

## Curriculum Vitae

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### 1. Overview

#### *Positions Held*

2016 (Oct)– Director, Isaac Newton Institute for the Mathematical Sciences (INI), Cambridge  
 2016 (Oct)– NM Rothschild & Sons Professor of Mathematics, University of Cambridge  
 2016 (Oct)– Research Visitor, University of Manchester  
 2014–2016 (Sep) Scientific Director, International Centre for Mathematical Sciences (ICMS), Edinburgh  
 1998–2016 (Sep) Beyer Professor of Applied Mathematics, University of Manchester  
 1998–2008 Head of Applied Mathematics, University of Manchester  
 1990–1998 Professor/Reader of Applied Mathematics, Keele University  
 1985–1989 Recurrent Research Visitor, Engineering Science and Applied Mathematics, Northwestern University USA  
 1983–1990 Lecturer in Mathematics, University of Newcastle upon Tyne  
 1982–1983 Temporary Lecturer in Mathematics, University of Manchester

#### *Education*

1979–1982 PhD and DIC (Applied Mathematics - Theoretical Acoustics), Imperial College London  
 1976–1979 BSc(Eng) Hons (1st Class) and ACGI (Aeronautical Engineering), Imperial College London

#### *Awards and Distinctions*

2015– Honorary Professorship, University of Edinburgh  
 2013–2018 Royal Society Wolfson Research Merit Award  
 2012 EngageU *Recognition of Distinction* award for “Maths Busking” activity - EU Competition for innovation in PE  
 2007–2009 President of the Institute of Mathematics and its Applications (IMA)  
 2002 Royal Society Leverhulme Trust Senior Research Fellowship  
 1990 Nuffield Foundation Science Research Fellowship

#### *Key Research Achievements and Responsibilities*

2016 New mathematical and physical model offered to explain shortfall of iron-rich Antarctic meteorites  
 2015 New theory offered to explain the Østrem curve for the melt rate of debris-covered glaciers  
 2014– Member of Scientific Board of the Smith Institute for Industrial Mathematics  
 2014–2015 Chair of EPSRC Strategic Advisory Team (SAT) for Mathematical Sciences  
 2014 Deputy Chair of REF Sub-panel B10 (Mathematics); 2008 Panel Member of RAE Sub-Panel 21 (Applied Mathematics)  
 2013 Re-appraisal of Fung’s model for quasilinear visco-hyperelasticity and its relation to Simo model  
 2012 Development of small-on-large model for propagation of elastic waves through complex nonlinear-elastic materials  
 2010 Publication of results on the application of the Wiener-Hopf technique to the pricing of exotic derivatives in mathematical finance; relates concepts of applied mathematics with common techniques used in probability theory  
 2007 Generalization of Jones’ work on the commutative factorization of classes of  $n \times n$  matrix Wiener-Hopf kernels  
 2006 & 2008 Two new homogenization methods introduced to predict effective wave properties of multi-phase composites  
 2000 Analytical results show that fluid loaded edge-waves can propagate without attenuation along the edge of elastic plates  
 1998 A new constructive method introduced to factorize Khrapkov-Daniele type Wiener-Hopf kernels  
 1996 Publication of seminal paper which offers constructive method for non-commutative factorization of wide class of Matrix Wiener-Hopf kernels; method demonstrated on a range of novel problems in elasticity, acoustics and fluid mechanics  
 1988 First constructive method for solving Matrix Wiener-Hopf equations which contain exponential phase factors  
 1987 Introduction of nonlinear effects into fluid-structural scattering problems in acoustics; revealed for first time that structural nonlinearities are more important than acoustic nonlinearities  
 1981 First analytical proof that unattenuated fluid-coupled flexural waves exist on elastic structures under heavy loading

#### *Impact of Research*

- Continuous work for industry throughout academic career; highlights include
  - 2014–2018** Nuclear Threat Reduction (AWE) funded project on tamper detection for arms control verification
  - 2013–2018** Dyson funded projects on mathematical modelling of novel metamaterials for noise reduction
  - 2011–2012** Dstl funded project to improve predictions of broadband noise from underwater propulsors
  - 2003–2005** Photon Design Ltd project to model wave propagation characteristics of multimode optical fibres
  - 2001–2019** Thales UK projects on advanced materials modelling and sound attenuation in underwater applications
  - 1992–1994** DERA (now QinetiQ) project to study sound radiation from underwater structures including transducers
  - 1989–1992** Nuclear Electric (now EDF Energy) project on ultrasonic inspection of welds

## 2. Research and Professional Activities

### *Selected Research Grants*

Total grant income of over £5.2m (~£2.7m for PhD and postdoctoral grants, ~£1.1m for personal (Royal Society, Fellowship, travel etc.) and collaborative grants, and ~£1.4m for conference organisation.

**2016–2018** Co-investigator (Col) & principal author of EPSRC funded grant to ICMS, Edinburgh (value ~£650k)

**2015–2018** Principal Investigator (PI) on EPSRC funded PDRA (value ~£261k)

**2014–2018** Principal Investigator (PI) on EPSRC/Dyson CASE PhD studentship (value ~£95k)

**2014–2018** Co-investigator (Col) on EPSRC/NNSP CASE PhD studentship (value ~£95k)

**2011–2012** PI on Dstl PDRA grant “Broadband Hydroacoustics Research”, collaboration between University of Manchester, Thales UK, and Universities of Cambridge, Southampton and Keele (value £122k)

**2011–2015** PI on EPSRC Platform Grant “MAPLE: MATHematics PLatform Engagement activity”, providing support to the School of Mathematics for intra- and inter-disciplinary activity (value £526k)

**2010–2013** Col on EPSRC PDRA grant “The influence of nonlinear pre-stress on wave propagation ...” (value £379k)

**2005–2015** Col (UK coordinator) on grants from RCNDE (EPSRC), CNRS and industrial partners for “Anglo-French Groupe De Recherche (GDR): *Etude de la propagation ultrasonore en milieux non homogènes ...*” (value ~£260k)

**2003–2005** PI on EPSRC/Photon Design Ltd (with Industrial Mathematics KTN) PDRA EPSRC grant “A diffusion analysis approach to wave propagation along optical multimode fibres” (value £100k)

**2002–2005** Col on EPSRC/MIRA/BAESystems (with Industrial Mathematics KTN) PDRA grant “Faraday Fast Track Proposal: Electromagnetic Compatibility in Complex Electrical Systems” (value £99k)

**2001–2019** PI on 8 EPSRC/Thales UK CASE PhD studentships and SmartHub/AMFIB grants (value ~ £945k)

**1999–2002** Col on Leverhulme Trust PDRA grant “Rossby Wave - Mean Flow - Topography Interactions ...” (value £81k)

**1993–1997** Col on EPSRC PDRA grant “Development of active control of wheel squeal ...” (value £98k)

**1992–1994** PI on DERA (now QinetiQ) PDRA grant “Scattering by Finite Elastic Bodies” (value £171k)

### *Supervision*

Supervisor of 9 research assistants, 23 PhD students (18 successfully completed, 5 current), numerous MSc dissertation students

### *Selected Plenary Conference Talks (all expenses paid), 1998–*

**Jan 2015** *Anglo French Physical Acoustics Conference 2015*, Fréjus, France

**Jul 2013** *Oxford Conference on Challenges in Applied Mathematics*, OCCAM, Oxford University

**Jun 2012** *International Conference on the Wiener-Hopf Technique and its Applications 2*, University of Aberystwyth

**Jun 2010** *International Conference on the Wiener-Hopf Technique and its Applications 1*, University of Aberystwyth

**Jan 2010** *New Developments in Elasticity: the Legacy of Robert Hooke*, Oxford University

**Sep 2006** *Fourth International Workshop on Electromagnetic Wave Scattering*, Gebze, Turkey

**Oct 2004** *Conference of GDR: Etude de la propagation ultrasonore en milieux non homogènes en vue du Contrôle Non Destructif*, INRIA-Roquencourt, France

**May 2004/8** *Frontiers in Applied and Computational Mathematics 1 & 5*, New Jersey Institute of Technology, NJ USA

**Aug 2003** *Euromech Fluid Mechanics Conference*, Toulouse, France (after-dinner speaker)

**Jul 2003** *Days on Diffraction International Conference*, Steklov Institute (St. Petersburg Branch) and University of St. Petersburg, Russia

**Aug 2003** *British Applied Mathematics Colloquium*, University of Southampton (after-dinner speaker)

**Aug 2000** *Lighthill Memorial Session*, International Congress on Theoretical & Applied Mechanics (ICTAM), Chicago, USA

**Aug 2000** *Meeting in Honour of Professor J.D. Achenbach*, Northwestern University, Chicago, USA

**Jan 1999** *International Union of Theoretical and Applied Mechanics 99/2: Symposium on Mechanical and Electromagnetic Waves in Structured Media*, University of Sydney, Australia

**Apr 1998** *British Applied Mathematics Colloquium*, Brunel University

### *Selected Committee Membership and Learned Society Activity*

- Scientific Board of the Smith Institute for Industrial Mathematics 2014–
- Advisory duties for EPSRC:
  - Expert Workshop and Pilot Panel for Shaping Capability 2011–2012; Workshop to define new DTG allocation process 2012; Strategic Advisory Team (SAT) for Mathematical Sciences Member 2011–2014 & Chair 2014–2015
- Steering Committee of EPSRC International Review of Mathematical Sciences 2010
- Advisory Board of the European Mechanics Society (Euromech) 2007–2012
- Council for Mathematical Sciences, and CMS/EPSRC liaison group 2007–2010
- Board of International Council for Industrial and Applied Mathematics (ICIAM) 2003–

- Scientific Committee of the Industrial Mathematics Knowledge Transfer Network (IMKTN) 2001–2014
- Council of the European Mechanics Society (Euromech) 2000–2006
- Duties for Institute of Mathematics and its Applications (IMA):  
President 2007–2009; Vice-President 2002–2004; Council 1998–2004 & 2007–2015; Research Committee 2005–
- Duties for London Mathematical Society (LMS):  
Council 2002–06; Chair of Personnel and Office Management Committee 2004–2006; Publications Committee 2006–2007; Research Policy Committee 2010–
- Royal Society UK Panel of International Union of Theoretical and Applied Mathematics (IUTAM) 1997–2013

#### *Selected Examining Duties*

- External Assessor for Five Year Undergraduate Teaching and Research Reviews at Imperial College London (2004), Glasgow (2009), Oxford (2010) and Edinburgh (2014)
- External Assessor on numerous Chair Appointment Panels; for example, in recent years: Birmingham, Brunel, Cork, East Anglia, Keele, Loughborough, Nottingham, Reading, University College London
- Numerous PhD and MSc vivas; regular assessor for Cambridge and Oxford College Fellowship Applications
- UG External Examiner at Cambridge, Bristol, University College London, University College Cork, East Anglia, and Nottingham, 1996–

#### *Selected Expert Reviewing, Prize Committee and Assessment Duties*

- Deputy Chair of REF2014 Sub-panel UoA B10 (Mathematics) 2014
- Philip Leverhulme Prize Committee in Mathematics and Statistics 2012
- David Crighton Medal Committee (joint IMA and LMS) 2012
- Committee for Royal Society International Joint Project Scheme 2011–2013
- Chair of Lighthill-Thwaites Prize Committee 2011; Member of Committee 2015
- Member of RAE2008 Sub-panel UoA 21 (Applied Mathematics) 2008
- LMS Prizes Committee 2005 & 2006; LMS Research Meetings Committee 1999–2007
- Euromech Prize and Fellowships Committee 2003 & 2006
- Acting Editor of IMA Journal of Mathematics Applied in Medicine and Biology 2002–2003
- Reviewer of Nuffield Foundation Newly Appointed Lecturer Grants 2001–2006
- Chair of the IMA Journals Board of Management 1999–2007 (charged with the overseeing of all aspects of IMA journals)
- Reviewing and assessment duties for EPSRC: Peer Review College of the Mathematics Programme 1995–2006; Mathematics Earmarked & Pool Studentship Panels 1994–1996; Mathematics Responsive Mode and specialist Panels 1997–2000 & 2013; Mathematics Evaluation Report Panel 1998–2000 (used to inform the annual Landscape documents); Doctoral Training Grant Panel for Mathematical Sciences 2007 and Chair in 2008 & 2009

#### *Selected Recent Conference Organization*

- Chair of (5-day) European Study Group with Industry, Manchester, (107th) March 2015; (53rd) April 2005
- Co-chair of (five day) Anglo-French GDR-AFPAC Conferences, Kendal, January 2010; and Gregynog, June 2014
- Chair of 50th British Applied Mathematics Colloquium (BAMC), Manchester, March 2008
- Chair of Mathmondes 2, a 2-day Anglo-French workshop, June 2006
- On Organising Committees of the 5th, 6th and 7th Euromech Fluid Mechanics Conferences, Toulouse, August 2003; Stockholm, June 2006; Manchester, September 2008
- Chair of (5-day) IUTAM Symposium “Diffraction and Scattering in Fluid Mechanics & Elasticity”, Manchester, July 2000
- Chair of (5-day) international workshop on “Mathematical Aspects of Diffraction by Wedges, Cones and Other Canonical Geometries”, Manchester, June 1999
- Co-chair of (3-day) workshop on “Asymptotic and Numerical Methods in Wave Propagation”, International Centre for Mathematical Sciences (ICMS), Edinburgh, April 1997
- Co-chair of (4-day) Euromech Colloquium 316 on “Advanced Techniques in Structural Acoustics”, Manchester, April 1994
- On Organising Committees of 25th (Manchester), 26th (Newcastle), 34th (Keele), 42nd (UMIST) and 47th (Liverpool) British Applied Mathematics Colloquia (BAMC)

#### *Selected Outreach Activity*

- Co-chair of 2-day IMA Festival of Mathematics, Manchester, July 2014
- Chair of “How to Talk Maths in Public” a two-day public engagement training conference for mathematicians by mathematicians (over 90 participants), Manchester, June 2010
- Co-organiser of “Meet the Mathematicians” annual public engagement conferences for 6th formers (embedded within the annual BAMC 2008–2012; [www.meetmaths.org.uk](http://www.meetmaths.org.uk))
- Co-founder of “Maths Busking”, which takes mathematics out onto the street ([www.mathsbusking.com](http://www.mathsbusking.com))