

Hugh Edmund Murray HUNT  
<http://www.eng.cam.ac.uk/~hemh/> Cambridge University Engineering Department  
Reader in Dynamics and Vibration (first appointment 1 Oct 1989)

### **Education/Qualifications:**

1984-88, Univ. of Cambridge, PhD. in Engineering, awarded Dec 1988.  
1979-81, Univ. of Melbourne, Bachelor of Engineering (Mech), First Class with Honours and First Place.  
1966-77, Melbourne C.of E. Grammar School (1977, Higher School Certificate for University entrance)

### **Professional History:**

Prior to 1982: Repco Clutch Co. (Melb.), Metallurgical Asst; Petroleum Refineries Aust Mech Design Engrn; Zinc Corp. (NSW) Mech Design Engrn; Melb. U., Research Asst (Fluid Mech); St. Thomas' Hospital (Lond), Research Asst (Physiology);  
1982-1984 ICI (Aust.) Engineering Ltd. (Melb.), Mech Design Engineer;  
Jun.1988-Sept.1988, Camb. U Eng Dept, Research Asst (British Gas);  
Oct.1988-Sept.1989, Emmott Research Fellow, Camb. U Eng Dept;  
Oct.1988-Sept.1989, Bye-fellow, Selwyn College, Camb.;  
Jan 1989, Research Fellowship at Emmanuel College Camb. for 3 years from Oct.1990;  
Jan-Jun 2003, MIT Boston, Cambridge MIT Institute Faculty Exchange.

### **Appointments and Affiliations:**

Member, Institution of Mechanical Engineers (1991, CEng 1992);  
M, Institute of Acoustics (1992);  
International Journal of Acoustics and Vibration, Editorial Board;  
International Congress on Sound and Vibration, Hong Kong, July 2000, Scientific Committee;  
Ball 2000: A Symposium Commemorating the Legacy, Works, and Life of Sir Robert Stawell Ball Upon the 100th Anniversary of "A Treatise on the Theory of Screws", Trinity College Cambridge, July 2000, Conference organizer;  
7th Int Congress on Sound and Vibration, Garmisch-Partenkirchen, July 2000, Scientific Committee, Proceedings Editor, Special session on noise and vibration from trains;  
Acoustics 2000: Research into Practice, Ins Acoustics Spring Conference, University of Liverpool, 17-18 April 2000, special session on Base isolation of buildings;  
6th Int Congress on Sound and Vibration, Denmark, July 1999, Scientific Committee;  
5th Int Congress on Sound and Vibration, Adelaide, Dec 1997, Scientific Committee.

### **Consultancies:**

- 2015 vibration of gas cylinders
- 2014 feasibility study on the mechanics of a circus stunt involving high-speed cars
- 2013 analysis of railway vibration in a recording studio, London
- 2013 ground vibration leading to subsidence in Brisbane, Australia
- 2011 Prediction of vibration in a hotel proposed near Crossrail
- 2010 Testing of a hand-held wind-up 3-phase generator
- 2010 Design of a steam sterilizer
- 2009 Feasibility study of a tethered balloon for geoengineering
- 2009 Vibration isolation of a London concert hall
- 2009 Fault detection in large prestressed concrete bridge slabs
- 2008 Hand-arm vibration in pneumatic tools;
- 2007 Detection of illegal immigrants stowed in vehicles on ferries;
- 2006 ABB Bomem (Canada), vibration in an orbiting satellite;
- 2005 Brisbane Cathedral – vibration of tower due to bell ringing;
- 2005 Ince & Co – Rollover of a tipper truck;
- 2005 Holset Engineering (Huddersfield) – vibration of turbocharger blades;
- 2000 Arup Acoustics (Cambridge) – braking forces in floating-slab track;
- 1999 Ling Dynamic Systems (Royston) – analysis of the dynamics of electromagnetic shakers;
- 1999 TQC Ltd (Nottingham) – vibration testing machines and engine test-bed vibrations;
- 1999 Kenchington Ford plc (London) – vibration modelling of elevated railway structures;
- 1998 Vetco Pipeline Services (Houston) – intelligent pigging of 4" gas distribution mains;
- 1998 R&D Marine (Balckock) – torsional vibration of marine-engine drive trains;

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- 1998 Kenchington Little plc (Cambridge) – wind-excited vibration;
- 1998 Powertron Ltd (Cambridge) – vibration endurance testing of railway electronic components;
- 1995 Netherlands Railways – railway track settlement near bridge abutments;
- 1990- Tiflex Ltd (Woking) – elastomeric materials in vibration isolation for railways;
- 1989 ICI Petrochemicals – design of a reactor bed.

**Expert Witness:**

2012 Chartis Group, Failure of weldments in an economizer, Lakeside Energy from Waste;  
 2007 Petition against Crossrail Bill, Grand Central Sound Studios, Select Committee House of Commons;  
 2003 Ince & Co, Investigation of the crash-landing of an Airbus A340 at London Heathrow;  
 1982 Failure of a gas-turbine geared coupling, Sydney, Australia.

**Academic Distinctions and Prizes Received:**

2015 Rooke Medal for Public Promotion of Engineering, Royal Academy of Engineering  
 2011, (with Shard Jain) Maurice Godet Award, Leeds-Lyon Symposium on Tribology  
 2011, 2008, 2006, 2004, Best First-year Lecturer Award, SSJC Cambridge University Engineering Dept  
 2008, Royal Academy of Engineering, ExxonMobil Excellence in Teaching Award  
 2001, John Winbolt prize, joint winner, best Civil-Engineering-related journal paper, CUED  
 2001, Pilkington Teaching Prize, University of Cambridge  
 1999, Institute of Physics Award for Public Awareness of Physics;  
 1997, Young railway engineer of the year award, third prize, Inst. Civil Engineers;  
 1992, Thomas Bernard Hall Prize, IMechE;  
 1984, Commonwealth Scholarship to Emmanuel College, Cambridge;  
 1981, Wright Prize; A.G.M. Michell Prize, Dixson Scholarship; Rennie Memorial Prize; Oscar Weigel Exhibition in Engineering; University of Melbourne  
 1980, C.B. Hebdon Major Scholarship at Trinity College, Melbourne  
 1979, Wright Prize in Mech. Eng. Sci. 1; Exhibition in Eng. Materials for Mech. Engineers (Univ of Melb)  
 1978, H.B. Howard-Smith Exhibition in "Intro. to Engineering" (Univ of Melb);  
 1977, Robert Bage Memorial Prize for Mathematics; "Outstanding Award" Univ. of Melb School Mathematics Comp.

**Television work:**

2015 – Documentary for Channel Four – Hitler's V3 Supergun  
 2015 – Wall of Death for Channel Four – with Guy Martin  
 2014 - Scientific advisor for a National Geographic TV series  
 2014 - Slinky Springs, Boomerangs for The One Show, BBC  
 2014 - Documentary for PBS Nova (USA) - D-day 360  
 2013 - Documentary for Channel Four - Attack of the Zeppelins (Zeppelin Terror Attack in the USA)  
 2012 - Documentary for Channel Four - Escape from Colditz (Escape from Nazi Alcatraz in the USA)  
 2011 - Documentary for Channel Four - Digging the Great Escape  
 2011 - Engineering Connections for BBC with Richard Hammond  
 2010 - Documentary for Channel Four - Dambusters: Building the Bouncing Bomb (Bombing Hitler's Dams in the USA)  
 2009 - Fifth Gear Stunt Special, Loop-the-Loop (Channel Five)

**Journal, Articles and Book Chapters (Refereed)**

1. 2014 Coulier, P. and Hunt, H.E.M. "Experimental study of a stiff wave barrier in gelatine", Soil Dynamics and Earthquake Engineering, 66 pp. 459-463 (5 pages)
2. 2014 Hussein, M.F.M., Francois, S., Schevenels, M., Hunt, H.E.M., Talbot, J.P., Degrande, G. "The fictitious force method for efficient calculation of vibration from a tunnel embedded in a multi-layered half-space", Journal of Sound and Vibration, 333(25) pp 6996-7018. (23 pages)
3. 2013 Kuo, K.A. and Hunt, H.E.M., "An efficient model for the dynamic behaviour of a single pile in viscoelastic soil", Journal of Sound and Vibration 332(10):2549-2561. (13 pages)

4. 2013 Kuo, K.A. and Hunt, H.E.M., "Dynamic models of piled foundations", *Applied Mechanics Reviews* 65(3), ISSN 0003-6900
5. 2012 Davidson, P., Burgoyne, C.J., Hunt, H.E.M., and Causier, M. "Lifting options for stratospheric aerosol geoengineering: advantages of tethered balloon systems", *Philosophical Transactions of The Royal Society A Mathematical Physical and Engineering Sciences* 370(1974):4263-4300 (38 pages)
6. 2012 Jones, S., Kuo, K.A., Hussein, M.F.M., and Hunt, H.E.M. "Prediction uncertainties and inaccuracies resulting from common assumptions in modelling vibration from underground railways" *Proceedings of the Institution of Mechanical Engineers Part F Journal of Rail and Rapid Transit* 226(5):501-512 (12 pages)
7. 2012 Jones, S. and Hunt, H.E.M. "Predicting surface vibration from underground railways through inhomogeneous soil" *Journal of Sound and Vibration* 331(9) 2055-2069. (15 pages)
8. 2012 Jones, S. and Hunt, H.E.M. "The effect of inclined soil layers on surface vibration from underground railways using the thin-layer method", *Journal of Engineering Mechanics* 137(12) 887-900. (14 pages)
9. 2012 Kuo, K.A., Hussein, M.F.M., and Hunt, H.E.M. "The Effects of a Second Tunnel on the Propagation of Ground-Borne Vibration from an Underground Railway", *Noise and Vibration Mitigation for Rail Transportation Systems, Notes on Numerical Fluid Mechanics and Multidisciplinary Design* Volume 118, pp 307-314 (8 pages)
10. 2011 Kuo, K.A., Hussein, M.F.M. and Hunt, H.E.M., "The effect of a twin tunnel on the propagation of ground-borne vibration from an underground railway ", *Journal of Sound and Vibration*, 330(25) pp. 6203-6222 (20 pages)
11. 2011 Jain, S. and Hunt, H.E.M. "A dynamic model to predict the occurrence of skidding in wind-turbine bearings", *Journal of Physics: Conf Ser* 305(1) 2027
12. 2011 Jones, S. and Hunt, H.E.M., "The effect of inclined soil layers on surface vibration from underground railways using the thin-layer method", *ASCE J. Engineering Mechanics*, 137(12):887-900 (14 pages)
13. 2011 Jones, S. and Hunt, H.E.M., "Voids at the tunnel-soil interface for calculation of ground vibration from underground railways", *Journal of Sound and Vibration*, 330(2) pp. 245-270 (26 pages)
14. 2010 Jones, S., Hussein, M.F.M. and Hunt, H.E.M., "Use of PiP to investigate the effect of a free surface on ground vibration due to underground railways", *Acoustics Australia*, 38(1) pp. 20-24 (5 pages)
15. 2010 Box, S., Bishop, C.M. and Hunt, H.E.M., "A Stochastic Six-Degree-of-Freedom Flight Simulator for Passively Controlled High Power Rockets", *J. Aerospace Engineering* 24(1) 31-45 (15 pages)
16. 2009 Talbot, J.P. and Hunt, H.E.M., "On the Performance of Base-Isolated Buildings", *Collected Papers in Building Acoustics: Sound Transmission*, Edited by: Barry Gibbs et al., Multi-science Publishing, ISBN 978-1-907132-10-0
17. 2009 Talbot, J.P. and Hunt, H.E.M., "Isolation of Buildings from Rail-tunnel Vibration", *Collected Papers in Building Acoustics: Sound Transmission*, Edited by: Barry Gibbs et al., Multi-science Publishing, ISBN 978-1-907132-10-0
18. 2009 Hussein, M.F.M. and Hunt, H.E.M., "A numerical model for calculating vibration due to a harmonic moving load on a floating-slab tracks with discontinuous slabs in an underground railway tunnel". *Journal of Sound and Vibration*, 321(1-2), pp.363-374. (12 pages)
19. 2009 Hussein, M.F.M., Hunt, H.E.M. "A computationally efficient software application for calculating vibration from underground railways". *J. Phys.: Conf. Ser.* 181 [\[PDF\]](#)
20. 2008, Hunt, H.E.M., " Types of Rail Roughness and the Selection of Vibration Isolation Measures", *Noise and Vibration Mitigation for Rail Transportation Systems*, Springer Berlin, Volume 99/2008, ISBN 978-3-540-74892-2, pp 341-347. (8 pages)
21. 2008, Hussein, M.F.M., Hunt, H.E.M., Rikse, L., Gupta, S., Degrande, G., Talbot, J.P., Francois, S. and Schevenels, M., "Using the PiP Model for Fast Calculation of Vibration from a Railway Tunnel in a Multi-layered Half-Space", *Noise and Vibration Mitigation for Rail Transportation Systems*, Springer Berlin, Volume 99/2008, ISBN 978-3-540-74892-2, pp 136-142. (7 pages)
22. 2007 Gupta, S., Hussein, M.F.M., Degrande, G., Hunt, H.E.M. and Clouteau, D. "A comparison of two numerical models for the prediction of vibrations from underground railway traffic". *Soil Dynamics and Earthquake Engineering* 27(7), 608-624 (17 pages)
23. 2007 Hussein, M.F.M. and Hunt, H.E.M., "A numerical model for calculating vibration from a railway tunnel embedded in a full-space". *Journal of Sound and Vibration* 305(3), 401-431 (32 pages)
24. 2007, Hussein, M.F.M, Gupta, S., Hunt, H.E.M., Degrande, G. and Talbot, J.P. "A computationally efficient model for calculating vibration from a railway tunnel buried in a half-space". *International Journal for Numerical Methods in Engineering*.
25. 2007 Hunt, H.E.M. and Hussein, M.F.M., "Ground-borne vibration transmission from road and rail systems - Prediction and control". Crocker, M.J., ed. *Handbook of Noise and Vibration Control*. New York: John Wiley & Sons, pp. 1458-1469 (12 pages)
26. 2006 Hussein, M.F.M and Hunt, H.E.M., "A numerical model for calculating vibration from underground railways", *Journal of Sound and Vibration*.
27. 2006 Gupta, G., Hussein, M.F.M., Degrande, G., Hunt, H.E.M. and Clouteau, D. "A comparison of prediction models for calculating vibrations from underground railway traffic" *Soil Dynamics and Earthquake Engineering*, 27(7):608-624 (17 pages)
28. 2006 Hussein, M.F.M and Hunt, H.E.M., "Modelling of floating-slab track with discontinuous slab, part 1: response to oscillating moving loads", *J Low Frequency Noise, Vibration and Active Control*, 25(1), pp. 23-39. [\[http\]](#) (17 pages)

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29. 2006 Hussein, M.F.M and Hunt, H.E.M., "Modelling of floating-slab track with discontinuous slab, part 2: response to moving trains", *J Low Frequency Noise, Vibration and Active Control*, 25(2), pp. 111-118. [\[http\]](#) (8 pages)

30. 2006 Hussein, M.F.M and Hunt, H.E.M., "Modelling of floating-slab tracks with continuous slabs under oscillating moving loads", *J. Sound and Vib.*, 297(1-2), pp. 37-54. [\[http\]](#) (18 pages)

31. 2006 Hussein, M.F.M and Hunt, H.E.M., "Ground-borne vibration transmission from road and rail systems - Prediction and control", *Handbook of noise and vibration control*, ed Crocker, John Wiley and Sons. pp.1458 – 1469 (12 pages)

32. 2006 Hussein, M.F.M and Hunt, H.E.M., "A power-flow method for evaluating vibration from underground railways", *J Sound and Vib*, 293(3-5), pp. 667-679. [\[http\]](#) (13 pages)

33. 2006 Forrest, J.A. and Hunt, H.E.M., "A three-dimensional tunnel model for calculation of train-induced ground vibration ", *J Sound and Vib*, 294(4-5), pp. 678-705. (28 pages)

34. 2006 Forrest, J.A. and Hunt, H.E.M., "Ground vibration generated by trains in underground tunnels", *J Sound and Vib*, 294(4-5), pp. 706-736. (31 pages)

35. 2003 Talbot, J.P. and Hunt, H.E.M., "The effect of side-restraint bearings on the performance of base-isolated buildings", *Proc I Mech E. Part C* 217, 849-859 (11 pages)

36. 2003 Talbot, J.P. and Hunt, H.E.M., "Isolation of buildings from rail tunnel vibration: a review", *J. Building Acoustics*, Vol 10(3) 177-192 (16 pages)

37. 2003 Talbot, J.P. and Hunt, H.E.M., "A computationally efficient piled-foundation model for studying the effects of ground-borne vibration on buildings", *Proc I Mech E. Part C* 217, 975-989 (15 pages)

38. 2003 Talbot, J.P. and Hunt, H.E.M., "A generic model for evaluating the performance of base-isolated buildings", *J Low Frequency Noise , Vibration and Active Control*, Vol 22(3) 149-160 (12 pages)

39. 2001 Hunt, H.E.M., "Damping of acoustic waves: High damping alloys and inorganic noise absorbing materials", *Encyclopedia of Materials: Science and Technology*, Elsevier

40. 2001 Talbot, J.P. and Hunt, H.E.M., "On the performance of base-isolated buildings", *Building Acoustics*, Vol.7(3) 163-178 (16 pages) (jointly awarded the John Winbolt prize 2001 for best Civil-Engineering-related journal paper, CUED)

41. 2000 Marwala, T. and Hunt, H.E.M., "Fault detection using pseudo modal energies and modal properties", *International Journal of Engineering Simulation* (1) 4-10 (7 pages) (online at <http://www.amorphic.co.uk/wol/nethome.htm>)

42. 1999 Marwala, T and Hunt, H E M, 'Fault identification using finite element models and neural networks', *Journal of Mechanical Systems and Signal Processing*, 13(3), pp475-490. (16 pages)

43. 1997 Hunt, H.E.M., 'Settlement of railway track near bridge abutments', *Proc Inst. Civil Engrs* 123(1),68-73 (6 pages)

44. 1996 Hunt, H.E.M., 'A vibrating pig for measurement of depth of cover and span detection', *Pipeline and Gas Journal*, Vol. 223, No. 8, pp. 70-71 (2 pages)

45. 1996 Hunt, H.E.M., 'Modelling of rail vehicles and track for calculation of ground vibration transmission into buildings'; *J Sound and Vib.* 193(1) pp185-194. (10 pages)

46. 1995 Hunt, H.E.M., 'Prediction of vibration transmission from railways into buildings using models of infinite length; *Vehicle System Dynamics Supplement*, Vol 24, 234-237. (4 pages)

47. 1993 Brackenbury, J & Hunt, H, 'Jumping in springtails: mechanism and dynamics', *J Zool, Lond* 229, 217-236; (20 pages)

48. 1993 Kopke, U.G. and Hunt, H E M , 'Identification of support condition of buried pipes using a vibrating pig' *Proc. I. Mech. E. Part E* 207, 29-40; (12 pages)

49. 1993 Hunt, H E M, 'The mechanical strength of ceramic honeycomb monoliths as determined by simple experiments'; *Trans I. Chem E. Part A*, Vol 71 (A3), 257-266. Special topic issue on advanced materials; (10 pages)

50. 1991 Newland, D E and Hunt, H E M, 'Isolation of buildings from ground vibration: a review of recent progress', *Proc I Mech E. Part C* 205, 39-52. (awarded Thomas Bernard Hall Prize from I.Mech.E for best paper); (14 pages)

51. 1991 Hunt, H E M, 'Modelling of road vehicles for calculation of traffic-induced ground vibration as a random process', *J Sound and Vib* 144(1), 41-51; (11 pages)

52. 1991 Hunt, H E M, 'Stochastic modelling of traffic-induced ground vibration', *J Sound and Vib* 144(1), 53-70; (18 pages)

53. 1991 Hunt, H E M, 'Transmission of vibration into vibration-isolated buildings', *J Low Frequency Noise and Vibration*, Vol 10(3), 72-77; (6 pages)

## Conference Papers

1. 2014 Verachttert, R., Hunt, H.E.M. and Hussein, M.F.M. "Changes in railway unevenness after the installation of in-track vibration countermeasures", *Proceedings of the 9th International Conference On Structural Dynamics, EURODYN 2014*
2. 2014 Hamad, W.I., Hunt, H.E.M., Hussein, M.F.M. and Talbot, J.P. "Tunnel-soil-pile interaction in the prediction of vibration from underground", *Proceedings of the 9th International Conference On Structural Dynamics, EURODYN 2014*
3. 2013 Kuo, K.A., Jones, S., Hussein, M.F.M. and Hunt. H.E.M., "Recent developments in the Pipe-in-Pipe model for underground-railway vibration predictions", *Proceedings of the 11th International Workshop on Railway Noise*, Uddevalla, Sweden;
4. 2013 Hussein M.F.M., Hunt H.E.M., Kuo K.A., Costa P.A. and Barbosa J, "The dynamic effect of a piled-foundation building on an incident vibration field from an underground railway tunnel" *20th International Congress on Sound and Vibration*, Bangkok, ICSV2013, 2:1594-1601

5. 2013 Cosello, H. and Hunt, H.E.M. "Wave dispersion and power flow analysis of an infinite aerofoil-shaped beam" 20th International Congress on Sound and Vibration, Bangkok, ICSV2013, 2:1594-1601
6. 2013 Kuo K.A., Hunt, H.E.M. and Lister, J.R. "Vibration of pressurised, elastic, spherical shells", 20th International Congress on Sound and Vibration, Bangkok, ICSV2013, 4:3513-3519
7. 2012 Jain, S., Whiteley, P.E. and Hunt, H.E.M. "Detection of planet bearing faults in wind turbine gearboxes", Proceeding of the International Conference in Noise and Vibration Engineering (ISMA2012). 4361-4372
8. 2012 Costello, H., Kuo, K.A. and Hunt, H.E.M. "Select this elementStability analysis of an aerodynamically shaped high-altitude-balloon tether", Proceeding of the International Conference in Noise and Vibration Engineering (ISMA2012). 3003-3012
9. 2012 Jain, S., Whiteley, P.E. and Hunt, H.E.M. "Determining vibration signature of a defective planet bearing in a wind turbine epicyclic gearbox", 19th International Congress on Sound and Vibration, Vilnius ICSV2012 4:2722-2729
10. 2012 Costello, H., Kuo, K.A. and Hunt, H.E.M. "Select this elementQuantification of the benefits of a streamlined tether for a high-altitude-tethered balloon", 19th International Congress on Sound and Vibration, Vilnius ICSV2012 4:2950-2957
11. 2012 Kuo, K.A., Woodhouse, J. and Hunt, H.E.M. "Select this elementThe modes of a tethered, spherical balloon", 19th International Congress on Sound and Vibration, Vilnius ICSV2012 1:161-168
12. 2012 Hunt, H.E.M., Kuo, K.A., Costello, H. and Shaw, R.A. "Vibration of a high-altitude tethered balloon with application to climate engineering", 19th International Congress on Sound and Vibration, Vilnius ICSV2012 1:670-688
13. 2012 Burgoyne, C.J., Hunt, H.E.M., Davidson, P. and Causier, M.L.T. "Structures for Stratospheric Particle Injection" IASS-IABSE Symposium, London
14. 2011 Jain, S. and Hunt, H.E.M. "Skidding behaviour of angular contact ball bearings under combined radial and axial loads, and time-varying operating conditions". 38th Leeds-Lyon Symposium on Tribology. Awarded the Maurice Godet Award "Young Scientist Best Contribution".
15. 2011 (Invited Keynote Paper) Hunt, H.E.M., Kuo, K.A., Costello, H. and Davidson, P.J., "Tethered aerostats: the dynamic behaviour of an aerodynamic tether with application to geoengineering", Proceedings of EuroDyn, Leuven July 2011
16. 2011 Jones, S., Kuo, K.A., Hussein, M.F.M. and Hunt, H.E.M., "Prediction inaccuracies and uncertainties associated with common assumptions in modelling vibration from underground railways", Proceedings of EuroDyn, Leuven July 2011
17. 2011 Jain, S. and Hunt, H.E.M., "Vibration response of a wind-turbine planetary gear set in the presence of a localized planet bearing defect", ASME International Mechanical Engineering Congress and Exposition, IMECE 2011 7(PARTS A AND B):943-952
18. 2010 Jones, S. and Hunt, H.E.M. "Simulating ground vibration from underground railways through subsiding soil layers", Proceedings of The International Conference on Computing in Civil and Building Engineering, Nottingham, January 2010
19. 2010 Jones, S. and Hunt, H.E.M. " Inhomogeneous soils and their effect on ground vibration due to underground railways", Proceedings of the 17th International Conference on Sound and Vibration, Cairo, 18-22 July 2010
20. 2010 Hunt, H.E.M., Hussein, M.F.M., Jones, S. and Kuo, K.A. "Ground-borne vibration from underground railways: Some commonly-made modelling assumptions and their associated inaccuracies and uncertainties" Proceedings of the Institute of Acoustics. 32: 593-600
21. 2010 Coulier, P., G Degrande, G., K Kuo, K.A. and Hunt, H.E.M. "A comparison of two models for the vibration response of piled foundations to inertial and underground-railway-induced loadings " Proceedings of the 17th International Conference on Sound and Vibration, Cairo, 18-22 July 2010
22. 2010 Hunt, H.E.M., "Simple, yet puzzling, problems in vibration ", ICCCBE Nottingham, April 2010
23. 2010 Coulier, P., Beckers, M., Kuo, K.A., Hussein, M.F.M., Hunt, H.E.M. and Degrande, G. "Vibrational discomfort in buildings", Transport Research Arena Conference, Brussels 7-11 June 2010
24. 2009 Kuo, K.A., Hunt, H.E.M., "Axial vibration of piled foundations: a fast-running model". Proceedings of EuroNoise 2009, Edinburgh, Scotland
25. 2009 Jones, S., Hunt, H.E.M., "Uncertainty in predicting ground vibration from underground railways: the effect of voids around tunnels on the response due to a moving load". Proceedings of EuroNoise 2009, Edinburgh, Scotland
26. 2009 Jones, S., Hunt, H.E.M. "The effect of inclined soil layers on surface vibration from underground railways using a semi-analytical approach". J. Phys.: Conf. Ser. 181 [\[PDF\]](#)
27. 2009, Kuo, K.A., Hunt, H.E.M. "The role of structural foundations in transmission of vibration from underground railways". Proceedings of ICSV16, Krakow, Poland
28. 2009 Jones, S., Hunt, H.E.M. "The effect of voids around underground railway tunnels on ground vibration". Proceedings of ICSV16, Krakow, Poland
29. 2009 Hussein, M.F.M., Hunt. H.E.M., "A software application for calculating vibration due to moving trains in underground railway tunnels". Proceedings of NOVEM 2009, Oxford, UK
30. 2009 Jones, S., Hunt, H.E.M., "The effect of soil uncertainty on surface vibration due to underground railways: a semi-analytical approach". Proceedings of NOVEM 2009, Oxford, UK
31. 2009 Kuo, K.A., Hunt, H.E.M., "Back to the future: how dynamic pile models published 30 years ago can be used to answer questions on underground railways". Proceedings of NOVEM 2009, Oxford, UK
32. 2008 Smith, R and Hunt, H.E.M., "Vibration of bell towers excited by bell ringing - a new approach to analysis" , Proceedings of the International Conference on Noise and Vibration Engineering, Leuven, Belgium, 2008.
33. 2008 Jones, S., Hunt, H.E.M., "Effect of inclined soil layers on vibration from underground railways". Proceedings of ISMA 2008, Leuven, Belgium

34. 2008 Kuo, K.A., Hunt, H.E.M., "Vibration in piled foundations due to trains in underground railway tunnels". Proceedings of ISMA 2008, Leuven, Belgium

35. 2008 Kuo, K.A, Jones, S. Hunt, H.E.M., Hussein, M.F.M., "Application of PiP: Vibration of embedded foundations near a railway tunnel". Proceedings of EuroDyn 2008, Southampton, England

36. 2007 Rikse, L., Hussein, M.F.M., Hunt, H.E.M. and Degrande, G. "A model for calculating vibration from a railway tunnel buried in a full-space including rigid bedrock". 14th International Congress on Sound and Vibration, Cairns, Australia, July 2007.

37. 2007 Hussein, M.F.M and Hunt, H.E.M, "The PiP model, a software for calculating vibration from underground railways", 14th International Congress on Sound and Vibration, Cairns, Australia, July 2007.

38. 2007 Hussein, M.F.M and Hunt, H.E.M, "Modelling of floating-slab tracks with discontinuous slabs in underground railway tunnels", 14th International Congress on Sound and Vibration, Cairns, Australia, July 2007.

39. 2007 (Invited Keynote Paper) Hunt, H.E.M., "Counter-intuitive Problems in Dynamics and Vibration" ACAM Brisbane Australia

40. 2006 Gupta, S., Fiala, P., Hussein, M.F.M., Chebli, H., Degrande, G., Auguszinowicz, F., Hunt, H.E.M., and Clouteau, D., "A numerical model for ground-borne vibrations and reradiated noise in buildings from underground railways", ISMA2006 International Conference on Noise and Vibration Engineering, Leuven, Belgium, September 2006.

41. 2006 Gupta, S., Degrande, G., Chebli, H., Clouteau, D., Hussein, M.F.M. and Hunt, H.E.M., "A numerical model for prediction of vibration from underground railways". 7th World Congress on Computational Mechanics (WCCM), Los Angeles, USA, July 2006

42. 2006 Hussein, M.F.M., Gupta, S., Degrande, G., Talbot, J.P. and Hunt, H.E.M, "An efficient model for calculating vibration from a railway tunnel buried in a half-space" , 13th International Congress on Sound and Vibration, Vienna, Austria, July 2006.

43. 2006 Gupta, S., Degrande, G., Othman, R., Clouteau, D., Hussein M.F.M. and Hunt, H.E.M., "A coupled periodic FE-BE model for ground-borne vibrations from underground railways", 3rd European Conference on Computational Mechanics, Lisbon, Portugal, June 2006.

44. 2005 Gupta, S., Hussein, M.F.M., Klein, R. Degrande, G., and Hunt, H.E.M, "A comparison of prediction models for vibrations from underground railway traffic", 12th International Congress on Sound and Vibration, Lisbon, Portugal, 2005 [\[PDF\]](#)

45. 2005 Hunt, H.E.M, "Variable-mass technology for the reduction of hand-arm vibration in pneumatic tools", 12th International Congress on Sound and Vibration, Lisbon, Portugal, 2005

46. 2005 Hunt, H.E.M, "Modelling of rail roughness for the evaluation of vibration-isolation measures", 12th International Congress on Sound and Vibration, Lisbon, Portugal, 2005

47. 2004 Hussein, M.F.M and Hunt, H.E.M, "A power-flow method for evaluating vibration from underground railways", 8th Int. Workshop on Railway Noise, Buxton, UK, 2004, 1, pp. 189-200. [\[PDF\]](#)

48. 2004 Talbot, J.P., Hunt, H.E.M. and Hussein, M.F.M., "A prediction tool for optimisation of maintenance activity to reduce disturbance due to ground-borne vibration from underground railways", 8th Int. Workshop on Railway Noise, Buxton, UK, 2004, 2, pp. 409-420. [\[PDF\]](#)

49. 2004 Hussein, M.F.M and Hunt, H.E.M, "Dynamic effect of slab discontinuity on underground moving trains", 11th International Congress on Sound and Vibration, St Petersburg, 5-8 July 2004 [\[PDF\]](#)

50. 2003 Hussein, M.F.M, Talbot, J.P. and Hunt, H.E.M, "Insertion Loss Models for evaluating the performance of vibration counter-measures for underground railways", 10th International Congress on Sound and Vibration, Stockholm, 7-10 July 2003 [\[PDF\]](#)

51. 2003 Hussein, and Hunt, H.E.M, "An Insertion Loss Model for evaluating the performance of floating-slab track for underground railway tunnels", 10th International Congress on Sound and Vibration, Stockholm, 7-10 July [\[PDF\]](#)

52. 2003, Hussein, M.F.M, Talbot, J.P. and Hunt, H.E.M, "Control of Vibration from Underground Rail Traffic", 6th World Congress on Railway Research (WCRR), Edinburgh,UK, September 2003, poster.

53. 2002 Talbot, J.P. and Hunt, H.E.M., "A generic model for evaluating the performance of base-isolated buildings", Tenth International Meeting on Low Frequency Noise and Vibration and its Control, York, UK.

54. 2002 (Invited Keynote Paper) , Hunt, H.E.M., "Ground vibration from man-made sources", Keynote address, 9th International Congress on Sound and Vibration, University of Central Florida, 8-11 July 2002.

55. 2000 Talbot, J.P. and Hunt, H.E.M., "An energy method for assessing the performance of base-isolated structures", NOVEM2000, Lyon Congress Centre, 31 August - 2 September 2000, CDROM

56. 2000 Hunt, H.E.M., "Floating slab track for vibration reduction: why simple models don't work", Proc. 7th Int Congress on Sound and Vibration, Garmisch-Partenkirchen, July 2000. CDROM

57. 2000 Hunt, H.E.M., "Base-isolation of buildings: a review", Acoustics 2000: Research into Practice, Ins Acoustics Spring Conference, University of Liverpool, 17-18 April 2000.

58. 2000 Marwala, T. and Hunt, H.E.M., 'Probabilistic fault identification using vibration data and neural networks', Proceedings of the IMAC-XVIII 674-680 (2000), San Antonio, Texas, USA.

59. 2000 Marwala, T. and Hunt, H.E.M., 'Feasibility of damage detection using vibration data in a population of cylinders', Proceedings of the IMAC-XVIII 1577-1583 (2000), San Antonio, Texas, USA.

60. 1999 Hunt, H E M, 'The effectiveness of floating-slab track for railways in tunnels', London Autorities Rail Impact Forum: Vibrational from railways, 28 September 1999, Ripley Arts Centre.

61. 1999 Forrest, J.A. and Hunt, H.E.M., "Ground vibration due to trains in underground railway tunnels", Proc. 6th Int Congress on Sound and Vibration, Denmark, July 1999. CDROM
62. 1999 Marwala, T. and Hunt, H.E.M., "Fault identification using a committee of neural networks", Identification in Engineering Systems, Proc 2nd Int. Conf, Swansea March 1999, pp102-111.
63. 1997 Varughese,S., Hunt, H.E.M. and Muhr, A , "Dynamic behaviour of elastomeric railpads", International Conference on Rubbers, Calcutta, Dec 12-14;
64. 1997 Hunt, H.E.M., 'Observations on the performance of vibration-isolated railway track', Proc. 16th ASME Bienniel Conf. on Vibration and Noise, Sacramento September 1997. CDROM
65. 1997 Hunt, H.E.M. and May, J.E., 'Vibration generated by underground railway trains', Proc. 5th Int Congress on Sound and Vibration, Adelaide.
66. 1996 Hunt, H.E.M., 'Measurement of pipeline support using a vibrating pig'; Proc. 4th Int Congress on Sound and Vibration, St Petersburg.
67. 1996 Hunt, H.E.M. and Newland D.E., 'The effect of variable foundation properties on railway-track vibration'; Proc. 4th Int Congress on Sound and Vibration, St Petersburg.
68. 1996 Hunt, H.E.M., 'Track settlement adjacent to bridge abutments', Vehicle-Infrastructure Interaction, San Diego
69. 1995 Hunt, H.E.M., 'Monitoring of offshore pipelines using forced transverse vibration: Data analysis'; Proc. 15th ASME Bienniel Conf. on Vibration and Noise, Boston. Vol.3 Part A pp.1373-79
70. 1995 Hunt, H.E.M., 'Modelling of structures of infinite extent for calculation of vibration transmission'; Proc. Int. Congress MV2, Lyon 5-6 Oct. Vol. 1 pp. 187-99
71. 1994 Hunt, H.E.M., 'Vibration transmission into base-isolated buildings using the dynamic-stiffness-matrix method'; Proc 3rd Int Congress Air & Structure Borne Sound and Vibration (Int. Sci. Publ.), Montreal, June;
72. 1992 Hunt, H.E.M. and Kopke, U.G., 'A vibrating pig for monitoring the support condition of buried and subsea pipelines', Pipeline Pigging and Integrity Monitoring Conference, Amsterdam, Pipes and Pipelines Int;
73. 1991 Hunt, H E M and Kopke, U G, 'Dynamic condition monitoring of buried gas pipes', Proc. Int. Mech. Eng. Congress Mech'91, IEAust, Sydney July, Conference 6 (Maintenance Engineering) 48-52;
74. 1991 Hunt, H E M, 'Transmission of vibration into vibration-isolated buildings', Proc. Sixth Int. Meeting on Low Frequency Noise and Vibration, Leiden. September 1991;
75. 1990 Hunt, H E M and Cryer, D P, 'Site and laboratory experiments on vibration transmission', Proc. Inst. Acoustics, Vol. 12: Part 7, pp.39-50;
76. 1989 Hunt, H E M, 'Stochastic modelling of vehicles for calculation of ground vibration', Proc. 11th IAVSD-Symposium - The Dynamics of Vehicles on Roads and Tracks, 298-309;
77. 1988 Hunt, H E M, 'Traffic-induced ground vibration', Proc. Inst. Acoustics, vol.10:Part 2, pp.493-500;
78. 1987 Hunt, H E M, 'Modelling of traffic-induced ground vibration by random process theory', Proc. Int. Conf. Traffic Effects on Structures and Environment, High Tatras, Czechoslovakia, December, pp.361-366;

## Patents

1. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [Atmospheric Delivery System, UK Patent GB2476518](#), granted 26 Mar 2013.
2. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High Altitude Tethered Platform, UK Patent Application GB2482340](#), published 1 Feb 2012
3. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High altitude tethered platform providing information services, UK Patent Application GB2482357](#), published 1 Feb 2012
4. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High Altitude Tethered Platform, UK Patent Application GB2482359](#), published 1 Feb 2012
5. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High Altitude Platform, Modulation of light by a radio signal, transmission along an optic fibre to a high altitude platform, UK Patent GB2486991](#), granted 7 May 2013
6. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High Altitude Platform, UK Patent GB2486992](#), granted 7 May 2013
7. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [High Altitude Platform, Elevated platform tethered to the ground, wherein the tether is coated in a hydrophobic material, UK Patent GB2486993](#), published 12 Jun 2013
8. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [A cloud of sub-micron particles having a refractive index greater than 1.4 , UK Patent GB2487286](#), granted 5 Feb 2013.
9. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [Atmospheric Delivery System, UK Patent GB2487287](#), granted 19 Feb 2014
10. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [A Method of Influencing the Global Incident Level of Radiation, UK Patent GB2487289](#), granted 12 Feb 2013.
11. **Davidson P.J., Hunt H.E.M. and Burgoyne C.J.**, [A method of delivering solid particles into the earth's atmosphere, UK Patent GB2487627](#), granted 15 Jul 2014.
12. **Hunt, H.E.M** Pipeline Pig and Method of Pipeline Inspection', Patent granted in U.S.A. US5385049 issue date 31 Jan 1995, and Australia.
13. 'Hunt, H.E.M Core for Cling Film Rolls', Patent specification, Australia, Canada, Europe EPO Patent EP0177332, 1985

- **Grants:**

Current:

**2012-2016 MOTIV RG67256** (Modelling of Train Induced Vibration)

Value FEC £346k (PI is Hugh Hunt) EPSRC, Partners: Universities of Southampton and Nottingham

**2013-2015 WinDrive RG68100** (EC Framework 7)

Value £782k (PI is Richard McMahon) £164k is for Hugh Hunt as CoI

**2010-2014 SPICE RG62135** (Stratospheric Aerosol Injection for Climate Engineering)

Value FEC £1.9m (Camb £872k Hugh Hunt is CoI) EPSRC/NERC, Partners: U.Bristol (PI Matt Watson), U.Oxford, U.Edinburgh

**2011-2015 RG61613** Mistuning of turbocharger wheels

Value £90k, iCase award (EPSRC, with Cummins Diesel)

Past:

2001-2003 CONVURT (CONtrol of Vibration from Underground Railway Traffic)

Value €3m (Camb €200k), EC Framework 5, Ten partners, incl U.Camb

1994-1995 Marie Curie Fellowship for 1-year RA Value £20k

- **Invited or contributed talks:** a list of major lectures or other research presentations.

- September 2014 "Gyroscopes and Boomerangs" Institute of Physics Ireland Frontiers of Physics conference, keynote lecture
- July 2014 "Can we engineer the Climate", Cambridge International Summer School 5-day workshop and Plenary Debate
- June 2014 "Should we Engineer the Climate? The SPICE project", Cambridge Centre for the Application of Research CSAR
- September 2013 "Engineering the Climate", British Science Festival, Newcastle
- July 2013 "Is Climate Engineering Feasible?", Climate Change Institute, Canberra
- May 2013 "Can we Engineer the Climate", Cambridge Public Policy Seminar
- April 2013 "Stratospheric Particle Injection for Climate Engineering", Science Museum Lates London
- July 2012, "Vibration of a high-altitude tethered balloon with application to Climate Engineering" Keynote, ICSV 19, 19th Int Congress on Sound and Vibration, Vilnius
- December 2012 "Boomerangs, Bouncing Balls and Other Spinning Things", Open University Christmas Lecture, Milton Keynes
- December 2012 "The Science behind Dambusters and Colditz" Cambridge Christmas Lecture
- July 2011, "Tethered aerostats: the dynamic behaviour of an aerodynamic tether with application to geoengineering", Semi-plenary Keynote, EuroDyn2011, Leuven
- October 2011, "Dambusters and the engineering behind the bouncing bomb", Royal Aeronautical Society joint with IMechE, Cambridge
- April 2011, "SPICE: Stratospheric Particle Injection for Climate Engineering", Monash University Sustainability Institute
- March 2011, "Dambusters and the engineering behind the bouncing bomb", Cambridge Science Festival
- June 2011, "The Dambusters Now", Cheltenham Science Festival
- March 2011, "SPICE: Stratospheric Particle Injection for Climate Engineering", Melbourne University Department of Engineering

September 2010, "The remarkable accuracy of the Trinity College Clock", British Horological Institute, Upton Hall

March 2009, "Science in a Spin", Cambridge Science Festival

- April 2008, "Counter-intuitive problems in dynamics and vibration", Imperial College Mechanical Engineering Research Showcase Event
- December 2007, "Counter-intuitive problems in Dynamics and Vibration", Keynote address, 5th Australasian Congress in Applied Mechanics, Brisbane, Australia.
- December 2007, "Vibration of bell towers", Address delivered in St John's Cathedral Brisbane as part of the 5th Australasian Congress in Applied Mechanics.
- January 2007, "Counter-intuitive problems in Dynamics and Vibration", Nottingham University.
- January 2007, "Vibration from Underground Trains - the PiP software", Institute of Acoustics, Royal Society, London ([poster](#))

- October 2006, "Counter-intuitive problems in Dynamics and Vibration", Mechanics Colloquium, Cambridge University Engineering Department.
- August 2005, "Counter-intuitive problems in Vibration", Adelaide University, Mechanical Engineering, invited seminar.
- August 2005, "Gyroscopes and Boomerangs", UNSW Mechanical Engineering, invited seminar, Sydney
- August 2005, "IEAust Eminent Speaker Series 2005", seven lectures given in Sydney, Canberra, Brisbane, Adelaide and Melbourne.  
Topics: "Vibration from Underground Railways", Counter-intuitive Problems in Vibration", "Gyroscopes and Boomerangs" ([website](#))
- August 2005, "Some counter-intuitive engineering design problems in vibration; On how a little knowledge can confuse our understanding of complex problems" , Keynote Address, ICED2005 Conference, Melbourne
- July 2002, "Ground vibration from man-made sources", Keynote address, 9th Int Congress on Sound and Vibration, U of Central Florida.
- March 1999, "Spinning into Space", National Science Week, Lady Mitchell Hall Cambridge, (IOP Award, jointly with Dr M K Warner, Dept of Physics);
- **Postdoctoral and other research co-workers, including visiting academics, with whom the applicant is or has been directly associated in the recent past.**

#### Postdocs and Research Associates

##### Present (on SPICE)

2010-2015 - Dr Kirsty Kuo (SPICE)

2014-2015 - Mr Arthur Tombs (WinDrive)

##### Past

2010-2013 - Mr Chris Walton (on secondment from Marshall Aerospace)

2001-2003 - Dr James Talbot (on CONVURT)

I have invited the following to work with me in CUED:

2008, Prof Gabor Domokos, Budapest University of Technology

2005, Prof David Thompson, University of Southampton

2001, Prof Malcolm Good, University of Melbourne

#### Students Supervised for Higher Degrees:

- 1992 Bhaskar, A, 'Damping in mechanical vibrations: new methods of analysis and estimation', PhD;
- 1992 Kopke, U G, 'Condition monitoring of buried gas pipes using a vibrating PIG', PhD;
- 1994 Cryer, D P, 'Modelling of vibration in buildings with application to base isolation', PhD;
- 1994 Lo, K T, 'Measurement and modelling of vibration transmission through piled foundations', PhD;
- 1995 Ng, S L D, 'Transmission of ground-borne vibration from surface railway trains', PhD;
- 1999 Forrest, J A, 'Modelling of ground vibration from underground railways', PhD.
- 2001 Marwala, T 'Fault identification using neural networks and vibration data', PhD
- 2002 Talbot, J P, 'Base isolation of buildings', PhD
- 2005 Hussein, M F M, 'Vibration from Underground Railways', PhD
- 2008 Rikse, L, 'Subway-Induced Vibrations', MSc Leuven
- 2010 Jones, S, 'Uncertainty in prediction of railway vibration', PhD
- 2010 Kuo, K A, 'Pile models for calculation vibration transmission into buildings', PhD
- 2010 Beckers, M, 'Incorporating geometric features into the PiP model for subway induced vibrations', MSc Leuven
- 2010 Coulier, P, 'The vibration response of piled foundations to inertial and underground railway induced loadings', MSc Leuven
- 2012 Coene, J, 'The PiP model', MSc Leuven
- 2013 Jain, S, 'Failure of wind-turbine gearboxes', PhD
- 2014 Costello, H, 'Dynamics of an aerodynamic tether', PhD

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- 2015 Futoryanova, V, 'Mistuning of turbocharger wheels', PhD

### Outreach activities:

I am in great demand to give talks at schools. The audience size at individual schools is usually small so instead I give lectures to large audiences via two main vehicles:

**Maths Inspiration** GCSE and A-level, typical audience size 500+ around the country, see <http://www.mathsinspiration.com/>

**The Training Partnership** A-level, audience size 900 at Logan Hall, University of London.

I am regularly invited to give talks at Science Festivals (most recently Cambridge, Cheltenham, Bath). I have also been invited by the Institute of Physics to give talks to gatherings of school physics teachers, most recently in Dublin for the "Frontiers of Physics" conference where I was the invited keynote speaker.

Rather than summarizing this activity here is a reasonably-complete list:

### **• Public Lectures, General Interest:**

- November 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", Bristol University, School of Physics
- November 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", Ottley Science Festival
- November 2014 "Zeppelin Terror Attack", Royal Aeronautical Society, Cambridge
- September 2014 "Gyroscopes and Boomerangs" Trinity College Dublin, Department of Physics invited lecture
- September 2014 "Engineering the Climate" Gravity Fields Festival, Grantham
- August 2014 "Attack of the Zeppelins", Plenary Lecture, Cambridge International Summer School
- July 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", IMA@50 Festival of Mathematics and its Applications, Manchester, In celebration of the 50th anniversary of the Institute of Mathematics and its Applications
- July 2014 "Can we engineer the Climate", Cambridge International Summer School 5-day workshop and Plenary Debate
- July 2014 "Attack of the Zeppelins: how many cows does it take to win a war?", Cambridge Science Centre
- June 2014 "Should we Engineer the Climate? The SPICE project", Cambridge Centre for the Application of Research CSAR
- November 2013 "Maths Problems in Engineering - Handling Infinity", Trinity College Mathematics Society
- September 2013 "Engineering the Climate", British Science Festival, Newcastle
- May 2013 "Boomerangs , Bouncing Balls and Other Spinning Things", Public Understanding of Science Lecture, St Pauls's Catholic School, Milton Keynes
- April 2013 "Stratospheric Particle Injection for Climate Engineering", Science Museum Lates London
- March 2013, "SPICE: Stratospheric Particle Injection for Climate Engineering" Cambridge Climate Change Forum
- February 2013 "Dambusters, Building the Bouncing Bomb", Salford University
- February 2013 "Boomerangs, Bouncing Balls and Other Spinning Things", Oxford University Science Society
- February 2013 "SPICE: Stratospheric Particle Injection for Climate Engineering", Trinity College Science Society
- February 2013 "The Remarkable Accuracy of the Trinity College Clock", Trinity College Mathematics Society
- December 2012 "Boomerangs, Bouncing Balls and Other Spinning Things", Open University Christmas Lecture, Milton Keynes
- December 2012 "Boomerangs, Bouncing Balls and Other Spinning Things", Cambridge Physics Centre, Pippard Lecture Theatre
- December 2012 "The Science behind Dambusters and Colditz" Cambridge Christmas Lecture
- November 2012 "Escape from Colditz" Royal Aeronautical Society, Cambridge
- April 2012 "Boomerangs, Bouncing Balls and Other Spinning Things" Danby Society, Downing College Cambridge
- January 2012 "Dambusters, Building the Bouncing Bomb", Marshall Aerospace Cambridge

- November 2011, "Dambusters: building the bouncing bomb", Phoenix Society, Churchill College, Cambridge
- October 2011, "Dambusters and the engineering behind the bouncing bomb", Royal Aeronautical Society joint with IMechE, Cambridge
- July 2011, "Dambusters: building the bouncing bomb", Science Summer School, Cambridge
- July 2011, "Bouncing Balls", Festival of the Spoken Nerd, Islington, London
- June 2011, "The Dambusters Now", Cheltenham Science Festival
- June 2011, "Boomerangs, Bouncing Balls and Other Spinning Things", Cheltenham Science Festival
- March 2011, "Dambusters: building the bouncing bomb", Cambridge University Engineering Department
- March 2011, "Dambusters and the engineering behind the bouncing bomb", Cambridge Science Festival
- September 2010, "The remarkable accuracy of the Trinity College Clock", British Horological Institute, Upton Hall
- July 2010, "The remarkable accuracy of the Trinity College Clock", Antiquarian Horological Society, Turret Clock Group, Cambridge
- February 2010, "Climate Change and Sustainable Energy", Dept of Physics, University of Southampton
- July 2010, "Boomerangs and other spinning things", Science Summer School, Cambridge
- January 2010, "Boomerangs, Bouncing Balls and other Spinning Things", The Thomas Hardy School Community Lecture, Dorchester ([poster](#))
- December 2009, "The Remarkable Accuracy of the Trinity College Clock", Institute of Physics, Cambridge;
- November 2009, "The Science of Spinning Things", Cambridge University Science Society
- October 2009, "Climate Change and Sustainable Energy", U3A Cambridge
- July 2009, "Understanding boomerangs and other spinning things", Science Summer School, Cambridge
- June 2009, "Boomerangs, Bouncing Balls and other Spinning Things", Prince's Trust, Greenwich London.
- June 2009 "Spinning Things - The Workshop", Royal Institution, London
- April 2009, "Noises in the Kitchen", Cambridgeshire Further Mathematics Centre, Centre for Mathematical Sciences.
- March 2009, "Science in a Spin", Cambridge Science Festival
- March 2009, "Science in a Spin", "Bath Taps into Science" Festival ([poster](#))
- July 2008, "Boomerangs, Bouncing Balls and Other Spinning Things", Cambridgeshire Further Mathematics Centre, Centre for Mathematical Sciences.
- March 2008, "The Secret Science of Music", Swavesey Village College.
- February 2008, "Counter-intuitive problems in vibration", Cambridge University Engineering Society
- March 2008, "Boomerangs, Bouncing Balls and other Spinning Things", Stokes Society, Pembroke College, Cambridge;
- January 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", Centre for Nonlinear Mechanics, University of Bath.
- March 2007, "Boomerangs, Bouncing Balls and other Spinning Things", Trinity College Science Society, Science Symposium
- December 2006, Institute of Physics, Physics Update Course for School Physics Teachers, Cambridge; ([report and photos](#))
- September 2006, "Boomerangs, Bouncing Balls and other Spinning Things", Royal Aeronautical Society, Bedford Branch
- September 2006, "Boomerangs, Bouncing Balls and Other Spinning Things", Alumni weekend, Cambridge
- July 2006, "Boomerangs, Bouncing Balls and other Spinning Things", Science Summer School, Cambridge
- July 2006, "Harmonics and Music", Science Summer School, Cambridge
- June 2006, HP Science Lectures, HP Labs Bristol: "Boomerangs, Bouncing Balls and Other Spinning Things." ([website](#))
- February 2006, "Gyroscopes and Boomerangs", IOP Physics in Perspective -- A Study Course for 6th Formers, London;
- December 2005, "Good Vibration - Counter-intuitive experiments in Vibration", IMA East Midlands Branch ([poster](#))
- January 2006, "The wonderful Physics of Gyroscopes and Boomerangs", Maxwell Society Lecture, Dept of Physics, Kings College London; ([poster](#))
- July 2005, "Boomerangs", Science Summer School, Cambridge
- November 2004, "Boomerangs, Bouncing Balls and Other Spinning Things", Trinity College Science Society ([poster](#))  
.....[Click here to see a video of the entire lecture](#) (small test clips: [.rm](#), [.wmv](#).)
- May 2004, "The Wonderful Physics of Gyroscopes and Boomerangs", IMA East Midlands Branch ([poster](#))

- December 2003, "The Wonderful Physics of Gyroscopes and Boomerangs", Portsmouth and District Physical Society, Special Christmas Lecture
- October 2003, "Gyroscopes and other spinning things", The Kelvin Club Peterhouse Scientific Society, Cambridge
- May 2003, "The Magic of Gyroscopes, Boomerangs and Other Spinning Things", MIT Boston USA
- July 2002 "The dynamics of spin: gyroscopes and other spinning objects", Science Summer School, 3 days
- February 2002, "Gyroscopes and boomerangs" Royal Institution, London, Inst of Physics, Physics in Perspective
- December 1999, "The Physics of Toys", Cambridge Christmas Lectures;
- March 1998, "Lifting and circling - why your boomerang does come back", National Science Week, Cambridge

### **Talks for Schools (large venues) and Talks for Teachers:**

- December 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", GCSE Maths in Action, London
- December 2014 "Bouncing Bombs and Boomerangs", Maths Inspiration, Birmingham Alexandra Theatre
- November 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", GCSE Maths in Action, London
- November 2014 "Bouncing Bombs and Boomerangs", Maths Inspiration, Reading Hexagon Theatre
- November 2014 "Bouncing Bombs and Boomerangs", Maths Inspiration, London Palace Theatre
- September 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", Keynote Lecture "Frontiers of Physics", Institute of Physics, Dublin
- June 2014 "Boomerangs, Bouncing Balls and Other Spinning Things" and "Dambusters, Colditz and Zeppelins", Physics Teachers' Training Day, St Paul's School London
- April 2014 "Boomerangs, Bouncing Balls and Other Spinning Things", Cambridge University Engineering Department, Year 12 Easter School
- March 2014, "Maths in a Spin", Maths Inspiration, Leeds West Yorkshire Playhouse
- December 2013, "Maths in a Spin", Maths Inspiration, Reading Concert Hall
- June 2013 "Maths in a Spin", Maths on Screen, available on DVD
- March 2013 "Boomerangs, Bouncing Balls and other Spinning Things", Maths and Beyond, Further Maths Support Programme, University of Warwick
- March 2013, "Maths in a Spin", Maths Inspiration, Bristol Hippodrome
- February 2013, "Maths in a Spin", Maths Inspiration, London Lyric Theatre Shaftesbury Avenue
- January 2013, "SPICE: Stratospheric Particle Injection for Climate Engineering", School of Physics, University of Birmingham
- November 2012 "Maths in a Spin", Maths Inspiration, Cambridge West Road Concert Hall
- March 2012 "Dambusters, Building the Bouncing Bomb", The Prince's Teaching Institute, Moller Centre Cambridge
- March 2012 "Dambusters and the Bouncing Bomb", Maths Inspiration, Leeds West Yorkshire Playhouse
- November 2011, "Dambusters and the bouncing bomb", Maths Inspiration ([link](#)), Manchester;
- November 2011, "Dambusters", (2 lectures) Maths in Action, Univ of London, A-level Mathematics Days.
- November 2011, "Dambusters: building the bouncing bomb", 10th Annual Maths Conference, AGS Aylesbury
- July 2011, "Boomerangs, Bouncing Balls and other Spinning Things", A-level, Invitation Maths Presentation Medway, Chatham
- March 2011, "Maths in a Spin", Maths Inspiration ([link](#)), Nottingham;
- November 2010, "Maths in a Spin", Maths Inspiration ([link](#)), Reading;
- June 2010, "Boomerangs, Bouncing Balls and other Spinning Things", A-level, Invitation Maths Presentation Medway, Chatham
- March 2010, "Maths in a Spin", Maths Inspiration ([link](#)), Winchester;
- March 2010, "Maths in a Spin", Maths Inspiration ([link](#)), Leeds;
- January 2010, "Boomerangs, Bouncing Balls and other Spinning Things", Oundle School
- December 2009, Institute of Physics, Physics Update Course for School Physics Teachers, Cambridge;
- November 2009, "At Home with Maths", Maths in Action, Univ of London, A-level Mathematics Days.
- November 2009, "The Maths of Breakfast", Maths Inspiration ([link](#)), Cambridge;

- November 2009, "Maths in a Spin", Maths Inspiration ([link](#)), Chatham;
- July 2009, "Boomerangs, Bouncing Balls and other Spinning Things", Rockingham Science Festival.
- July 2009, "Boomerangs, Bouncing Balls and Other Spinning Things", Cambridgeshire Further Mathematics Centre, CMS
- March 2009, "Boomerangs, Bouncing Balls and Other Spinning Things" Royal Institution, School Event, Key Stage 3 Science
- March 2009, "Maths in a Spin", Maths Inspiration ([link](#)), Portsmouth;
- March 2009, "Maths in a Spin", Maths in Action, Imperial College London, GCSE Mathematics Day, 2 lectures.
- December 2008, Institute of Physics, Physics Update Course for School Physics Teachers, Cambridge;
- November 2008, "Maths in a Spin", Maths Inspiration ([link](#)), RNCM, Manchester;
- November 2008, "Maths in a Spin", Maths Inspiration ([link](#)), West Road Concert Hall, Cambridge;
- November 2008, "Maths in a Spin", Maths Inspiration ([link](#)), Adrian Boult Hall, Birmingham;
- November 2008, "Mathematics in a Spin", Maths in Action, Univ of London, A-level Mathematics Days.
- September 2008, "Boomerangs, Bouncing Balls and Other Spinning Things", IOP Netowrk Day for Physics Teachers, Derby;
- July 2008, "Boomerangs, Bouncing Balls and other Spinning Things", The Prince's Teaching Institute Summer School, Homerton College.
- July 2008, "Boomerangs", Rockingham Festval (4 sessions)
- March 2008, "Boomerangs, Bouncing Balls and Other Spinning Things", Physics in Action, Imperial College London, GCSE Science Day.
- December 2007, Institute of Physics, Physics Update Course for School Physics Teachers, Cambridge;
- November 2007, "Boomerangs, Bouncing Balls and other Spinning Things", Maths Inspiration ([link](#)), Reading;
- November 2007, "Boomerangs, Bouncing Balls and other Spinning Things", Maths Inspiration ([link](#)), Criterion Theatre, Picadilly;
- July 2007, "Boomerangs, Bouncing Balls and other Spinning Things", Rockingham Science Festival.
- March 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", Maths in Action, Univ of London, A-level Mathematics Day.
- March 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", Maths in Action, Imperial College London, GCSE Mathematics Day, 2 lectures.
- November-December 2006, "Boomerangs, Bouncing Balls and Other Spinning Things", Maths in Action, Univ of London, A-level Mathematics Day, 3 lectures.
- November 2006, "Boomerangs, Bouncing Balls and other Spinning Things", Maths Inspiration ([link](#)), Birmingham;
- March 2006, "Boomerangs, Bouncing Balls and other Spinning Things", Maths Inspiration ([link](#)), Greenwich; ([website](#))
- July 2005, "Boomerangs and Bouncing Balls", Science for Schools, Royal Institution, London.
- July 2005, "Gyroscopes and Boomerangs", Royal Institution, London;
- February 2005, Aim Higher, "Gyroscopes and Boomerangs", CUED
- December 2003, Institute of Physics, Physics Update Course for School Physics Teachers, Cambridge;
- December 2003, "The wonderful physics of gyroscopes and boomerangs", Univ of London, A-level Physics Day.
- June 2002 "Spinning out of control" SeeK lecture (Science and Engineering Experiments for Kids) see <http://www.msm.cam.ac.uk/seek/seeknew/spinning.htm>
- November 2001, "The magic physics of boomerangs", University of London, A-level Physics Day.
- November 2000, "The mathematics of boomerangs", University of London, A-level Mathematics Day.

## **Talks at individual Schools:**

- July 1010, "Climate Change and Sustainable Energy", Hills Road Sixth Form One World Day
- November 2009, "Boomerangs, Bouncing Balls and Other Spinning Things", Hitchin Girl's School, CMS
- April 2009, "Boomerangs, Bouncing Balls and Other Spinning Things", Spalding High School.
- March 2009, "Boomerangs and Bouncing Balls", Wilson's School [poster](#) ;
- March 2009, "Boomerangs and Bouncing Balls", Cambridge Science Festival Schools Roadshow (4 schools in Cambridgeshire - Mepal and Witcham Primary School, Wilburton Primary School, Newnham Croft Primary School, Meadow Primary School Balham);

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- January 2009, "Boomerangs, Bouncing Balls and Other Spinning Things", Tom Passmore Memorial Mathematics Lecture, Wellington School
- September 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", Bishop's Stortford High School;
- May 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", St Paul's School for Girls, London.
- March 2007, "Boomerangs and Bouncing Balls", Cambridge Science Festival Schools Roadshow (4 schools in Cambridgeshire ([news link](#)) - Lantern Primary Ely, Thomas Eaton Primary Wimblington, Teversham CE Primary, St Peter's CE Junior Wisbech);
- February 2007, "Boomerangs, Bouncing Balls and Other Spinning Things", Wiles Society, Leys School Cambridge
- June 2006, "Boomerangs, Bouncing Balls and Other Spinning Things", Archway School, Stroud, Glos
- March 2006, "Boomerangs and Bouncing Balls", Cambridge Science Festival Schools Roadshow (4 schools in Cambridgeshire - All Saints Primary March, Sutton Primary near Ely [video](#), Braham Primary and Grove Primary Cambridge);
- August 2005, "Wonderful Boomerangs", Wesley College, Melbourne (Lower and Middle schools);
- March 2005, "Boomerangs and Bouncing Balls", Cambridge Science Festival Schools Roadshow (4 schools in Cambridgeshire - Fawcett Primary Cambridge, Guilden Morden Primary near Royston, Harston Primary and Lady Adrian School Girton);
- June 2004, "Boomerangs, Bouncing Balls and Other Spinning Things", St Benedicts School, Ealing, London
- March 2004, "Boomerangs and Bouncing Balls", Cambridge Science Festival Schools Roadshow (5 schools in Cambridge - Mayfield Primary, St Lukes Primary, Milton Road Primary, Pelican Primary and Park Street Primary);
- March 2002, "Gyroscopes and Boomerangs", Tom Passmore Memorial Mathematics Lecture, Wellington School
- September 2001, "Gyroscopes and boomerangs", St Paul's School London
- February 1997, "Gyroscopes and Boomerangs", Eton College;

### **Invited and After-dinner talks:**

- November 2014 "Can we Engineer the Climate", Cambridge South Rotary
- March 2014 "The remarkable accuracy of the Trinity College Clock", Antiquarian Horological Society, Bury St Edmunds
- September 2013 "Can we Engineer the Climate", Sustainability Leadership, Hauser Forum Cambridge
- May 2013 "From Dambusters to Colditz", Freemasons Cambridge
- January 2013, "Dambusters and Colditz", Haematology Department Retreat, Robinson College Cambridge
- November 2012 "Dambusters and Colditz" Remembrance Sunday Commemoration, Trinity College Cambridge
- November 2006, "Gyroscopes and Boomerangs", Stimulating Physics, Institute of Physics, York
- September 2005, "Boomerangs", Biala Early Intervention Centre, Box Hill Victoria, fundraising dinner
- August 2005, "An Australian's Guide to Cambridge", Cambridge Society of Victoria, Melbourne
- August 2005, "Wonderful Boomerangs", Inst of Engineers (Mech) Annual Dinner, Brisbane
- August 2005, "Gyroscopes and Boomerangs", ICED2005 Conference Banquet, Melbourne