

Book chapters

3. Steiros, K., Bruce, P.J.K., Buxton, O.R.H. & Vassilicos, J.C. (2015) Flow field characteristics and energy injection in a tank stirred by regular and fractal blade impellers, *To appear, Springer Proceedings in Physics, Springer*

2. Buxton, O.R.H. & Ganapathisubramani, B. (2015) Concurrent scale interactions in the far-field of a turbulent mixing layer, *To appear, Progress in Turbulence VI, Springer*

1. Rodríguez López, E. Bruce, P.J.K. & Buxton, O.R.H. (2014) Downstream evolution of perturbations in a zero pressure gradient turbulent boundary layer, *To appear, Progress in Turbulence VI, Springer*

Invited talks and seminars

35. **April 2016** Steiros, K., Bruce, P.J.K., Buxton, O.R.H. & Vassilicos, J.C. Fluid flow characteristics of regular and modified blade impellers, *16$^{\text{th}}$ International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Honolulu, HI, U.S.A.*

34. **January 2016** Prigent, S., Buxton, O.R.H. & Bruce, P.J.K. Experimental investigation of the wake of a lifting wing with cut-in sinusoidal trailing edges, *54$^{\text{th}}$ AIAA Aerospace Sciences Meeting, AIAA Science and Technology Forum and Exposition , San Diego, CA, U.S.A.*

33. **November 2015** Steiros, K., Bruce, P.J.K., Buxton, O.R.H., & Vassilicos, J.C. Experimental investigation of the flow field and power consumption characteristics of regular and fractal blade impellers in a dynamic mixer, *68$^{\text{th}}$ Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Boston, MA, U.S.A.*

32. **November 2015** Breda, M. & Buxton, O.R.H. Evolution of the velocity gradient tensor in the near field of a square cylinder, *68$^{\text{th}}$ Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Boston, MA, U.S.A.*

31. **November 2015** Baj, P., Bruce, P.J.K. & Buxton, O.R.H. Space-scale unfolding mechanism in canonical multi-scale flows, *68$^{\text{th}}$ Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Boston, MA, U.S.A.*

30. **November 2015** Rodríguez López, E., Bruce, P.J.K. & Buxton, O.R.H. Study of the near field wake of trips generating an artificially thick turbulent boundary layer, *68$^{\text{th}}$ Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Boston, MA, U.S.A.*

29. **September 2015** Rodríguez López, E., Bruce, P.J.K. & Buxton, O.R.H. Modulation and eddy structure in artificially high Reynolds number turbulent boundary layers, *JJ70 - 70th birthday celebration for Javier Jiménez, Salamanca, Spain*

28. **September 2015** Steiros, K., Bruce, P.J.K., Buxton, O.R.H. & Vassilicos, J.C. Flow field characteristics and energy injection in a tank stirred by regular and fractal blades impeller, *ERCOFTAC Special Interest Groups 44 and 42 Multiscale-forced turbulent flows: fundamentals and applications, Sheffield, U.K.*

27. **September 2015** Prigent, S., Buxton, O.R.H. & Bruce, P.J.K. Wake properties of a lifting wing with cut-in sinusoidal trailing edges, *ERCOFTAC Special Interest Groups 44 and 42 Multiscale-forced turbulent flows: fundamentals and applications, Sheffield, U.K.*

26. **September 2015** Baj, P., Bruce, P.J.K. & Buxton, O.R.H. Mixing behind multiscale obstacles, *ERCOFTAC Special Interest Groups 44 and 42 Multiscale-forced turbulent flows: fundamentals and applications, Sheffield, U.K.*

25. **August 2015** Baj, P., Bruce, P.J.K. & Buxton, O.R.H. Triple decomposition of a fluctuating velocity field in a multiscale flow, *15$^{\text{th}}$ European Turbulence Conference, Delft, Netherlands*

24. **August 2015** Rodríguez López, E., Bruce, P.J.K. & Buxton, O.R.H. Downstream evolution of perturbations in a zero pressure gradient turbulent boundary layer, *15$^{\text{th}}$ European Turbulence Conference, Delft, Netherlands*

23. **August 2015** Buxton, O.R.H. Modulation of fine-scale velocity gradient phenomena by concurrent large-scale velocity fluctuations in a developed shear flow, *15$^{\text{th}}$ European Turbulence Conference, Delft, Netherlands*

22. **June 2015** Steiros, K., Bruce, P.J.K., Buxton, O.R.H. & Vassilicos, J.C. Flow field characteristics and energy injection in a tank stirred by regular and fractal blades impeller, *International Conference on Jets, Wakes and Separated Flows, Stockholm, Sweden*

21. **November 2014** Buxton, O.R.H., Wynn, A. & Rabey, P.K. The kinematics of the reduced velocity gradient tensor in a fully developed turbulent free shear flow, *67*$^{\text{th}}$ *Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, San Francisco, CA, U.S.A.*

20. **October 2014** Buxton, O.R.H. Scale interactions in a self preserving turbulent free shear flow, *Aerodynamics and Flight Mechanics Research Group, University of Southampton, U.K.*

19. **September 2014** Buxton, O.R.H. & Ganapathisubramani, B. Concurrent scale interactions in the far-field of a turbulent mixing layer, *iTi Conference on Turbulence, Bertinoro, Italy*

18. **September 2014** Rodríguez López, E., Buxton, O.R.H. & Bruce, P.J.K. Downstream evolution of perturbations in a zero pressure gradient turbulent boundary layer, *iTi Conference on Turbulence, Bertinoro, Italy*

17. **September 2014** Buxton, O.R.H. Scale interactions in a free turbulent shear flow and the kinematics of the reduced velocity gradient tensor, *Aero- and Hydrodynamics Research Group, Department of Mechanical, Maritime and Materials Engineering, TU Delft, Netherlands*

16. **June 2014** Buxton, O.R.H. An academic life post Osborne Reynolds, *Department of Mechanical Engineering, University College London, U.K.*

15. **November 2013** Buxton, O.R.H. & Ganapathisubramani, B. Simultaneous large-scale and sub-grid scale PIV measurements in a turbulent shear flow, *66*$^{\text{th}}$ *Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Pittsburgh, PA, U.S.A.*

14. **August 2013** Buxton, O.R.H. & Ganapathisubrmani, B. Scale interactions in the far field of a turbulent mixing layer, *Eighth International Symposium on Turbulence and Shear Flow Phenomena (TSFP8), Poitiers, France*

13. **January 2013** Buxton, O.R.H., Burns, R.A. & Clemens, N.T. Simultaneous krypton PLIF, LII and PIV measurements in a sooting jet flame, *51*$^{\text{st}}$ *AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition, Grapevine, TX, U.S.A.*

12. **November 2012** Buxton, O.R.H., Burns, R.A. & Clemens, N.T. Krypton and PAH PLIF, LII and PIV measurements in a sooting non-premixed jet flame, *65*$^{\text{th}}$ *Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, San Diego, CA, U.S.A.*

11. **January 2012** Buxton, O.R.H., Lochman, B.J., Sharma, M. & Clemens, N.T. Simultaneous PIV and PLIF imaging of low temperature ablation in a Mach 5 turbulent boundary layer, *50*$^{\text{th}}$ *AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition, Nashville, TN, U.S.A.*

10. **December 2011** Ganapathisubramani, B. & Buxton, O.R.H. Fine-scale features in turbulent shear flows, *Aerodynamics and Flight Mechanics Research Group, University of Southampton, U.K.*

9. **December 2011** Ganapathisubramani, B. & Buxton, O.R.H. Fine-scale features in turbulent shear flows, *Turbulence seminar series, Imperial College London, U.K.*

8. **September 2011** Buxton, O.R.H. & Ganapathisubramani, B. PIV measurements of convection velocities in a turbulent mixing layer, *13*$^{\text{th}}$ *European Turbulence Conference, Warsaw, Poland*

7. **July 2011** Buxton, O.R.H. Fine-scale features in turbulent shear flows, *Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, U.S.A.*

6. **November 2010** Buxton, O.R.H., Lardeau, S., Laizet, S. & Ganapathisubramani, B. Effects of resolution on the fine scale features in the far field of a turbulent planar mixing layer, *63*$^{\text{rd}}$ *Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Long Beach, CA, U.S.A.*

5. **October 2010** Buxton, O.R.H. The fine scale features of turbulent shear flows, *ERCOFTAC's Autumn Festival, Instituto Superior Técnico, Lisbon, Portugal*

4. **June 2010** Buxton, O.R.H. The fine scale features of turbulent shear flows, *8*$^{\text{th}}$ *ERCOFTAC Osborne Reynolds Colloquium and Research Student Award, Cranfield University, U.K.*

3. **June 2009** Buxton, O.R.H. & Ganapathisubramani, B. Investigation of enstrophy production in the far field of an axisymmetric turbulent jet, *Sixth International Symposium on Turbulence and Shear Flow Phenomena (TSFP6), Seoul, Republic of Korea*

2. **January 2009** Buxton, O.R.H. & Ganapathisubramani, B. The classification and composition of fine scale eddies in a turbulent jet, *47*$^{\text{th}}$ *AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition, Orlando, FL, U.S.A.*

1. **November 2008** Buxton, O.R.H. & Ganapathisubramani, B. Fine-scale features in the far-field of a turbulent jet, *61*$^{\text{st}}$ *Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, San Antonio, TX, U.S.A.*